100 PAGES

# RadioCommunication

The Journal of the Radio Society of Great Britain

June 1993

Volume 69 No 6

THE VOICE OF AMATEUR RADIO FOR 80 YEARS

***Exclusive:* H M King Hussein, JY1, talks to *RadCom***

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**RSGB membership at 31 July 1992: 32,416**

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**COVER PICTURE:**
Arguably the most famous radio amateur in the World is HM King Hussein of Jordan. We were privileged to find out first hand just what he thinks of the hobby. Colour Feature page 50.

Photograph: Raymond Irons.

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# RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS
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Membership application forms are available from RSGB HQ

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## The RadCom Leader

# Never a Dull Moment

SOME TIME AGO a friend who I hadn't seen for some time asked me about my job as General Manager of the RSGB. I gave what I thought was a fairly good explanation of what my duties were and what the Society and amateur radio was all about. "Oh", he said, "That sounds pretty dull".

A few days ago, sitting on a train on my way back to Potters Bar having attended a meeting at the Science Museum, I suddenly thought of this friend.

On this particular day, as I said, I was at the Science Museum discussing the future of the Permanent Special Event Station GB2SM. The *RadCom* editorial team were also in Central London interviewing HM King Hussein of Jordan, JY1. The HQ Rally team were en route to the Isle of Wight for International Marconi Day. And the President of the Society, Peter Chadwick, G3RZP, taking advantage of a visit to the USA on business, was visiting the ARRL.

Life working in amateur radio is dull? *Never!*

Saturday 19 June is a day we are all looking forward to at HQ - Open Day. It's our chance to show you life at Lambda House. Since last year's Open Day a lot of work has been carried out to Lambda House; we now have an HQ we can all be proud of.

As last year you will be able to tour the building, meet the staff and visit the museum and the library. There will also be local clubs in attendance and refreshments will be available. I do hope you will join us.

***Peter Kirby,***
***General Manager***

# NEWS & REPORTS

● GB0DC AIMS TO TELL the world of the 900th anniversary of the laying of the foundation stone for Durham Cathedral. Look for them on 3.5, 7, 14, 21 and 28MHz SSB and 430MHz SSB and FM, on 22, 23, 26 May and 2, 5, 6, 9, 16, 19, 20 and 23 June. Details G4JDP, 091 388 5936.

● APOLOGIES TO Bob Peace, G8SOZ, who was wrongly described as retiring Planning Committee Chairman. Bob Beace has retired as EMC Committee Chairman. The Chairman of the Planning Advisory Committee was Harold Fenton, G8GG.

● FORMER COUNCIL Member, Angus McKenzie, G3OSS, was recently married at Finchley Methodist Church. He met his bride, Angela, whilst out exercising Simon, his guide dog.

● ARRL PAST PRESIDENT Harry J Dannals, W2HD, has been named the Dayton Hamvention Ham of the Year for his three decades of voluntary work.

● THE CHINESE Taipai Amateur Radio League has become the 126th member society of the IARU.

## College Activity

SOUTH-EAST ESSEX Sixth Form College holds its annual Activities Week 7 - 11 June. 85 lower-sixth-year students will experience amateur radio for the first time with GB5SAW, supervised by G1VCY and sponsored by Waters and Stanton. Operation will be on 2m and 70cm SSB, FM and packet and any calls or messages will be enthusiastically received. Packet messages should go to GB5SAW @ GB7DUG.

## GB2RS Plymouth

WE ARE SAD to report that Lieutenant Commander Ellis Diggle, G3LSD of Stoke Damerel, Plymouth died on 1 March. Until his recent illness, Ellis was a GB2RS news reader on 80 metres. The news is now read from Plymouth by G0LRJ.

## New RLO

THE RSGB Liaison Officer for Tyne and Wear and Co Durham is J I Batley, G0IID, 3 Folldon Avenue, Fulwell, Sunderland, Tyne and Wear SR6 9HP; tel 091 548 3301.

**UK Grammar School boys are beamed up to the shuttle**

# Guildford School Seen in Space

PUPILS AT the Royal Grammar School, Guildford have become the first outside America, perhaps the first in the world to have a direct colour TV link to the space shuttle *Discovery* STS-56. In addition to the video link, there was two-way voice contact between the shuttle and pupils during two orbits on 9 April.

The school's reputation for 'space firsts' managed to secure it an official role in the radio experiments (SAREX) being conducted aboard *Discovery*. In the past, the Royal Grammar School has been the first school to talk to Helen Sharman on the *Mir* space station, as well as having digital and voice contact with the shuttle *Atlantis*.

Space pictures are received daily in the school's radio room. Frank Bell, G7CND, who is Deputy Head of Science at the Royal Grammar, described the school's activities to an enthralled audience at last year's AMSAT-UK Colloquium.

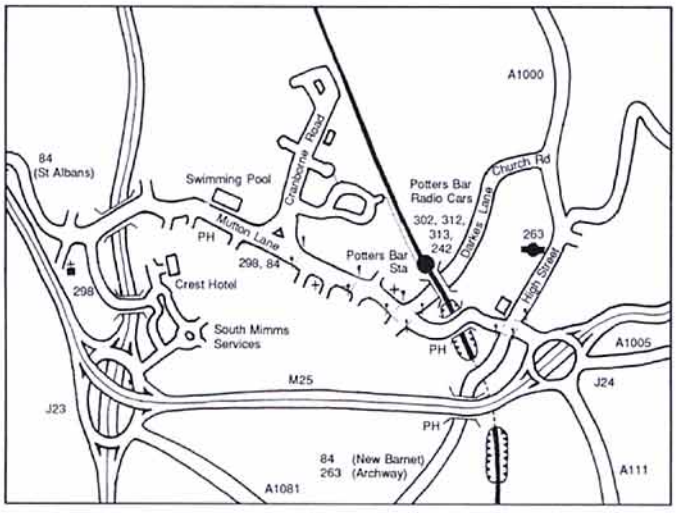
During the radio link with *Discovery*, the school was in direct contact with NASA's mission control in Houston. Because of the shuttle's attitude manoeuvring during the first link-up, only a brief voice exchange was possible. The mission director in Houston made the decision to allow a further contact on the next orbit 90 minutes later. The second contact proved to be a triumph. The equipment worked well and there was an interference-free six-minute radio contact. Antenna direction and Doppler correction was carefully controlled from the school's radio station.

When the SSTV image (shown above) was sent, KB5AWP on the *Discovery* reported receiving a good clear picture. Then three pupils asked questions directly to the astronauts. These related to their onboard atmos-

***continued on page 6*** ▶

**This tiny part of Guildford was visible from space on 9 April, thanks to Frank Bell, G7CND, and his pupils: (l to r) Back row - Iain McIntosh, 2E1BNG; Daniel Saunders, 2E1BNL; Theodore Markettos and Leslie Starkey, G7OEK. Front row - David Lloyd, 2E1BMN; Ben Nichols; Robert Panman and Andrew Timewell,**

## Visit Your Headquarters on 19 June




**RSGB HQ is on the right hand side of Cranborne Road, (look for the aerials!). The map is not to scale.**

SATURDAY 19 JUNE is our annual HQ Open Day. Additional attractions this year are refreshments, local clubs and a balloon race! Bring your friends and family.

- *Meet the staff*
- *See the QSL Bureau*
- *Use the shack*
- *Tour the Museum - recently expanded*
- *See how RadCom is produced*
- *Browse round the Bookshop*

**Open 10.30 am to 4.30 pm**

**HOW TO GET THERE**

# School in Space

*continued from page 5*

pheric experiments and the potential damage caused to the shuttle by space debris.

## At Six AM

EVEN THOUGH THE scheduled contact was at half-past six in the morning during the Easter holidays, many pupils crowded into the school's radio room for a chance to talk to the astronauts. One pupil who returned to Guildford from Gloucester specially for the chance to be involved with the event said it was certainly worthwhile.

Equipment used at Guildford was a FT726R plus 100W linear, feeding a 20-el crossed yagi. Two Kenpro rotators were used for az-el adjustment.

Frank gratefully acknowledges the help given by Doug, G0SYX/KO5I and Marcel, G1NBR, both of whom work at the Centre for Satellite Engineering Research at the University of Surrey.

The shuttle crew included Ken Cameron, KB5AWP; Ken Cockerell, GB5UAH; Mike Foal, KB5UAC; Ellen Ochoa, KB5TZZ and Steve Oswald, KB5YSR.

## Pupil Power

G7CND ORGANISED the school's radio equipment in preparation for the contact, but it was the pupils themselves who controlled almost all of the voice and TV exchange. Ben Reed, 2E1BLR, was the main operator of GB6STS. Many other pupils have their own callsigns and more are taking their exams as this is being written. A wonderful result of Frank's enthusiastic use of amateur radio as an educational tool.

## Christian Amateurs' Conference

CHRISTIAN RADIO AMATEURS are invited to attend the Annual Conference of the World Association of Christian Radio Amateurs and Listeners to be held this year at the St Edwards Baptist Conference Centre at Malvern. Held 8 - 10 October, a full programme of fellowship, worship and amateur radio activities is planned.

The inclusive charge of £50 and bookings, or requests for further information, should be addressed to W G Peterson, G4EZU, 124 Darnley Rd, Gravesend, Kent DA11 0SN; tel 0474 533686.

## RSGB at NEPCON'93

THANKS TO GENEROUS sponsorship by Reed Exhibitions and Graseby Technology, the RSGB was able to put on a stand at NEPCON'93, one of the largest electronics exhibitions in the UK. Steven Farrer, the Exhibition Director of Reed and David Topham, GM3WKB, of Graseby, provided the Society with a 15' x 15' corner aisle stand which attracted an enormous amount of interest and many enquiries.

During the three days of the exhibition, over thirteen thousand visitors passed through the NEC's Halls 1 and 2. Over a thousand, many from overseas, called in at the RSGB stand. Of the 315 who signed the visitors' book, 158 carried callsigns, including JA, F, VK, LA, ZS, 2E, 2W and OH.

Stand Organiser Hilary Claytonsmith, G4JKS, was ably assisted by John Layton, G4AAL; John Harvey, G4IVY; Peter Merall, G4TMK and Ray Yates, G8ACR, with Warwick Hall, G4WMH, providing logistical support.

**Before the doors opened: the RSGB stand at NEPCON'93.**

**The 1992 D-Day event on Southsea Common. Horndean ARC would be pleased to see you at GB6OL this year.**

## D-Day Commemorated

GB6OL (OVERLORD) WILL be on air from Southsea Common, near Portsmouth Dockyard 29 to 31 May.

Members of the Horndean ARS intend operating from signals vehicles loaned by the Military Vehicle Trust on a site used to marshal forces prior to the D-Day landings. All HF bands will be used, plus VHF and packet from 0800 to 1700GMT. Visitors are most welcome at the event which also features all types of vehicles, tanks, field guns etc. The D-Day Museum is close by.

## Packet Frequency Proposals

THE VHF COMMITTEE is considering various proposals for allocating more spectrum for packet radio on 144MHz. As well as some proposals of our own we will also be considering the following proposals submitted by various European societies for discussion at the IARU Region 1 meeting in Belgium in September.

The IARU proposals are summarised first. The initials are the originating society and the C5 number refers to a particular paper.

**DARC** (C5.10): Allocate 144.610 - 144.630MHz for narrow-band 'automatic digipeaters', bandwidth not to exceed 5kHz.

**URE** (C5.24): Allocate 145.300MHz or 145.275MHz for normal packet radio.

**REF** (C5.42): Allocate 144.600 - 144.610MHz for narrow-band packet radio.

**REF** (C5.43): Allocate 145.275MHz for normal packet radio.

The VHF Committee is also considering the following possibilities and would welcome comments from any interested parties:

1) Create a digital communications sub-band of 144.5375 - 144.6875MHz
2) Create a digital communications sub-band of 144.5875 - 144.7375MHz. This would require the definition of a new frequency for FAX calling.
3) Allocate two existing 'channels' such as S8/S9 to packet radio.

Proposals 1 and 2 create a sub-band of 150kHz which could accommodate six 25kHz channels or eleven 12.5kHz channels - think carefully about bandwidths versus channel centre frequencies to see why it's not 12. Narrow band RTTY needs to be accommodated within the sub-band.

Comments on all the above proposals should be sent to the RSGB VHF Committee c/o G3UBX (QTHR) or via packet radio to G3UBX @ GB7MAX or via Internet Email to jphb@scitsc.wlv.ac.uk

Peter Burden, G3UBX, Chairman RSGB VHF Committee

## Direct Debit Double Jeopardy

SUBSCRIPTION SERVICES LTD has said it regrets that, at present, it can collect only *one* Direct Debit from a bank account for amateur licence renewal fees. This has caused difficulty where two licensees sharing a joint bank account have different renewal dates.

The situation is likely to be resolved shortly but in the meantime anyone who is in this position is advised to make alternative payment arrangements.

# Liberty and Fraternity

AS A MEMBER of the Free French Forces, Jean Cendral operated under the name Paul Chaubet. Code-named 'Lombard', he was dropped into France in an area known as Temple with the mission of establishing a radio liaison network with the UK. Now licensed as F6IGL, Jean plans to mark the 49th anniversary of the liberation of France by using one of the original Mk3 'suit-case' transmitters to work the UK using only its 18m longwire antenna strung from a tree.

He intends using the 80m or 40m bands in Vercours on 26-27 June and in Temple on 15 August, and is looking for French-speaking UK licensees to complete the contact. Volunteers are invited to call Jean (reverse the charges, he says!) on 010 33 68 25 39 79, or write to him at 25 Avenue St Louis, 11620 Villemoustaussou, France.

**RSGB HQ STAFF were on hand at the Wireless Museum, Puckpool, Isle of Wight, to assist in the celebration of International Marconi Day on 24 April. Selling RSGB books were Despatch Manager Derek Lund and Amateur Radio Administrator Lynnette Crawshaw. The room was formerly an ammunition tunnel! Meeting the Lord Lieutenant of the Isle of Wight, Lord Mottistone, were representatives of two services: (l to r) Wing Cdr Alec Gilding, G3KHS (RAFARS); Museum Executive Officer Vern Scambell, G3FWE (RNARS); and CRS Mike Matthews, G3JFF (RNARS). GB0IMD was on air throughout the day.**

## Jaybeam and TV Masters

FOR SOME TIME, the sole distributor of Jaybeam antenna spare parts has been TV Masters. However, as the manufacture of this range is now carried out by SMC (Southampton), TV Masters will be unable to continue to support this line.

In general, orders for Jaybeam spares should now go to SMC but a few items are still available from TV Masters while stocks last, so it may be worth giving them a call (0604 37769). TV Masters have asked us to convey their gratitude to RSGB members for their custom over the last four years.

**The RSGB — Working for You**

# EMC Standard

## An RSGB proposal

AS REPORTED in *News and Reports*, April, the Society has formed an 'ad hoc' group with the intention of producing an EMC Standard for commercially manufactured amateur equipment. The first meeting was held at HQ on Tuesday 6 April, and after many hours work a first draft of the standard was roughed out. There is still a great deal of work to be done, in consultation with manufacturers and with other Region I IARU Societies, before a final version can be formally put forward to the European Telecommunications Standards Institute (ETSI).

It is important that members should be in no doubt as to why the Society has undertaken this somewhat thankless task. There are two reasons:

(1) If no standard is raised for amateur equipment, then it will automatically come under the 'generic' standard for radio communication equipment. This is framed around commercial communication requirements, and does not reflect the special nature of amateur radio, where knowing how to operate the equipment, and how to deal with problems which may arise, is part of the skill expected of holders of the Amateur Radio Licence.

(2) If amateurs themselves do not put forward a suitable standard, some other administration or organisation may produce one reflecting their own interests. This may well be against the interests of amateurs - even to the extent of being more demanding than the generic standard.

Members wishing to contribute should write to Peter Chadwick, G3RZP, c/o RSGB HQ, marking the envelope 'EMC SPEC'.

## GAM1 to be Installed

THE RSGB'S PROPAGATION Data Beacon, GAM1, is soon to be operational on 3.821MHz. The final bits of official paperwork are being processed and crystals are awaited. Full details of this latest RSGB service will be published as soon as the station has been commissioned.

## 1993 IARU Conference

THE NEXT REGION 1 triennial conference is to be held 19 - 24 September in De Haan, Belgium. The Society will be sending a number of delegates to represent the interests of all UK amateurs in this international forum. See our new bi-monthly *IARU* column on page 21 for some background.

## RSGB President Visits ARRL

PRESIDENT PETER Chadwick, G3RZP, taking advantage of a visit to the USA on business, recently visited the Headquarters of ARRL at Newington, Connecticut. During his visit he discussed the relationship between the ARRL and the US licensing authority, the FCC. Other topics included bandplanning, European EMC specifications and the current position of incentive licensing in the USA.

## EMC Liaison Officer

THE RSGB COUNCIL has appointed an EMC Liaison Officer to provide a direct link between the RSGB and the RA's Radio Investigation Service. He is Fred Robins, G3GVM, who is a member of the Society's EMC Committee and is professionally involved with EMC. The appointment has been made as part of the Society's greatly increased profile in the area of electromagnetic compatibility.

- 93 COMPETITORS entered the 1992 All-Japan ARDF Championship, including some from China, Korea and Russia.
- The 1993 European ARDF Championships will take place in Czechoslovakia, 7 – 12 September.
- AWARDS FOR the 50th anniversary USAAF into Essex (GB5AF, GB4EC, GB2GB, GB2AFE and GB0WB) are now available. Applications go to Braintree and District ARS, G4JXG, 88 Coldmailhurst Avenue, Braintree, Essex CM7 5PY.

# Prosecutions

ON 29 APRIL, David John Giles-Probert, formerly G7GDR, appeared before Dudley Magistrates charged with three offences under the Wireless Telegraphy Act. These were in connection with alleged offences committed on 20 and 22 October 1992 which involved the transmission of music, general broadcasts without the use of a call-sign, and the use of abusive and offensive language through the GB3BM Repeater in Birmingham.

The magistrates sat from 10am until 5pm, and since at the end of the day the evidence for the prosecution had still not been completed, they adjourned the hearing, and set aside 8 and 9 July for the resumption of the case.

Giles-Probert's VHF transceiver, frequency counter, scanning receiver and SWR meter, which had been seized during a search of his premises, were retained by the court for the time being and he was released on unconditional bail pending the resumed hearing.

### Fined £100

At Lisburn Magistrates Court on 25 March, a radio amateur was convicted under Section 1(1) of the Wireless Telegraphy Act 1949 for use of radio other than in accordance with a licence and for having apparatus available for use other than in accordance with a licence.

The defendant was fined £100 plus £10 costs. More painfully, perhaps, his £500 Yaesu HF transceiver, which was used for the offence was ordered forfeit.

The case arose following complaints of interference to television reception in Lisburn. A search warrant was obtained and served last October, when the defendant was found to be transmitting on an illegal frequency. Amazingly, the defendant had previously been given warnings about his illegal transmissions.

# Club Publicity in *D-i-Y Radio*

IF YOUR CLUB is holding an event which is particularly suited to the beginner or Novice licensee, the RSGB can provide publicity in *D-i-Y Radio*. Details of relevant meetings, rallies or open days should be sent to Marcia Brimson at RSGB HQ, marked 'D-i-Y Radio'. And don't forget to tell us about any committee members with special responsibility for newcomers and Novices.

**Taizo Arakawa, GW0RTA / JA3AER, with Brownies he tested for their Radio Communication badge. Taizo also provided an HF station for Thinking Day on the Air.**

## CODE NEWS

# ARRL Backs Morse

US NATIONAL Society the American Radio Relay League has resolved to continue support for Morse code proficiency for amateurs operating below 30MHz, as presently required by international law.

Citing the code's longevity as a licence requirement and its ability to overcome language barriers, the ARRL Board instructed "all ARRL representatives to continue to insist before all national and international bodies that there be no modification to the present . . . requirement".

The RSGB's HF Committee recently sought the views of all UK amateurs on this matter (*RadCom*, December 92). Their report is currently under preparation and will be published in *RadCom* just as soon as it is available.

# Morse Record Broken?

A CLAIM THAT THE Morse receiving speed record was broken in 1991 is being investigated by *The Guinness Book of Records*. The existing record of 75.2WPM was established by Ted R McElroy in a tournament held in North Carolina in 1939. Any member able to confirm the 1991 record claim, or who wishes to stage an attempt on the old one, should drop a line to the *RadCom* office at RSGB HQ.

● THE US COAST GUARD intends to discontinue CW watchkeeping on the 500kHz distress frequency from 1 August and to cease all Morse code services in the medium frequency band. From that date, ships must be equipped for satellites and HF SSB.

# New Test is Faster

RESULTS FOR the first month of the new 'QSO format' RSGB Morse test, introduced by the Radiocommunications Agency on 1 April, show a 70% pass rate which is slightly higher than under the old format.

The time taken for the test itself has been more than halved, from nine minutes to four minutes per candidate.

● SOUTH AFRICA has scrapped a long standing rule that amateurs must complete 200 CW contacts, or a year of CW, before being allowed to use phone.

The Republic of Ireland scrapped a similar rule last year. Many members will remember this kind of restriction in the UK, too, some years ago.

# Scottish Trophies

TWO TROPHIES are awarded annually in Scotland: The Jack Wylie Trophy to the Scottish club, society or RSGB member thought to have done most for amateur radio in Scotland, in general terms, in the past year. And the Jock Kyle trophy to the Scottish club, society, group or RSGB member thought to have done most in Scotland in the field of VHF in the past year. In the case of an award being made to an RSGB member that person must have been resident in Scotland during the period that the award refers to.

In 1992 no nominations were received for either trophy and they were therefore not awarded. Nominations and citations for each of the trophies in respect of the 1993 awards are required from at least five RSGB members resident in Scotland who should send them to the Zonal Council Member, Ian Suart, GM4AUP, by 13 August 1993. In the event of more than one nomination being received for either trophy the final decision on the award will be placed in the hands of the Scottish RLOs. In the event of no nominations being received, the trophies will pass to the safe keeping of the Zone G Council Member until nominations are called for in 1994.

# Jersey Club's New HQ

ON SUNDAY 25 APRIL, General Manager Peter Kirby was a guest at the opening of the Jersey Amateur Radio Society's new headquarters at Point La Moye, St Brelade. The new HQ is located in a former Signals Station built by the Germans during their wartime occupation of the islands. The official opening was carried out by the Lieutenant Governor of the Channel Islands, Air Marshal Sir John Sutton, accompanied by Lady Sutton. The impressive building has been refurbished by members of JARS with the help of various local organisations including Lions International.

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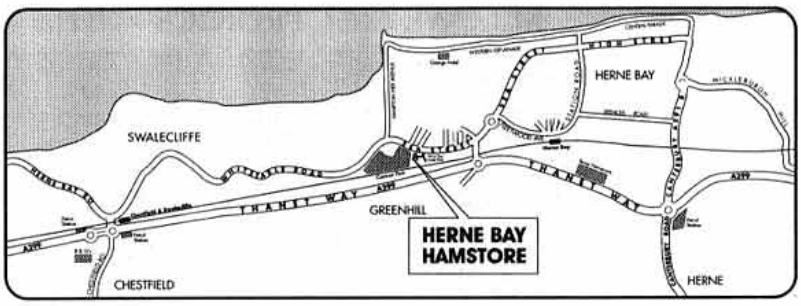


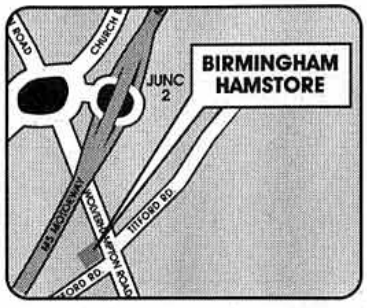


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We had quite a laugh the other day, looking at one of our competitor's latest attempts at selling the benefits of his "service department". There's only one sure way to check out a service department and that is to go and see it. We're more than happy to take customers around our service department — to see the level of technology needed to keep your gear working — to see the thousands of spares we stock, on the shelf — to see the level of skill demonstrated by our seven, full-time expert technicians. (To be fair, I haven't counted our R&D staff!) Whilst I'm on the subject of people, make sure that whoever is going to repair your hard earned rig has professional qualifications and really is a full time employee of the company, otherwise his motivations for doing a proper job may be different, and to ensure that your legal rights are not compromised. After all, you can hardly expect someone whose daytime job is mending false teeth to be fully conversant with the workings of a TS950SDX — the circuit's over 33 feet long! Proper after sales service does cost money and it is impossible to provide with continual price cutting.

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Tel: 0622 692773

**Tom** G4LAR at
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**Steve** G1WSY at
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**Derek Foster** G7ESZ
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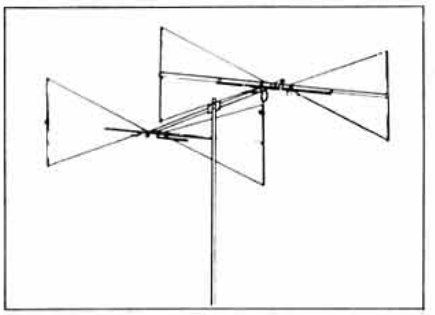

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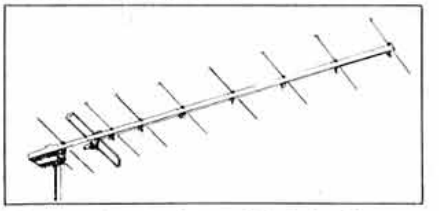

This season we've added the Tonna range of vhf and uhf beams. Tonna have been around for years and represent incredible value. The quality of construction is very good and they are mechanically sound despite the light weight. Also you can get on the air straight away without fiddling about with gamma matches and the like — with a Tonna, you just plug in and go!

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*Of course once you've got that meaty new rotator and some shiny new beams, you might need some other bits of hardware to go with it. You don't need to trek round galaxy for all of this — each of our many branches (11 of 'em now!) carries a full range of Barenco antenna hardware — antenna clamps, mast couplers, T and K brackets, chimney lashing kits and many other items. We also carry genuine British made coax — you know, the stuff with proper braid, rotator control cable and nearly all the connectors you are ever likely to need. Boldly go to one of our branches today and talk about a package deal on a new beam and rotator — it may not cost as much as you think! We're one Enterprise that really cares about our customers. (PS — A quick safety first message: When installing antennas, don't forget to Kling-on tight!)*

# HF NEWS

**JOHN ALLAWAY G3FKM**
10 Knightlow Road, Birmingham B17 8QB

I'M VERY PLEASED to be able to report that after very long negotiations the Canadian Radio Relay League and the Canadian Amateur Radio Federation have finally merged to form the Radio Amateurs of Canada. Congratulations to RAC - and every success in the future.

The comments made by Rag, OZ8RO, about the recent AH1A expedition really started something! In a recent reply Rag says that his remarks were really meant to address generalities which apply to *any* expedition. He says, "However, if one is prepared to put up with all the hassle and inconvenience connected with DXpeditions to remote places, one hopefully also has the 'guts' to accept comments and suggestions which could improve the productivity, efficiency, and quality of future ventures. When so many put so much time, effort, and money, into going places to operate, and so many spend so much time and energy trying to work them, it must be relevant to make assessments when a DXpedition is over.

"That does not mean that I believe I have all the answers to why some seemed to be more successful than others. But, I believe that *constructive* criticism is in everybody's interest. The only way to improve things in the future is to point out what one thinks could have been done better in the past. My comments were written in that spirit.

"Let us hope that discussions will continue in DX circles in Europe and that common sense will dictate better behaviour and improved operating standards. I should like to propose that the DX-press all over the world compiled comments after each major expedition, so that operators had as much feed-back as possible. If later DX-peditions used that information sensibly, we should all benefit. Once again - I apologise if I created any hard feelings."

G0JNX is QRT and has been for quite a long period. However, he has just received many QSL cards from stations all over the world who he has most certainly not worked. The pirate calls himself 'Mike'.

## PROPAGATION

THIS MONTH SMITHY confirms the suspicions of many that conditions have deteriorated on all bands including 1.8MHz where G4DBN complains that "160 propagation has been appalling since February, and pretty poor all of this year".

The G8KG report goes as follows: "Broadly speaking, solar activity continued to be on a plateau up to the end of March but there were signs of a slow decline in the first three weeks of April. By the end of this period the 27-day average solar flux had fallen steadily from values in the 140s to only 117 sfu, just above the 'low' recorded in June of last year. At the same time the slight upward trend in geomagnetic activity reported last month seems to have continued and there is an increasing tendency for major disturbances to occur at 27-day intervals which is characteristic of the declining phase of a cycle.

In their March bulletin SIDC Brussels offer a first tentative forecast of the timing of the forthcoming minimum as arriving probably between November 1995 and September 1996 which would mean an unusually short cycle lasting between nine and ten years. This is perhaps a good time to remember that while it is quite usual to see references to the '11 year cycle' the past 14 cycles fall into two distinct groups, seven 'long' cycles (9 to 14, and 20) with a mean duration of 11.7 years and seven 'short' ones (8, 15 to 19, and 21) with a mean duration of 10.2 years, the shortest of these lasting 9.6 years.

## DX NEWS

ACCORDING TO the *Long Island DX Bulletin,* XT2BW in **Burkino Faso,** will end his stay in December 1993. In the meanwhile he keeps a schedule with QSL manager WB2YQH each Sunday at 2100 on 14.211MHz, and will take other callers when finished and make schedules for other bands. The same source says that D2BG will be in **Angola** until July and has an excellent signal near 14.205MHz at 1730 and is willing to make skeds for other bands. PA3CXC, in *DX'press*, says that the deteriorating situation in **Southern Sudan** could end up in separate independent republics being formed in the territory. A conference was expected to take place last month and new republics

## BAND REPORTS

QUITE A LOT of input this month in spite of the alleged falling off of conditions on the bands. Thanks go to G2AFV, G2HKU, G3's GVV, IQF, IZD, KKJ, YRM, G4's DBN, DJC, GW4KGR, G4's MUW, NXG/M, XRV, G0KDS, RS 30144, and the UK DX Packet Cluster via G4PDQ. Stations listed in italics were using cw:-

**1.8MHz**
**0000** EA9MK, *9K2MU.*
**0600** *CU0WPX, NF6S/KP1,* TK5BF, *YV1DRK.*
**2100** *4X4DK, 9G1AA.*
**2300** *PY0FM, ZS4TX,* 7X2DG.

**10MHz**
**0000** *P40AA, VP5P.*
**0500** *KH6AFS, ZB2/DL7VEE.*
**0600** *VR6BB.*
**0700** *FK/DJ5CQ, J52AG, VK3XX, VK9NS, ZB2AZ, 5T5CJ.*
**1800** *C21/VK2BEX.*
**2000** *DP0GVN, TR8RR, ZA1M, 9K2ZZ.*
**2100** *FK8CP, TA2BK, 3B8CF, 5R8DJ.*
**2300** *C6A/DL7VOG, FM5BH, HP2CWB, TU4SR, V420KAO, 8Q7VM, 9G1AA.*

**14MHz**
**0600** ET3YU, FK8FU, KH6s, T30JH.
**0700** FW1FM, H44BC, HC8A, KH3AF, V63OM, VK9ND, YJ8RN, *ZK1TB.*
**0800** A35KB, H44MS, P29AI, V63CS, *5W1CW.*
**1000** *C21/VK2BEX,* KH6FKG, FW1DJ, V73C.
**1500** *BVs 2TA, 4CT,* OX3KM, *VQ9s MW, TV,* W6-W7, YB0ARN.
**1600** JT1BG, V85SS, YI1HAS, 9M8YL.
**1700** V85PB, XU3UN.
**1800** EP2MHB, XU3RLD.
**2000** A71BY, ET3SID, HS1HSJ, ST0/PA3CXC, EI4HF/T5, XU7VK.
**2100** *C91J,* JA9AA, TZ6FK.
**2200** A71A, VP8CMX, ZX0F.

**18MHz**
**0900** A35KB, A92BE, *VK9NS,* ZL4DJ, *9K2ZZ.*
**1100** *J52AG,* PJ2MI, V73C.
**1200** H44MS, *3D2QB.*
**1500** *S21ZK,* TA2BK, *YB4GDZ.*
**1600** *SV9/W9GHY, TU4SR, VQ9AC, XU5SE.*
**1700** C53GB, *HH3RA,* KP2A, *KH6CC, V85KX, 7Q7XX,* 9G1AA.
**2000** *DP0GVN, FS/DF4VX,* W5IJU/KP1, *6W6JX.*

**21MHz**
**0800** W0WWB/KH0, KL7CUS, ZX0F.
**0900** BT5HPW, ET3YU, T20AA, YK1AO.
**1100** P29DX, T30NJ.
**1200** KG6DX, YI1AL, ZS9A, 9G1AA.
**1300** ET3DX, V63s CS, OM, 5R8DJ.
**1500** C91S, ET3U, W5IJU/KP1, VU7CG, YI1MH.
**1600** A61AF, BV6ER, VQ9BB, XU4OF, 7Q7JL, 9V1XO.
**1700** A25/ON5GA, SU1ER, VQ9MW, 9G1AA, 9X5HG.
**1800** A22RV, HC8J, ZX0F, 5R8DG, 5X1A.
**1900** HC8A, J52AK, VP8CKB, ZD9BV, 4V2PK.

**24MHz**
**1100** A35KB, *YI9CW, 9F2CW.*
**1200** *FK/DJ5CQ,* S21ZG.
**1400** A45ZZ, FR5HL, *FY5GB,* JY5GA, ZB2/DL7VEE, *3B8CF.*
**1900** *W5IJU/KP1, XQ0YAF.*

**28MHz**
**1100** BV2CD, *KX6BM,* GW3ZEY/SU, V85PB.
**1200** ET3DX, FR5GG, 5H3JC, *5R8DJ.*
**1300** C56/DL8UZ, C91J, XQ0X, YI1HAS.
**1400** A71BY, N6QHO/D2, FH5CB, S21ZG, YI1AJ.
**1500** HC7SK, J73WA, *TR8GA,* VR6BX, ZD7DP, *ZP9XS.*
**1600** CE0ZIS, FR7GG, VP8CKB (S.Ork), 9G1AA.
**1700** C91S, S79MD, VP8CMP.
**1800** HC8A, TO5M, 3X0HLU.

## NINE-BAND TABLE NO 6

| CALL | 1.8 | 3.5 | 7 | 10 | 14 | 18 | 21 | 24 | 28 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| G3KMA | 160 | 275 | 319 | 245 | 325 | 282 | 325 | 271 | 318 | 2520 |
| G4BWP | 139 | 266 | 301 | 209 | 324 | 270 | 320 | 247 | 307 | 2383 |
| G4GIR | 130 | 258 | 299 | 209 | 325 | 262 | 320 | 236 | 309 | 2348 |
| G3XTT | 175 | 235 | 287 | 191 | 322 | 253 | 314 | 227 | 290 | 2294 |
| G3GIQ | 71 | 215 | 278 | 121 | 325 | 235 | 325 | 213 | 310 | 2093 |
| G3TXF | 83 | 187 | 245 | 129 | 302 | 152 | 301 | 115 | 268 | 1782 |
| G4OBK | 123 | 160 | 215 | 121 | 282 | 173 | 258 | 166 | 242 | 1740 |
| GM3PPE | 69 | 164 | 199 | 175 | 266 | 223 | 248 | 177 | 217 | 1738 |
| G3JXN | 49 | 125 | 192 | 126 | 275 | 201 | 280 | 183 | 280 | 1711 |
| G3NOF | 5 | 104 | 107 | - | 324 | 191 | 325 | 208 | 296 | 1560 |
| G3WGV | 66 | 122 | 175 | 146 | 227 | 187 | 224 | 150 | 211 | 1508 |
| G3JJG | 52 | 103 | 195 | 142 | 231 | 161 | 257 | 140 | 199 | 1480 |
| G4XRX | 3 | 48 | 80 | 96 | 256 | 135 | 276 | 143 | 221 | 1258 |
| G4NXG/M | 6 | 43 | 95 | - | 231 | 123 | 250 | 137 | 236 | 1121 |
| G3IAR | 56 | 96 | 102 | 97 | 201 | 124 | 176 | 82 | 123 | 1057 |
| AVERAGE | 79 | 160 | 206 | 134 | 281 | 198 | 280 | 180 | 255 | 1773 |

**Next deadline - scores to reach G3GIQ by 8 July 1993. The entry level is 600 total and there is no need to work all bands. (Prepared by G3GIQ).**

## QTH CORNER

| | |
|---|---|
| C90AB | John Neary, P.O.Box 42, Nacala, Mozambique. |
| ET3DX | JH1AJT, Yasuo Miyazawa, PO Box 8, Asahi-ku, Yokohama, Japan 241. |
| ET3SID | S May, Box 60222, UNECA, Addis Ababa, Ethiopia. |
| VP8CKB | via K1IED, L.Skilton, 72 Brook St, South Windsor, CT 06074, USA. |
| ZD7DP | P O Box 86, St Helena. |
| 4V2PK | P O Box 1095, Port of Spain, Haiti. |
| 5R8AL | now via F6ACT, 13 Rte Communale No 1, F-64410 Bouillon Par Azac, France. |
| 5X1B | James Brandenberg, U S Embassy, Kampala, Dept of State, Washington, DC 20521, USA. |
| 9G1AA | via PA2FAS, Wim Faasen, Weeskinderendijk 81, 3314 CM, Dordrecht, Netherlands. |

## 1993 WARC BANDS TABLE

| | 10MHz | 18MHz | 24MHz | Total |
|---|---|---|---|---|
| G3KKJ | 77 | **113** | **114** | 304 |
| G3IAR | **87** | 89 | 48 | 224 |
| G3IZD | 30 | 80 | 85 | 195 |
| G2AFV | 68 | 53 | 33 | 154 |
| G0MHC | 32 | 52 | 25 | 109 |
| GJ4GG | 22 | 34 | 27 | 83 |
| G3IQF | 31 | 26 | 13 | 70 |
| G4MUW | - | 40 | 19 | 59 |
| G4XRV | 55 | - | - | 55 |
| G0KDS | - | - | 12 | 12 |

could be Bahr el Ghaza, Eastern Equatorial, Western Equatorial, and Upper Nile. *RSGB DX News Sheet* says that John himself has been active as PA3CXC/ST0 and advises that if you are looking for him 1.832, 3.510, 7.001MHz or about 30kHz up from the lower edge of the other bands are places he often frequents.

F6FYD is now in **Liberia** as EL2YD and will be there for the rest of 1993. K5LBU is in **Sierra Leone** and is using the callsign 9L1CB. The club station 9L1SL has been active on 14 and 21MHz and is used by several operators so that it is important to ask for the QSL route for the particular operator contacted if you want a QSL. According to *DX'press* he is working as a missionary and will be there for two years. G4ZQM is in **Mozambique** and on the air as C90AB. He has been worked on 14MHz SSB and is expected to be there for a while. G3NVM recently visited Mozambique and met C9JA in Maputo who said that there are now 19 licensed stations in the country. FR5ZU was expecting to be FR5ZU/T on **Tromelin Is** from mid-May for an unspecified period. From **Uganda** 5X1B is reported active most days from about 1900 near 21.030MHz or 30kHz up from the low ends of 14 or 28MHz. 5X1A is to be found on the low end of the 21MHz SSB band between 1600 and 1900. John Layton, G4AAL, is in **Somalia** for a three month tour of duty with Oxfam. He has been worked as T5/G4AAL near 21.267MHz but he is a keen CW operator so I suggest looking for him on that mode.

VQ9AC, on **Chagos Is**, has been reported on 21.315MHz at 1730 and will make schedules for other bands. F1MXQ will be in **Cambodia** until the middle of this month as XU5SE. HA7VK is reported to have successfully renewed his XU7VK licence and should be active until the end of this month. VK3OT, who is XU0UN's QSL manager, says that there is a possibility that not all of the stations operating under the auspices of the UN are properly licensed. DL1WH is in **Bahrain** and on the air as A92WH.

The ITU has now approved a new callsign series for **Bosnia Herzegovina.** This is the series T9A - T9Z and includes T90A-T90Z, T90AA-T99ZZ, and T90AAA-T90ZZZ. The new national society has proposed to the Ministry of Communications that T92AA-T92ZZ replaces the former YU4AA-YU4ZZ, T93AA-Y93ZZ = YT4AA-YT4ZZ, T94AA-T94ZZ = 4N4AA-4N4ZZ, and T95AA-T95ZZ = YZ4AA-YZ4ZZ.

A *DXCC News Release* from ARRL dated 13 April said that the DX Advisory Committee had voted to add **Macedonia** to the DXCC list for contacts made since 8 September 1991. The committee also voted unanimously to delete **Czechoslovakia** w.e.f. 31 December 1992, and from 1 January 1993 to replace it with the **Czech Republic** and the **Slovak Republic.** The DXCC desk will accept QSL cards for these three new countries starting 1 June 1993. The DXCC desk announced that at the end of March the backlog of unprocessed applications was 1,830 (representing 125,728 QSLs) - a big improvement since October last year when there were 3,803 applications representing more than a quarter of a million cards waiting. Applications at the end of March were taking nine to twelve weeks to go through the system.

FO5DV, in **French Polynesia**, has been reported on 7.007 and 10.107MHz between 0400 and 0700. V63MF is the new callsign issued to Mary Fox who is on a two year tour with the Peace Corp on Woleai Atoll (OC-132) **Micronesia.**

*DX'press* has been researching into the rapidly changing maximum number of countries it is possible to work on the current DXCC list. On 31 December 1992 there were 325 but on 1 January 1993 three new ones were added (Bosnia, Croatia, and Slovenia). This made the total 326. However Abu Ail and Czechoslovakia have now been deleted and Macedonia, and the Czech Republic and Slovak Republic added. So I make the total in mid-April to be 327. I wonder how long it will be until it is possible to have 100 *deleted* countries?

## GHANA, UGANDA, AND MOZAMBIQUE

ITS OFFICIAL! I received a letter from Kofi Jackson, 9G1AJ, dated 12 April confirming that the ban on amateur radio in Ghana was finally lifted on 19 March 1993. Kofi is at the Ghana Frequency Registration and Control Board and he says that it is now busy re-registering former licensed amateurs and assisting them to collect their old equipment which was deposited with the police in February 1982. He formally inaugurated the Netherlands expedition to Dormaa on 28 March and as he says "we in Ghana are now back in the fold".

Dronz Arigho, G3NVM, recently visited Mozambique and reports that the licensing authority Telecomunicacoes de Mozambique has now lifted restrictions and it is much easier to obtain a licence. Previously there were time restrictions and exact frequencies to be used and times of operation had to be specified.

Some information about Uganda appeared in last month's column. Dronz also met Mr Mubiru, the acting Managing Director of the Uganda Posts and Telecommunications Corporation, who told him that foreign nationals can obtain permission to operate in Uganda with the minimum of fuss and form filling. All that is required is your original CEPT licence (full Class A) which has to be produced at the time of application and that the issue of the licence takes 24h maximum. A clipping from the *Vision* (a Ugandan newspaper) says that details of procedures and regulations governing amateur regulations can be obtained from the U P and T Corporation Frequency Management Office, G P O Kampala.

## DXPEDITIONS

IT IS REPORTED that PS7KM and PT7AA are planning a visit to **St Peter and Paul Rocks.** Timing was not certain but if it didn't take place last month it may be in June.

Advance notice of an intended visit by some of the former VP8SSI team to **Peter 1 Island** is given in *RSGB DX News Sheet.* The group is said to already have arranged transportation, landing permission, and the assurance of a licence, and is scheduled to land there on 1 February 1994. There will be ten operators with four HF stations operating on all modes/bands and the intention is to stay for 16 days. Contributions are being solicited and are being collected (as in the case of VP8SSI) by AA6BB and KA6V who will also act as QSL managers. The team is expressing special thanks to Norwegian amateurs for making this expedition possible. More news later of course.

George, GM3DPL, is expecting to be in **Barbados** between 10 May and 1 June, staying at 8P9FC's home and hoping to

*continued on page 16* ▶

**DXers get together for a private 'pile-up': (l to r) Richard F bard, HK0HEU, of San Andreas; Lloyd Colvin, W6KG, of Richmond, California; Ken Miller, K6IR, of Rockville, Maryland; Iris Colvin, W6QL, of Richmond, California; and Ron Szama, LU2AH, of Buenos Aires, Argentina.**

# NEVADA EVER

## SCANNING RECEIVERS

**NEW – MVT-7100,**
Set to be *THE* handheld of 1993. This radio must be heard to be believed. It provides effortless reception of SSB and CW signals using **TRUE** carrier injection with 50Hz resolution. It can even (with accessories) be hooked up for FAX and DATA reception.

- 100KHz–1650MHz
- 1000 memory channels
- All mode reception (incl. SSB & CW)

Each set is supplied with all accessories including: UK Charger, NiCad Batteries, Earphone, Telescopic Antenna, Original Yupiteru English Manual..... **PRICE £449**

**YUPITERU MVT 7000 HANDHELD**

- Receives 8 to 1300 MHz 100kHz-1300MHz (at reduced sensitivity)
- 200 Memory channels
- Rotary or keypad freq. control
- AM/FM/NFM
- Large display with strength meter

*Each set is supplied complete with:-*
Full set of high power NiCads, AC charger, DC power lead and carry strap ..... **£369**

**HP2000 HANDHELD**
Still our most popular handheld scanner.

- 500KHz-1300MHz
- 1000 Memory channels
- AM/FM/WFM Modes
- Sensitive Receiver
- Supplied with all accessories & UK charger ..... **£299**

**MS1000 Base/mobile**
A mobile version of the HP2000 hand-held but with added features.

- ★ Tape recorder voice activated switching
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- ★ 500kHz–600MHz, 805–1300MHz
- ★ Supplied with mains adaptor ..... **£279**

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Mobile version of the 7000 c/w mains adaptor. Especially sensitive @ UHF. Recommended..... **£389.00**

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Our most popular base scanner. Latest updated version. (100kHz–2036MH) **£899**

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New software for IBM/clones. Gives logging, monitoring and control of AR3000..... **£59.95**

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Full feature software for AR3000..... **£119**

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Covers 500kHz-1300MHz receiving NFM/WFM/AM and SSB.

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**Yaesu FRG100 HF receiver**
A superb new radio covering 50kHz to 30MHz – our top selling general coverage receiver.... **£559**

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**Yaesu FT-890 –** Recent reviews answer all your questions. Based on a winning combination, available with or without auto A.T.U..... **£1175**

**Yaesu FT-530 –** A Twin Band Handheld and a host of features including Dual In-Band RX, CTCSS DTMF all fitted. Wideband coverage plus optional speaker mic with LCD display. Guaranteed to be the next No. 1..... **£449.95**

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Yaesu FT767GX HF + VHF/UHF..... £1597
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Yaesu FT736R VHF/UHF multimode..... £1569
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## DRAKE

**Drake R8E –** Number one in the U.S. since 1943. Drake is known right across the globe for its technology and above all, reliability – remember the "B" line separates (mine are still going!). Wide frequency coverage, excellent dynamic range Superb filtering In fact it's simply the best shortwave clarity you'll find. Outperforming many other receivers costing much more. Whatever your interests – Drakes' R8E can handle it!!!

- Fully filtered with AMS as standard
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**£1195**

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R8E Matching Speaker..... **£49.95**
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Just arrived. This new "micro" 100 watt HF mobile rig is in short supply because of its popularity. We have purchased large quantities – call for info or part exchange price on your old HF rig..... **£999**

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Kenwood TS140S HF transceiver..... £849
Kenwood TS950SDX..... £3499
Kenwood TS790E..... £1799
Kenwood TS711E..... £1099
Kenwood TR751E..... £699
Kenwood TM741E..... £758
Kenwood TI922..... £1699
Kenwood TM702E..... £499
Kenwood TM732E..... £599

## MICROPHONES

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Desk mic

- ★ FM/SSB audio selector
- ★ Electret insert
- ★ Slide switch to allow selection of 2 radios

**99.95**

Adonis 308 Low noise desk mic..... £84.95
Kenwood MC50 Desk mic..... £49.95
Kenwood MC60A Desk mic..... £99.95
Kenwood MC80 Desk mic..... £59.95
Kenwood MC85 desk mic..... £119.95
Kenwood MC43S Hand mic..... £22.95
Kenwood MC44E h/mic..... £29.95
Kenwood MC45E h/mic..... £29.95
Kenwood MC44 DME h/mic..... £45.95
Kenwood MC45 DME..... £49.95

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High quality Japanese manufactured – outstanding performance.

**End fed zepp antennas** Using vinyl coated annealed copper wire – supplied with matching unit for coax feed.

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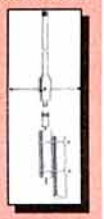

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**Alinco DJ-580 –** Fast becoming the top selling Twin Band handheld here in the U.K. Complete with all "mod-cons" including AM Airband RX. Comes ready to go just plug-in and charge - the perfect way to operate 2M & 70 Cms..... **£399**

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Losses quoted at 100MHz

**CONNECTORS** (for above)
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## KENPRO RADIO

**KT-44 –** 70 cms handheld. Thumb wheel frequency control. Full 10MHz! Ideal novice or repeater user. c/w NiCad, beltclip & charger..... **£159.00**

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As a Sony Shortwave centre, we stock a complete range of Sony Shortwave product. Here is a selection of our best sellers:-

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(1.6–60MHz) 3kW ..... **£124.95**

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(1.8–200MHz) 200W..... **£89.95**

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(140–525MHz) 200W ..... **£99.95**

**Revex W520**
(1.8–200MHz) 200W..... **£79.95**

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Professional line using 2 separate sensors 2–3MHz, 120–500MHz, cross needle power/SWR up to 1kW..... **£99.95**

**0% FINANCE AVAILABLE**
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RING FOR DETAILS

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Vector 500. "Canadian Punch!" A full 1000 Watts PEP on SSB enables you to beat the pile-ups. Now available here in the U.K. Top band to 10 from only 60-80 Watts input. Call now for your brochure!.

- 4x811A Low Cost Tubes
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- Compact 24lb weight

**£865**

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**Yaesu FT-690** 6m Porta-pack..... **£345**
**Yaesu FRG-9600** 25–950MHz RX..... **£365**
**Yaesu FT290R** 2m Porta-pack..... **£325**
**Icom R72** Short wave RX, boxed..... **£625**
**Trio JR500/S** Receiver..... **£149**
**Tokyo HC200** ATU (80–10m)..... **£99**
**Trio R1000** Short wave receiver..... **£275**
**Yaesu FT-902DM** HF TX, v.g.c..... **£625**
**Sommerkamp FT-1012D** HF TX..... **£495**
**Adonis 308** Desk mic (boxed)..... **£65**
**Yaesu FT747GX** HF 12V TX..... **£650**
**Yaesu FT-890** HF TX, c/w M/M..... **£1175**
**Icom R100** Mobile scanning RX..... **£425**
**Tokyo HT-120** 20m mobile TX..... **£245**
**CT1600** 2m H/H c/w BS25+h/set..... **£165**
**Yaesu FT-470** Twin band h/held..... **£365**
**Kenwood TR-77** Twin band h/held..... **£325**
**Alinco DJ-560** Twin band h/held..... **£345**
**Kenwood TS-530/S** HF TX, v.g.c..... **£549**
**Kenwood AT-230** ATU, v.g.c..... **£169**
**Icom IC-240** 2m mobile..... **£149**
**Tokyo HX-240** HF transvertor..... **£185**
**Adonis AM-508** Mic (compressor)..... **£75**
**Yaesu FRT-7700** S/W RX ATU..... **£49**
**Uniden B/Cat 200XLT** H/H scanner **£140**
**Yupiteru MVT-7000** H/H scanner..... **£215**

**Call us now – even if we haven't listed your radio, for what we know to be unbeatable P/X deals.**

## VECTRONICS

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**VC300 –** 150 Watt (300W P.E.P.) ATU with dual pointer metering of FWD/REV/SWR. Two coaxial inputs plus wire or balanced line (4:1 balun included)..... **£149.00**
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**CAR SUPPRESSION**
**FU400 –** RF suppressor for use with either car alternators or generators (effective 2.2–400 MHz)..... **£7.95**

# HF NEWS

*continued from page 13*

have his own callsign which was not yet know at the time of writing. GM4ZAA and GM1HPC will be with him.

At the time of writing the proposed visit by Romeo, 3W3RR, to **Libya** and **Tunisia** had not materialised because he had been ill. He was said to have received no reply from Libya to his request for a licence.

## CONTESTS

### ALL ASIAN CONTEST

**0000 19 June - 2400 20 June (CW)**

**0000 4 September - 2400 5 September (Phone)**

1.8 TO 28MHZ. Single-operator single and multi-band, and multi-operator multiband classes. Call "CQ AA" on CW "CQ Asia" on phone. Exchange RS/T plus two figures indicating age - ladies send 00! QSOs with Asian stations count three points on 1.8MHz, two on 3.5MHz and one on other bands. Multipliers are the number of different Asian prefixes worked on each band (following WPX rules). Note that JD1 stations on Minamitori Shima do not count because they are in Oceania. I have photocopies of the *1992* rules available - the 1993 version had not yet arrived when this was being written. SASE please.

### URE RTTY CONTEST

**1600 19 June - 1600 20 June**

3.5 TO 28MHZ following IARU Region 1 band plans. Use 45.5 bauds speed and 170Hz shift. Send RST and *CQ* zone (UK is zone 14). Score is one point for QSOs within own continent on 14, 21, and 28MHz, two for QSOs outside own continent, three for with own continent on 7 and 3.5MHz and six with other continents. The multiplier is the total of DXCC countries and zones worked on each band added together. I have not yet received the 1993 rules.

### VENZUELAN DX CONTEST

**0000 3 July - 2400 4 July (SSB)**

**0000 24 July - 2400 25 July (CW)**

3.5 TO 28MHZ. Work anyone. Single operator single or multi-band, and multi-operator single and multi-transmitter classes. Exchange RS/T and QSO number (from 001). QSOs with own country count one point, in the same continent three, and with other continents five. The multiplier is the number of different YV call areas and DXCC countries (including one's own) worked on each band. Use separate log for each band and send the usual summary sheet. Mark multipliers the first time they are worked. Send logs to reach Radio Club Venezolano, Concurso Independencia de Venezuela, P O Box 2285, Caracas 1010-A, Venezuela, to arrive by 30 September (SSB) or 30 October (CW).

The results of the **1993 ARRL 160 Metre Contest** include the callsigns of eight European entrants, the only one from the UK being **G3BDQ** who scored 126 points.

### CANADA DAY CONTEST

**0000 - 2359 1 July**

ORGANISED BY THE NEWLY formed Radio Amateurs of Canada. 1.8 to 144MHz, CW and phone. Single-operator single and multi-band, single-operator multi-band (less than 5W output), and multi-operator. Suggested CW activity frequencies are 25kHz above band edges (look on the half hours) and 1.850, 3.775, 7.075, 14.175, 21.250, and 28.500MHz for SSB. The same station may be worked on each band/mode. Send RS/T and serial number - Canadians send RS/T and province or territory. The multipliers are the twelve provinces and territories and each QSO counts ten points. Entries have be sent to reach RAC, PO Box 356, Kingston, Ontario, K7L 4W2, Canada, by 31 July. Official forms are available from this address on request. I can supply copies of rules *but not entry forms* (SASE please).

## EXPEDITIONS

GM0GMN AND GM4KHE will visit **Barra and Vatersay Is** (EU-10) between 10 to 17 June. They have the callsigns GB0IB for use on Barra and GB0OH on the Outer Hebrides. Special QSLs will be issued. More information from Jim Bertram, GM0GMN, (tel: daytime - 041 649 4036, after 1800 - 0475 24007).

## THANKS

TO ALL WHO sent in news items and reports and also to the editors of the *Long Island DX Bulletin* (W2IYX), *RSGB DX News Sheet* (G4DYO), the *Lynx DX Bulletin* (EA2KL), the *EA DX Boletin* (EA1QF), and *DX'press* (PA3DZN). Please note that the deadline for the receipt of items for the **August** column will be **23 June.**

# VHF/UHF NEWS

**NORMAN FITCH G3FPK**
40 Eskdale Gardens, Purley, Surrey CR8 1EZ

SEVERAL AURORAS occurred in April and there was some enhanced tropospheric propagation at the end of the month. However, activity seems to remain at a low ebb with few readers bothering to send in reports.

## EURO MATTERS

IN THE APRIL issue I mentioned the effect of EC legislation on British law and how European standards and ERC Decisions may now supersede BSI standards and DTI and RA regulations. These topics were discussed during the VHF Committee meeting on 24 April.

We need to know of any proposals that could adversely affect amateur radio operation. While the Committee does its best to keep track of such developments, members cannot guarantee to be aware of everything that is in the pipeline. We have useful lines of communication to various EC regulatory bodies, but we must have as much warning as possible of *anything* that could pose a threat to the amateur service.

If you hear of, or read about anything of this nature, however innocuous it might seem, in a trade or professional journal, please let us know. Such tip-offs will be treated in the strictest confidence should their divulgence conflict with an informant's professional office. You can either contact me, through the usual routes, or Peter Burden, G3UBX, the chairman of the VHF Committee, at 2 Links Road, Penn, Wolverhampton, WV4 5RF.

Peter can also be reached via packet radio to G3UBX @ GB7MAX and Internet E-mail to jhpb@scitsc.wlv.ac.uk.

## DSI 29.7-960MHZ

THE EUROPEAN Radiocommunications Committee (ERC) is carrying out the second phase of its Detailed Spectrum Investigation (DSI). (The first phase - 3.4 to 105GHz - has been completed, the results being published in a 176 page document, now the subject of public consultation).

To quote from the ERO's *Information Sheet*: "The aim of the DSI process is to ensure that the European administrations, industry, broadcasters, service providers, operators and users derive maximum benefit from the radio spectrum, the limited natural resource. The management team of DSI phase two will examine the current use of the radio spectrum in the band 29.7 to 960MHz and the changes that are likely to take place over the next fifteen years. The DSI will also address how this frequency band is managed and administered in CEPT countries. The main objective of the DSI is to develop a European Table of Frequency Allocation and Utilisations to be implemented by June 2008."

Section 8 of the paper identifies 13 key issues, one of which is: "Are there any spectrally efficient modulation or access techniques likely to make a significant impact in the next few years, eg linear modulation, CDMA etc?" This is one area where amateurs can play a significant development role, the attraction being that nobody needs to allocate large sums of money for R and D.

Copies of this six-page document can be obtained from the

**Most of Scotland's keen VHF/UHF DXers attended a dinner in Aberdeen on 10 April. Starting at the extreme left and working clockwise, they are Graham,GM8FFX; Ron, GM4ILS; Ray, GM4CXM; Stewart, GM4AFF; David, GM4JJJ; Keith, GM4YXI; Dan, GM0ONN; Melvyn, GM0GDL; Chris, GM3WOJ; Angus, GM0CDW; Andy, GM4IPK; Gavin, GM7LVJ and Allan, GM4ZUK.**

European Radiocommunications Office, Holsteinsgade 63, DK-2100 Copenhagen, Denmark. It can also be downloaded from the BBS - 8N1 up to 9600Bd - on 010 45 35 432781. The deadline for contributions is 28 February 1994 and the VHF Committee is preparing a comprehensive paper on behalf of the RSGB. It is planned to submit the results of DSI phase two to the ERC and CEPT Administrations in January 1995.

This phase of the DSI takes in the 50, 70, 144 and 430MHz amateur bands so it is vital the RSGB and IARU Region 1 present a sound case for the retention of these bands. With so many services clamouring for spectrum space there is bound to be fierce competition for frequencies.

Nevertheless, we should adopt a positive approach, perhaps even making a case for small, primary allocations around 220 and 900MHz for experimenting with new techniques - 'He who dares, wins!' Of the 1.55% of this spectrum to which we currently have access, only 50-51MHz and 144-146MHz is allocated on a primary basis.

## CONTESTS

THE WAB GROUP is promoting two VHF contests in June. On the 6th, there is the 70MHz Phone event, 1400 - 1800GMT, and on the 27th the 144MHz QRP Phone contest, 0900 - 1700GMT. For a full set of contest rules, and supplies of contest stationery, send a 9 x 6in SASE and three first class stamps to the contest manager, Gordon Horsfield, G4SKQ (QTHR).

The UK Six Metre Group is running a 24-hour event on 5 June, 0000 - 2400GMT, open to all 6m operators, world wide. The four UK classes are Single-op fixed station, SWL, Novice and All-other, which last includes Portable and Multi-op categories. Entry forms and log sheets are available from the contest manager, Cliff Ibell, G1IOV (QTHR), on receipt of a large SASE.

The Hungarian Radioamateur Society, MRASZ, is promoting an annual contest on the third full weekend each June, this year the 19/20 weekend. Time is 1400 - 1400GMT and the bands 144, 432 and 1296MHz. There are five categories; Single-op, single band; Single-op, multi-band; Multi-op, single band; Multi-op, multi band and SWL. Exchange calls, RS(T) plus serial number - "separated on each band" - and Maidenhead locator. Scoring is one point per kilometre on 2m, 2pts/km on 70cm and 4pts/km on 23cm. The rules are: ". . . . according to IARU recommendations," and entries should be sent by 1 August to Vak Bóttyán Rádióklub, Thán K.u.1, GYÖNGYÖS, H-3200, Hungary.

Finally, reminders about the *Practical Wireless* 144MHz QRP Contest on 20 June, and the weekly Scandinavian Activity Contests every Tuesday. See page 16 in the May *RadCom* for further details. For information on RSGB contests, please refer to the Contest Classified section.

## PUBLICATIONS

THE APRIL issue of *The VHF-UHF DXer* is back to its standard 20-page format after the bumper March edition. It includes further letters about contest scoring; a short piece on last year's IARU Region 1 VHF meeting and a list of papers to be tabled at the Den Haan meeting this September, by David Butler, G4ASR; a four-page 'Tech Slot' by G4DDK and G4SWX on noise figure measurements; an account of EME activity at FF1EME and the usual band reports. Contact editor/publisher Dave Hardy, G8ROU (QTHR), for subscription details.

The UKSMG's bi-monthly journal *Six News* is no longer jointly edited by Neil Carr, G0JHC, and John Livesey, G0JJL, the latter having stepped down due to lack of sufficient spare time. The April edition, number 37, runs to 52 pages packed with relevant information for 6m enthusiasts. For details of the group send an SASE to Chris Gare, G3WOS, who is QTHR.

The May issue of *CQ-TV*, the journal of the British Amateur Television Club (BATC), maintains its consistently high standard, both for technical content and quality of production. It includes a review of the Phoenix 16-ele 70cm antenna by editor Mike Wooding, G6IQM. I enjoyed the humorous offering: 'How to Repair Electronic Equipment' reprinted from a New Zealand magazine. The advice includes: "Brandish a large screwdriver in a menacing manner. This will frighten the instrument and demonstrate your knowledge of the deadly 'short circuit' technique."

## METEOR SCATTER

THE ARIETIDS meteor stream should peak on 7 June, according to the prediction in the *1993 Meteor Shower Calendar* published by the International Meteor Organization (IMO). For computer buffs, the parameters at maximum are: solar longitude (LS) 76.7 degrees, Right Ascension (RA) 44 degrees and Declination (DEC) +24 degrees. The Zenithal Hourly Rate (ZHR) is about 60. GMT times when the reflection effectivity exceeds 50% are: NE/SW 0430-0930 and 1300-1530; E/W 0700-1200; NW/SE 0300-0530 and 0900-1430; N/S 0300-0800 and 1100-1600.

Peak day for the Zeta Perseids should be 9 June - LS 78.6 degrees, RA 62 degrees, DEC +23 degrees and ZHR 40. Prime times: NE/SW 0600-1100 and 1430-1730; E/W 0830-1330; NW/SE 0400-0700 and 1100-1600; N/S 0430-0930 and 1200-1730. The Beta Taurids should peak on 28 June - LS 96.7 degrees, RA 86 degrees, DEC +19 degrees and ZHR 25. For the best times, just add two hours to the figures for the Arietids, as the curves are very similar.

## MOONBOUNCE

### CONTESTS

G0JHC forwarded a flyer from Giovanni Zangara, IW0BET, about an EME contest sponsored by the Italian national society, the ARI. This Marathon EME 1993 runs for the whole of the year and there are many categories in the six bands - 144 and 432MHz, 1.3, 2.3, 5.7 and 10.4GHz. If you want full details, Giovanni's packet radio route is IW0BET @ IW0CFV and his QTH is PO Box 36, I-00100 Roma Centro, Italy. According to K2UYH's April *Newsletter*, this year's ARRL contest is scheduled for 9/10 October and 6/7 November. Unfortunately the second leg coincides with the European 24-hours Marconi Memorial CW contest on 144MHz.

### NEWS

*The Newsletter* advises that ZB2BU was due to leave Gibraltar in May so ZB0T activity: ". . . . appears a lost cause." Mark had one 70cm QSO with DL9KR last December. There is no further news from LU7DZ, YV5ZZ or UA4API/A, mentioned last month. EA6/DF5JJ (JM19MN) is QRV on 23cm from his new summer QTH. Peter's QTH is C Garriga 12, E-07460 Pollenca, Mallorca. Tel: 010 34 71 531426.

### 144MHZ ACTIVITY

While terrestrial activity appears to be declining on the VHF/UHF bands, interest in EME mode is steadily increasing. Robbie Thomson, GM0NXP (SCD), is experimenting with four 11-ele Yagis and copied SM5FRH at RS52 on 4 March. At present he lacks TX power so is in the market for a large PA at reasonable cost. Taking advantage of 'ground gain' Edward Allely, GW0PZT (GDD), heard JA4BLC for 10min at 1510 moonrise on 3 April; no other stations were heard that weekend, probably due to the high geomagnetic level.

John Regnault, G4SWX (JO02PB), was doing well in April up to the 13th when his azimuth rotator broke again. In his E-mail report of the 26th, he said he was waiting for replacement gears and contemplating QSB-in-the-wallet of $76. On the 2nd, J37AV (alias W6JKV on Grenada) was audible for 25% of the 45min following his moonrise. Many were calling J37/W6JKV, the previously announced call, which begs the question, were they *hearing* Jim? Conditions were fair at moonrise on the 3rd with JA1KLX/1, I1KTC, SM2CEW and I2FAK worked from 1444. G3ZIG (JO02) gave John initial No:224 at 1556. Later he completed random QSOs with LA8YB and SM5MIX.

Inspite of a major magnetic storm on the 4th, his sked with FR5DN was completed at 1632 for initial No:225. UA6BDC (KN96CQ) called him during the sked and he runs eight Yagis and 1kW. DF6NA was initial No:226 at 1711 but QRM from stations working via the aurora was too great for further EME. On the 5th another aurora was in full spate at 1730 moonrise and John couldn't hear his own echoes, even with ground gain. On the 7th, G4YRY was worked for No:227. At 2200 he started with SV1AAF/3 (KM17IO), completing by 2228 for No:228; Petro runs 1.2kW and four 17-ele Tonna Yagis.

The next sked weekends are 29/30 May, with predicted sky temperatures in degrees Kelvin of 248/18 on 144/432MHz respectively, then 26/27 June, 320/24. The in-between weekends are Moon in the south, apogee and unusable due to Sun noise at New Moon.

## 50MHZ

### PROPAGATION

The Six and Ten Reporting Club issues monthly summaries of propagation data prepared by Ray Cracknell, G2AHU (HWR), and circulated by Ian Brotherton, G2BDV (DOR). In the March issue, Ray confirms what a poor month it was, due to generally unsettled to disturbed geomagnetic conditions. On 4 April he mentions that G2ADR

(YSN) heard J37AV at 1400 on 50.100MHz at QTE 190 degrees; the GC bearing is 250 degrees. It will be interesting to learn if Jim was QRV at that time and that it wasn't some hoaxer.

### NEWS

TED COLLINS' G4UPS (DVN) April *Information* includes more details of the proposed operation from the Belorus Republic mentioned on page 17 in the May *RadCom*. 6m QRGs are 50.095, 50.145, 50.165 and 50.215MHz, plus a beacon on 50.077MHz. Dates are now 20 June to 2 July. Calls are EV5B and EV5C in KO33; EV5D and EV5K in KO42; EV5M and EV5N in KO41. They will be QRV on 28.885MHz and 14.345MHz. QSLs should go to DL5BAC at Dorfstr 14A, D-2862 Worpswede 1, FRG.

From Kuwait, 9K2MU is a new station using a TS680S transceiver and vertical antenna; Murtada plans to make a 6-ele Yagi. QSL via 9K2AR at Box 77, Safat 13001, Kuwait. ZD8LII is QRV again from Ascension Is. LA6HL will be QRV from HP and IP fields in Iceland again this summer, using the call TF/LA6HL, 9-29 July; QSL via home call QTH.

### ACTIVITY

TERRY CHAPLIN, G1UGH (SFK), reports auroral activity from 1700 for 15min on 4 April with GM3XOQ (IO99) and GB3LER heard. On the 27th, in what appears to have been the first decent 'summer' Es opening, he worked five 9Hs in JM75, S59AM (JN65), I8TWK and IK8HJC (JN70), I4CIL (JN64), IK8DYD (JN71) and I0OEU (JN61). Paul Baker, GW6VZW (GWT), wrote before the Es and has been working some English novice stations. He wonders where the 2Ws are on 6m, as he hasn't yet heard one?

G4UPS and G3CCH (HBS) continue their daily tests at 0800GMT and very rarely fail to make contact. Ted was alerted to the 4 April aurora by a telephone call from SM7AED at 1530. Between 1545 and 2000 he made several contacts with G and GM stations. OZ3SDL was heard both aurorally and T9. Beacons copied Tone A were GB3NGI, GB3RMK and SK6SIX. SM7AED was heard or worked around 0800 on 13-17 April.

## 70MHZ

ROGER BETTS, G0TRB/G1EHJ (SFD), has been given an old 3-ele beam which he hopes will improve his performance when repaired. His country total is four, including ZB last year when he also worked OZ3SDL and OE6XHF crossband to 6m.

## 144MHZ

IN THE AURORA on 4 April, G1UGH only heard GM3XOQ and GI4OWA (IO64), both quite weak. On the 19th, Terry heard GU7DHI (GUR). Bill Meinerts-Hahn, G3UOL (WMD), is sticking rigidly to his 2.5W and seems to be doing quite well on QRP with 38 counties and ten countries worked up to 24 April. G4SWX gave up on EME at 1727 on 4 April, turned his array to the NE and worked YL2MB (KO27) and UZ2FWA (KO04) in the aurora.

Arlen Pardoe, GM0HUO (FFE), reported April auroras on 4-6, 8, 9, 13 and 21. UZ2FWA was a new country and square at 1803 on the 4th, other countries worked being ON, PA, SM and G till fade-out at 1930.

The next phase started at 2230 and beacons OY6VHF and GB3LER were still auroral at 0700 next morning. From 1340 on the 5th, he completed seven QSOs with G, DL and LA stations on CW. At 1815, GB3VHF was Tone A but not GB3LER. He contacted LA9HFA (JO59) at 1742 on the 8th and LA0GH (JO38) at 1545 on the 21st. From 1825 on the 27th, Arlen made SSB tropo contacts with ON1ALD (JO10) and G3NBQ (IO83); PA3FOC was heard.

GM0NXP operated /P from IO76XA in the Kilsyth Hills, 1050ft ASL on 4 April. In 3.5 hours he worked 28 stations on tropo and 13 via aurora including UZ2FWA and others in DL, EI, G, GI, GM, LA and SM. Next day from home (IO75XS), Robbie made another 27 contacts in three hours with stations in IN, IO, IP, JN, JO and JP fields to: ". . . . show that interest still exists in two metres."

GW0PZT made auroral contacts on 4 April from 1648 to 1757, but found activity a bit thin. Best DX were GM4IPK (IO99) and UZ2FWA at 1664km who was audible for over 90mins. Numerous PAs were coming through on tropo on the 27th, plus a few weak DLs and next day the band was open again to PA and DL.

## 430MHZ UP

CHRIS SKELCHER, G3YHF (WMD), worked F, DL and PA stations on 27 April using one watt to a 19-ele Tonna Yagi at 10m AGL. Best DX was DJ9RX (JO43) at 740km, proving the potential of QRP during openings. In average winter conditions, Chris works 80-100km with this station. Congratulations to John Quarmby, G3XDY (SFK), who worked F1GHP (IN96) for his 100th square on 23cm on 3 February. He has been QRV since the late 1970s and wrote: ". . . . so it has hardly been rapid progress compared with what can be done on, say, 6m."

### LOCATOR SQUARES TABLE
**Starting Date: 1-1-1979**

| Callsign | 50MHz | 70MHz | 144MHz | 430MHz | 1.3GHz | Total |
|---|---|---|---|---|---|---|
| G3IMV | 403 | - | 492 | 125 | 52 | 1072 |
| GJ4ICD | 560 | - | 264 | 121 | 68 | 1013 |
| GW4LXO | 440 | 23 | 261 | 108 | 48 | 880 |
| G6HKM | 415 | - | 237 | 118 | 57 | 827 |
| G4RGK | 167 | - | 319 | 182 | 58 | 726 |
| G6HCV | 435 | | 246 | - | - | 681 |
| G4TIF | 310 | 28 | 207 | 112 | - | 657 |
| G4DEZ | 201 | - | 255 | 71 | 62 | 589 |
| G0EVT | 230 | 12 | 249 | 65 | 1 | 557 |
| G1SWH | 245 | 33 | 179 | 63 | 9 | 529 |
| G8LHT | 196 | 20 | 202 | 93 | 17 | 528 |
| G0JHC | 462 | - | 48 | - | - | 510 |
| G4MUT | 186 | 25 | 158 | 97 | 34 | 500 |
| GW6VZW | 332 | - | 143 | 6 | - | 481 |
| G3XDY | - | - | 224 | 153 | 00 | 477 |
| G0MGA | 249 | - | 216 | - | - | 465 |
| G0CUZ | - | - | 375 | 80 | - | 455 |
| G4SSO | 80 | - | 269 | 99 | - | 448 |
| GU7DHI | 329 | - | 106 | 5 | - | 440 |
| G0FIG | 200 | - | 171 | 42 | - | 413 |
| G4SWX | - | - | 404 | - | - | 404 |
| G0GMB | 66 | - | 216 | 108 | - | 390 |
| G4RRA | - | - | 299 | 80 | - | 379 |
| G4YTL | - | 38 | 279 | 37 | - | 354 |
| G6MXL | 110 | 23 | 115 | 64 | 28 | 340 |
| G1GEY | - | - | 179 | 125 | 35 | 339 |
| G0HVQ | 268 | - | 71 | - | - | 339 |
| G0NFH | 133 | 26 | 101 | 51 | 18 | 329 |
| G1UGH | 196 | - | 121 | - | - | 317 |
| GW8JLY | - | - | 271 | 36 | - | 307 |
| G0EHV | - | 35 | 187 | 81 | - | 303 |
| G8XTJ | 147 | - | 126 | - | - | 273 |
| GW4VEQ | - | - | 267 | - | - | 267 |
| G3FPK | - | - | 246 | - | - | 246 |
| GW4FRX | - | - | 235 | - | - | 235 |
| G4DOL | - | - | 226 | - | - | 226 |
| GM1XOG | 181 | - | - | - | - | 181 |
| G7LIJ | - | - | 153 | - | - | 153 |
| G7EWL | 54 | 2 | 79 | 6 | - | 141 |
| G3FIJ | 1 | 24 | 80 | 25 | 3 | 133 |
| G7CLY | 70 | - | 60 | 2 | - | 132 |
| GW0PZT | - | - | 124 | - | - | 124 |
| G6ODT | - | 3 | 57 | 62 | - | 122 |
| GM0GDL | - | - | 122 | - | - | 122 |
| GI1CET | 88 | - | 29 | 3 | - | 120 |
| G0HDZ | 11 | - | 67 | - | - | 78 |
| GM0NXP | - | - | 69 | - | - | 69 |
| G4OBK | 21 | 1 | 45 | - | - | 67 |
| G7JAF | - | - | 53 | 3 | - | 56 |
| G3UOL | - | - | 42 | - | - | 42 |

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 1 July.

## VALE G3CHN

I AM SURE that all readers will be saddened to learn that Roger Thorn, G3CHN, died on 30 April at the age of 68. For many years his voice was regularly heard over a wide area when he read the *GB2RS News Broadcasts* on 2m from his clifftop QTH on Bolberry Down in Devon. He saw wartime service as a Marconi wireless operator in the Merchant Navy in the North Atlantic. He left the service in 1953 and became the Station Engineer of the Decca Navigator Station at Bolberry till he retired in 1984 and the family moved to the Isle of Wight.

Roger was a long time member of the prestigious First Class Operators' Club and used his CW skills to establish a 144MHz record breaking distance of 2,138km to LZ via auroral mode. He was a very keen LF and HF band operator and it was a joy to read his impeccable 'fist' in FOC marathons. He leaves a widow, Dilla, and a son, John Henry, to whom we convey our sincere condolences.

## COPY DATES

ON THAT SAD note, a reminder that the **August** deadline is **1 July** and the **September** one, **29 July**. You can fax reports to 081-668 5582, telex them to 9312111074(CN), E-mail them to CompuServe 70630,603, which can be accessed via Internet, or via BT Gold on 76:MSX021. The man at BTG's Helpline told me you couldn't connect to the system from Internet, etc. But G3UBX found a gateway through Interspan, whatever that server is!

# QSL

**JOHN HALL, G3KVA**
Corfe Lodge, Ipswich Road, Long Stratton, Norfolk NR15 2TA.

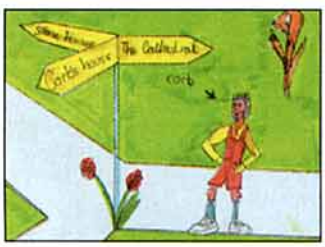
DEREK HOLMES, GW3JSV, has kindly sent about 100 9N1MM cards for QSOs with UK amateurs in 1991. Derek managed to have them collected by Don Watson, GW3RJY, from the American QSL manager for the late Father Moran and wanted to make sure they reached their destinations. Many thanks to both of you for the trouble you went to. I will personally see they go into the system and they should be with the lucky recipients shortly. Another in the never give up hope series!

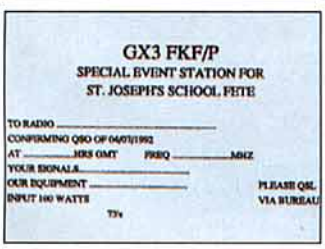
● Derek Griffin, G8DLF/P, V31DE, wrote to say he has retired to Belize and will be operating on the HF bands using an Icom 735 and 40 feet of sloping wire. He will also be operating AMTOR and will have PACTOR when he can obtain an upgrade for his PK232. He will be pleased to reply to any QSL cards sent to him at PO Box 180, Belmopan, Belize, Central America. Derek also says that all V31 stations can be reached through PO Box 168 in Belmopan, Belize.

● Ken Matchett, VK3TL, has written about a very interesting project for which he is curator. The Wireless Institute of Australia has set up what amounts to a QSL museum and they have a collection of over 400,000 QSL cards comprising modern DX, pre-war QSLs, thematic collections etc. You name it, they have a sample, and will supply photocopies of particular cards to researchers. Ken says he would be interested in swapping cards with any club or UK amateur who has a similar collection. He says he has many pre-war G QSLs but he needs some modern prefixes. All the cards are well cared for and are indexed and some have been mounted on display boards for exhibition at schools and radio conventions. If anyone is interested in the project they can get all the 'gen' from Ken at 4 Sunrise Hill Road, Montrose, Victoria 3765, Australia.

● I note with some interest an article by Bill Snyder, W0LHS, in *World Radio* dated February 1993 where Bill got into some difficulty with the way he had written the date on a QSL card for an RTTY contact with Pakistan. The contact took place on 10 April 1992 and Bill wrote the date as 10/4/92 in the European fashion of DD/MM/YY as he does with all cards he sends overseas. The American QSL manager for the AP station read this as October using the American method of MM/DD/YY and sent the card back saying the station was not operating in October! All was sorted out eventually but if you are really desperate for a card to be acknowledged it is these little details that can mean the difference between success and failure. In such cases I tend to write the month in words just to make sure there can be no confusion.

● Now that we have reorganised the Bureau at Headquarters members may be interested to know that one of two supervisors will be on duty from 9.15am to 5pm every day. They will be pleased to answer any queries. Just ask for Jan or Doreen in the Bureau. If you prefer to write to me then I will always try and sort out any problem and reply promptly.





**Pupils at St Joseph's Junior School in Salisbury designed their own QSL cards. Here are three of the best. The reverse side gives station details.**

● Bill McConachie, BRS88921, has sent me a picture of a very strange QSL card from ET3YU which is headed "PIRATE RADIO ET3YU" and purports to be located in Addis Ababa. Bill says the operator was first class and QSLs very quickly. The RSGB *DX News Sheet* has no knowledge of the station which appears to be operated by a gentleman named Dragan Stojanovic.

● For some very good reason, the origin of which I cannot remember, we are sending all SV5 and SV0/5 cards to the Radio Amateur Club of the Dodecanese, PO Box 329, PO Box 329, Rhodes Island, GR 85100, Greece.

● Victor Digilevech, UC2AO, has written me a personal letter to inform me that there is now a national Bureau for Belarus (White Russia) located at PO Box 469, Minsk 220050, White Russia. He says that any applications for awards for the UC RC area should be sent there as well as all QSL cards. Victor is the new White Russia National QSL Manager.

● Despite official listings I can authoritively state that the Italian National QSL Bureau is now located at Via D Scarlatti 31, I 20124, Milan MI, Italy.

● The new address for the Luxembourg National QSL Bureau is RLAOC, ASBL BP 1352, L-1013 Luxembourg.

● We have had boxes of cards for the Finnish National Bureau returned 'moved away' or similar. There seems to be the odd problem there but Jukka Kavanen, OH3GZ, Varuskunta Rak 47 A8II, SF-11310 Rithimaki, Finland has very kindly offered to receive cards on behalf of the Bureau and distribute them.

## AWARDS

HERE IS ANOTHER Radio Society of Great Britain HF award to try and obtain, though it is by no means easy. It is the Commonwealth Century Club and the certificate is reproduced above. It may be claimed by any licensed radio amateur who can produce evidence of having effected two-way communication (since 1 January 1984) with amateur radio stations in at least 100 current Commonwealth call areas.

General rules are:

1. Contacts must have been made on bands below 30MHz.
2. Contacts can be made from any location in the same DXCC country.
3. With effect from 1 July 1989 credits for contacts on the 10, 18 and 24MHz bands will be given.
4. Contacts with land mobile stations will be given providing the exact location of each station at the time of contact is clearly stated on the evidence submitted with the claim for the award.
5. Mixed or single mode is acceptable

The fees and entry details are shown on page 3 of the *RSGB Call Book*. For a small additional charge recipients of the award can obtain a plaque commemorating their achievement. Details from the HF Awards Manager, Bill Ricalton, G4ADD, 4 South Road, Longhorsley, Morpeth, Northumberland NE65 8UW.

If you can manage to obtain all Commonwealth Call Areas then there is a very special plaque available to commemorate the magnitude of that achievement. I have no idea how many of the latter have been awarded but I suspect very few.

# HF F-LAYER PROPAGATION PREDICTIONS FOR JUNE 1993

The time is represented vertically at two-hour intervals GMT for each band, ie 00=0000, 02=0200, 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 F-layer openings at 50MHz and 1.8MHz are indicated by a plus (+) sign in the 28 and 3.5MHz columns, with these latter bands having a probability of 9.

| Time / / GMT | 28MHz 000001111122 024680246802 | 24MHz 000001111122 024680246802 | 21MHz 000001111122 024680246802 | 18MHz 000001111122 024680246802 | 14MHz 000001111122 024680246802 | 10MHz 000001111122 024680246802 | 7MHz 000001111122 024680246802 | 3.5MHz 000001111122 024680246802 |
|---|---|---|---|---|---|---|---|---|
| ** EUROPE | | | | | | | | |
| MOSCOW | ..........11. | ..........11. | ..122211234 1 | 2134444346664 | 6566665567 98 | 8754333346 88 | 6421111113 57 | 3.........24 |
| MALTA | ..........11. | ..........11. | ...223222244 2 | 3125554457 75 | 7567666678 99 | 9885444456 89 | 8853111123 68 | +52.......35 |
| GIBRALTAR | .......... | .....1..1.121 | 1..2322224 53 | 6336765667 87 | 9876554456 89 | 8864322224 68 | ++3.......4+ | |
| ICELAND | .......... | .......... | .....1...121 | 4112443335 66 | 8765544455 77 | 6654222223 45 | 332.......2 | |
| ** ASIA | | | | | | | | |
| OSAKA | .......... | .......... | ...1111111121 | 1111322233 53 | 1..1311135 74 | .........351 | .........12. | .......... |
| HONGKONG | .....11..111. | ..122212344 2 | 2112332246 64 | 3...1111368 6 | 1.........365 | .........132 | .......... | |
| BANGKOK | .....11121112 2. | 1122332245 63 | 2122233357 85 | 51...111368 8 | 3.........367 | 1.........135 | .........2 | |
| SINGAPORE | ....11...1.. | ..1122112 32. | 1123343346 52 | 3222343357 75 | 51..111136 88 | 3.........367 | 1.........135 | .........2 |
| NEW DELHI. | ...111...11. | ..1222112 32. | 1123333346 53 | 3332233357 86 | 741...11368 8 | 51.....368 | 3.........136 | .........3 |
| TEHERAN | ...1111.122. | ..2223223 441 | 2144343357 74 | 5453333357 87 | 8641...1136 89 | 851.....368 | 62.....136 | 3.........3 |
| COLOMBO | ...1111.1... | ..1223223 22. | 2133343355 53 | 4333243357 75 | 841...111368 8 | 62.....368 | 4.....136 | .........3 |
| BAHRAIN | ...1121122 21 | ..2333324 442 | 3244444467 76 | 6563223468 98 | 9741...1136 89 | 851.....368 | 62.....146 | 3.........3 |
| CYPRUS | ...1121122 21 | 1.1333334 552 | 3246665567 86 | 6477666678 98 | 9875444567 99 | 9852111235 78 | 752.....257 | 42.....24 |
| ADEN | ...2122233 31 | 1.2333445 654 | 4355344568 87 | 7664223468 99 | 9851...1368 9 | 863.....368 | 64.....146 | 4.........3 |
| ** OCEANIA | | | | | | | | |
| SUVA/S | .......... | .......... | .....111. | ..1121112 331 | ..3421112 551 | ..22....33. | .......... | .......... |
| SUVA/L | 1.......32 | 2112.....53 | 4335.....85 | 3356 1....85 | 1156 2...262 | ..23....33. | .........1. | .......... |
| WELLINGTON/S | .......... | .......... | .....1.....21 | 1122 21....42 | 2244 21.1..74 | .132....252 | ..1.....2. | .......... |
| WELLINGTON/L | 1.........1 | 311.......3 | 5332.....16 | 6554.....37 | 4565 1....165 | 1243....253 | ..1.....2. | .......... |
| SYDNEY/S | .......... | ...111..... | ..23331....2 | 1135 4321...4 | 2135 3111 2326 | ...2....353 | .........131 | .......... |
| SYDNEY/L | 1.........1 | 2.........3 | 5213.....6 | 5335 1.....17 | 3246 3.....56 | 1.131....153 | ...1.....31 | .......... |
| PERTH | ...1111..... | ..13332..... | 2135543..... | 4344 5431.... | 6322 2111 111. | 41.....351 | 1.....134 | .........3 |
| HONOLULU | .......... | .......... | .....111. | ..1111112 211 | .133 2111 231. | ..331....1.. | ..1..... | .......... |
| ** AFRICA | | | | | | | | |
| SEYCHELLES | ...2122231.. | ..2333445 211 | 3145445556 543 | 6464233467 76 | 9751..1136 | 862.....368 | 63.....146 | 4.........3 |
| MAURITIUS | ...2123234 32 | ..2334445 654 | 2.454555788 7 | 5.643434689 9 | 8362.1113689 | 863.....368 | 651.....146 | 42........3 |
| NAIROBI | 1..2123344 11 | 2.1434556 733 | 6346445578 76 | 8575334588 8 | 9873..1136 89 | 884.....368 | 662.....146 | 43........3 |
| HARARE | 1..2123445 42 | 3..3335567 65 | 6226445578 88 | 8457433468 99 | 9875 11.1368 9 | 8852....368 | 763.....146 | 43........3 |
| CAPETOWN | ...1113453.. | ...3335666 2. | ...6545578 51 | 1..7543458 74 | 52.531.12688 | 8713....368 | 762.....136 | 43........3 |
| LAGOS | ...1213456 41 | 21.2335668 63 | 5325544578 86 | 8657333589 8 | 9976 2...2689 | 8863....368 | 763.....136 | 43........3 |
| ASCENSION Is | ....2123453. | ....4234676 1 | 21..644568 84 | 5411643358 97 | 8854 31..2689 | 8863....368 | 763.....36 | 43........3 |
| DAKAR | 1...2123354 1 | 3112423557 63 | 6435644558 87 | 8767632337 98 | 9986 31..1589 | 8863....268 | 7631.....36 | 43........3 |
| LAS PALMAS | ....1.111221 | 1..1322324 42 | 4214655657 76 | 7546766778 98 | 9887655557 99 | 9975322224 78 | 87521....157 | 542.....24 |
| ** S. AMERICA | | | | | | | | |
| Sth SHETLAND | .....23351. | .....35572. | .....45685. | ....1345871 | .....1.12685 | 523.....367 | 7631.....36 | 43........3 |
| FALKLAND Is | .....133441 | .....355662 | 1....1456885 | 4....2345898 | 8331.1.12689 | 8752 1....358 | 7631.....36 | 43........3 |
| R DE JANEIRO | 1....113233 1 | 21...3344563 | 643..4455787 | 8751433468 9 | 9973 2111379 | 8863 1....158 | 7631.....25 | 43........2 |
| BUENOS AIRES | 1.....122331 | 31...2244553 | 6322.3455687 | 8654.3334689 | 9975.111236 9 | 8863.....48 | 6631.....15 | 43........2 |
| LIMA | 1.....1.121 | 2....1.122233 | 5212413433 56 | 8534523333 57 | 9875 3111..26 | 8863 1.....4 | 6631.....1 | 33.......... |
| BOGOTA | .........11 | 2....1112113 3 | 5211332322 46 | 8533442322 47 | 9865 4111..16 | 7863 1.....3 | 5631.....1 | 23.......... |
| ** N. AMERICA | | | | | | | | |
| BARBADOS | 1....1.1.121 | 2....1212123 3 | 5212443333 56 | 8534543322 58 | 9875 311...37 | 8863 1.....4 | 6631.....2 | 33.......... |
| JAMAICA | .........11 | 1....1.111122 | 41...2222235 | 7422232322 36 | 8865 3111..15 | 6863 1.....2 | 4631..... | .3.......... |
| BERMUDA | .........1 | 1....1.111122 | 41...3222245 | 7422232222 47 | 8864 311...26 | 7863 1.....3 | 4631.....1 | 23.......... |
| NEW YORK | .......... | 1.........11 | 31...1111124 | 631..2222236 | 7753 2111..15 | 5853 1.....2 | 2531..... | .2.......... |
| MEXICO | .......... | .........11 | 31...1111123 | 5311..1222123 | 6754 2111...1 | 3753 1..... | 1531..... | .2.......... |
| MONTREAL | .......... | .........1 | 2....1111123 | 521..2122135 | 7753 2111..25 | 5753 1.....2 | 2531..... | .2.......... |
| DENVER | .......... | .......... | 1.........1 | 321.....1112 | 4543...11..1 | 2553 1..... | .231..... | .......... |
| LOS ANGELES | .......... | .......... | 1.........1 | 2111....11111 | 2443 1..11..1 | .453 1..... | .12..... | .......... |
| VANCOUVER | .......... | .......... | .......... | 1111.....111 | 2343 2...1111 | .353 1..... | ..2..... | .......... |
| FAIRBANKS | .......... | .......... | .......... | 1.1111...11.1 | 1233 2111 1211 | .133 1..... | .......... | .......... |

The provisional mean sunspot number for March 1993 issued by the Sunspot Data Centre, Brussels was 61.9. The maximum daily sunspot number was 98 on 21 and 24 April and the minimum was 15 on 14, 15 and 16 April. The predicted smoothed sunspot numbers for June, July and August, are respectively: (classical method) 60, 58, 56; (SIDC adjusted values) 53, 50, 46.

# IARU

JOHN ALLAWAY, G3FKM
and
TIM HUGHES, G3GVV

THE PURPOSE of this new bi-monthly column is to attempt to give readers a better understanding of IARU, what it is, what it does and why. The awareness of IARU is not high in most countries merely because it works mostly in the background, only becoming noticeable to the members of a Society if that Society decides to organise one of the triennial Regional Conferences. So first of all a little background to it all . . . .

In the mid 19th century the telegraph system in one European country often could not be connected to that in the next country. A message received at a border had to be taken across by hand and retransmitted. To meet this rather unsatisfactory situation an international telegraph union (ITU) was formed. This organisation held international conferences, one of the first took place in London in 1903.

Subsequently the need for licensing and regulation of wireless telegraphy stations became necessary, and these too came under the jurisdiction of the ITU. Such regulations and a treaty had been signed in 1912, but it was not until 1927 that the need to revise and update these concepts was appreciated. In Washington DC in October 1927 the International Radio Telegraphic Conference met, with 350 delegates from 74 countries present.

It was at this Conference that the interests of radio amateurs were first represented, and as a result our frequency allocations were made on a world-wide basis and what is more were harmonically related. These frequencies were in the 1.7, 3.5, 7, 14, 28, and 56MHz bands.

But prior to this, a group of radio amateurs (some 250 strong) had attended a meeting in Paris to consider the possibility of forming an International Amateur Radio Union. It was agreed that its main purpose would be the coordination and encouragement of international two-way communication, and it should be an organisation of individual members until national societies were formed in the principal nations, when federation would be possible. It was agreed that its headquarters would be in the USA at West Hartford, Conn, the Headquarters of the ARRL. It also seemed logical that since one of its chief tasks was going to be the monitoring of, and cooperation with, organs of the ITU, its structure should be similar. So it was decided ultimately that there would be three Regions, corresponding with the Regions of the ITU: Region 1 would comprise Europe (including the whole of the former USSR), Africa, and parts of the Middle East. This was the first regional organisation to be formed (in 1950). Region 2 would consist of the Americas, north and south, and Region 3 would include the rest of the world. The IARU in Region 1 is the longest established and the most developed of the three with a membership of 69 countries at the time of writing and with several more (Macedonia, the Czech and Slovak republics and Bosnia Herzegovina) going through the election process.

The officially listed objectives of IARU are "the protection, promotion, and advancement of the Amateur and the Amateur Satellite Services within the framework of regulations established by the International Telecommunication Union, and to provide support to Member Societies in the pursuit of these objectives at the national level, with special reference to the following:

(a) representation of the interests of amateur radio at and between conferences and meetings of international telecommunications organisations;

(b) encouragement of agreements between national amateur radio societies on matters of common interest;

(c) enhancement of amateur radio as a means of technical self-training for young people;

(d) promotion of technical and scientific investigations inthe field of radiocommunication;

(e) promotion of amateur radio as a means of providing relief in the event of natural disasters;

(f) encouragement of international goodwill and friendship;

(g) support of Member Societies in developing amateur radio as a valuable national resource, particularly in developing countries; and

(h) development of amateur radio in those countries not represented by Member Societies.

**The 1981 IARU Region 1 Conference was held in Brighton. Pictured are: (l to r) Basil O'Brien, G2AMV, RSGB President; Lord Wallace of Coslany, RSGB Past President; Lou van Nadort, PA0LOU, Chairman IARU Region 1; and Noel Eaton, VE3CJ, President IARU.**

The various aspects listed above will be addressed in future articles.

## NEWS ITEMS

POSSIBLY THE MOST important news recently, was the presentation of one of the IARU Amateur Radio Administration courses to twelve members of the Ministry of Communications staff in Dhaka, Bangladesh, by IARU President W1RU. Since 1979 Bangladesh Amateur Radio League officers have been working patiently to regularise amateur licensing in their country. A problem seems to be the absence of an amateur radio examination system! However, for the time being, licenses are being issued on the basis that the applicant has in fact passed an examination in another country. On the way home from Bangladesh Dick Baldwin also visited Thailand and discovered that there are now 60,000 VHF licensees with another 100,000 "just around the corner"! A remarkable tribute to the persistent and enlightened leadership of the Radio Amateur Society of Thailand (and to the 25 or so Post & Telegraph Department officials who had attended one of the amateur radio administration courses in the past!) New Zealand has applied to participate in the CEPT Common Licence arrangement TR61/01 and ZLs with General licenses qualify for CEPT Class 1 privileges, and with Limited licenses, Class 2 [See 'Operate in ZL', *RadCom*, May 93, p5 - Ed].

Peru is also making enquiries about taking part. This is of considerable significance since if successful this would mean that the concept had a foothold in all three Regions.

NOTE: Tim Hughes is the Chairman of the RSGB's IARU Committee and John Allaway is Secretary of IARU Region 1.

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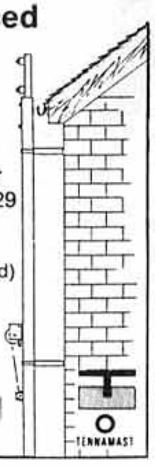

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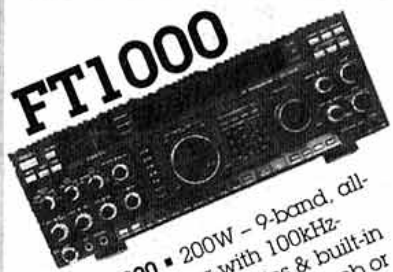

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**YAESU FT-990** • 100W – all mode 160-10M HF transceiver with 100kHz-30MHz receiver, 99 tunable/scannable memories & built-in antenna tuner w/memory. Dual VFOs, digital IF shift/notch filters, speech processor. Special provisions for CW, RTTY, Packet. Digital Voice Contest option. Built-in AC ps. 12¾"w x 4½"h x 11½"d, 30 lbs

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# SWL NEWS

**BOB TREACHER BRS 32525**
93 Elibank Road, Eltham, London SE9 1QJ

AS WE ENTER the summer months, many listeners turn their attentions to chasing DX on the VHF spectrum. Every year I hope that more listeners will follow suit, but each year I am disappointed. Perhaps this year will be different. The HF SWL will be even more reliant on 14MHz during the summer, so it is interesting to find a different aspect of the hobby to occupy the mind. Monitoring VHF - especially 50MHz - can take up a great deal of time. Good Sporadic E openings can be fairly short - especially at 144MHz - so much time can be spent listening in the hope that something will materialise. The wait can most certainly be worth it, but it is the uncertainty of it all that will probably keep most SWLs glued to 14MHz. It is, however, worth noting that during the summer Sporadic E season 28MHz will provide listeners with many of the elusive European countries that are just not audible at other times of the year. Signals will invariably be 5 x 9, so do not forget 28MHz (or 24MHz for that matter) if you want to add some 'easy' ones to your countries score.

## NETS LIST

I STILL HAVE some copies of the Nets list available that I was offering in April for anyone sending 60p to cover copying and postage costs. The list gives details of 190 'Nets' and is essential rigside material for those who enjoy doing their DXing the 'easy' way!

## SWL SOFTWARE

I STILL HAVE a good deal to learn about computers in amateur radio, but I know that finding a program which will keep my station log and make contest logging even easier would be a tremendous asset. I have recently received details of software which others with more experience may find useful.

First, Readycrest Ltd market several Shareware programs by G3ZCZ/W3. 'Lan-Link' - Version 2.00 is a personal packet terminal program for the TNC1, TNC2, KPC-2 and, in particular, a smart multimode digital communications controller for the KAM, MFJ1278 and the PK-232. 'PC-Ham' is a menu driven computerised logbook. It displays or prints QSOs sorted by callsign in alphanumeric order. It also searches for and displays all QSOs with a specified prefix, generates DXCC status automatically, updates award records directly from log entries, analyses contest QSOs for duplicates and scoring, and much more.

For more details on both these products you can write to G0BIX at Readycrest Ltd, 19 Hill Chase, Walderslade, Kent ME5 9HE.

The second bit of software news came from Geoff, GJ4ICD. He provided details of 'The 1994 PC HF Spectrum'. This seems to be the listener's guide to short wave on disk with over 15,000 entries of marine, broadcast, etc stations heard. Release date is expected to be in the autumn, but advance information can be obtained from Geoff Brown, GJ4ICD, at Belmont Road, St Helier, Jersey JE2 4SD.

## WAB NEWS

THE LATEST *WAB Newsletter* arrived shortly before my deadline. An insert provided the minutes of the WAB AGM. As part of the Chairman's opening remarks, mention was made of the passing away of two stalwart listeners - Frank Parkhurst and Hedley Falkinder. A number of HAB Awards were presented to a number of SWLs who were present. Mention was also made of Chris Gibbs' achievement in hearing 4,200 WAB areas.

## DX HAPPENINGS

DAVID WHITAKER, BRS25429, sent a report from Tenerife on his holiday listening from the R-2000 he took with him. Best DX was a KH6 on 7MHz SSB. During the ARRL SSB contest, 80 countries had been heard in nearly eight hours listening.

Philip Davies, G1EMD, like many other reporters did not manage to hear the KH5/KH5K expeditions. Others only reported hearing the KH5K weakly and briefly on 14 and 18MHz. With conditions to Europe from the central Pacific area likely to be poor for the next four years I imagine that any big expeditions will wait for an upturn in conditions before large amounts of money are spent activating a really rare one - like T33. However, someone will hopefully prove me wrong in the not too distant future!

Philip also mentioned an early morning tune across the DX portion of 80 metres. He heard Eric, GU2FRO, working ZL4BO who commented that ZL7AA was on 3.785MHz. A tune to that frequency provided Philip with a very nice new one on that band.

Albert Tideswell, BRS48462, did not mention ZL7AA in his 80 metre loggings, but had heard VK5MS, A61AD, JT0AJ (it has been reported in the DX press that this station is a 'pirate'), 9V1XQ and 4S7VK, which was Albert's number 301 on 80 metre SSB. A superb achievement. Perhaps he will provide a few more details so I can pass on details of how long this feat has taken, what antenna has been used, etc. I have 276 current countries heard on the band and new ones are few and far between. Indeed, apart from the new European Republics, the only new one recently has been S0RASD.

Looking at recent conditions and other reports to hand this month, it seems 'mixed' is the best way to describe the bands. One day the Pacific was coming in on 14 and 21MHz, but 24 hours later the bands were almost closed. On the whole, conditions were good enough for listeners to log several new ones on each of the higher bands. Some of the best callsigns on offer were:

**28MHz**: A22SC, C91J, FH5CB, S79FIB, P2OX, VS6VA, ZD7SM and ZF2UF.

**24MHz**: A71CW, FK8CP, S0RASD, TZ6LYN, V63MK, 3X0HLU, 5N0CEP, 5T5SN and 9J2AS.

**21MHz**: BV4AS/7, N6QHO/D2, ET3YU, FK/DJ5CQ, S21ZH, N9OQS/T5, V63CS, V73C, YI9CW (ex YI1BGD) and 5R8DJ.

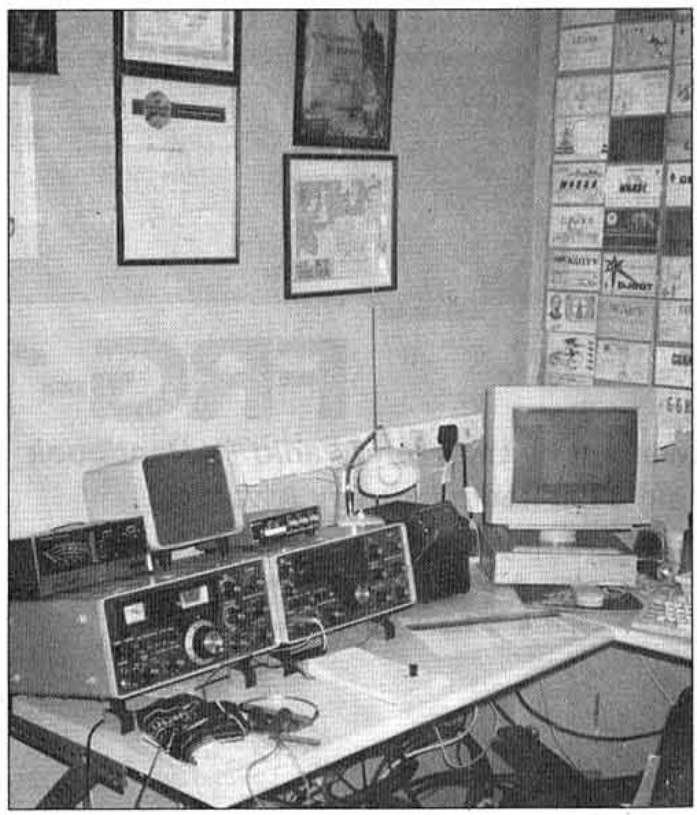
**18MHz**: A22BW, C91J, DU1AK, J52AG, JT1BV, W5IJU/KP1, VK9LM, 3D2AA, 4S7EA, 5H3MT and 9G1AA.

**14MHz**: FC5C, FO40K, FT4WD, H44MS, N9NS/KH5K, KH8/DL8UFF, TN1AT, V63MF, VP8CGK (South Georgia), ZD88V, ZD9CQ, ZS6AIS/7P8 and 9M8YL.

One thing seemed certain, the bands were remaining open longer. Indeed, DX could still be heard on many occasions on 21, 18 and 14MHz after 2100h. Keep the reports coming during the summer months as it will be interesting to see how the bands behave, and please do not forget to send in your reports of VHF happenings. Spend a little more time listening on 18MHz - there is plenty of DX on that band to keep most people happy!

## FINALE

NEWS AND comment for the **August** issue should reach me no later than **16 June**.

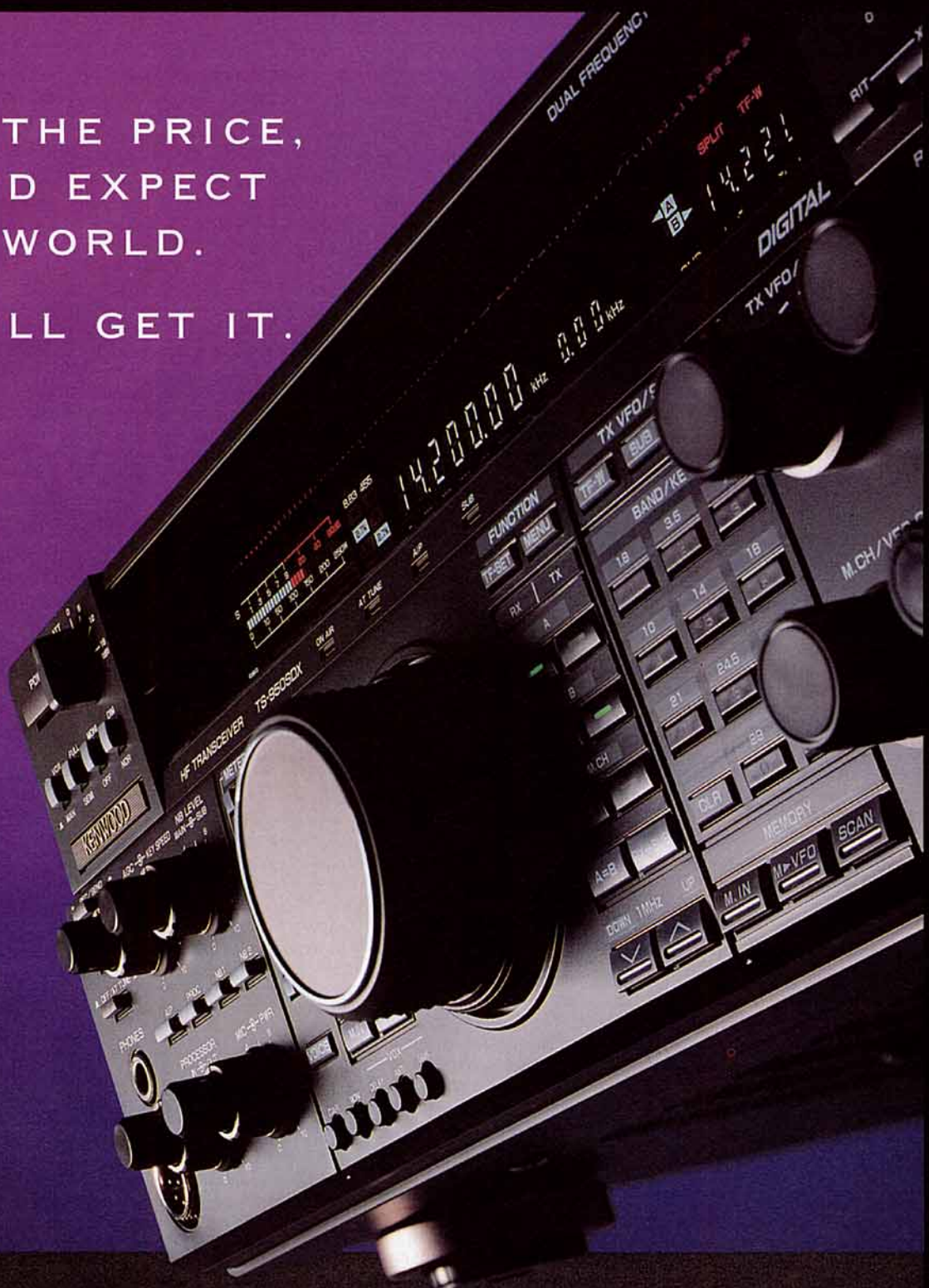


**Mick Toms, BRS31976 has an FT101 and FR101 providing dual VFO facilities on all bands including VHF.**

THE THREE POINTS OF THE KENWOOD TRIANGLE REPRESENT ADVANCED TECHNOLOGY, QUALITY AND STYLE

# FOR THE PRICE, YOU'D EXPECT THE WORLD.

# YOU'LL GET IT.




The TS-950SDX is at the very pinnacle of the Kenwood HF transceiver range. And when you look at its specification, that's not surprising.

It boasts a number of highly advanced features like built-in digital signal processing, 50 Volt MOSFET finals, AIP (advanced intercept point), built-in sub-receiver and built-in automatic antenna tuner. To name but some of its world-leading technical tours-de-force.

Just as important, it's made with Kenwood's traditional attention to detail and reliability, to stand up to a lifetime's use.

The TS-950SDX is part of a range of HF transceivers priced from around £1000 to £3500. And although quality is never cheap, it's still a small price to pay to have the world of radio communications at your command.

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HOME AUDIO, CAR AUDIO, COMMUNICATIONS EQUIPMENT, TEST AND MEASURING INSTRUMENTS, TELECOMMUNICATIONS

# Contest Exchange

ANDY COOK, G4PIQ
Fishers Farm, Colchester Road, Tendring, Clacton-on-Sea, Essex, CO16 9AA

ARE YOU one of those people who has decided that contests are the worst thing to hit amateur radio since the abolition of the Artificial Aerial licence? Well - if you are, don't stop reading now, and take a few minutes to discover why Mark Davis, G0KHB, changed his mind from this viewpoint.

Mark says he has a love/hate relationship with contests. When he first became active on HF with a direct conversion 80m Rx, he decided that he absolutely hated contests since the high levels of activity on the band during the events gave his receiver a hard time. Also his first contact with a contest station almost put him off radio for life - the high-speed 'pulse' of CW being a bit too much to handle.

After a little perseverance, Mark realised that contests posed a marvellous opportunity to work DX, particularly if you are a smaller station. He migrated his station to 20m and, obviously deciding that 2W was far too much power, ran his new system at that pile-up crushing level of 800mW into an 30m end-fed antenna. For a very long time, the best that Mark had worked was one W8 station; but that was until this year's ARRL CW contest. During that event, he was astonished to work a total of 20 'stateside' stations.

What this all goes to prove is that contests can be a marvellous opportunity for the smaller station to work DX (whatever your individual definition of the term) with relative ease.

There are at least two main reasons behind this situation; firstly, if we are talking about pure distance, contests encourage the mega-stations onto the bands. These are the people who have huge antenna systems, and, in general, these guys are obviously going to stand a better chance of working a small station at this end than will stations running average antennas. This is particularly so since they are likely to have paid careful attention to their receive systems. In the past when I have not had HF antennas on my tower, I have popped up for the odd contest and been amazed at the ease with which I could work quite large numbers of US stations on 40m and 80m with just 100W and loading up 30ft of my 70cm transmit feeder!

Secondly, if we are talking about working rare countries, there are many opportunities to be taken in this area also. Although, particularly at the start of the contest, the pile-ups can be pretty vicious, as the event progresses they thin out considerably, and the small station stands a much better chance of being heard - probably a better chance than outside of the contest since DX stations are rarely on for 48 hours at a stretch.

The same situation applies in VHF/UHF contests, and perhaps even more so. It is only during contests that some of the very biggest stations on the best sites are put together and activated. It is also very likely that the longest distance QSOs you make will be with well sited portable stations, who are only active during contests again extending your range over that in 'peace time'.

## GIVE A FEW POINTS AWAY

FROM SOME of the correspondence I have received, one of the major factors which stops people from taking advantage of the contests to work a few people is the misapprehension that you can't make contacts with a contest station unless you are entering the contest. This is most certainly not the case. In general, a contest station is likely to be even more pleased to have you reply to his CQ calls than would a normal station - making as many QSOs as possible is always the foundation of a big score.

The great difficulty you are faced with is knowing what information you have to send to the contester. The obvious solution to this is to look up the rules in *RadCom* (either in the *Contest Classified* pages for RSGB events, or in the *HF News* column for some non RSGB HF events). If you have access via packet radio to a DXCluster node; on most of the UK nodes, you can try typing SHOW/HFTEST JUN or SHOW/VHFTEST AUG for example to get information on contests for a particular month. If for whatever reason you end up being no further enlightened, then take a listen around the band to what is being worked by whom, and what information is being passed.

At VHF, almost without exception, every contact you make will count for points. The information exchanged does vary from contest to contest, but listening to what the contesting station sends you will almost always show what he needs from you. If you get report, serial number, and locator, then give him the same information back - pretty straightforward when you think about it isn't it!

But there are some occasions when you will come unstuck following this simple rule. For example, from a Swiss station you may get report, serial, locator and canton. If you are in the UK, giving your canton is obviously a bit tough; so, don't worry about it, and just give them the information which you do have. If anything else is needed, the contester will ask you for it.

Another common misconception is that, if you are not entering the contest, you should not send a serial number. Again, this is not the case - if the exchange includes serial numbers; then, even if you are just floating around giving a few points away, still send 001 to your first contact, then 002 to your second, and so on.

At HF, life tends to be a lot more complex - I don't think anyone has taken to exchanging inside leg measurements, or the conjugate of the complex antenna impedance of your previous QSO partner at that particular frequency; but, listening to some of the exchanges around, you do begin to wonder sometimes! Also, at HF, there are quite often some QSOs which will not count for points. An example of this is in the RSGB 21/28MHz contests, in which inter-UK contacts do not count for points. My view is that, if you have no written information about the contest, and after a reasonable amount of listening you cannot work out what the exchange and valid contact mix is, then you should go on and call a few people. They will soon let you know if they need different information, and if contacts between particular countries are not valid for points in that event. This technique is very definitely second best to getting the correct information from whatever source, but is very much better than spending the weekend cursing that **** contest and not making any QSOs! Don't be put off if the operator appears to snap at you - not only does efficient operating demand the minimum of time spent talking, but the adrenalin can sometimes make people act a little sharply in the heat of the contest. What does justifiably irritate the operator however are the stations who insist on continuing to call even after being told that the contact is not valid!

You can spend as long or as short a time as you like in the contest, and maybe, at the end of it all, you will think - 'Hey - I've actually made several QSOs here'. If this turns out to be the case, why not send log into the adjudicator? You are most unlikely to come last, it makes the results table form a better representation of the level of activity, and it helps to encourage others onto the bands in the future.

## PRACTICAL WIRELESS 2M QRP

**The Far Canal Contest Group, G0SEA, operating in *PW* QRP contest.**

BY NOW, some of you will have taken up my suggestions in the April column of contests in which to get your feet wet. For VHF types, there is another good opportunity on Sunday 20 June, 0900 - 1700UTC in the shape of the *PW* 2m QRP contest. Power output in this event is limited to 3W, meaning that virtually everyone is on an even footing in this respect, and making it viable for people to go portable with very small stations. The contest exchange is report, serial number and locator and a very simple scoring system is in place - further details are in June *Practical Wireless*. It is remarkable what can be worked with only 3W, particularly in the middle of the sporadic-E season, and perhaps entering this event will demonstrate what fun contests can be, and encourage you into the RSGB events later in the year. The sun even shines for this one sometimes too!

So, good luck everyone, don't forget to enjoy the field days, and I look forward to working all the non-contestants as well in future events!

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# Novice Note Book

**IAN KEYSER, G3ROO**
Rosemount, Church Whitfield, Dover, Kent CT16 3HZ

ONE OF THE MOST awkward pieces of equipment to use and store while in the shack is the handheld transceiver. Quite often they are placed on stacked shelves where they may get hidden or, even worse, dropped while retrieving a book.

Clive Williamson, G4IEB, has overcome this problem with a very elegant solution. It takes less than an hour to complete and costs virtually nothing for the components. For the younger Novices still at school this project could be carried out in a design/technology lesson.

## THE PROJECT

THE DESIGN DESCRIBED here was for Clive's son's KT44 70cm handheld but with very slight adjustments to the dimensions, it would be suitable for any handheld. If in doubt, a card model could be constructed first to check the suitability for your rig. Clive's descriptive notes for building the stand are reproduced here. The materials required are as follows:

- 22SWG aluminium sheet cut into two rectangles to suit your rig.
- Two 3mm pop rivets, or nuts and bolts
- Four stick-on feet or grommets
- A rectangle of fabric such as 'leatherette'
- Some contact glue such as Evostick

Have the following tools ready:

- Steel Rule, Tri-square and pencil
- Bench sheets
- Folding bars or vice
- Hatchet stake (for bending sheet metal)
- Rawhide faced or soft faced mallet.
- Hand drill with 2, 3 and 10mm drills, (the 10mm drill is for de-burring)
- Small metal file

## MAKING THE STAND

START BY DECIDING on the size of metal rectangles you require. Mark them out in one corner of the metal sheet, using the steel rule, tri-square and pencil. Observe the photograph carefully, and you'll see how this is done. Then cut out the two rectangles with the shears and smooth the edges with a file.

Make a 'safe edge' along one short edge of each piece of metal. To do this, about 8 millimetres of metal is bent over to 90° in the vice or bending bars. Then, using the rawhide mallet, the panel is bent right over so that a smooth tight 180° bend is produced.

## MARK THE LINES

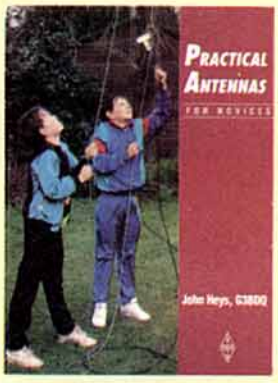
DECIDE WHERE THE bends in the metal have to be made and mark the lines with the pencil. Carefully align the lines to the edge of the vice and tighten it . . . . then carefully bend. The obtuse-angled panel is easily bent as required by hand. On the piece of metal which is bent to an acute angle, mark the centre line of its 'base' and drill two 3mm holes in suitable positions for fixing the two pieces of metal together. After this, don't forget to deburr the holes.

Now, using finger power, hold the two pieces together and find the position where your rig will be held firmly. Mark the position of the holes in the undrilled piece of metal and deburr. The two pieces are then pop riveted together, or alternatively, small nuts and bolts could be used.

Metal polish and a soft rag will bring a shine to your stand and then the finishing touches can be added. These could include a set of feet and some suitable fabric covering.

**Make this extremely useful stand for your handheld transceiver as described by G4IEB.**

# Practical Antennas for Novices




THIS GUIDE, written specially for UK Novices by John Heys, G3BDQ, tells you how to build good, simple antennas (aerials) for each of the Novice bands from 1.8MHz (short-wave) to 434MHz (UHF), plus construction projects to ensure they are working correctly. A chapter is devoted to safe common sense ways of setting up antennas for transmitting and receiving. This book will suit not only Novices, but also any beginner looking for easy-to-build antenna systems that really work. 60 pages.

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# RSGB OPEN DAY
## Saturday 19 June


See page 5

# NOVICE NEWS

**MRS ESDE TYLER, G0AEC**
43 Nest Est, Mytholmroyd, Hebden Bridge, W Yorks, HX7 5BH

ALTHOUGH I did not have any candidates for the NRAE papers in September or December, I was interested to read the City & Guilds reports on them. I was curious to know if there had been any significant improvement in the answering of questions on safety. The September report shows that a question on the colours of wires used to wire a mains plug correctly, attracted the right answer by 71% of candidates - an improvement, but still not good enough - nor safe enough.

Concerning the use of the station at a temporary location the report said: "Half the candidates thought that notice should be given to the Secretary of State rather than the Manager of the Radio Investigation Service". I could have answered that one wrongly and wondered about other Instructors. So I asked a few amateur friends, including one or two Instructors. Several answered correctly but quite a percentage immediately said "DTI", which means that, unintentionally, some potential Novices are possibly being misled. Page 79 of the current *RSGB Call Book* is headed 'Radio Investigation Service Addresses' and the information in the block below the title gives the information. When next you are wearing your Instructor's hat, please ensure that a similar question would gain full marks. That mark could be crucial!

In the general comments at the end of the September report there is a bouquet for Instructors generally, which you may like to read. "The paper was very well attempted by most candidates indicating that they were well prepared for the examination" - so well done Instructors, take a bow.

## RISHWORTH SCHOOL

ASSEMBLY IS early at Rishworth School - at 8.40am but by invitation - we were there to see certificates presented to the youngsters about to enter the hobby. I was very impressed.

There were two entrants for the November RAE and both were successful. Six more passed the December NRAE so radio-activity in this area should increase. Of those six, I know four callsigns. There is Chris, 2E1BOE, and three Matthews, 2E1 BOB, BOE and BOO respectively.

All this is interesting enough, but there is more. The Mayor of Calderdale, Bill Carpenter, is an amateur with the callsign G4KQJ (generally known as King Queen Jack) and when he was asked to present the certificates, he managed to find the time among his many other duties to do so. His address to the assembled school was a very good commercial for the hobby.

Five more youngsters took the March NRAE - including one young lady. Emma is eleven and is the sister of Matthew. I wish you success Emma, gentle female voices are rare in this area as in others. A further class of four is running at present, under the guidance of Tony, G7OKW; Roy, G3NBI, and Richard, G3UGF. Others are joining a waiting list as there will be a break for Summer holidays.

I am planning a visit to the school some Saturday morning when I will be shown the construction projects - of which there are many - going far beyond the requirements of the Novice course.

Rishworth School has a well-appointed radio shack. If you hear G0SQA, please answer - you could be speaking to one of their home-grown products!

## NEWS FROM GREAT YARMOUTH

DAVID, G3OEP, wrote to me recently telling of Novice activities within the Great Yarmouth Amateur Radio Club. David has been Chief Instructor for Norfolk since the beginning of the Novice Training Scheme and sixteen local Novices and one from Norwich bear testimony to David's dedication and the Club's commitment to training.

The enthusiasm did not end there. Stan, 2E0ABQ, was elected Club Chairman last year, becoming Vice chairman this year when John, 2E1BEE, was elected to the Chair. If any other club has a similar situation with Novices holding such high offices, we would like to hear about it. The club also has many keen Raynet members. Raynet came into being because of the East Coast flooding that occurred forty years ago when many lives were lost. Earlier this year tides rose over four metres above the normal level causing consternation - thus showing the need for Raynet in threatened areas.

Across the length and breadth of the country, amateurs give up their time to practice emergency procedures. When such an emergency arises, the Raynet system moves into action with each member of the team knowing exactly what to do - it is too late learning a procedure when disaster has struck. In all areas Novices have joined their fellow amateurs in Raynet exercises and have proved willing, capable and valued.

However, there are restrictions on what Novices are allowed to do - in spite of the fact that most Controllers would trust them with their lives. David makes the point that given an emergency of 1953 proportions, Raynet would not be able to cope without Novice commitment and help. Which brings me to David's next point - the value placed on Novices and the treatment they receive from Clubs and other organisations. Novices like to feel that they are an important member of any community, and will give their best when they feel that their efforts are appreciated. Are local Novices encouraged to join in all activities. Are their opinions sought and discussed? Are activities arranged to interest a wide age-range? Is help and advice given from the more experienced when a new aspect of the hobby is being opened to them? Are visiting speakers aware that Novices - of any age - may not have the background knowledge to ask questions without feeling that their lack of knowledge shows?

While not all Novices are young, please remember that once you too felt a midget among giants and needed guidance. Give them the help that you once received - you could soon find that they have a huge contribution to make to everyone's advantage. A few lines from someone to tell how your Club extends the welcome may give ideas to others. Novices, this is your column, you tell us.

**The Mayor of Calderdale, Bill Carpenter, G4KQJ, presenting RAE and NRAE certificates at Rishworth School.**

## MORSE HELP

HOW DID you learn Morse code? There are many methods - all of which are right for someone. The time comes, however, when listening is absolutely vital.

Morse tutors help a great deal when learning and reading random letters and numbers. Computer programs too could give random letters - or random words - and again give much needed practice. Also useful are transmissions on the bands, friends' tapes, club members giving practice before the main attraction for the evening, evening classes and practice between yourselves when you are ready for using a key. Some are perhaps more realistic, but most are heard in relative comfort with few background distractions.

For the Class 'A' licensees of yesteryear, with two separate transmissions in the test - plain language and numbers - the learning, practice and test did little to prepare anyone for life in the real world of communication on the bands and some amateurs, after trying and feeling hopelessly inadequate, lost the will to persevere - and consequently lost the hard-won skill. That is no longer the case, of course.

The Novice 5WPM test has always been in the form of a proper QSO including callsigns, numbers for signal reports and some procedure signals. Now the 12WPM test follows the same format and after it, the nervous can confidently embark on a QSO.

# WATERS & STANTON ELECTRONICS

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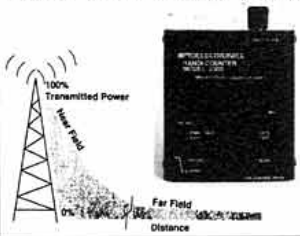


## RADIO KITS

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| MFJ-8100K | SW regen RX kit | £71.95 |
| **RAMSEY KITS** | | |
| SA-7 | Broadband RX pre-amp | £19.95 |
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| QRP-20 | 20m 1 watt QRP TX+VXO | £31.95 |
| QRP-40 | 40m 1 watt QRP TX+VXO | £31.95 |
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| CVF-80 | 80m VFO for MTX/CTX TX | £11.95 |
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| DcRx-40 | 40m SSB/CW RX 12V FW | £16.95 |
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| MA-4 | Mic amp/filter — AT-160 | £6.95 |
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RADCOM TECHNICAL FEATURE

# A Multiband Doublet

## For 10/18/24MHz

V C Lear (G3TKN/VO1XG)

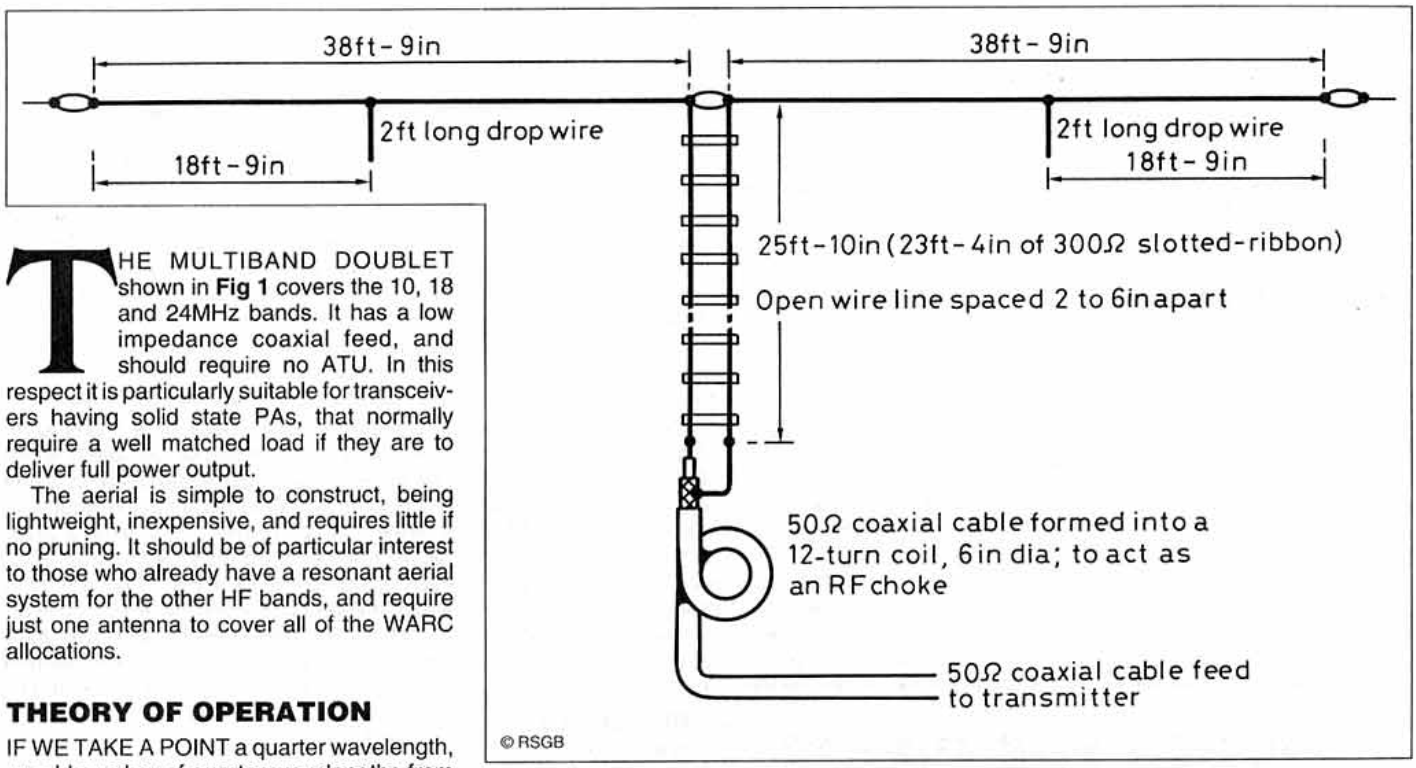


**Fig 1: The Doublet is easy to build and can give excellent results.**

THE MULTIBAND DOUBLET shown in **Fig 1** covers the 10, 18 and 24MHz bands. It has a low impedance coaxial feed, and should require no ATU. In this respect it is particularly suitable for transceivers having solid state PAs, that normally require a well matched load if they are to deliver full power output.

The aerial is simple to construct, being lightweight, inexpensive, and requires little if no pruning. It should be of particular interest to those who already have a resonant aerial system for the other HF bands, and require just one antenna to cover all of the WARC allocations.

### THEORY OF OPERATION

IF WE TAKE A POINT a quarter wavelength, or odd number of quarter wavelengths from the end of a wire, we arrive at a point which has maximum current, and hence low impedance. By observing some odd multiples of quarter wavelengths for each of the WARC bands using the formula;

$$L = 234/f$$

where L = Length in ft of one quarter wave and f = Frequency in MHz

we find the following:

$^3/_4$ wave on 10.125MHz = 69ft 4in

$^5/_4$ wave on 18.1MHz = 64ft 7in

$^7/_4$ wave on 24.9MHz = 65ft 9in

As can be seen from the above, these lengths are fairly close together. In the multiband doublet, the open wire line or 300Ω slotted ribbon stub, operates with a standing wave on it in each case, and the total length of wire from one end of the aerial to the centre, then down to the base of the stub is such that a point of low impedance is achieved on each of the three bands. The aerial is optimised for 18.1MHz, where the length from one end of the aerial to the centre then down to the base of the stub is five quarter waves. On 10.1MHz it is a little short of three quarter waves, and on 24.9MHz it is very close to seven quarter waves.

To gain a better understanding of the antenna in terms of current distribution, radiation resistance, and radiation pattern, it is easier to analyse the operation of the aerial on each of the WARC bands.

### 10MHZ OPERATION

THE CURRENT DISTRIBUTION on 10MHz is shown in **Fig 2**. From this we can see that each leg is 0.42 wavelength, and each half of the antenna carries in-phase currents, thus providing slight broadside gain. In other words it operates as two half waves in-phase, or two-element collinear. The theoretical gain of two half waves fed in-phase is 1.9dB. However, one could expect slightly less than this where the elements are slightly shorter, and hence where the current antinodes are closer together.

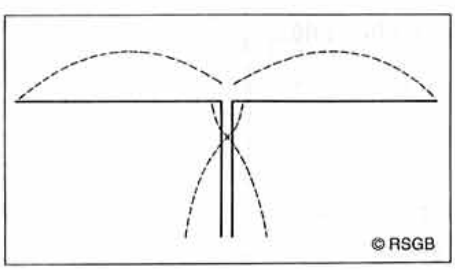


**Fig 2: Current distribution at 10MHz.**

Measurements with a well calibrated general coverage receiver (Eddystone EC10) and noise bridge placed at the bottom of an open wire (2in spacing) stub indicated resonance around 9.9MHz, with the aerial at about 30ft. A 300Ω slotted ribbon stub produced resonance at 9.7MHz. However, in both cases it was obvious by observation of the noise null that the antenna had a reasonably flat response between around 9.5 to 10.2MHz, and although at 10.1MHz the feedpoint could be expected to show slight inductive reactance (Ra+jX), no problems were encountered in practice. The aerial was fed with power from both a valve PA transmitter (Drake T4XC), and a TS130S with solid state PA. The latter produced its normal power output without the need for any external ATU. SWR figures across the 10MHz band were around 1.1:1 measured at the transmitter end, and different lengths of coaxial feed line produced similar results, indicating the line was operating in a flat condition.

The radiation pattern at 10MHz will be similar to a two element collinear array, maximum radiation being broadside to the wire, with a slightly narrower pattern than a dipole.

## 18MHZ OPERATION

ON THIS BAND the antenna is three half waves centre fed, and hence we have a low impedance point at the centre of the aerial (see **Fig 3**). The stub, which is exactly half a wavelength at 18.1MHz, acts as a 1:1 impedance transformer, and simply transfers the low impedance seen at the centre of the aerial to the feedpoint at the base of the stub. It should be noted, however, that the impedance at the centre of multiple odd half wavelength aerials increases slightly with the number of odd half waves. In practice, no problems were encountered in this latter case, and SWR figures around 1.2:1 were obtained on the 18MHz band, with the TS13OS giving full output.

The theoretical radiation pattern for a three half wavelength aerial consists of four major lobes, each at 42° to the wire. The gain of each major lobe is in the region of 1dB compared to a dipole orientated to give maximum radiation in the direction of one of the main lobes.

## 24MHZ OPERATION

ON 24MHz, EACH LEG is approximately one wavelength, and the antenna functions as a two wavelength centre fed system. The current distribution is shown in **Fig 4**. However, when resonance was checked using the noise bridge, the aerial was found to resonate at 25.7MHz. This meant that the impedance at 24.9MHz would have a reactive component present, which would be capacitive, so that the impedance would be of the form (Ra-jX)

The SWR was in the region of 2:1, and while the T4XC transmitter with its valve PA would load into the antenna, problems were encountered with the TS13OS, which would not now deliver full output at 24.9MHz.

The aerial was lengthened slightly at the ends to bring its point of resonance nearer to 24.9MHz, but this produced an unacceptable match at 18MHz, and a very slight deterioration at 10MHz. It was therefore decided to attach short loading wires a half-wavelength (at 24.9MHz) from the ends of the antenna. This meant the loading wires were at points of high impedance at 24.9MHz, but points of lower impedance at 10 and 18MHz. As a result their effect was less on these latter two bands than it was on 24MHz operation.

In practice the resonant frequency was lowered from 25.7MHz to 25.2MHz using two 2ft loading wires as shown in Fig 1. Although there was a slight lowering of resonance on the 18MHz band, it did not cause any problems, and there was certainly no noticeable difference on 10MHz. The SWR obtained at 24.9MHz was 1.4:1, and the TS130S was now delivering its full output.

The loading wires provide a means of pruning the antenna for the best compromise match on 18 and 24MHz, and depending on its height above ground, and general siting, it is probably worthwhile carrying out a little adjustment of these wires.

It is worth noting that when open wire line was used for the stub, the problem did not arise on 24MHz; the bandwidth appearing greater on each band. Therefore it is only worth fitting the loading wires if matching difficulties are encountered on the 24MHz band.

The radiation pattern at 24MHz will produce multiple lobes, tending towards the plane of the wire, but with slight gain in each of the major lobes.

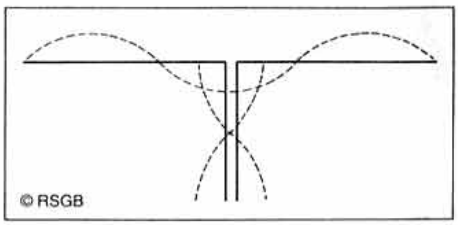


Fig 3: Current distribution at 18MHz.

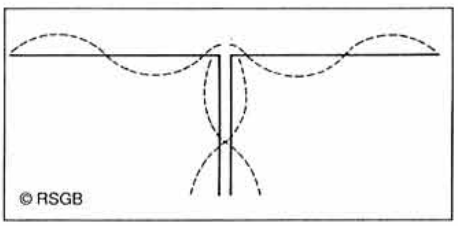


Fig 4: Current distribution at 24MHz.

## RF CHOKE BALUN

TWO SIMPLE RF CHOKE type baluns were tried, and both worked well.

The first type was made by simply coiling up the coaxial feeder to make a 12 turn coil, 6in diameter at the point of connection to the base of the stub.

The second type was one described by G2HCG, [1]. It is reproduced in **Fig 5**. It was found possible to just squeeze on 10 turns of UR43, wound as shown in the diagram. If UR43 50Ω cable is used throughout, no breaks in the cable are necessary until it joins onto the stub. However, UR67 heavy duty 50Ω was used to keep losses to a minimum at 24MHz, and a well weatherproofed barrel connector was used to join the PL259 plug on the end of the balun to the PL259 on the UR67 coaxial feeder.

The simple choke balun is probably to be preferred for this antenna, as some slight reactance is present at 10 and 24MHz. Many of the commercial baluns are trifilar wound on a ferrite core, and while they work in a satisfactory manner into a resistive matched load, internal losses can increase if they are used where the load becomes reactive. However, a commercial 'W2AU' type balun was tried both with the open wire line and 300Ω slotted ribbon stubs, with no noticeable drop in performance.

## CONSTRUCTION

IF THE STUB SECTION is made from open wire line, this can use 16-18SWG wire, spaced anywhere from 2 to 6in. Spreaders may be easily made from sections of plastic curtain rail, or small diameter PVC piping. If plastic curtain rail is to be used for the spreaders, it is essential to make sure it is of all plastic construction, with no metal strengthening rod running through the middle. Constructional details for the open wire line are shown in **Fig 6**.

Slotted 300Ω ribbon feeder (type GMP6) offers another alternative for the stub, and is less obtrusive than open wire line. However,

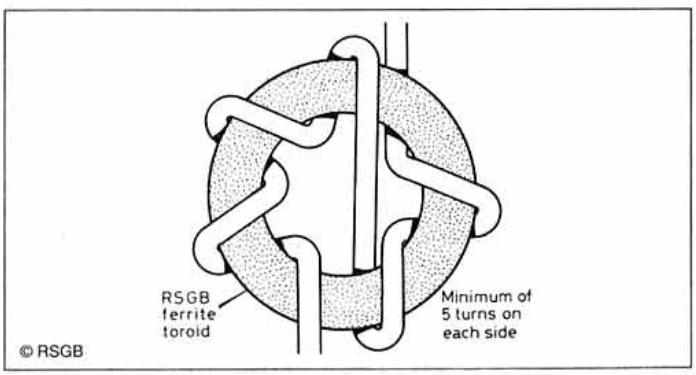


Fig 5: RF choke balun.


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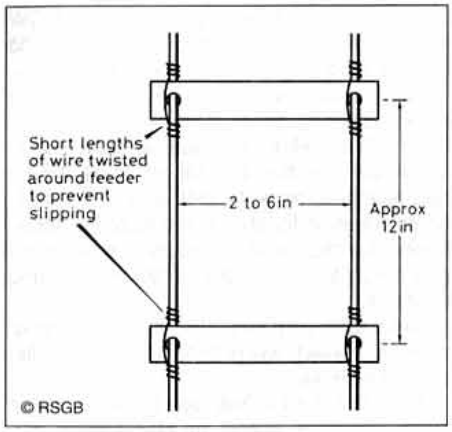


**Fig 6: Detail of open wire line construction.**

it can be affected more by weather than open wire line, although the differences are probably undetectable. The solid dielectric 300Ω ribbon is not to be recommended, but if it is used its lower velocity factor (normally about 0.82) must be taken into account when calculating the stub length.

The 300Ω slotted ribbon was connected to the centre of the aerial using a short length of polypropylene cord, threaded through one of the slots in the feeder, to take the weight of the cable. This relieved mechanical strain at the soldered joints.

A dipole 'T' piece was used to connect the ribbon to the coaxial cable via the RF choke balun. Again a small piece of cord was threaded through the slot in the ribbon to take the weight off the points of connection to the 'T' piece.

## OPERATION ON THE OTHER BANDS

THE DOUBLET HAS ALSO been used on all bands for 7 to 28MHz inclusive, by extending the stub into the 'shack' and connecting to a balanced ATU. Although this takes away the principal advantage of the doublet using just one coaxial feed, it does offer the opportunity to extend its coverage.

It should be remembered that when used in this way, the impedance offered to the ATU will be dependent upon the length of open wire or slotted 300Ω ribbon between the aerial and the ATU. An ATU with balanced antenna connections should be used.

On 7MHz the antenna is only 11.5ft short of a double extended zepp. The double extended zepp is basically two five-eighths-wavelength sections fed in phase, and can offer 3dB gain over a dipole. Maximum radiation will be broadside to the plane of the antenna with a bi-directional lobe narrower than that expected from a dipole.

On 21 and 28MHz the doublet will offer multi-lobe radiation patterns in much the same way as it does at 24MHz.

## RESULTS

THE ANTENNA HAS BEEN used mainly on the WARC bands in the form shown in Fig 1, using both open wire and 300Ω slotted ribbon stubs into coax. The apex height has been 40ft, with both ends sloping down to about 25ft.

With the antenna running N/S, particularly good results have been obtained on 18MHz on both long and short path into VK. When the antenna was first tried on 10MHz, the first report received was a S9+10dB from North America which was rather encouraging. However, it did seem rather directive on 10MHz, and as expected the best reports come from stations in an E/W direction.

On 24MHz it has given good contacts into Africa and California, but does appear quite directive as one would expect with a multi-lobe radiation pattern.

## CONCLUSION

THE ANTENNA DESCRIBED offers a simple and inexpensive way to sample all three WARC bands.

It should be noted that one is more likely to have a greater degree of success with a simple wire antenna at 18 and 24MHz because the general level of QRM is less on these allocations than on the more established amateur bands.

## FURTHER READING

[1] 'Controlled Feeder Radiation', B Sykes, G2HCG, *RadCom* May 1990

[2] 'The G5RV Antenna - up to date', L Varney, G5RV, *RadCom* July 1984

[3] 'ATU or ASTU', L Varney, G5RV, *RadCom* August 1983


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**MOS-FETs** permit high-power VHF with spectacularly low intermodulation distortion. **Guenter Schwarzbeck, DL1BU** comments in ***cq-DL*** 1/93 on his test of the *BEKO HLV-300 300W 144MHz amplifier*, designed and manufactured by **Bernhard Korte, DG5KAZ***.

THE NEED FOR extra-clean SSB signals is never more obvious than during VHF contests. The stacked Yagis at your adversary's QRO station on the next hilltop may well put 10mV on your receiver's input. Even if your receiver can handle that, and few rigs can, the other station's intermodulation (IM) products are likely to wipe out the sub-microvolt DX signal you want to hear. When a MOSFET VHF linear was offered for review, a comparison with valves and bi-polar transistors was irresistable.

The BEKO amplifier uses two Motorola MRF-150 devices in parallel; it includes a regulated 50V @ 10A power supply, a blower and a simple temperature-compensating bias supply which at +3.7V sets the optimum standing current of 2 x 2A. More than 30 transistors are used in circuits for control and protection against excessive drive, SWR and temperature.

## TEST RESULTS

THE LINEARITY PLOT shown in **Fig 1** clearly shows the excellence of the BEKO amplifier. The 1dB gain compression occurs well above its 300 watt rated output and up to 200W the gain is a virtually constant 13.5dB. All two-tone tests were done at this 200W PEP output.

IM products in an amplifier's output are meaningless unless its drive is at least an order of magnitude cleaner. No amateur SSB transceiver is that clean. Two 10W CW transmitters, however, through 6dB attenuators and a coax combiner, yielded a drive with IM3 at –48dBc or 54dB below two-tone PEP; no higher-order IM products were visible. **Fig 2** (blue).

With this driver, the HLV-300 measurements were –41 to –43dB for IM3, –52 to –56dB for IM5, and –65 to –62dB for IM7; beyond that nothing.

Harmonic suppression at a rated 300 watt CW output into a 50Ω dummy load was excellent, especially so as it was achieved with PCB-track inductors and chip capacitors and not with coaxial low-pass filter sections. The second and third harmonics were down 72 and 86dBc respectively and all higher harmonics below –90dBc.

The insertion loss of the amplifier on receive, 0.4dB, is less than expected; this points to the use of good coaxial relays.

## COMPARISONS

THE SAME DRIVE WAS applied to a traditional valve linear with a 4CX350 in class AB rated at 700W PEP output; it was dissipating a whopping 250W (>2kV at a standing current of 120mA) and yielded 400W PEP. IM products were –29dBc for IM3, –32dBc for IM5, –47dBc for IM7 and –49dBc for IM9 (**Fig 3**). Reduced drive (and output) did not improve the IM performance. In class B, as recommended for 400W FM or CW output, the figures were –20, –25, –36 and –48dBc respectively. For FM these figures may be irrelevant but for QRO CW they are not; the rise and fall of dots and dashes produces a wide band of key clicks.

Bi-polar transistors basically do as well, or rather as poorly, as valves in Class B; in wide-band HF amplifiers this can be improved to the values for the 4CX350 in class AB by negative feed-back. In VHF and UHF amplifiers, negative feedback is difficult to apply, hence the deplorable performance often encountered from this type of amplifier during contests.

Note well: *any* amplifier, if overdriven or wrongly biased, will pollute a band and discredit its owner.

The BEKO HLV-300 can be seen at the UKW-Berichte stand at HamRadio '93, Friedrichshafen (25-27 June). Its price is approx £1000 + VAT.

* B Korte, Ruessstrasse 6, D-8000 Munich 50.

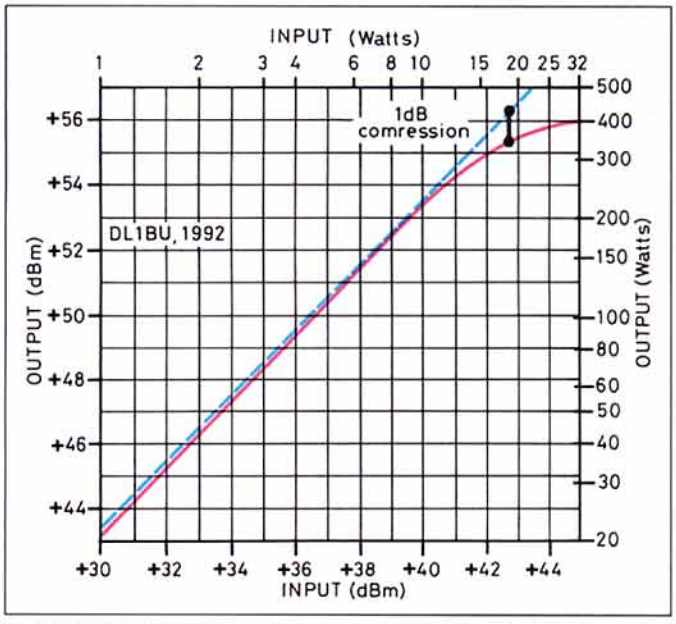


**Fig 1: MOSFET 145MHz linear. Output vs Input. The blue line denotes perfect linearity with a gain of 13.5dB. At 300W 'rated' output compression is 1dB.**

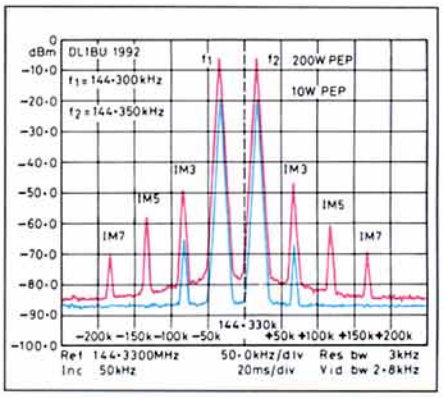


**Fig 2: MOSFET 145MHz linear. Two-tone intermodulation spectrum. 200W PEP output red, input blue.**

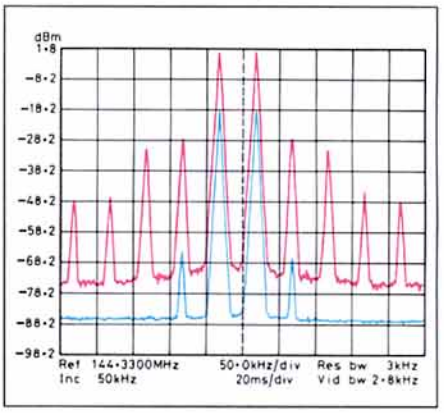


**Fig 3: 145MHz valve amplifier (4CX350 in Class AB). Two-tone intermodulation spectrum. 400W PEP output red, input blue.**

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# PRODUCT NEWS

**Note: Product news is compiled from press releases sent in by the manufacturers and distributors concerned. Details are published in good faith but *Radio Communication* cannot be held responsible for false or exaggerated claims made in the source material.**

BACK TO THE FUTURE? Not really amateur radio, but we thought readers might be interested in the Roberts 'Revival'. This is a rather attractive LW/MW/FM portable, looking externally just like the company's R200 model of the late 1950s, complete with a wooden case. Internally however, it uses the latest components and technology. The little set aroused considerable interest here in the *RadCom* office, and it will be fascinating to see if the style catches on. Must a radio have a black box to sell these days?

For more details on this and the full range of Roberts radios contact Bronwen Andrews or Stuart Newman at **PR Unlimited, 78 Ebury Street, London SW1W 9QD Tel: 071 730 7174** or your local Roberts dealer.

THE MFJ-8100 IS a rather nice looking short wave receiver kit which has just been released. It covers 3.5 to 22MHz and is a regenerative design, capable of AM/SSB/CW reception. The MFJ-8100 has a FET RF amplifier, dual FET regenerative detector and LM386 audio stage.

Because the receiver is designed for short end-fed wires, the makers claim that it is able to provide a performance similar to that obtained from an active aerial and gives beginners a chance to obtain good short-wave signals from very modest aerials.

The 40-page instruction manual is particularly detailed, and the suppliers, Waters and Stanton Electronics, offer a backup service in the event of the kit not working. All in all, it looks like an ideal beginners project.

The set is built in a smart metal cabinet (supplied ready drilled), and is similar in appearance to the MFJ-9020 transceiver reviewed in the March issue of *RadCom*. Price of the MFJ-8100 is £71.95 inc VAT, and UK carriage is £5.00. Further details on this and other MFJ products from **Waters and Stanton, Tel: 0702 206835**

ONE OF THE MOST useful items of test equipment in any amateur shack is a frequency counter, and SAJE Electronics have recently introduced two high-sensitivity portable models. The SJ-40 and SJ-130 are full featured (micro-based) battery operated counters with frequency ranges which extend to 400MHz and 1.3GHz respectively.

A liquid crystal display gives excellent eight-digit resolution, the instruments are lightweight (250g) and compact (165 x 87 x 38mm). Battery life is typically 12 hours from a PP3. Sensitivity is high - better than 10mV at 40MHz.

The counters are available from **Holdings Amateur Electronics (G3LLL), 45 Johnston Street, Blackburn BB2 1EF Tel: 0254 59595**. VAT inclusive prices are SC-40 £105, SC-130 £129. There is also a mains powered version (SC-230) at £175. UK carriage is £1.50 per order.

THE LATEST PC SOFTWARE Reference Manual (Issue 15a) from the Public Domain and Shareware Library contains a comprehensive selection of software for a wide variety of applications on the IBM-PC and compatibles.

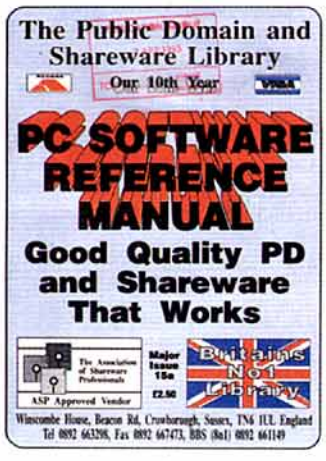
There are many programs devoted to amateur radio (including packet radio and antenna design), as well as those for data communications and scientific applications.

Also featured are files for printed circuit board design and circuit analysis. A number of manufacturers now produce data disks of their products, to enable selection of ICs and discrete semiconductors for particular applications. A variety of these are listed on page 34 of their catalogue.

As well as ordering by post, downloading of files by modem is also possible for those who can't bear to wait for the postman to deliver.

For your free 124 page catalogue contact:

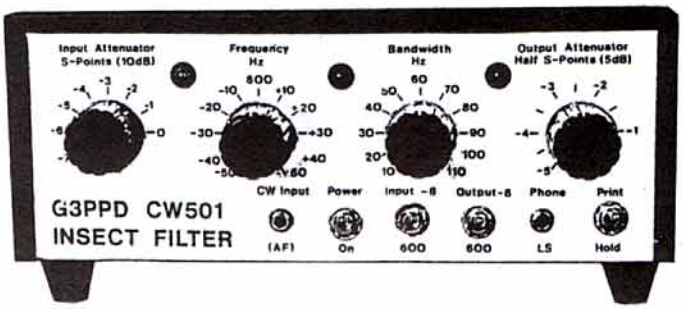
**The Public Domain and Software Library, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL Tel: 0892 663298.**




IF YOU'RE ONE OF the many amateurs who've acquired the CW bug, then you need . . . . a G3PPD CW501 Insect Filter! This is claimed to be the 'Rolls Royce' of CW audio filters, and the manufacturers say that it really is the 'bees knees' when it comes to pulling DX out of the noise. Apparantly the Insect Filter has been enthusiastically endorsed by leading European DX stations, and "it's so sensitive you will be able to hear insects talking to one another".

Besides adjustable frequency and bandwidth, input and output attenuators are fitted, as well as switchable impedance matching networks for 600Ω or 8Ω. The unit measures 200 x 150 x 75mm, requires a power supply of 13.8V, and is available as a kit or ready built. Listeners with computers may be interested to learn that optional TTL and RS232 interfaces are available.

To obtain your Insect Filter (on 28 days approval if required), beetle on down to: **Stuart Dobson, The Haven, Lound Rd., Blundston, Lowestoft NR32 5AT Tel: 0502 732322** for delivery and price information.



# IN PRACTICE

IAN WHITE, G3SEK
52 Abingdon Road, Drayton, Abingdon, Oxon OX14 4HP – or @ GB7AVM

## STOCKING YOUR JUNK BOX

YOU CAN SAVE a lot of time, money and frustration on your next project if you already have most of the components 'in stock'. There's often no need to pay full catalogue prices for ordinary components like small resistors, capacitors and general-purpose semiconductors, because you can buy them much more cheaply from surplus dealers at rallies and junk sales. If you snap up the real bargains as they come along, you need only pay the higher prices to fill in the gaps.

Try to build up a stock of small resistors of assorted values between 10Ω and 100kΩ. Start off your capacitor stock with 1nF, 10nF and 100nF, of the small plate variety. These are always useful for RF bypassing in transistor or other low-voltage circuits. Lay in a few small electrolytics, eg 10µF and 100µF, especially the miniature tantalum-bead types; they're quite dear at full price but plentiful as surplus. Lower-value capacitors such as 10pF, 47pF etc may be useful in VHF circuits.

For semiconductors, stock up with small-signal diodes (1N4148 and similar), power rectifiers (eg 1N4007), zener diodes of various voltages, small-signal transistors of all sorts, a few 7805 and 7812 voltage-regulator ICs and perhaps a few 2N3055s, the 'universal' NPN power transistor. But do remember that components appear cheaply on the surplus market for a good reason, and sometimes it's because they are out-of-tolerance or incorrectly marked. Before you store them away for future use, it's always worth measuring a few samples if you can.

'Junk' units (sold as non-working) are an excellent source of components. It's hardly worth stripping down junk units for ordinary Rs and Cs, but well worthwhile for semiconductors, specialised RF components and even the hardware like nuts and bolts (new price 2p each!). For example, the cheapest way to buy a surplus 2N3055 is often ready-mounted on a heatsink - though you have to take the risk that it's a puddle of melted silicon inside. Junk RF units are often over-priced at rallies; the real bargains appear in ordinary scrap-yards and at radio car-boot sales.

There are many surplus-component firms, and most of them appear at the big rallies, so get there at least once a year to re-stock with small Rs, Cs, semiconductors, LEDs, ferrite beads and all that kind of stuff. Some firms offer 'bargain bags' of mixed components at very low prices, but it's best to inspect them in person before buying.

The stocks of the professional dealers change rapidly because they buy-in whatever becomes available, so don't expect them to have everything you need. At a rally, shop around: what you can't find at one stand may be available at another. The best surplus bargains go to those who are best prepared and this background knowledge can be acquired free by studying the commercial component catalogues.

## ORDERING FROM CATALOGUES

THAT BRINGS ME to those components you haven't got in stock, can't find on the surplus market and therefore need to buy from a major component supplier which does aim to stock everything you could possibly need. Unless you're close to a branch in a big city, you usually have to deal with these forms by mail order.

Taking the retail companies first, the Maplin and Cirkit catalogues are sold through high-street magazine shops and are also useful as data books. Other mail-order retail catalogues I'd particularly recommend are Electromail (the retail branch of RS Components), Bonex, Mainline and Electrovalue. Most of the retail companies use pre-printed order forms, and are very easy to deal with.

Payment by credit card has many practical advantages. Leaving aside the strictly financial aspects, the main advantage over cash or cheque with order is that you don't have to predict the cost to the nearest penny. The supplier will charge the actual price, automatically taking care of any variations in carriage charges, or overpayments if components are out of stock. If there has been a minor price increase, the supplier generally sends the components and charges you accordingly, without having to contact you for a further small payment; this usually works out best for all concerned. And in all these transactions, you have some protection from the credit card company in cases of error or dispute.

If there is a pre-printed order form, always use it. The form asks for all the information the company needs, so you can hardly go wrong if you fill it in with care. Most companies have a flat-rate carriage charge in the region of £1-£3 for small items, and this is partly to encourage you to put together an order of worthwhile size. If there isn't a pre-printed form, that means you are dealing with a supplier whose primary business is with commercial companies. Many are pleased to accept credit-card orders from amateurs, using the facility intended for non-account commercial customers, but do remember that you have to deal with them in a businesslike manner and 'speak their language'. In particular, you must quote stock numbers and respect any minimum-order quantities specified in the catalogue. The type of letter shown in **Fig 1** will generally 'do the business' for you.

Mr J Q Ham
73 Grid Drive
ANYTOWN
Midshire
AN1 2RF

Component Supplies Ltd
PO Box 88
OXFORD
OX99 3DB

date

Dear Sirs,

Please supply the following components -

| Qty | Stock code | Description | Unit price | Total |
|---|---|---|---|---|
| ... | ..... | ..... | ..... | ..... |
| ... | ..... | ..... | ..... | ..... |
| ... | ..... | ..... | ..... | ..... |

Total price .....
Carriage .....
VAT on the above .....
Total .....

Please charge ..... card No. ....., expiry date ....., and deliver to the above address.

Yours faithfully,

[signature]

J Q Ham

**Fig 1: Sample order letter. For payment by credit card, the above details - including signature - are essential. UK suppliers will only deliver to the address shown in the records of the credit-card company.**

## TUNING AND LOADING

*PLEASE CAN YOU explain the operation of the PLATE and LOAD controls on my valve linear amplifier? Being a relative newcomer to amateur radio I don't have a background with valves, and the manual is too obscure to be of any help*

A PROBLEM OF our time, indeed .... In days of old, everyone would have known how to adjust these two controls, and there would have been plenty of people to set newcomers straight. But today, people who have only ever used no-tune rigs are acquiring second-hand HF transceivers with valve PAs, or valved HF linear amplifiers. The almost universal output circuit for HF valve amplifiers is the pi-network (**Fig 2**).

The coil L1 is usually tapped at several points, selected by the main band-switch to give the correct inductance for each band. The variable capacitor C1 nearest to the valve is typically 300pF maximum and is called the TUNE or PLATE (American for 'anode') capacitor, while the variable C2 nearest to the output is called LOAD, LOADING or occasionally ANTENNA.

Typically the loading capacitor is 1000pF maximum, and both C1 and C2 may have additional fixed capacitors switched in parallel for the lower frequencies. To complete the picture (Fig 2) ,an RF choke RFC1 delivers the DC supply to the valve anode(s) and a DC-blocking capacitor, C3 carries the RF current into the pi-network. Connected across the output is a safety choke RFC2, whose purpose is to keep the output terminal and the antenna at DC ground potential if C3 fails short-circuit.

The settings of C1 and C2 will

interact, though C1 is usually the more critical and is used to resonate the circuit as a whole. The setting of C2 will allow you to maximize the RF output into various kinds of loads. If your antenna has a VSWR below about three on the chosen operating frequency, you can often manage with the pi-network alone, eliminating the need for a separate antenna tuning unit (ATU).

Try this simple CW tune-up sequence, with the transmitter connected to a 50Ω dummy load that's big enough to handle the RF power. Many transmitters have a time-limit on continuous key-down time, especially until the pi-network has been correctly adjusted for maximum transfer out of the valves and into the load, so check your manual and take care until you've got the hang of it.

1. Select CW, plug in the key, and set the PLATE and LOAD controls to mid-way.
2. If your transmitter has a low-power TUNE position, use it; if not, reduce the output power for the next step.
3. Press the key and quickly adjust the PLATE control for maximum RF output (measured on a built-in meter or an external RF power or VSWR meter). Release the key.
4. Switch to normal power output. Press the key and readjust PLATE for maximum RF output. Release the key.
5. Press the key and adjust LOAD for maximum power output. Release the key to give the valves a breather. Press the key and readjust PLATE. Release the key.
6. Repeat step 5 until you cannot obtain any more RF output.

This is normally the correct condition for HF linear operation, with the system tuned and loaded for maximum power output at full drive level. When you switch to SSB, you should then adjust the DRIVE control for the correct SSB drive level as detailed in the equipment manual. In certain cases you may be instructed to maximize the available RF output at a specified anode current, or in the case of 4CX250Bs to adjust the LOAD control for the correct value of screen-grid current [1].

With a little practice you'll be able to tune and load your transmitter very quickly, especially if you make a note of the correct settings for each band. When you connect an antenna of nominal 50ohm impedance, you'll have to repeat the procedure to tune and load the amplifier into whatever impedance the antenna is actually presenting. If you use an ATU, don't touch the transmitter after setting it up with the 50ohm dummy load; instead, adjust the ATU with the aid of a VSWR meter so that the antenna looks to the transmitter like a 50ohm load.

## DRILLING HOLES

*WHENEVER I TRY to drill a box or a panel, it ends up looking a mess. How should I do it right?"*

WE'RE NOT TALKING about precision engineering here, just ordinary DIY drilling of boxes and panels in soft materials like aluminium or plastic. The process divides into three equally important sections: marking-out, centre-punching, and the drilling itself.

A good way to mark where you're going to drill holes is to cover the relevant sections of the workpiece with masking tape (DIY stores).

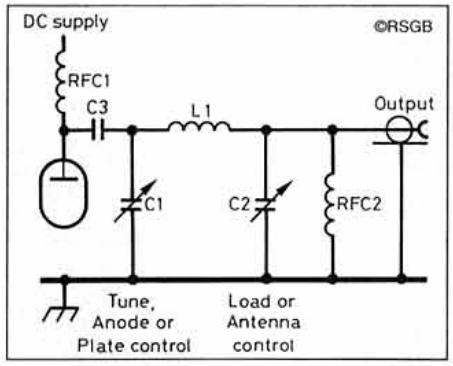



**Fig 2: Basic pi-network circuit. The band-switch generally selects a tap on the inductor for each band, and additional fixed capacitors may be switched in parallel with C1 and C2 for the lower-frequency bands.**

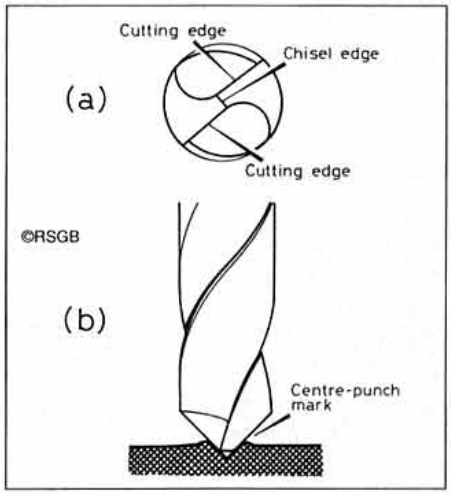



**Fig 3: (a) Close-up of a twist-drill bit, showing flat chisel-edge tip and the two cutting edges. (b) Choose a pilot drill sufficiently small that its chisel edge is located entirely inside the centre-punch depression.**

This allows you to draw lines and write on the surface without spoiling the appearance. Use a sharp pencil, ruler and set-square to mark where the holes are to be drilled, working from two edges that are at right-angles. Write the diameters of the holes near where your marking-out lines cross. Some components require several mounting holes, and it's often possible to mark one hole and then use the component itself as a template for marking the others. It's generally more important that the holes are accurately positioned relative to one another, than it is to locate the whole component accurately. For marking holes on a 0.1in grid, tape down a piece of Veroboard and mark through the holes.

The next step is to centre-punch the holes. This will locate the point of the drill-bit in the vital initial stages of drilling. Without this mark the point will wander and bite in at the wrong place, or else the drill will bend or break. I prefer a small, sharp centre-punch which can be accurately located and given a gentle tap with a light hammer. If a deeper mark is needed, this can follow afterwards.

Obviously a vertical drill-press is best for the drilling itself. Second in order of preference comes a hand-drill, and last of all a hand-held power drill because it's too easy to make expensive and dangerous mistakes. For holes larger than 3-4mm you should probably use a pilot drill, typically 2-3mm diameter. Any normal twist drill does not have a sharp point: even the tiniest has a flat 'chisel edge' at the end (**Fig 3a**), which needs to be located entirely within the centre-punched depression to prevent the drill from wandering (**Fig 3b**). Drill the pilot hole right through and open it out with progressively larger sizes, once again keeping the chisel edge of the larger drill inside the hole and letting the two main cutting edges (Fig 3a) do the work. Many problems with drilling are caused by blunt or damaged drills. They do wear out, even on aluminium, and regrinding drill points is highly-skilled work.

Whatever kind of drill you're using, ALWAYS clamp your work securely. If you're using a drill press, make sure that the drill bit is accurately located over the centre-punch depression or else you'll probably break something. For non-precision work, leave the masking tape in place to further discourage the drill from wandering. There's a lot to be said for starting with a hand-drill; just take it easy, concentrating on keeping the drill-bit square to the workpiece.

When drilling is under way, don't try to push the drill through the metal or plastic - let it 'find its own way'. If the hole is deep, pull the drill out frequently and clear any swarf out of the spiral flutes.

It's a critical moment when the drill breaks through the other side. It can snatch viciously and may even break the drill-bit or pull a power drill out of your hand. That's when you learn the virtues of clamping the work securely! Try to ease off the pressure at the last moment, and let the drill drift gently through the last small thickness. It can be very difficult to avoid tearing thin metal when the drill breaks through; one solution is to clamp the sheet rigidly between two thicker pieces of waste material.

These few pointers should greatly help to improve the quality of your drilling. Some aspects are a bit 'quick and dirty', and there are several good books to instruct you in the finer points of precision marking-out and drilling [2]. If all else fails, you'll have to develop the art of 'hole-shifting' - it's amazing what mistakes can be rescued with the help of a thin round file!

## UNTIL NEXT MONTH...

IF YOU HAVE any comments on this month's column, or any new questions, I'd be very pleased to hear from you by mail or by packet (see head of column). But please remember what I said in the first *In Practice* column (April *RadCom*): I can only answer questions through this column, and they have to be on topics of general interest. Sorry, but regretfully I cannot give individual advice. The feature on books will be held over until next month.

## REFERENCES

[1] Transmitters, power amplifiers and EMC. *The VHF/UHF DX Book*, DIR Publishing Ltd, ISBN 0-9520468-0-6.

[2] *The Amateur's Workshop*, Ian Bradley, Argus Books, ISBN 0-85242-482-5.

[3] *UK Callbook 1993*, RSGB.

[4] *The ARRL Handbook*, obtainable from RSGB (see page 94).

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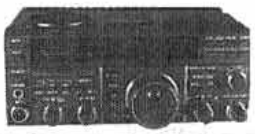
# ARE COMMUNICATIONS '92


FT890/AT

FT990
FT990/DC

FT1000

TS450S

TS850S

TS950SDX

**These are what can only be described as the 6 most popular HF transceivers at present. They have everything you require or not require whatever the case may be. Phone us now and we will tell you why as well as the all-important question – *No prizes for guessing.***

TH78E

ICW21E/ICW2E

FT530

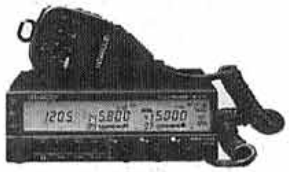
DJ580E

Just look at the choice that is open to you, they all do the same we hear you say. Not true, there is one which has just that bit extra, which one will it be for you?

TM732E

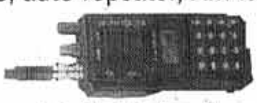
FT5100

IC3230

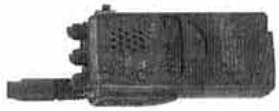

TM741E

Yet again all four of these mobiles are packed with features from 2m, 70cm, 6m in one rig, remote head facility, wideband receive, dual receive, auto repeater, AM facility. It just goes on and on.

FT26/76


DJF1/F4

TH28/48


P2E/4E

If a dual band hand held is not for you then just take a look at these 2m and 70cm handies. From the basic FT26 to the sophisticated TH28E. The thing is all of these hand helds are good, it's just a question of your taste.

NRD535G

## *Rich Man Poor Man*

Why bother with any other shortwave receivers, these are the only two that fit the bill. The basic FRG100 which is winning awards left right and centre for performance and price and the NRD535G which can only be the **best** for the most serious listener.

FRG100

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*Don't forget, we want your good secondhand equipment.*

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# Simply Silicon

**National LMF100** – This month's IC is a Dual Switched Capacitor Filter offering high performance and versatility. Q factor, bandwidth and passband gain are selectable with external resistors, and a TTL or CMOS compatible clock at 50 or 100 times the centre frequency sets the frequency response. DIL versions are the LMF100ACN, LMF100CCN and LMF100CIN which have similar levels of performance in most applications. A 24 page file of design data for applications using this chip is available from National Semiconductor.

THE LMF100 CONSISTS OF two independent general purpose high performance switched capacitor filters. With an external clock and two to four resistors, various second order and first order filtering functions can be realized by each filter block. Each block has three outputs. One output can be configured to perform either an all-pass, high-pass or notch function. The other two outputs perform band-pass and low-pass functions.

The centre frequency of each filter stage is tuned by using an external clock or a combination of a clock and resistor ratio. Up to a fourth-order biquadratic function can be realized with a single LMF100.

Higher order filters are implemented by simply cascading additional packages, and all the classical filters (such as Butterworth, Bessel, Elliptic, and Chebychev) can be realized. The National LMF100 is pin compatible with the industry standard MF10, but provides greatly improved performance.

## FEATURES

- Wide 4V to 15V power supply range
- Operation up to 100kHz
- Low offset voltage
  typically $V_{os1}$ = +/– 5mV
  $V_{os2}$, $V_{os3}$ = +/-15mV
- Low crosstalk -60dB
- Clock to centre frequency ratio accuracy = +/– 0.2% typical
- fo x Q range up to 1.8MHz
- Pin compatible with MF10

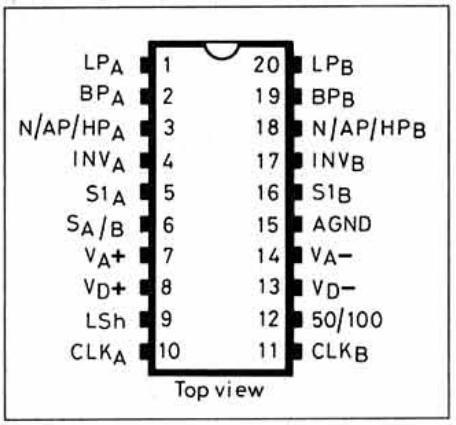


**Fig 1: LMF100 in 20 pin DIL package.**

## PIN DESCRIPTIONS

### Lp (1,20), BP (2,19), N/AP/HP (3,18)

The second order low-pass, band-pass and notch/all-pass/high-pass outputs. These outputs can typically swing to within 1V of each supply when driving a 5kΩ load. For optimum performance, capacitive loading on these outputs should be minimized. For signal frequencies above 15kHz the capacitance loading should be kept below 30pF.

### INV (4,17)

The inverting input of the summing op-amp of each filter. These are high impedance inputs. The non-inverting input is internally tied to AGND (mid-supply) so the op-amp can be used only as an inverting amplifier.

### S1 (5,16)

S1 is a signal input pin used in certain modes of operation. The input impedance is $1/f_{CLK}$ x 1pF. The pin should be driven with a source impedance of less than 1kΩ. If S1 is not driven with a signal it should be tied to AGND.

### $S_{A/B}$ (6)

This pin activates a switch that connects one of the inputs of each filter's second summer either to AGND ($S_{A/B}$ tied to V–) or to the low-pass (LP) output ($S_{A/B}$ tied to V+). This offers the flexibility needed for configuring the filter in its various modes of operation.

### $V_A$+ (7)

This is both the analogue and digital positive supply.

### $V_D$+ (8)

This pin needs to be tied to V+ except when the device is to operate on a single 5V supply and a TTL level clock is applied. For 5V, TTL operation, $V_D$+ should be tied to ground (0V).

### $V_A$– (14), $V_D$– (13)

Analogue and digital negative supplies. $V_A$– and $V_D$– should be derived from the same source. They have been brought out separately so they can be bypassed by separate capacitors, if desired. They can also be tied together externally and bypassed with a single capacitor.

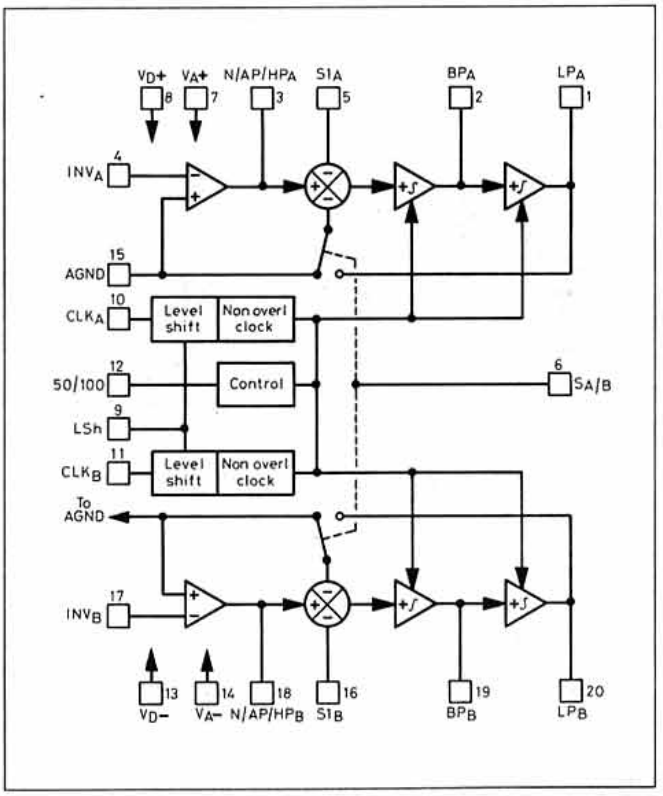


**Fig 2: Internal configuration diagram.**

### LSh (9)

This is the level shift pin. With dual +/-5V supplies and CMOS (+/-5V) or TTL (0V-5V) clock levels, LSh should be tied to the system ground. For 0V-10V single supply operation the AGND pin should be biased at +5V and the LSh pin should be tied to the system ground for TTL clock levels. LSh should be biased at +5V for +/-5V CMOS clock levels. For single 5V operation the LSh and $V_D$+ pins are tied to system ground for TTL clock levels.

### CLK (10,11)

Clock inputs for the two switched capacitor filter sections. Unipolar or bipolar clock levels may be applied to the CLK inputs according to the programming voltage applied to the LSh pin. The duty cycle of the clock should be close to 50%, especially when clock frequencies above 200kHz are used.

### 50/100 (12)

By tying this pin to V+ a 50:1 clock to filter centre frequency ratio is obtained. Tying this pin to mid-supply or to V– allows the filter to operate at a 100:1 clock to centre frequency ratio.

### AGND (15)

This is the analog ground pin. This pin should be connected to the system ground for dual supply operation or biased to mid-supply for single supply operation. For optimum filter performance, a 'clean' ground must be provided.

## TYPICAL OPERATION

The LMF100 has six major modes of operation. Mode 3a (see **Fig 3**) is typical, and values are calculated as follows:

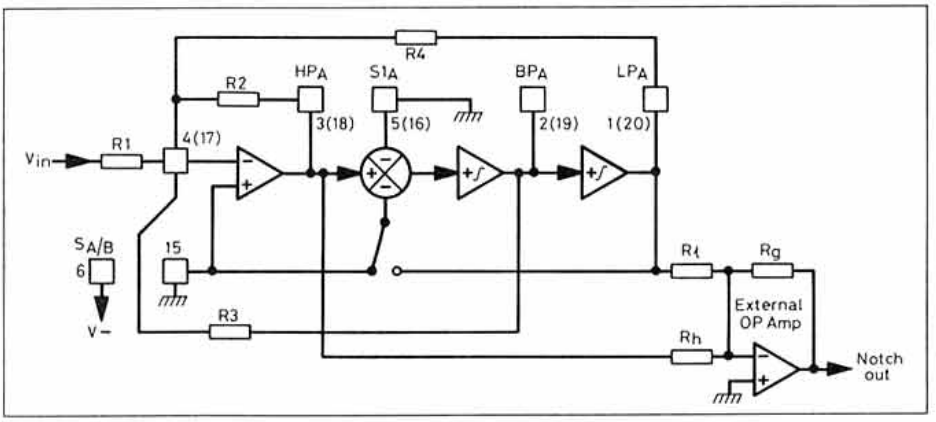


**Fig 3: The LMF100 in mode 3a has HP, LP, BP and notch outputs, as shown above.**

Centre frequency = $f_o = \frac{f_{CLK}}{100} \times \sqrt{\frac{R2}{R4}}$

*or* $= \frac{f_{CLK}}{50} \times \sqrt{\frac{R2}{R4}}$

Q $= \sqrt{\frac{R2}{R4}} \times \frac{R3}{R2}$

Highpass gain $= H_{OHP} = -\frac{R2}{R1}$

Bandpass gain $= H_{OBP} = -\frac{R3}{R1}$

Lowpass gain $= H_{OLP} = -\frac{R4}{R1}$

Notch frequency $= \frac{f_{CLK}}{100} \times \sqrt{\frac{R_h}{R_f}}$

*or* $= \frac{f_{CLK}}{50} \times \sqrt{\frac{R_h}{R_f}}$

Gain of notch at $f_o$ =

$$Q\left(\frac{R_g}{R_f} H_{OLP} - \frac{R_g}{R_h} H_{OHP}\right)$$

The integrated circuit is available from National Semiconductor distributors or in the LMF100CIN version from Electromail (RS). Tel: 0536 204555.

**NOTE:** Device characteristics and application notes in *Simply Silicon* are compiled from manufacturers published data. Circuit diagrams are included for experimental purposes only, and have not been proven by *Radio Communication*. Transmitting equipment must be operated in accordance with national regulations. All data is copyright of the device manufacturer.


**RSGB National Mobile Rally**

**Sunday 18 July 1993**

**Open 10am**

**Woburn Abbey, Bedfordshire**

- **Large Trade Exhibition**
- **RSGB Bookstall and Enquiries**
- **Members' Mart**
- **All Under Cover**

The RSGB makes no charge for entrance to the rally, but all visitors must pay for entrance to Woburn Park in which the rally takes place, at £5 per vehicle including passengers. £2.50 single occupants. All normal Woburn attractions are available at a small extra cost.

**RSGB, Lambda House, Cranborne Road, Potters Bar, Herts. EN6 3JE**



NOTE NEW DATE

**RSGB INTERNATIONAL HF CONVENTION**

*It's the place to be*

**Friday 8 – Saturday 9 – Sunday 10 – October 1993**

**EARLY INFORMATION**

- **Location:** The Beaumont Conference Centre, located a few minutes drive from the M25 and Heathrow Airport. Nearby Windsor with its famous castle and shopping facilities is a must.
- **Programme:** An extensive programme of talks on topics such as DX-peditions, Equipment, IOTA, DX-Clusters, EMC, HF DX-ing, Antennas & Contesting.
- The latest amateur radio software
- Ladies programme
- Young Amateur of the Year award
- The 1993 International HF Convention is organised by the HF Committee of the RSGB in association with the HF Contest & IOTA Committees, and the Chiltern DX Club
- Overseas visitors reception
- Saturday evening DX dinner
- Invited Traders and Special Groups
- For the full convention prospectus including an advance booking form, please send an SASE to – RSGB HF Committee, PO Box 599, Hemel Hempstead, Herts HP3 0SR, UK.

**Radio Society of Great Britain**

**Lambda House, Cranborne Road, Potters Bar, Herts. EN6 3JE**

RADCOM TECHNICAL FEATURE

# A Calibrator Marker Unit

by Ian Keyser, G3ROO

THE IDEA FOR THIS calibrator was born when David, GM4ZNX, and I were working on our new transceiver project called 'The Doomsday Box', the name of which is more indicative of the completion date than anything else! We needed a comb generator with a flat frequency response over the HF spectrum. The results were so satisfying that we thought that it could make an excellent crystal calibrator and an excellent Novice project. **Fig 1** shows the circuit, and all components are readily obtainable. A suitable layout is shown in **Fig 2**.

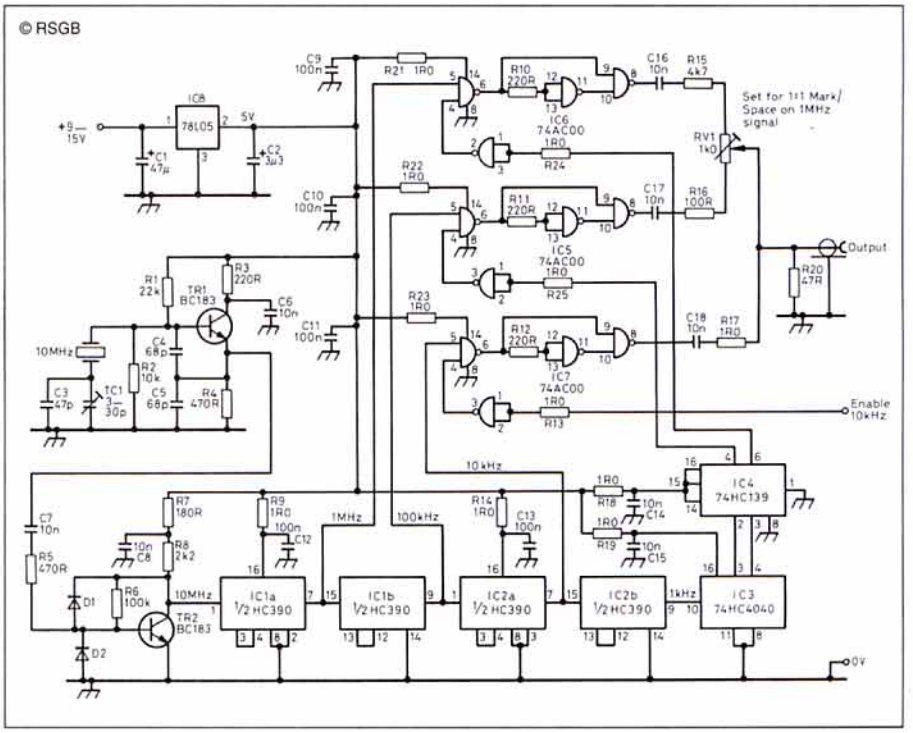


**Fig 1: The 10kHz enable input is active-low and should be pulled up to +5V when not used.**

## FINER FEATURES

AS USUAL WE STARTED looking at the drawbacks of calibrators, and although the initial design overcame the problem of poor frequency response, it still suffered from the inability to know where you are tuned within the frequency spectrum. In a conventional marker it is easy to turn on the MHz markers first, and then turn on the 100kHz marks and count. However, if you mis-count you have to turn off the 100kHz markers and start again from the 1MHz position. It would be a lot easier if the 1MHz and 100kHz markers could be tagged differently so that they are easily identified. This is not as difficult as it first appears and, with some thought, it would be possible to make tagging very specific indeed. A 10MHz crystal and two 74HC390 chips can generate a square wave down to 1kHz and high speed gates would give very effective combs from the 1MHz, 100kHz and 10kHz outputs. 1kHz is far too fine to worry about and so was ignored.

## COMB GENERATOR

THIS CIRCUIT GENERATES very short duration pulses on the positive going edge of the square wave from the divider chain. These pulses have nanosecond duration time and so are very rich in harmonics. Advanced-CMOS quad NAND gates are used, which switch at very high speed. Three identical circuits are used to generate very short duration negative going pulses at pin 8 of each NAND gate. Pin 5 of IC6, IC5 and IC7 receive signals from the counter chain at 1MHz, 100kHz and 10kHz respectively.

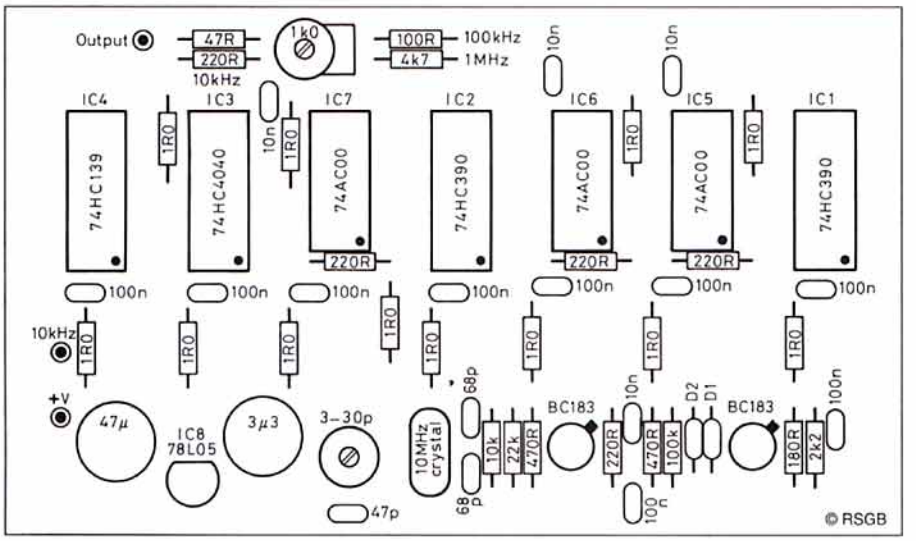


**Fig 2: The calibrator uses readily obtainable and inexpensive components.**

## TAGGING THE MARKERS

AS DISCUSSED EARLIER, provision has been made to turn off the comb outputs by logic signals and as I decided that having the 10kHz tone on all the time would be confusing an 'Enable 10kHz', input was included on the edge of the board so that it could be turned on or off as required.

This left the 1MHz signal and the 100kHz for tagging. A rummage through the available logic ICs in the drawer revealed a 74HC4040, a 12 bit counter and a 74HC139, a 2 to 4 line decoder. Thus was decided the method of tagging. Outputs Q7 and Q8 of the 74HC4040 are used to give square waves at about 7 and 3.5Hz. When these are decoded they gener-

## COMPONENTS LIST

**Capacitors**

| | |
|---|---|
| C1 | 47µF 25V |
| C2 | 3µ3 16V |
| C3 | 47p |
| C4,C5 | 68p |
| C6,C7,C8 | 10n |
| C9,C10,C11 | 100n |
| C12,C13 | 100n |
| C14,C15,C16 | 10n |
| C17,C18 | 10n |
| TC1 | 3-30pF pre-set |

**Resistors** **5% 0.25W**

| | |
|---|---|
| R1 | 22k |
| R2 | 10k |
| R3,R10 | 220R |
| R4,R5 | 470R |
| R6 | 100k |
| R7 | 180R |
| R8 | 2k2 |
| R9,R13,R14 | 1R0 |
| R11,R12 | 220R |
| R15 | 4k7 |
| R16 | 100R |
| R17,R18 | 1R0 |
| R19,R21 | 1R0 |
| R20 | 47R |
| R22,R23 | 1R0 |
| R24,R25 | 1R0 |
| RV1 | 1k0 |

**Semiconductors**

| | |
|---|---|
| IC1,IC2 | 74HC390 |
| IC3 | 74HC4040 |
| IC4 | 74HC139 |
| IC5,IC6,IC7 | 74AC00 |
| IC8 | 78L05 |
| TR1,TR2 | BC183 |
| D1,D2 | BAR28 or similar Schottky diodes |

**Additional items**
10MHz crystal
PCB or prototype board.

A kit of parts for this project is available from Kanga Products, Seaview House, Crete Road East, Folkestone, Kent CT18 7EG. Tel: 0303 891106.

ate a nice 'dit' speed. These two outputs are fed into the two input pins of the decoder and the four outputs will go low (logic 0) in sequence with a mark to space ratio of 3:1. This can be seen in **Fig 3**. The 74HC139 outputs '0' and '2' are used to gate the 100kHz and 1MHz at different times. Thus when tuning on a receiver at the 100kHz interval we will hear a dit followed by a time interval of three dits and then another dit and so on.

When we tune to the MHz position on the receiver we will still hear the 100kHz signal, but also the pulsed output from the 1MHz comb. This output will occur on the middle space of the three spaces of the 100kHz comb and so we will hear dit, one space, dit, one space etc . . . . The 1k preset is added so that the levels of the two signals can be balanced.

## ON YOUR MARKS

WHEN TUNING THROUGH the band without the 10kHz markers enabled, a signal at each 100kHz position will be heard going "dit—dit—dit- . . . .". Having arrived at a MHz position a rapid string of dits ("dit dit dit dit . . . .") will be heard.

When the 10kHz marker is enabled a continous unmodulated tone is heard every 10kHz up the dial, but at each 100kHz position a slow string of dits is heard modulating the tone. At the 1MHz position the rapid string of dits will be heard as modulation. The amplitude of the 10kHz marker is kept lower than the other two markers to make the modulation easily recognisable.

My spectrum analyser shows that the comb output is flat to within 3dB up to 70MHz and is only 6dB down at 2 meters. Listening on my FT290 transceiver proved that the marker signals are adequate for use on this band. On 70cm they are 10dB down, but no gear is available to do an audible check. Finally, the PCB layout shown in **Figs 4** and **5** gives a clean, stable output.

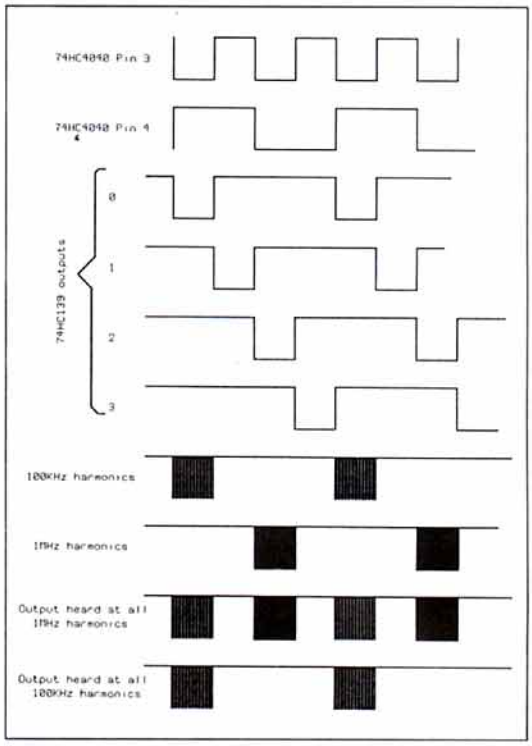


**Fig 3: Output waveforms are gated using the 74HC139 decoder.**

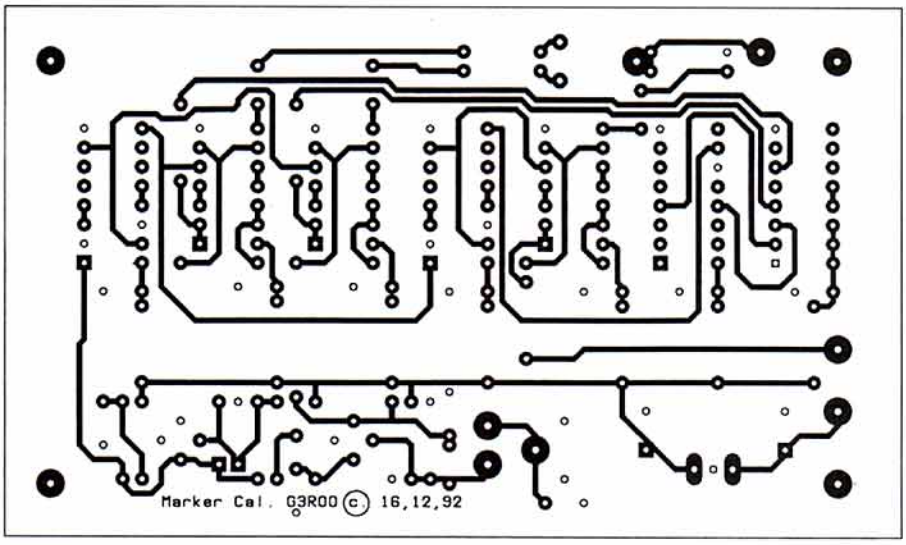


**Fig 4: Track side of the printed circuit board.**

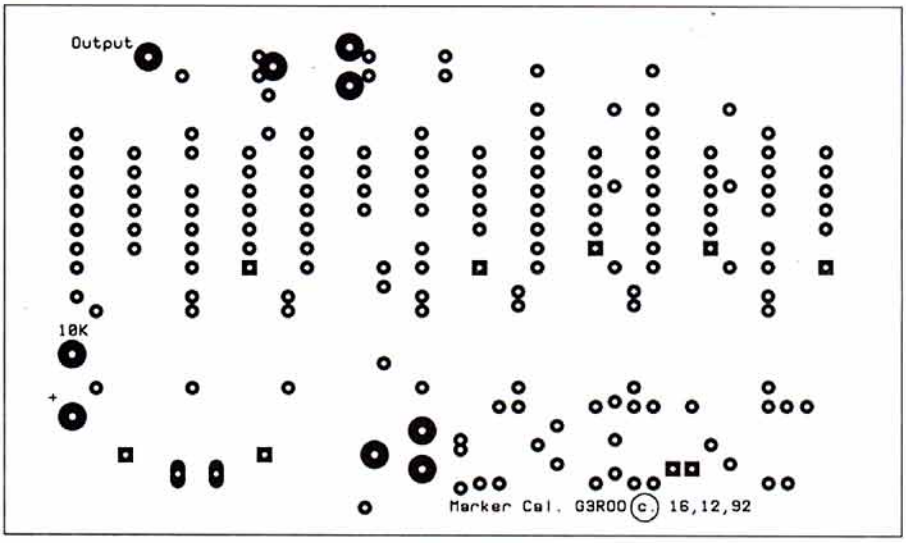


**Fig 5: Component side of PCB. Note the 10kHz enable input.**

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RADCOM NEWS FEATURE

# RSGB Annual Meeting 1992 — Informal Session

THE PRESIDENT opened the informal session by announcing the presentation of the following awards:

**The Founders Trophy** to R Western, G3SXW

**The Ostermeyer Trophy** to M Grierson, G3TSO

**The Courtney-Price Trophy** to L Moxon, G6XN

**The Pilot Officer Norman Keith Adams Prize** to G Billington, G3EAE

**The Wortley-Talbot Trophy** to R Rylet, G3VXJ

R J Hughes, G3GVV, then presented the Society with a medallion from the Brazilian Amateur Radio Society for the work in support of amateur radio performed by *RadCom* magazine.

The President went on to present the Society's Certificate of Merit to J P Hawker, G3VA, for his outstanding service to amateur radio.

A message of support from the Bulgarian Federation of Radio Amateurs was then read out.

**Some of the magnificent trophies presented each year at the Annual Meeting.**

## President's Speech

PRESIDENT TERRY BARNES, GI3USS, then spoke of the remarkable turn round in the Society's financial position but warned that it was no time to be complacent. The economic recession was still biting into the amount of money members had available for the purchase of books, and traders were also bound to restrict the amount expended on advertising. He called for increased efforts to recruit new members.

He then spoke of the strategy conference held in July to plan the future three years. Whilst many of the proposals had already been implemented a number required further discussion before putting into place.

Moving on to the Novice Licence, he expressed the hope that many recipients would go on to achieve full licence status and membership of the Society.

He said he hoped that the Solar Data Broadcast Station, GAM1, would be operational before very much longer due entirely to the efforts of a dedicated band of volunteers.

The Society was held in high esteem internationally and he personally hoped that the Radio Society of Great Britain would continue to be represented at gatherings and conferences overseas.

Turning to subject of the *Annual Report* he said that it had been presented in a new format this year which he hoped was appreciated by members. The election ballot papers had been included with the Annual Report and Accounts, together with a reply paid envelope. However, despite these improvements very few members took the trouble to exercise their franchise. It was difficult to see what more the Society could do to encourage members to vote.

The President then thanked P E Chadwick, G3RZP, Executive Vice President for his support and paid tribute to the Headquarters staff, volunteer officers of the Society and most of the membership for their loyal support during his term of office.

## Questions

DECLARING THE attendance at the Annual General Meeting as 100, the President invited questions:

H L W Bellfield, G3SBV, asked about the result of the request for members views on Third Party Traffic. J Bazley, G3HCT (Chairman Licensing Advisory Committee), responded by saying he had received some very positive views. As a result he considered that the Licensing Advisory Committee had a mandate to approach the Radiocommunications Agency for an extension of the Greetings Message facility and he was expecting a decision soon.

H Kay, G0FAB, asked why, when the previous General Manager appeared to be performing satisfactorily, was it necessary to appoint a new one? T I Lundegard, G3GJW (Chairman Finance and Staff Committee), explained that whilst Mr Kirby's predecessor had an undoubted talent for financial matters the Society had to remain dynamic and the skills needed in a Headquarters General Manager had changed. The Warwick initiative had shown that administrative ability was necessary to carry the Society forward and the new manager was felt to be eminently suitable in this respect. The previous General Manager's contract had run its course and a decision had been taken to replace him.

W J Kennedy, G3MCX then expressed thanks for the Society taking action on his point about the lack of information on parking facilities at the Annual General Meeting.

M Shardlow, G3SZJ, then raised the question of confirmation of elected Council Members who had reached, or would reach during their term of office, the age of 70 years. He said that the Agenda had been altered from that used in previous years. The Company Secretary said he was responsible for the wording of the Agenda and he would clarify the position. *[Company Secretary's note: Subsequent legal advice indicates that the requirement to confirm the appointment of such elected members of council is no longer necessary - the requirement having been abolished some 13 years ago. It will not appear on future Agendas].*

J R Harris, G4DRV, then asked about the position regarding RAYNET and C N Trotman, GW4YKL (Acting Emergency Communications Officer), answered by saying that the situation was still somewhat confused, mainly because RAYNET groups had traditionally worked on their own in small autonomous cells. The newly formed RAEN had now been registered as a limited company with the prospect of charitable status. However, not all groups wished to be part of that particular organisation; it was for that reason that an Emergency Communications Officer had been

**At your service: Justine Hodges (left) and Fiorina Sinapi.**

appointed by the Society. Until a number of points had been clarified it would be unwise for the Society to issue any statement.

N A Bedford, G4NJP, asked, in view of the Princess of Wales tapes exposé, whether the Society monitored press reports and responded accordingly. The General Manager replied by saying that he had only been with the Society for about four weeks when the initial scanner publicity appeared in the national press. Despite having no public relations machine at his disposal, the Society had responding by issuing a full press statement together with a letter of explanation to every national newspaper editor. Despite detailed explanation given to some newspapers they persisted in printing misleading articles on the subject of amateur radio and there was little else the Society could do once that attitude prevailed.

L J Smith, G3HJF, asked why he could not obtain minutes of Council Meetings and why he was not allowed to attend in person as an observer if he so wished. The Company Secretary replied that the minutes of Council, once confirmed, were available to any member on application to Headquarters and had been for some time. A notice to the effect had appeared in *RadCom*. As to attending he (the Company Secretary) said he could see no difficulty other than accommodation, adding that his experience in public office had shown that few members of the public attended meetings despite having the right to do so; the open invitation to members to attend the Warwick discussions had received a disappointing response. However, if there was a general feeling that members would like to attend and observe then he felt sure Council would give it consideration.

T Winchcombe, G6ZH, asked about the administrative expense involved in processing applications for special event stations. The General Manager confirmed that no charge was levied for this service and J Bazley, G3HCT, reiterated the fact that as it was a variation to the licence only the Secretary of State could levy a charge as part of the licence fee. However, the Society did receive a contribution from the RA for the administrative costs involved in issuing such licences. He also pointed out some of the conditions under which some licences were issued.

J S Linfoot, G0CCP, asked why, if the contribution did not cover the total cost, did the RSGB continue to perform the task and J Bazley, G3HCT, said that it was part of the service to members.

P B Higgs, GW4IGF asked what the current membership of the Society was and the President replied that it was 31,749 which was down from last year's figure and that was a matter for some concern although the rate of decline in numbers had slowed down recently.

C Redwood, G6MXL, asked about code-free licences and J Bazley, G3HCT, replied that the HF Committee were seeking views of members and others on that matter. The issue was complicated but the Society wanted to have as many opinions on the matter before making representations to the RA.

At this point G Williams, G4FKH, briefed the meeting on the GAM1 project which had suffered a number of set-backs due to equipment and software problems. However, thanks to several generous donations of parts and labour the project was scheduled to go live early in 1993 from a site in Bedfordshire. J Smith, G3HJF, asked why the transmitter frequency was situated outside the amateur band when it was essentially a service to amateurs and was told that there were very good reasons for that decision, the most important of which was to keep the facility free from QRM.

J D Ray, G8DZH, then asked whether the Society was aware of any proposals to reduce frequency allocations on 70, 23 or 13cm. J N Gannaway, G3YGF (Vice-Chairman of the Licensing Advisory Committee) said he was aware of the rumours but as far as he was concerned there was no foundation for them.

M P Williams, G4GRS, requested clarification on the position of a repeater for which he was the keeper. Another repeater had been allocated the same frequency and, despite letters to the Society and its Repeater Management Group (RMG), he had not received a satisfactory answer. G W Dover, G4AFJ, Chairman of the RMG replied that he was fully aware of the problem and had previously discussed it with questioner. The problem was complex and he had asked the appropriate RMG Zonal Representative to contact Mr Williams and try to agree a solution.

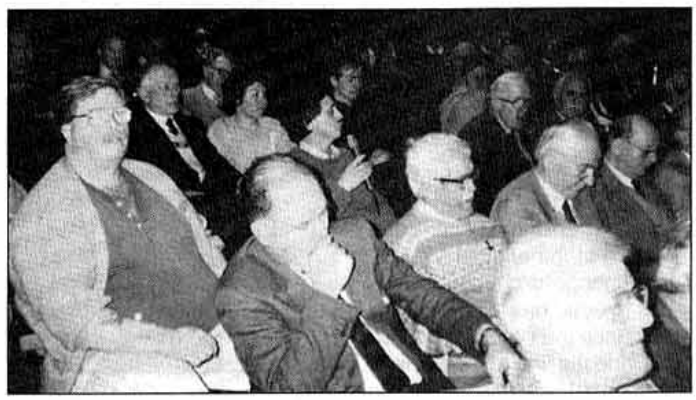
J S Linfoot, G0CPP, asked why the Society did not put as much effort into assisting amateurs obtain full Class A and B licences as it did with the Novice Licence. E J Case, GW4HWR (Chairman Training and Education Committee), replied that the Society showed people how to get a licence but the onus for doing so was with the applicant. The cornerstone of the amateur service was self motivation and training. The Society could point the way but that was all.

A member of the Training and Education Committee P W Mayer, G0KKL, remarked that Colleges of Further Education were becoming more and more reluctant to run Amateur Radio Examination Courses and this caused immense problems for those organising them.

G R Foster, G1DRG complained about the lack of information percolating down to RLOs. C N Trotman, GW4YKL, answered as Chairman of Membership Liaison Committee by saying that they should generate a great deal of information themselves although there were plans to circulate a newsletter to each RLO in the near future. The General Manager said he felt some sympathy for the position the RLOs found themselves in but said that the Society hoped to appoint a Public Relations Officer in the near future and keeping RLOs well informed about Society matters would be a responsibility of the post holder.

The President then drew attention to the arrangements for the installation of the 59th President of the Society, scheduled to take place on 9 January 1993.

L J Smith, G3HJF, asked whether RadCom readers could expect more contest coverage in the magazine and the Managing Editor of *RadCom*, M Dennison, G3XDV, replied that this was an old chestnut and a survey of readers had revealed that they did not want more contest news. The magazine staff was fully aware of this minority interest and tried to allocate appropriate space. However, a compromise might be to offer the full details to interested members by way of an information sheet supplied on request and on receipt of a stamped envelope. The other point worth making was that *RadCom* could not publish information it did not receive and members who submitted information for publication should understand the printing lead time for the magazine was weeks before it actually appeared. Early submission of copy made it more likely that the material would appear.



**Alan Betts, G0HIQ, takes the microphone during the informal session.**

RSGB MEMBERSHIP CONSULTATION

*A Review of the Society's . . .*

# *Memorandum and Articles of Association*

**by Nigel Roberts G4IJF, Secretary, M&A Review Working Group**

SHORTLY AFTER the Warwick Strategy Conference, RSGB Council set up a working group to review the Society's formal constitution - the *Memorandum and Articles of Association (M&A).* The group consists of Council Members Hilary Claytonsmith, G4JKS; Nigel Roberts, G4IJF and Neil Lasher, G6HIU (Chairman).

Over the last few years, occasional technical problems have arisen from time to time with the *M&A.* The Society was founded in 1913 and was incorporated as a company limited by guarantee thirteen years later. However the *Articles* have not always been updated to reflect changes in the work of the Society over the years. There *have* been some changes from time to time, but usually in reaction to perceived problems whenever they arose. This is a very expensive way of doing things, since each minor change to the *Articles* requires an Extraordinary General Meeting of the Society, necessitating expenditure on legal advice on each occasion.

Until now, there has been no comprehensive review of our constitution in the light of today's RSGB - which has changed in many ways since it was formed as the Incorporated Radio Society of Great Britain of the late 1920s.

The goals of our review are to provide the RSGB with a constitution which:

- accurately reflects the work of our Society,
- is responsive to the needs of the Society for the foreseeable future,
- corrects existing anomalies,
- is in understandable English,
- keeps changes to the minimum required to fulfil the above goals while keeping the spirit (and in most cases, the letter) of the original *M&A*, ie no 'change for change's sake'.

This work has been taking place since the Warwick Conference, and the first result of this is a proposal for a revision of the *Memorandum.* This was presented to Council on March 12th and was approved.

The revised document is reproduced here, along with a brief commentary. The proposed changes are shown in bold and are marked by change-bars.

This revised *Memorandum* has also been vetted by the Society's legal advisers and it is now intended that it will be presented to the membership for ratification by Special Resolution at an EGM to be held on the same date as the AGM in December. This should give you plenty of time to consider it before then.

A lot of thought has gone in preparing the proposed changes to the *Memorandum*, and your comments are invited at this early stage. Note: Information on proposed changes to the *Articles* will appear in a subsequent issue of *Radio Communication.*

## The Memorandum

AS THE RSGB IS a company with limited liability under the Companies Acts, it is required to have both a memorandum and a set of articles. No doubt many members will ask 'Exactly what are these?' Broadly speaking, a Memorandum is a statement of a company's aims and objectives while its Articles relate to how the company is set up in order to achieve the aims contained in the Memorandum.

Strange though it might seem to most members, our *Memorandum and Articles* do not mention amateur radio! There is a very simple explanation. When our Society was incorporated in 1926, amateur radio as such did not exist; the RSGB was a collection of people interested in what was - at the time - a new and developing area of technology who wanted to set up a learned society to promote research and development of 'radio science'.

Distinctions between professionals and amateurs in the radio field came later - in the beginning *all* radio people were 'amateurs'!

The absence of a reference to amateur radio in the *Memorandum* was identified by the Warwick Conference and the working group felt this was an important change which could be implemented very easily.

You will note that the phrase Amateur Service is used in the revised *Memorandum.* There is a specific reason for choosing this wording. Amateur Service is the term used by the International Telecommunications Union (ITU) in *Radio Regulations* (the international rules which most UN member countries have agreed will govern the use of radio throughout the world). It is where you will find definitions of the Amateur Service and the Amateur Satellite Service next to all the other services (Broadcast Service, Fixed Service, Aeronautical Mobile Service and so on). It is on the basis of these definitions that frequency allocations are made at ITU World Administrative Radio Conferences.

The other changes are fairly minor and are an attempt to make the *Memorandum* more properly reflect the work of the Society and the modern world. Paragraphs 3.(b)(9) - 3.(b)(11) (which are new) simply document what the Society does already.

Since the British Empire passed into history nearly half a century ago, we thought we the reference to "Colonial & Foreign" [3(b)(8)] should be brought up-to-date - even though technically the United Kingdom still does have a few colonies.

The substitution of 'one pound' for 'one guinea' simply recognises the disappearance of the guinea as a commonly understood unit of currency (it is actually equal to £1.05).

The inclusion of a standard general clause [3(f)], normal with modern companies, is an attempt to 'future proof' the Society's constitution.

It is not a trivial matter to change the Memorandum of a Company. It is the Memorandum which - more than any other document - defines the company's 'soul'. We believe that the changes we are proposing (which still have to be agreed by the Membership in December) fulfil our aim of providing for the future of the Society while remaining true to the spirit of the past.

If you have any comments on the *Memorandum*, or indeed on any other aspect of the society's constitution, we welcome your comments. Please write to us c/o RSGB Headquarters.

**Three of the original signatories of the 1926 RSGB Memorandum of Association: (l to r) Brigadier-General Sir Capel Holden; Henry Bevan Swift, G2TI; and Gerald Marcuse, G2NM.**

**The Companies Acts 1908 to 1917**

**Company Limited by Guarantee and not having a share capital**

# Memorandum of Association of Radio Society of Great Britain

(name of company altered from "The Incorporated Radio Society of Great Britain" by Special Resolution dated the 18th day of December 1953)

1. The name of the Company (hereinafter called "The Society") is "RADIO SOCIETY OF GREAT BRITAIN".
2. The registered office of the Society will be situate in England.
3. The objects for which the Society is established are:-
   (a) To succeed to and take over such of the property, rights and obligations of the existing Radio Society of Great Britain as may lawfully be acquired and taken over by the Society.
   (b) To promote the general advancement of the science and practice of Radio Communication **or other subjects allied thereto** and to facilitate the exchange of information and ideas on these subjects among its members and to obtain the maximum liberty of action consistent with safeguarding the interests of all concerned, and for this purpose:-
      (1) To hold Meetings of the Society for reading and discussing communications bearing upon Radio Science or the application thereof or upon subjects relating thereto;
      (2) To hold, promote or support Exhibitions of instruments, apparatus or other appliances connected with the Amateur Service, Radio Science or its applications;
      (3) To print, publish, sell, lend or distribute the proceedings or reports of the Society or any papers, communications, works, or treatises on **the Amateur Service**, Radio Science, or its applications, or subjects connected therewith in the English or any foreign tongue or any abstracts or translations thereof or extracts therefrom;
      (4) To take charge of the books, pamphlets, publications, manuscripts or instruments at present in the possession of the Radio Society of Great Britain, and to observe and perform the Trusts of any deed affecting the same or any of them, or to form any additional library of books, works, manuscripts on Radio Communication or the application thereof or other subjects allied thereto;
      (5) To borrow or raise money as the Society may think fit;
      (6) To make grants of money, books, medals, apparatus or otherwise for the purpose of promoting invention and research in Radio Communication or its applications or in subjects connected therewith;
      (7) To form Sections of its members united in pursuit of some common interest;
      **(8) To affiliate with itself British, European and any other societies world-wide interested in Radio Communication or other subjects allied thereto;**
      **(9) To purchase for the purpose of resale components, papers, books, apparatus and other items relating to radio communication and subjects allied thereto;**
      **(10) To act under agreement on behalf of government agencies for the purpose of issuing licences and variations thereto;**
      **(11) To develop and conduct examinations for the purpose of the furtherance of knowledge in the Amateur Service;**
   (c) To purchase, take on lease, or otherwise acquire, and also let, lease, or to dispose of any premises or other property for the purposes of the Society, subject to the provisions of Section 19 of the Companies (Consolidation) Act, 1908;
   (d) Subject to the rules of law affecting champerty and maintenance to raise and administer funds for the purpose of protecting and indemnifying members of the Society from and against unfounded claims and to take steps to defeat such claims, and for the purpose of affording to its members legal advice and assistance in connection with their wireless experiments;
   (e) To consider, originate and support improvements in the law which may seem directly or indirectly conducive to any of the Society's objects, and to resist and oppose alterations therein which may seem to the Society directly or indirectly adverse to the interests of the Society or its members or any section thereof;
   **(f) The doing all such other lawful things as the Society may think fit.**

   Provided that the Society shall not support with its funds any object or endeavour to impose on or procure to be observed by its members or others any regulation, restriction or condition which if an object of the Society would make it a Trade Union.

   Provided also that in case the Society shall take or hold any property subject to the jurisdiction of the Charity Commissioners for England and Wales or Board of Education, the Society shall not sell, mortgage, charge or lease the same without such authority, approval or consent as may be required by law, and as regards any such property the Managers or Trustees of the Society shall be chargeable for such property as may come into their hands, and shall be answerable and accountable for their own acts, receipts, neglects, and defaults, and for the due administration of such property in the same manner and to the same extent as they would as such Managers or Trustees have been if no incorporation had been effected, and the incorporation of the Society shall not diminish or impair any control or authority exercisable by the Chancery Division, the Charity Commissioners or the Board of Education over such Managers or Trustees, but they shall, as regards any such property, be subject jointly and separately to such control or authority as if the Society were not incorporated. In case the Society shall take or hold any such property which may be subject to any trusts, the Society shall only deal with the same in such manner as allowed by law having regard to such trusts.
4. The income and property of the Society shall be applied exclusively in the promotion of the foregoing objects, and no dividend shall be paid to its members or any of them; but these restrictions shall not prevent the payment to any member (including any member of the Council of the Society) of interest on money lent, or rent for premises leased by him or her to the Society, nor the payment of appropriate fees or other remuneration for original literary or other material accepted by the Society for publication or inclusion in any of its publications.
5. The liability of the members is limited.
6. Every member of the Society undertakes to contribute to the assets of the Society, in the event of the same being wound up during the time that he is a member or within one year afterwards, for payment of the debts and liabilities of the Society contracted before the time at which he ceases to be a member, and of the costs, charges and expenses of winding up the same, and for the adjustment of the rights of the contributories amongst themselves, such amount as may be required not exceeding **one pound**.
7. If upon the winding up or dissolution of the Society there remains, after the satisfaction of all its debts and liabilities, any property whatsoever, the same shall not be paid to or distributed among the members of the Society, but shall be given or transferred to some other institution or institutions, having objects similar to the objects of the Society, and which shall prohibit the distribution of its or their income and property amongst its or their members to an extent at least as great as is imposed on the Society under or by virtue of Clause 4 hereof, such institution or institutions to be determined by the members of the Society at or before the time of dissolution, or in default thereof by such Judge of the High Court of Justice as may have or acquire jurisdiction in the matter, and if and so far as effect cannot be given to the aforesaid provision then to some charitable object.
8. True accounts shall be kept of the sums of money received and expended by the Society, and the matters in respect of which receipts and expenditure take place, and of the property, credits, and liabilities of the Society; and, subject to any reasonable restrictions as to the time and manner of inspecting the same that may be imposed in accordance with the regulations of the Society for the time being, shall be open to the inspection of the members. Once at least in every year the accounts of the Society shall be examined, and the correctness of the balance-sheet ascertained by one or more properly qualified Auditor or Auditors.

We, the several persons whose names and addresses are subscribed, are desirous of being formed into a Company in pursuance of this Memorandum of Association H.C.L. HOLDEN. Brig.-Gen., 2 St. John's Park, S.E.2 (Army Retired Pay); MAURICE CHILD, 60 Ashworth Mansions, Maida Vale, W.9 (Director of Company); O.F. BROWN, 13 Hampstead Way, N.W.11 (Civil Servant); J.H. REEVES, 2 Penywern Road, S.W.5 (Tutor); H.R. HALLIWELL, 2 Princes Road, Crumpsall, Manchester (Electrical Engineer); GERALD MARCUSE, Queens Park, Caterham (Merchant); H. BEVAN SWIFT, 49 Kingsmead Road, Tulse Hill, S.W.2 (Electrical Engineer). Dated the 22nd day of July 1926. Witness to the above signatures, FEARNLEY OWEN, St. Michael's Alley, Cornhill, E.C.3 (Solicitor).

...THE MARTIN LYNCH H.F. TOP TEN...THE MARTIN LYNCH H.F. TOP TEN...

## No. 2

Fighting for the No. 1 spot, the NEW IC-737 from ICOM. Auto atu & Keyer built in as standard, no silly "slider controls" and wonky plastic doors on this one! At last a real successor to the IC735, read what Henry F. Lewis, G3GIQ has to say...

**Deposit £475.00 & 12 payments of £85.00**

## No. 3

My favourite for months, the Yaesu FT-890. With or without Auto ATU, a real winner for BASE or MOBILE H.F. Did you know that it is now available with SPEECH ANNOUNCEMENT, (as an option), for blind operators? Only from LYNCH!

**Without Auto ATU, Deposit £375.00**
**& 12 payments of £85.00**
**With Auto ATU, Deposit £495.00**
**& 12 payments of £90.00**

## No. 4

Probably the best selling H.F. transceiver in the world, the TS850S from Kenwood. Certainly one of the most reliable. A true base station radio from a world beating company.

**Without Auto ATU, Deposit £510.00**
**& 12 & payments of £95.00**
**With Auto ATU, Deposit £540.00**
**& 12 payments of £105.00**

## No. 5

It's crept up in price, but it's now only the same cost as an old TS940S listed at, 4 years ago! The radio? Yaesu's FT990. For Peter Hart to use words like "thoroughly recommended", I can't really comment anymore.

**Without int. PSU & CW filter, Deposit £595.00**
**& 12 payments of £129.50**
**With both options, Deposit £699.00**
**& 12 payments of £150.00**

## No. 6

At the budget end of the market, the Icom IC-728 offers excellent performance together with the quality feel from this famous manufacturer.

**Deposit £195.00 & 12 payments of £66.66**

## No. 7

For those of you who want a good, no frills H.F. package but also want to dabble on 6 Metres, how about the Icom IC-729? Identical to the IC-728 at No. 6, but with 10 watts on 50MHz as well as a full 100 watts on H.F.

**Deposit £275.00 & 12 payments of £85.00**

## No. 8

Performance and flexibility of the "big boys", the TS-690S from Kenwood is still up in the TOP-TEN, and there's good reason. The price. Closely compare the spec of the '690 with other H.F. machines and the rig scores high up the ladder. Throw in a SIX METRE option giving a massive 50 watts output in addition to 100 on H.F., and you can see why this one is so popular.

**Without Auto ATU, Deposit £480**
**& 12 payments of £85.00**
**With Auto ATU, Deposit £510**
**& 12 payments of £95.00**

## No. 9

Want the No. 8 slot, but without SIX Metres? You got it with the TS-450S. 100 watts, General Coverage, All Mode, Selectable filtering in both I.F's. Big radio features in a mid-sized package.

**Without Auto ATU, Deposit £449.00**
**& 12 payments of £75.00**
**With Auto ATU, Deposit £480.00**
**& 12 payments of £85.00**

## No. 10

A joint entry at No. 10, The Flagships from YAESU & KENWOOD, the FT1000 & TS950SDX transceivers. Both have features for the really serious amongst our H.F. operators, including 150-200W output, Dual Receive, Built in Power supplies & Auto Tuners as standard, the list goes on forever. If your serious, ring me for a tailored quotation to suit your needs. If your not, ring someone else!

**FT1000 & TS950SDX, *deposits from as little as* £700.00.**

# MARTIN

## G4

## THE AMATEUR RADIO

### THE MARTIN LYNCH H.F. TOP TEN

### No.1

Straight in at No. 1 is the new TS-50S from Kenwood. A real MINI-MOBILE H.F. Transceiver, no bigger than a TR751E 2M Multi! 500kHz to 30MHz, 100w out, matching auto ATU available as an option.

**DEPOSIT £199.95 & 12 payments of £66.67**
**With matching Auto ATU, Deposit £295.00 & 12 payments of £83.75**

# Twelve Mont

# ZERO IN

***Still saving up for that new RADIO, but worried abo***
***you should be). Have no fear, LYNCHY's here! I've be***
***deposit, (no 50% as required by my competitors), an***
***with NO INTEREST. The whole shabbang is subject to***
***who have to wait for you to pay them each month***
***chappy! (or lassie as the case may be). Beaten the pr***
***the wait. Don't be shy, give it a try. I promise I'm***

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**IF YOU DON'T WANT TO TAKE ADVANTAGE OF MY FREE FINANCE AND WOULD RATHER PAY CASH, CHEQUE, CREDIT CARD OR TRADE-IN, THEN CALL 081 566 1120 TODAY FOR YOUR TAILOR MADE QUOTATION.**
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### THE MARTIN LYNCH V.H.F. TOP TEN

It's got to be the LYNCH + muTek FT736RDX from Yaesu. The most flexible multiband 2/6/70/23 all mode transceiver available today. Complete FRONT END REPLACEMENT DESIGNED BY muTek, push this transceiver to the No. 1 slot. The performance is now exceptional - expect to see these being used in "VHF CONTESTS" around the world.

**No.1**

**FT736RDX, with muTek, 2/70 operation,**
Deposit £495 & 12 payments of £125
**FT736RDX/6 with 6m extra,**
Deposit £608 & 12 payments of £142.50
**FT736RDX/23 with 23cm extra,**
Deposit £623.00 & 12 payments of £160.00
**FT736RDX/6/23 with all bands fitted, 2/6/70 & 23cm,**
Deposit £742 & 12 payments of £175.00.

*** muTek FRONT END BOARDS available as "after fit kits",** £199.95, plus £59.00 fitting charge if required.

## chs To Pay At NTEREST

**ut beating the next PRICE INCREASE?, (if you're not en advertising it for months. There's no catch, a small d spread the balance over a whole TWELVE MONTHS the ladies at TRICITY FINANCE, (they're the battalion ), giving approval and there it is - another happy ce increase and got your new WIRELESS SET without much better at doing deals than I am at poetry!**

## OR SECOND HAND GEAR!

**CALL, WRITE OR FAX - SPRING NEWSLETTER NOW AVAILABLE**

Packed with interesting goodies, including 'First Impressions' by Ken Feather and Henry Lewis, an insight into using all the latest Handies and H.F. products from Japan, also a look at the latest HF Mini Mobile from KENWOOD, plus much, much more, TOGETHER WITH THE LATEST MARTIN LYNCH SECOND-HAND LIST!! WRITE OR PHONE FOR YOUR FREE COPY TODAY!!

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### No. 2

Not a transceiver, but a WIDE BAND ALL MODE PORTABLE RECEIVER, the NEW MVT7100 from Yupiteru. As supplied by MARTIN LYNCH to the M.O.D. and countless other customers, this new model from Japan is truly amazing. 500kHZ to 1650mHZ, ALL MODE, in your hand? Are they serious? Yep. I'm handing them out like confetti. It's not a toy, it's the most incredible miniature receiver available.

**Deposit £49.00 & 9 payments of £44.45**

### No. 3

First the FT727, then the FT470 and now the FT530, YAESU get better and better at Dual Band portable design. Complete with CTCSS fitted as standard, (NONE of the others have), extended RX, AM/NBFM selectable, Auto Repeater facility, it's been the choice for hundreds already.

**Nicads & Charger included.**
**Deposit £100.00 & 12 payments of £35.75**

### No. 4

Icom were the first company back in 1980 to bring you a fully synthesised solid state transceiver - their technology in digital design carries on - witness the NEW IC-W21ET dual band Handie. Massive dual display, Extended RX, superb "feel" to the user.

**Nicads & Charger included.**
**Deposit £74.00 & 9 payments of £45.00**

### No. 5

Alinco have been knocking the "big three" for several years now and they continue to do so with the DJ-580. Ask around the Dual-Band Handie users and the odds are they'll be using one. All the bells and whistles, well built and very reliable.

**Nicads & charger included.**
**Deposit £53.00 & 12 payments of £33.00**

### No. 6

When Angus Mckenzie, G3OSS said this is THE transceiver for Two metres all mode, he wasn't kidding. I've been selling them for years and there's still nothing to touch it. Full 25W out and don't forget the matching 70cm version, the TR851E!

**The TR751E 2M, Deposit £149.00**
**& 12 payments of £50.00. For the TR851E 70cm,**
**Deposit £199.00 & 12 payments of £50.00**

### No. 7

Kenwood's TH-78E marches into the TOP TEN because of it's performance, excellent ergonomics, (if SONY ever designed a dual band Handie, this is what it would look like), beautiful build quality and endless user features. For people who like mind blowing "ADVANCED" facilities, wait no longer.

**Deposit £49.00 & 12 payments of £35.00**

### No. 8

Want a simple to use, REMOTE HEAD DISPLAY, High-Power Dual-Band Mobile, that doesn't blow your brains away whilst QUEUING ROUND THE HANGER LANE GYRATORY? (WHERE?) - Well get your cheque book out lads & ladies, the TM-732E from KENWOOD is for you! Yes, it's got all the gizmo's if you want them, but if you don't, then it's got to be the easiest mobile/base FM 2/70 transceiver available.

**Deposit, £69.00 & 12 payments of £50.00**

### No. 9

Hands up those who want a SINGLE BAND HANDIE, but quite fancy the thought of being able to listen to the "other mob" on 2 or 70? Thought so. Kenwood thought so as well. The NEW TH28E & TH48E. Single band FM Handie, but press one button, and instantly monitor the opposite band to the one your transceiving on. They're lower priced so I can offer them on my nothing to pay (but small deposit), for 3 months scheme.

**TH28E Transceive on 2M, rx on 70cm,**
**Deposit £39.00, £250 in 3 Months**
**TH48E Transceive on 70cm, rx on 2M,**
**Deposit £49.00, £280 in 3 Months**

### No. 10

Still a firm favourite for people who want MULTI-MODE PORTABILITY on 2 Metres, the FT290R mk11, still has the market to itself. The rest have given up! Available with a "clip on" 25W linear, the FT290R is the perfect all rounder for 2M operation, either portable, base or mobile.

**Without matching linear,**
**Deposit £129 & 12 payments of £35.00**
**With Matching FL2025 Clip on Linear,**
**Deposit £159 & 12 payments of £45**

...THE MARTIN LYNCH V.H.F. TOP TEN...THE MARTIN LYNCH V.H.F. TOP TEN...

RADCOM NEWS FEATURE

# The Hobby of Kings

**We all know what fun amateur radio is but if we could do anything and money was no object, would we still choose it as a hobby? King Hussein says a firm "Yes"**

HIS MAJESTY, King Hussein bin Talal, JY1, is arguably the world's most famous radio amateur. How many of us have mentioned him when incredulous friends and relations (or the Press) ask "what on earth do you get from your radio?". It is useful to be able to demonstrate that there must be something in it by quoting household names: the late Rajiv Gandhi, King Juan Carlos of Spain, President Menem of Argentina, Senator Barry Goldwater and so on. If they can enjoy amateur radio, then it must be great for us lesser mortals.

But what does someone with unlimited facilities for travel and communications *really* get from the hobby? In a 45 minute interview with *RadCom*, King Hussein explained his philosophy.

PHOTOGRAPHS: RAYMOND IRONS

**King Hussein on amateur radio: "It has given me the opportunity to know people throughout the world and . . . . to realize that we belong to a very large family that inhabits the global village which is our home now.**

## A Large Family

WE WONDERED what first made the King aware of amateur radio? He revealed that "actually it was a very kind present (a Hallicrafters radio) that I received many years ago, more years than I care to remember . . . and my interest has always been in people and in communication amongst them."

It is this fascination with people communicating which is the key to his interest in amateur radio. It may well also be the reason that King Hussein has survived in power for several decades in contrast to many of his contemporaries in the Middle East.

"It has given me the opportunity to know people throughout the world and, in many cases, to visit them later and to realize that we belong to a very large family that inhabits the global village which is our home now. It has also enabled me to encourage many Jordanians to be involved in this field, both in terms of the technical side as well as in terms of the communications side which is just as important. It has given me the opportunity, whenever I have been able to be active, to also move away completely from whatever my responsibilities were, and to have a complete break, a complete switch-off."

## Friends all over the World

IS HE REALLY ACTIVE? "Not as much as I used to be, but wherever I move to I try to come on. I have a station in this country but we recently had a bit of a disaster with the antenna - it broke. We tried to take it down and it crashed down, as has happened to me several times in life. It is up and running again now."

"And I've also been honoured to have gained permission to operate from different countries. I have a callsign here (G0/JY1) as you know. And I operate from the United States, Spain, Austria, Canada . . . I try to operate whenever and wherever I can. I have constructed equipment but not as much as I would have liked to."

He maintains a well-equipped station in Jordan: "The equipment I was with for many years was a Drake. But right now we have moved on to the Icom 781."

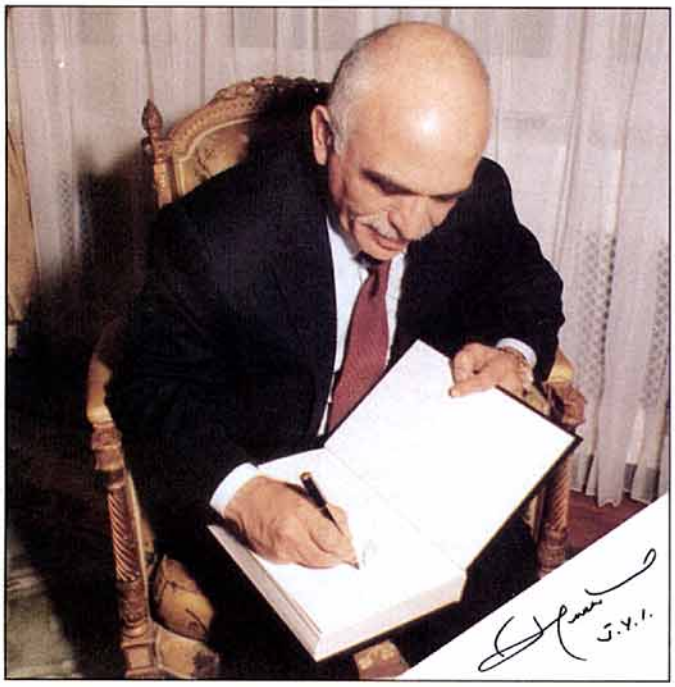
His natural diplomacy makes him reluctant to single out his most interesting contact but the enthusiasm is obvious when he describes what amateur radio means to him:

"In times of crisis and difficulty, it was a way to keep in touch with friends throughout the world who were able to help relay messages and to secure humanitarian help as well. Such was the case in the period 1967-70 in particular. In Jordan communications were severely damaged at times and then we were able to . . . through the help of many friends . . . secure medical assistance.

"I've enjoyed also talking to all age groups with all kinds of interests. People who have sustained injuries which prevent them doing very much other than using their abilities to get in touch with friends throughout the world."

And he's a DXer too. "I tried to make initially as many contacts

The Jordanian flag flies above Belgravia.



A souvenir for the RSGB Library. King Hussein signs a *RadCom* bound volume.

as I could so that we could log them and then maybe get some awards. I can't remember exactly what the number (of DXCC countries) is but we passed the 150 mark many years ago.

"We try to help our friends whenever they come to visit to operate from Jordan; we helped in some of the expeditions as well, setting them up and providing the equipment - to provide new areas for people to contact"

## King to King

HE DESCRIBES proudly a contact with the first amateur to operate from space - Owen Garriott, W5LFL, on the space shuttle Columbia: "We managed to arrange a schedule with him on his 92nd orbit. It was an excellent contact - something like three or four minutes horizon to horizon. We were following him with a directional antenna."

In what must have been a remarkable contact to listen to, King Hussein of Jordan has spoken to King Juan Carlos of Spain over the air. He also talked about amateur radio with Rajiv Gandhi, VU2RG, when they met.

He is obviously a man who enjoys taking to people. How, then does he square the obvious demands of the pile-up, and his desire to make friends? "I realise that one has to do both, but of late it's become almost impossible. Because whenever one comes up, within a matter of a few minutes, more than usually you would have a pile-up and my hearing is not as good as it used to be. I've operated aeronautical mobile quite a bit in the past on the HF bands but the pile-up is even worse."

## AR in Jordan

AMATEUR RADIO in Jordan is expanding with around two hundred licensees of all ages. Amman has VHF and UHF repeaters with a very high standard of operation and a friendly welcome is given to visitors. The licensing system is similar to ours - an exam leads to a B class licence and for an A class licence (which includes the WARC bands) a Morse test is required. UK licensees can easily obtain temporary JY8 callsigns.

Other Royal licensees include HRH the Crown Prince, El Hassan bin Talal, JY2HT and the Chairman of the Royal Jordanian ARS, Prince Ra'ad, JY3RZ.

JY1 operates almost exclusively SSB, and sometimes in contests. His QSL cards are too many to display, but the shack wall is decorated with awards.

He agrees that amateur radio is a good hobby for young people: "We have over the years presented several schools with equipment or helped them with regard to club radios."

King Hussein has many ham friends in the UK, though characteristically he declines to single anyone out. He has visited some in their homes which must be the ultimate proof of amateur radio as the great leveller.

As an RSGB member, King Hussein reads *RadCom* and he tells us he enjoys it. He was presented with a 1992 Bound Volume of *RadCom* and a copy of the July 1991 edition which featured a visit to Jordan by Robin Bellerby, G3ZYE, and a group from St Dunstans. In return, he signed a bound *RadCom* volume for the RSGB.

Above: Robin Bellerby, G3ZYE, whose involvement with the Anglo Jordanian Friendship Society was instrumental in making the interview possible.

Right: HM King Hussein, JY1, talks to *RadCom* Editor Mike Dennison, G3XDV whilst Assistant Editor Marcia Brimson takes notes.

# Pat Hawker's Technical Topics

## BEVERAGE AND HIS 'WAVE ANTENNA'

THE DEATH LAST JANUARY of Harold H Beverage, one-time W2BML, at the age of 99 years, has taken from us one more of those immortal pioneers of radio communications who were willing to admit that their interest in radio engineering stemmed from amateur radio. Harry Beverage began as an amateur-radio enthusiast, yet he rose to the highest ranks of the professionals. Honoured in 1957 by The American Institute of Electrical Engineers "for his pioneering and outstanding achievements in the conception and application of principles basic to progress in national and world-wide radio communications".

Beverage not only invented diversity reception – for long a key feature in point-to-point communications – but also the 'Wave Antenna' that for almost 70 years has generally been called the 'Beverage antenna'. It was so described in *QST* in 1922 by Paul Godley (W)2XE who met Beverage on the liner *Acquitania* en route to the UK. Godley came to Britain on behalf of ARRL for the transatlantic tests in the winter of 1922/23. Beverage in cooperation with Chester Rice and Edward Kellog (who were later responsible for the moving-coil loudspeaker) presented detailed information in a 50-plus page paper 'The Wave Antenna – A New Type of Highly Directive Antenna' in the *Journal of the AIEE* spread over six issues (March 1923, pp258-269, April pp372-381, May pp510-519, June pp636-644 and July pp728-738).

In *TT*, October 1970, pp686-7, I wrote: "Top-band DX enthusiasts will probably need no reminding of the Beverage antenna which has recently been used on both sides of the Atlantic for the reception of 1.8MHz signals .... The antenna was developed in the early 'twenties for the reception of commercial transocean stations operating on the very low frequencies [in the region of 15,000 metres]. In its simplest form it consists of a very long straight wire, extending up to several miles in length, mounted on quite low poles, and correctly terminated at the far end to earth so as to prevent reflections (**Fig 1(a)**) – not exactly an antenna for the amateur with only a short garden.

"But a check with the original description has brought to light several features which are seldom mentioned. For instance, the normal system on VLF was to use two wires with a reflecting transformer at the far end and the terminating impedance at the receiving end, making it possible accurately to null out [off-beam] interference [the same principle as the Jones, the W1ETC and the VK5LR noise-cancelling systems described in *TT*, March 1993].

"Then again, although one normally thinks of the Beverage as being many wavelengths long, this was always impossible at VLF, and the paper suggests that pronounced directional effects can be achieved with an electrical length of one-half to one-wave-length – putting a different order of magnitude on the real estate needed on HF! The Beverage is related to the vee-beam and rhombic antennas, and is not limited to low frequencies .... The 1923 paper showed how the electrical length of the antenna could be reduced by 'stretching' the wire by inserting a series of capacitors at intervals along its length [the basis of G6CJ's 'Loaded wire dipoles' described in the *RSGB Bulletin*, July 1961 [and since then in *TT*, *ART* and other RSGB publications].

"One of the famous early Beverage antennas was that erected by Paul Godley at Ardrossan in Scotland during the vital amateur transatlantic tests of 1922 when his 400-metre long wire collected signals from a number of American amateurs between about 200 to 300 metres. I can recall using a wartime Beverage antenna [at Hanslope Park in late 1941] about 0.5-mile long, on frequencies of the order of 3.5 to 9MHz where it proved a very effective antenna [for receiving an Abwehr network of stations in Norway].

"So far as signal collecting properties are concerned, there is little point in stringing this type of antenna higher than is required for ordinary security and to pass over obstructions. One of the organisations [BBC Monitoring Service near Reading] currently using Beverage antennas for the reception of overseas MF broadcasting stations has recently [late 1960s] been carrying out theoretical studies on optimum lengths and heights to see if any improvement could be obtained by raising the present antennas (from 1000ft to 2500ft long and about 10ft high) to a height of about 30ft. Generally, these studies indicate that the first effect of raising height is to degrade sidelobe performance: the only real advantage in raising height would seem to be where extremely long antennas are possible, since additional height lowers the rate of attenuation. It is also shown that by connecting two Beverage antennas in parallel it is possible to slew the directivity over a useful angle. The [BBC Research] study suggests that these antennas are useful for the reception of signals arriving at angles of 5° to the horizon". I have added text within square brackets – *G3VA*.

As a result of Harold Beverage's work, RCA built six VLF transmitting stations on the Atlantic coast of the USA, some using high-frequency alternators, plus one receiving station at Riverhead, Long Island. Here a Beverage antenna some six miles long erected between Eastport and Riverhead was used to prove the system. Terminated, very long, wire antennas can also make excellent unidirectional transmitting antennas but in this case it is usually necessary to raise the height which reduces ground absorption but degrades the sharp directivity into two lobes. **Fig 2** shows a transmitting type 400ft all-band unidirectional terminated long-wire for HF operation reported some years ago in *TT* (*ART7* p305) by Richard White, G3SRO.

Further background information on the Beverage antenna is given by Peter Lankshear in a four-page article 'The Vintage Beverage' (*Electronics Australia*, April 1993, pp98-101). This shows that Beverage began development of his directional antenna in 1917 at the suggestion of Dr E F W Alexanderson, chief engineer of General Electric (USA) to safeguard wartime traffic across the Atlantic from the possibility of German jamming. Beverage always acknowledged that he drew on the earlier work on directional antennas by Marconi (1906) and the 'Ground Aerial' developed in Germany by F Kieblitz in 1911 who had found that he could obtain good direc-

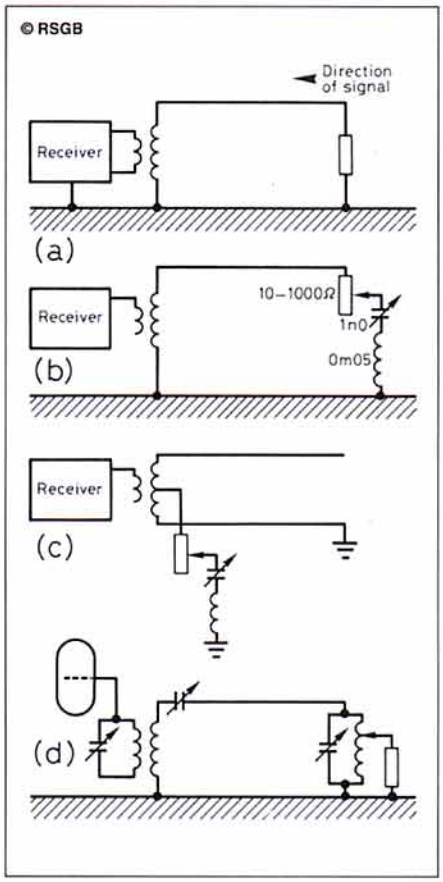



**Fig 1: Some of the many possible variations of the Beverage or 'Wave Antenna'. (a) The basic arrangement as used by a number of amateurs on 1.8MHz for long-distance reception. (b) an arrangement suggested by Harold Beverage in 1923 for 'short waves' (ie wavelengths less than about 450 metres). (c) Is a variation of (b) enabling the termination to be at the receiving site. (d) This was an arrangement illustrated in the 1931 edition of the 'Admiralty Handbook of Wireless Telegraphy'.**

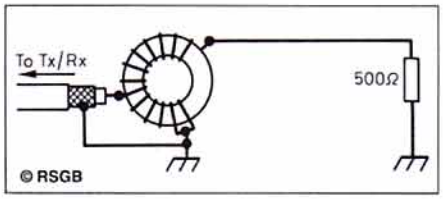



**Fig 2: An all-band 'terminated long-wire' Beverage antenna used in the 1970s by Richard White, G3SRO, and suitable for transmission as well as reception. It was about 400ft long, 40ft high. At the far end terminated with a non-inductive high-wattage 500Ω resistor earthed to an 8ft aluminium stake via a vertical down-lead. The transmitter fed the antenna via a ferrite toroidal step-up transformer using a toroid of about 1.5in diameter, with 3 turns input and 7 turns to the antenna, bifilar wound and space. It should have a worst SWR on any band 3.5-28MHz of only about 1.8:1. Unlike a low antenna this has two main lobes and by directing it towards central America G3SRO got good coverage of North and South America.**

tional signals at the centre of a length of wire supported about one metre above ground and earthed at its extremities. The first Wave Antenna was erected at New Brunswick (New Jersey) near the high-power US Navy station NFF equipped with an Alexanderson alternator.

## COMPATIBILITY – BUT WITH HOW MUCH POWER?

MOST OF US HAVE from time to time echoed, or at least agreed, with the thoughts expressed by Gary Breed, K9AY, in his editorial 'An EMC wish list', *RF Design*, August 1992. He complained about there being too many electronic gadgets in the home which are affected by radio-frequency interference at extremely low RF field strengths. He noted that although some products such as TV sets and video recorders (VCRs) have been getting better, consumers are buying more electronic devices than ever, and they have a right to expect them to work reliably. He added: "Those RF designers who understand EMC tell me that even a few simple concepts can help with both (unwanted) radiation and susceptibility. Strategically placed two-cent bypass capacitors, minor changes in PC board layout or careful routing of cables can contribute many decibels towards improved EMC performance."

I don't suppose that, when he wrote his editorial, K9AY expected many of his professional or amateur readers to disagree. However this proved not to be entirely the case. He duly published (February, 1993 issue, p13) a letter from Robert Orban of Belmont, California under the heading 'Turn down the power before turning up the price' that puts forward a view that, however unpopular it may be for most amateur radio enthusiasts, should at least make us think.

Robert Orban wrote: "While I support your idea that consumer equipment should be more resistant to EMI than most of it presently is, my jaw dropped when I read that the FCC had measured a 9 volt/metre field induced in a hapless neighbour's home by a ham running a 1kW HF transmitter. This is a huge, absurd amount of RF for a piece of consumer equipment to reject!

"EMI suppression is not free. If a $300 (retail) VCR can have no more than about $40 in actual component cost, the cost of adding sufficient EMI suppression to reject a 9V/m field can significantly affect the selling price of such equipment. I would ask you why tens of millions of consumers should be so taxed to permit a few amateurs to indulge their hobby. In the 1930s, it did not seem unreasonable to let people fire up 1kW rigs in residential neighbourhoods. In the 1990s, it seems absurd to permit this. Reducing power to 10W would reduce the electric field 20dB (to 0.9V/m). While this is still a lot of RF, the power level now becomes comparable with other services, like cellular phones and the like. It is time for the FCC to act to reduce the permissible RF fields that amateurs can blast into their neighbours' homes."

I can imagine the shudder that would follow an announcement by the Radiocommunications Agency that maximum output power of UK licences would shortly be reduced from 400W to 10W! It is true that, like all pre-WW2 newly licensed amateurs, my own licence (or more precisely the G3VA issued to my father on my behalf) specified a maximum of 10 Watts DC input on the, then, 1.7, 7 and 14MHz bands only. In practice this proved sufficient power for me to work enough CW DX on 14MHz and European AM phone on 1.7 and 7MHz that I did not bother to apply (through the RSGB) for a 25-Watt permit after six months. A few pre-war UK Old Timers held high-power permits of up to 1kW. With so many 'straight' receivers still in use, I found that even my 10W of 1.7MHz AM phone could be heard by broadcast listeners in the town. BCI was a problem long before TV arrived on the scene.

It is clear that we cannot really expect consumer-electronics receiver and appliance manufacturers to build into all their products sufficient RF immunity to cope with a high-power transmitter a few feet away. In the 1930s, power levels at most UK amateur stations were much lower than those at professional transmitting sites, such as broadcast, coast stations, fixed point-to-point services and these were seldom located in residential areas. Today, the situation is very different and there are many TV local relay stations, cordless telephone transmitters working at what amateurs would regard as QRP. And for mobile transmitters for cellular radio, PMR (private mobile radio) etc, only a

## AUSTRALIAN AMATEURS ON LONG WAVES

THE JULY 1923 ISSUE of the Journal of the AIEE with the final instalment of 'The Wave Aerial' also contains an article 'The Electrical Plant of Transocean radio telegraph' by E F W Alexanderson and other RCA engineers which reflects the professional viewpoint in the days before amateurs showed the value of the short waves. Incidentally, 'short waves' in 1923 were wavelengths between 200 and 600 metres! This paper stated:

"The economical wavelength for communicating over a certain distance can be selected by the practical rule that the economic range of a station for reliable communication is about 500 to 1000 times the wavelength. If too short a wave is selected the signals will be weak in daytime and strong but variable at night . . . . generally speaking for distances over 3000 miles the reliability of wavelengths of over 11,000 metres is so much greater than that of shorter waves. Long waves have therefore been universally adopted for long distance communication."

So strongly was this opinion held that the paper concluded: "Thus it can be stated that guess-work has been eliminated from the development of radio communication, and that sound foundations, both technically and financially, can be laid for all future expansions of our system."

A number of countries who do not use long-waves (LF) for broadcasting have in recent years issued experimental LF permits for amateurs. In *Amateur Radio* (April 1993) John Adcock, VK3ACA, (with LF experimental callsign AX3T35) describes "The day we crossed the Tasman on Long Wave". In the past he has used about 100 Watts to a 'back-yard' antenna. On 196kHz, however, efficiency is very low with only about 0.2W radiated. Nevertheless with this set-up at Oak Park, Victoria, his signals have been heard all over Victoria, Adelaide, Hobart and parts of New South Wales in daylight and as far away as Brisbane at night.

His latest exploit, using the rather more efficient 1.8MHz antenna of VK3BDJ at Gordon, Victoria, was heard in New Zealand across the Tasman Sea (roughly about 1200 miles) by ZL3PN, ZL4MD and ZL2CA although atmospheric noise was fairly bad. 3.5MHz was used for call-back. The antenna at VK3BDJ is built in typical broadcast antenna style comprising a triangular steel lattice galvanised mast 109ft high standing on a base insulator. It is guyed with three sets of guy wires radiating out in three directions at 120° around the mast, with eight levels of guys vertically. To improve the loading and capacitance of the antenna on 196kHz an extra 16ft vertical steel pole was added to the top, to which a top load of some 30 radial wires around 50ft long was also added. A counterpoise was constructed at the base consisting of a hexagon of wire with six radial spokes, with each span about 16m long suspended from eight poles about 3m high, and insulated with stick porcelain insulators: **Fig 3**. Even so it is probable that radiated power on 196kHz is less than 10 Watts.

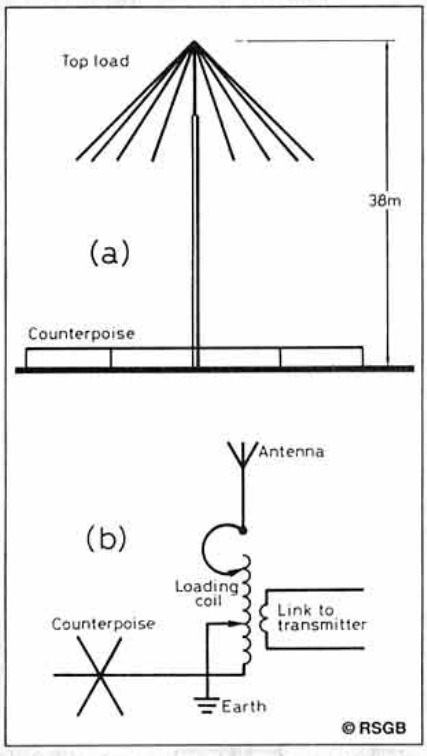



**Fig 3: The antenna that put signals across the Tasman Sea from Australia to New Zealand on 196kHz with under 100 Watts (radiated power probably under 10 Watts) . . . . (a) Outline of antenna (guy wires not shown). (b) Antenna loading arrangement.**

few military vehicles have comparable power to the maximum powers that can legally be used /M by amateurs.

David Sumner, K1ZZ, in his editorial (*QST* March 1993) introduces two articles that explore the question of using appropriate power for fixed rather than mobile operation. He writes: "There are occasions when the maximum legal power is necessary. There are also plenty of times when it isn't. Knowing the difference and acting accordingly has always been a part of responsible operating."

Carl D Gregory, K8CG, describes the use of automatic RF power control for AMTOR operation, drawing on power-adaptive systems developed in recent years for professional and military data transmission. At the receiving terminal, incoming signals are evaluated and the terminal automatically transmits back control signals that adjust the power of the distant station.

A long article 'Transmitter Power: What it is, What it does, and How to use it' by Diehl Martin, N5AQ, and David Newkirk, WJ1Z, stresses that excessive power is worse than wasted – it represents potential interference. As someone who usually runs an 813 power amplifier providing rather over 100W HF output on CW, I can recognise that at times, particularly on 3.5 and 7MHz, this is more than necessary – reflected in those S9 + 20dB reports. The answer for CW operation would seem to be a switch to cut power by an order of magnitude or so (I do in fact have a switch that turns off the screen voltage on the 813 and must remember to use it more often!). For SSB there is the problem that the linearity of an amplifier is optimum when correctly adjusted for its rated output.

An editorial in *Amateur Radio* (April 1993) by Ron Henderson, VK1RH, Federal President, 'Being a Good Neighbour' points out that while Australian licences, like those in the UK, have a power limit of 400W PEP, very few linears are available in Australia of that rating. He writes: "The most common is 1.2kW with some up to 2kW; three to five times the legal limit. It would be naive to think all of these are meticulously adjusted to 400W PEP. How natural the temptation must be to up the output as the sunspot number falls.

"In living with our neighbours we will all be faced at one time or another with the problem of RF interference . . . . if the neighbour's TV is a cheap import, fitted only with rabbit's ears (set-top antenna), the authorities will generally support us. But what if that TV has passed a stringent type standard? Now the laws of nuisance apply; the neighbour has as much right to receive clear TV as the amateur has to pursue his hobby . . . ."

## A 14MHZ 50/120W VALVE AMPLIFIER

ONE DOES NOT TEND to associate the Japanese with valve equipment. But looking through *CQ ham radio* (Nr 2/93) my eye was caught by the diagrams for a grounded-grid triode amplifier by 7L10PH using one of the relatively ancient 809 directly heated triodes: **Fig 4**. If I have understood the article correctly (*CQ ham radio* has a curious mixture of Arabic figures and type numbers within masses of the impenetrable (to me) Japanese kanji characters) the amplifier can provide some 120W output on SSB/CW and 50W on FSK/AM with 15W PEP drive. But, to my mind, the most interesting feature of this design is the use of a high-voltage-multiplication PSU in which some 800V HT is derived from a mains transformer with a secondary winding rated at 120V 0.8A and five power diodes plus some 350V electrolytics. With high-voltage transformers, even the 350-0-350V secondaries formerly widely used in audio-amplifiers, no longer readily available, and usually quite costly, voltage multipliers with silicon power diodes become increasingly attractive. For example, the late John Brown, G3EUR, showed *TT*, October 1989, p37) how a 15V + 15V transformer could be used to provide both heater and 150V HT supplies for a two-stage QRP transmitter based on the PCL84 triode-pentode valve still readily available: **Fig 5**.

The 7L10PH transmitter uses the tuned cathode approach in conjunction with heater chokes L1, L2 (100µH, 4A rating) which can involve some loss of filament voltage unless care is taken to check this carefully at the valve socket. A two-part article on 'Grounded Grid Linears' by D Kooistra, PA0DKO, (*Electron*, February and March 1993) recalls an alternative approach which was described by Harold C Barber, W6GQK, and Robert I Sutherland, W6UOV, in 'High-Power Zero-Bias Grounded-Grid Linear' (*QST*, September 1961). This presented full constructional details of a 1kW (1500W PEP output) amplifier using the then new 3-400Z zero-bias triode: **Fig 6**.

The authors pointed out that the driving impedance of the 3-400Z is a nominal 122ohms: "Since this figure varies widely over the operating cycle, a high-C tuned cathode circuit, C1-L1, is employed to stabilize the load impedance as seen by the exciter. Filament voltage is applied to the tube via the coil of this circuit which is in the form of a coaxial winding having two sets of taps. One set of taps (S1B) is for establishing resonance in the various bands. Excitation is fed to the second set (S1A). The latter is set for minimum SWR on the coaxial line from the exciter (50ohms). The usual driving difficulties experienced with grounded-grid amplifi-

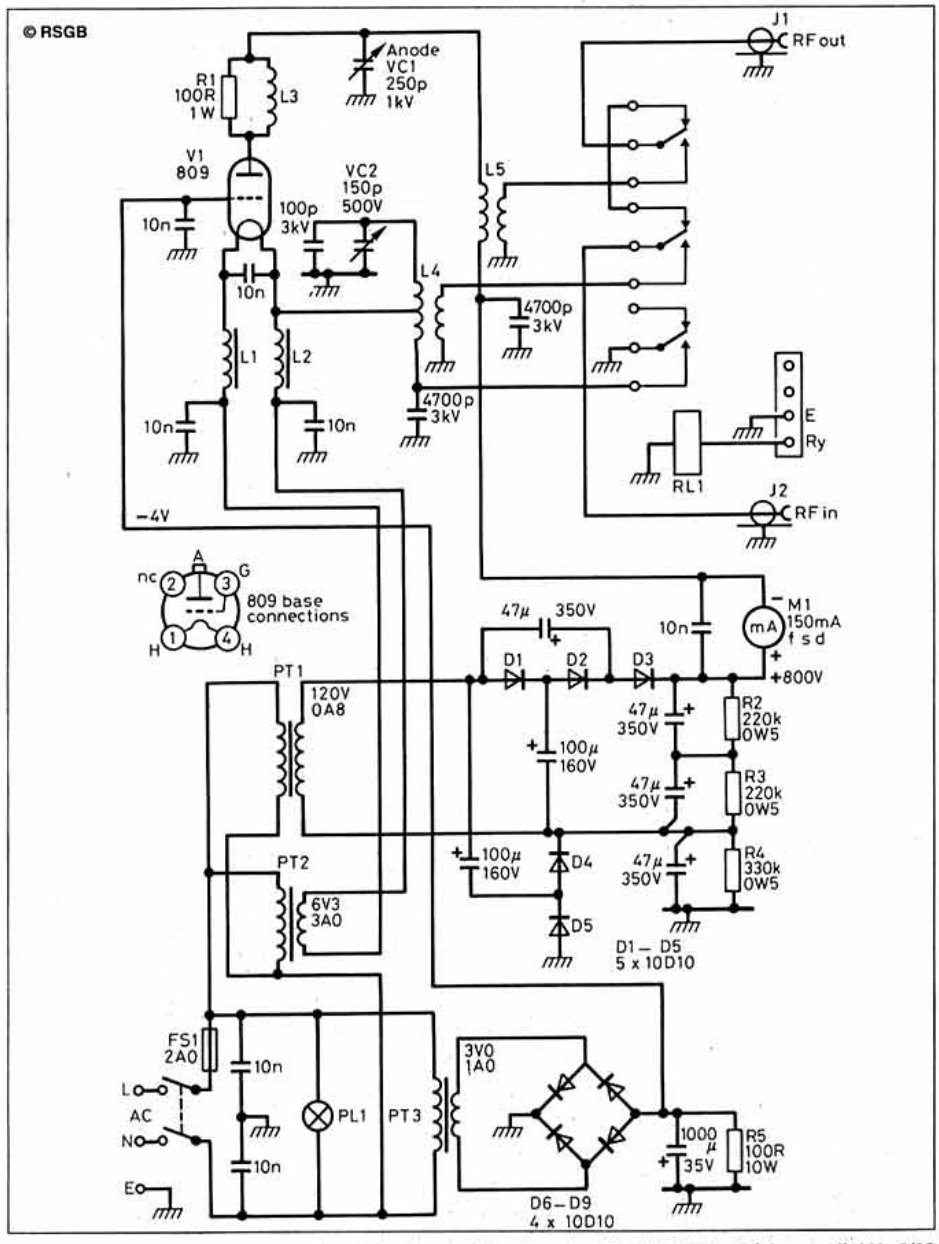



**Fig 4: The 14MHz 50W grounded-grid 809 linear amplifier described by 7L10PH in 'CQ ham radio' No 2/93 showing the use of a voltage-multiplying PSU in conjunction with a 120V 0.8A transformer winding.**

ers are entirely absent and no coupling problems have been found in switching from band to band. Increased power output, reduced intermodulation distortion, and ease of drive are gained when a tuned cathode circuit is used in preference to the old-fashioned untuned RF choke input circuit.

"The tuned cathode circuit is built as a discrete sub-assembly. The unit consists of the coaxial coil L, the tuning capacitor C1, the coupling capacitor C2, bypass capacitors C3 and C4, and band switch sections S1A and S1B. The coaxial coil is wound from a 61in length of standard $^{3}/_{16}$in soft copper tubing . . . . Before the coil is wound a length of No 12 Formvar, insulated copper wire is passed through the tubing, leaving about three inches protruding from each end. Be sure you sand the ends of the tubing to a smooth, rounded edge to prevent marring or scraping the insulation of the wire during this operation. Wire with enamel insulation should not be used, since enamel is too soft and may be easily damaged. Next, the coil is wound around a $1^{5}/_{8}$th inch form (a section of water pipe may be used) making a coil of approximately 10.5 turns . . . ." The 1961 article provides detailed constructional information on what was clearly a high-performance linear, but my purpose here is primarily to give a reminder of the use of a coaxial-coil for the tuned cathode circuit.

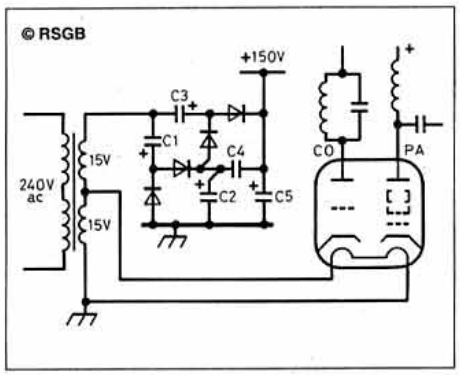



**Fig 5: The late John Brown, G3EUR showed how a one-valve QRP transmitter could be powered from a 15V + 15V, 15-20W toroid or laminated core transformer. D1-D4 1N4003. C1-C4 50μF (100V). C5 25μF (200V).**

## FLAMMABLE ATMOSPHERES, EMC HAZARDS AND MOBILE RADIO

A RECENT IEE COLLOQUIUM "Operation of radio transmitters in proximity to flammable atmospheres" included a report by Brian Colwell (ERA Technology) on a study carried out on behalf of the DTI on 'The safe use of radio transmitters on road tankers and other vehicles'. This noted that "The benefits of use of mobile radio telephone systems, particularly by sales and distribution personnel, led to their proliferation. Similarly, the use of CB radios amongst lorry drivers proved a useful aid to the advance warning of traffic jams or other hazards so avoiding action could be taken."

It was foreseen that flammable atmospheres could occur at the tanker loading depots and at petrol station forecourt areas, particularly if spillage occurred. Flammable gases and vapours which can be ignited by an electric spark include fire damp in mines, methane and petroleum spirit, ethylene and hydrogen.

Fortunately, there are few recorded explosions that can indisputably be ascribed to the operation of mobile or fixed transmitters, although much evidence of sparks induced across gaps in metal structures by high-power broadcast transmitters (see for example 'Sparks flying in Riyadh' *TT*, September 1984, p774).

Mr Colwell added: "For radio telephone equipment, the maximum effective radiated power that can be authorised [for professional or commercial applications] is 25 watts and their frequency bands range from 41MHz to 960MHz. In practice, each application is considered with due regard to range required, base transmitter antenna height etc, and to the possibility of interference to or from adjacent transmitters in terms of location and frequency. The net result . . . . is that transmitter powers, particularly for mobile or hand portable sets, are licensed generally for much lower effective radiated power than the maximum. The effective maximum is less than 10 watts ERP . . . . CB radio transmitters are currently authorised to operate on 27MHz (2W ERP) and 934MHz (25W) although early use on 27MHz was AM. Illegal use on 27MHz using a 100W power amplifier ('burner') was considered in the study . . . . Some concern had been expressed that an Army Land Rover

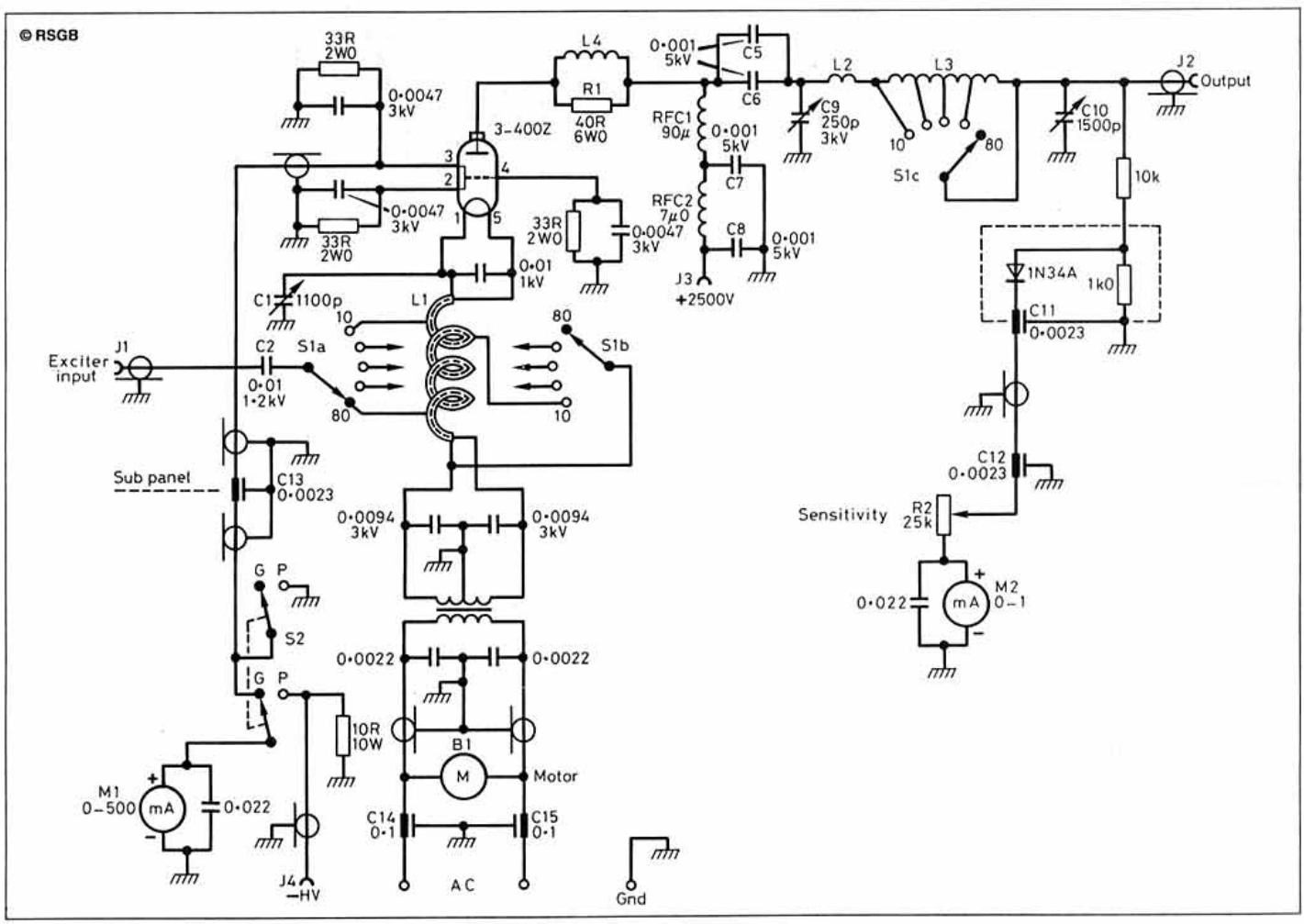



**Fig 6: The 1kW zero-bias ground-grid linear described in 1961 by W6GQK and W6UOV showing the use of a coaxially-wound filament coil.**

carrying operational radio equipment could transmit adjacent to a petrol station . . . . A range of amateur radio transmissions were considered up to 1240MHz at the authorised maximum transmission powers. This frequency was chosen as the highest at which a simple monopole/dipole antenna would be used . . . ."

While this particular study concentrated on transmitters likely to be used within tanker vehicles, it is clear that there are circumstances where even 25W transmitters could create a small but potentially hazardous spark. The ERA report found "The worst case situation observed was at a petroleum distribution terminal where an overhead gantry is used to top or bottom load a tanker lorry. These situations gave a URA (Unintended Radio Antenna) loop perimeter of 9.5m. For a transmitter onboard the same vehicle the antenna had a worst case separation distance of 1m from the nearest top loading tank inlet. Likewise, the separation distances from the URA were identified for the range of transmitter types and the fuel loading/unloading locations [not given at the IEE presentation]." **Fig 60** shows examples of how URAs with spark gaps can occur.

All this emphasises once again the advice given before in *TT* that mobile transmitters should never be used on petrol-station forecourts. Some instruction manuals provide such a warning but manuals may not be passed on to those buying equipment second-hand etc or such instructions may be disregarded as unimportant.

There is, however, another reason why one should be very careful when installing mobile transmitters of more than just a few watts output. Many modern cars are fitted with all sorts of microprocessor-controlled gizmos that cannot cope with the RF from typical amateur transceivers. Consider the sad story of W8JH as reported initially in *WorldRadio*, then *CQ Magazine* (May 1992) and most recently reprinted in *Break-in* (September 1992) by John Walker, ZL3IB:

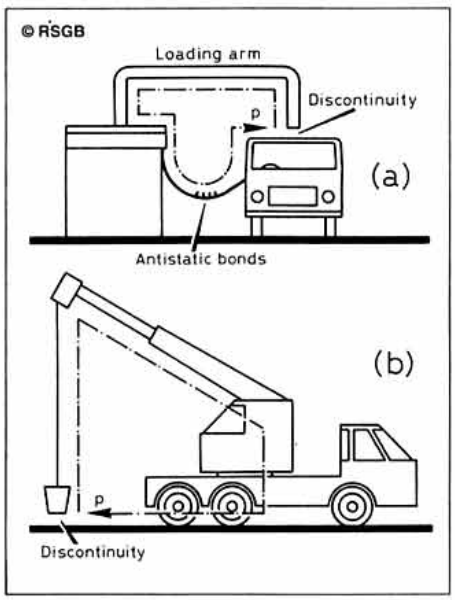



**Fig 7: How a metal structure can form an 'unintended radio antenna (URA)' with a discontinuity forming a potential spark gap when a transmitter is located in the immediate neighbourhood. (a) Tanker loading facility. (b) Mobile crane. (ERA Technology).**

## MORE ON THE DIRECT-READING CAPACITANCE METERS

AN ERROR IN THE ORIGINAL *Break-in* circuit diagram for the direct-reading capacitance meter (Fig 2 of the April *TT*) although fairly self-evident by comparison with Fig 1, slipped through into *TT* and is corrected in the comments by John Wylde, ZL1ALS, published in the October 1992 *Break-in*: "Congratulations to ZL2AKW on his capacitance meter design – simple, practical and it works. With a little tweaking of the range resistors I had mine working quite accurately three days after receiving the September Break-in but with a few modifications due to my junk box not producing all the specified components: (1) I used a 7805 regulator with a couple of diodes in the E lead to produce the 6V. (2) 0-50µA meters cannot be bought in Whitianga on a Sunday and would be expensive anyway so I installed a modified crystal socket on the panel and plug in my multimeter switched to the 10mA scale. The socket is shunted with a 4k7 trimpot to adjust to 50µA FSD. (3) Instead of terminals for Cx I brought out short leads with small alligator (crocodile) clips. This arrangement works fine for all sizes and shapes of capacitors, even those with 0.25in leads.

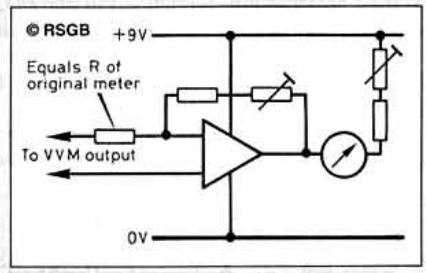



**Fig 8: An arrangement used by Ken Green that not only permits the use of a less sensitive meter movement but also prevents the meter from being destroyed by an overload.**

"The circuit diagram contains a few minor errors – RA and RB for the 5µF scale should be 8.2M and 1M (not 8.2k and 1k). Also the text and circuit are at odds re the top range – 5µF or 10µF. I adjusted R4 to make S1 multiply by 20 giving me a 10µF range, others may choose to make it x10 and 5µF."

Ken H Green writes: "For the original direct-reading capacitance meter (Fig 1 of the April *TT*) you point out that it is necessary to avoid overloading the 50µA meter movement – how true! May I suggest a modification that would eliminate the problem while, at the same time, allowing the use of other less sensitive meters.

I was given an old AVO valve multimeter which uses a 30µA movement; its intermittent behaviour I traced to a burned out meter coil – puzzling since the balanced driver-amplifier was capable of only 40uA maximum output. One of the current shunts appeared to have been burnt too.

"A replacement meter was available as far as shape and size/type was concerned but had an FSD of 100µA. A local contact with younger fingers than mine swapped the meter scales and I turned it into a 30µA FSD meter with the aid of a bit of modern electronics magic – details submerged in the compost heap but something like **Fig 8**. I padded the meter out so that it gave FSD when connected across a 9V battery and then fed it from the main body via an op-amp current-to-voltage converter. Works like a dream and my previous meter is bomb-proof."

"W8JH found out the hard and expensive way that the 1992 Toyota Camry automobile will definitely not support any mobile operation with an output greater than 10W. It was confirmed via Toyota's hotline that anything over 10W would in a sense fry the car's onboard computer. In W8JH's case repairs came to $1,115 for which he was responsible. What is becoming evident is that our electronic marvels are sometimes a two-edged sword. What we like as features in a particular car and what makes us lean towards purchasing that model may also be at great odds with using that vehicle for mobile operation. Obviously, Toyota did not take into account in their design the [relatively few] potential sales to Amateurs.

"If you are interested in mobile operation (beyond the occasional use of a hand-held unit) scratch this model from your list of options. Use W8JH's experience to help when you select any new car. Specifically ask if there will be a problem if you operate a mobile rig. We can now add cars to computers and other home entertainment devices as having potential RF susceptibility problems. It does seem odd, though, that we, in a lawful manner, should represent the problem."

Five years ago, a *TT* item 'Vehicle EMC affects reliability and safety' (May 1988, pp347-8) it was emphasised that the use of CMOS microprocessor-controlled systems in cars, combined with the increasing use of 'composites' such as fibreglass rather than metal, was causing car manufacturers to take seriously the question of immunity against strong RF fields, including those from nearby radio, television, radar stations and carphones. But I added that "it should not be forgotten that few manufacturers contemplate the possibility that a radio amateur may wish to install a high-power transmitter in the vehicle."

The Toyota incident would seem to confirm that while increasingly car electronics are being designed to make them less vulnerable to strong local RF fields, this holds good only for transmitter powers of less than about ten watts.

Remember this when installing one of those 40W models, or when contemplating really high power HF mobile operation. Sudden failure of, for example, electronic breaking could be extremely dangerous – as well as being costly to repair. Whether we like it or not, it is unrealistic to expect the vehicle manufacturers to provide immunity to transmitter powers significantly higher than those found in the cellular or PMR mobile services.

***G3VA***

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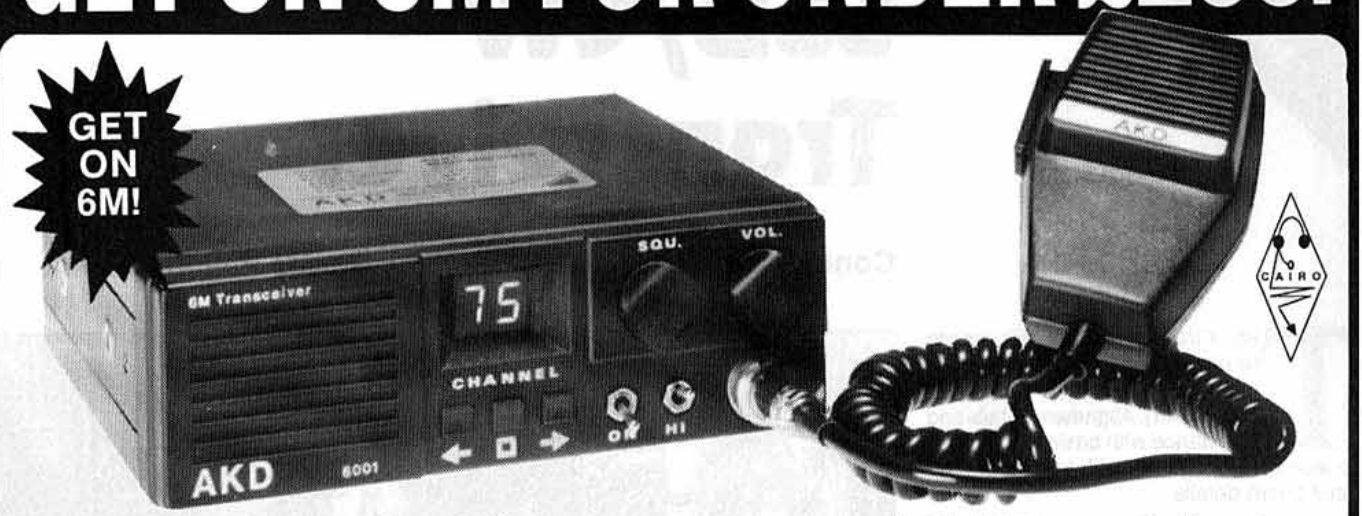


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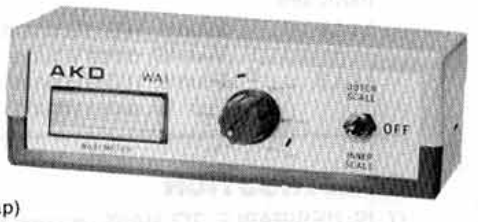


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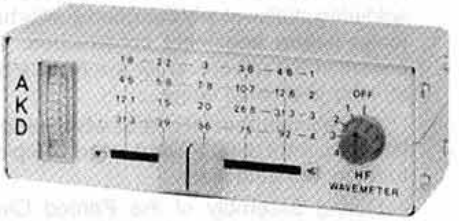


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RADCOM TECHNICAL FEATURE

# A 2 metre SSB/CW Transceiver

## Concluding a three part article by Bernie Pallett, G3VML

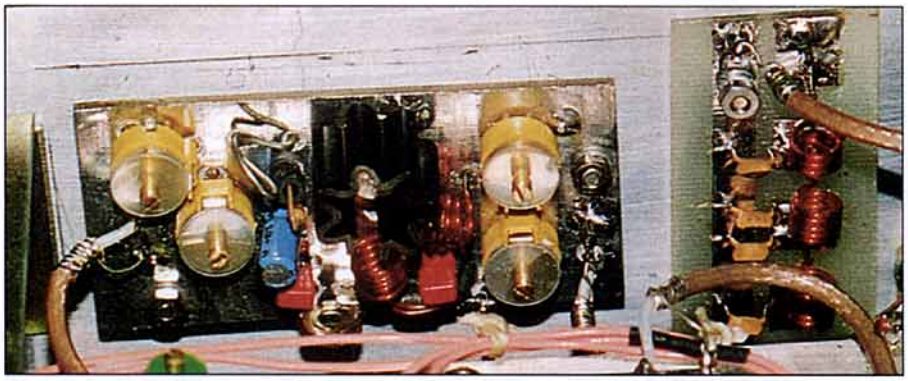
THE FINAL PART of this article features the power amplifier (module 10) and low pass filter (module 11). Alignment details and assistance with basic fault finding are also given, together with kit and printed circuit board details.

### POWER AMPLIFIER (MODULE 10)

THE LINEAR POWER amplifier (see **Fig 10**) is based around a 2N4427 bipolar transistor and is rated for 600mW CW output into a 50Ω resistive load. The quiescient collector current of transistor TR1 is set to 15mA by adjustment of the base bias via variable resistor RV1. Instructions for this procedure, together with the adjustment of the input and output matching circuits, are described opposite.

**Power amplifier (module 10) Components list**

| | |
|---|---|
| **Capacitors** | |
| C1,C3 | 10nF min monolythic ceramic |
| C2 | 1μF 16V electrolytic |
| TC1,TC2, TC3,TC4 | 5.5 to 65pF miniature RS (Electromail) 125-660 or equivalent |
| **Resistors 0.25W 5%** | |
| RV1 | 5k0 pre-set resistor, vertical mounting |
| R2 | 220R |
| R3 | 22R |
| **Semiconductors** | |
| TR1 | 2N4427 |
| D1 | 1N4148 |
| **Inductors** | |
| L1 | 1 turn, 22SWG copper, 0.25in ID |
| L2 | 5 turns, 22SWG enam copper, close wound, 0.25in ID |
| L3 | 3 turns, 22SWG enam copper 0.25in ID |
| RFC1 | 7 turns, 28SWG enam, wound on FX1115 ferrite bead. Also fit a ferrite bead to the lead of R3. |
| **Additional items** | |
| Heat sink | Push-fit lobbed finned 80°C per watt. |



**The LPF (module11) is shown adjacent to the Power Amplifier (module 10). Both are mounted on the rear panel of the transceiver.**

### 144 MHZ LOW-PASS FILTER (MODULE 11)

THE IMPEDANCE at the filter (**Fig 11**) input and output terminals provides a suitable match for 50Ω coax cable. The insertion loss of this filter is less than 1dB, whilst the attenuation of the second and subsequent harmonics, is in excess of 49dB.

**Low-pass Filter (module 11) Components list**

| | |
|---|---|
| **Capacitors** | |
| C1,C3 | 27pF miniature ceramic |
| C2 | 33pF miniature ceramic |
| **Inductors** | |
| L1,L4 | 3 turns, 18SWG enam, 3/16in ID, close wound |
| L2,L3 | 5 turns, 18SWG enam, 3/16in ID, close wound |

### CONSTRUCTION

IT IS DESIRABLE TO HAVE access to a soldering station plus some good quality hand tools, before beginning construction. This project is too advanced for the Novice constructor to attempt alone.

All the printed circuit boards which process RF signals are double sided, with the top side forming a ground plane.

During assembly of the Printed Circuit Boards, refer to the respective circuit and component layout diagram. Note carefully the relative position of each component before fitting. Also, remember to close crop the unused terminal pins on the Toko screened inductors, before installation.

Ensure that the double sided PCBs have countersunk ground-plane side bore holes. A PCB countersinking tool should be used where necessary, alternatively a 1/4 inch drill bit should suffice. Do not, however, countersink the bore holes allocated for the chassis grounded component leads, or the wire links from the ground plane to the underside circuit track. Component leads which are grounded, or connect to the underside circuit track, should where possible be soldered on both sides of the board.

Use 28SWG tinned copper wire to make the Toko S18 inductor coil taps. Care should be taken to use a small soldering iron bit and only apply sufficient heat in short bursts. This will prevent damaging the coil former when making coil taps on the wire links.

Before making each soldered tap, examine the coil construction against the relevant circuit diagram, to determine the correct tap position.

The completed circuit board modules are mounted on the mainframe chassis with 0.25in, 6BA tapped metal stand off pillars together with the appropriate length 6BA bolt, spring washer and 6BA nut. Miniature Teflon 50Ω coax is utilised for inter-module RF circuit connections.

The cabinet dimensions to house the finished product are not critical, but it is advisable not to use a metal cabinet at least 7.5in wide, 2.5in high and 10in long. It is important to bond all the cabinet metal covers electrically to the main cabinet chassis – this helps avoid possible RFI problems. Where metal decking is fitted within the cabinet, it is vital that all the circuit modules containing heat sinks should be fitted to the upper deck.

A commonly available vernier dial mechanism was fitted for VFO tuning control purposes .

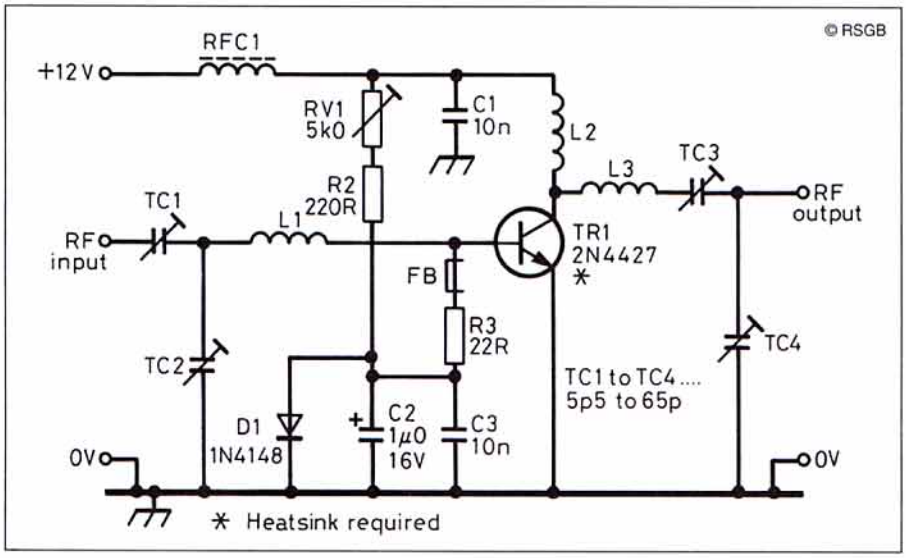



**Fig 10: Module 10, the 600mW linear amplifier is based around a 2N4472 bipolar transistor.**

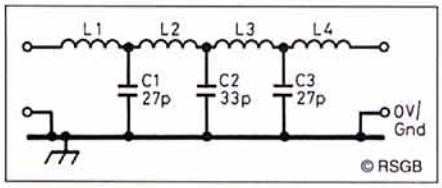



**Fig 11: Module 11, the 144MHz low pass filter.**

## TEST EQUIPMENT (MINIMUM RECOMMENDED)

a) Multimeter
b) Frequency Counter (operational to 146MHz)
c) VHF Signal Generator
d) Gate/Grid Dip Oscillator (operational to 146MHz)
e) RF Dummy Load 50Ω, 1 watt
f) Toko S18 Trimming Tool (obtainable from Maplin or Cirkit)

## BASIC FAULT FINDING

WITH THESE TYPES OF PROJECTS, the most likely faults are those caused by simple constructional errors. Before proceeding further, it would be wise to ensure that the transceiver inter-module wiring is correct, especially anything relating to the power supplies or signal circuits. If a particular module is suspected then first check that the circuit conforms to the relevant circuit diagram.

Check especially all resistance values and circuit continuity with the aid of a multimeter. If fitted to the module in question, check all fixed parallel tuned circuits by placing a GDO close to each inductor. Should it not be possible to obtain a pronounced dip on the GDO then an inductor could have been incorrectly installed, or perhaps an associated tuned circuit capacitor is of the wrong value.

## ALIGNMENT PROCEDURES

THIS SUGGESTED ALIGMENT procedure assumes that the constructor has already gained a little prior experience of servicing VHF equipment, whilst at the same time having access to some basic test equipment.

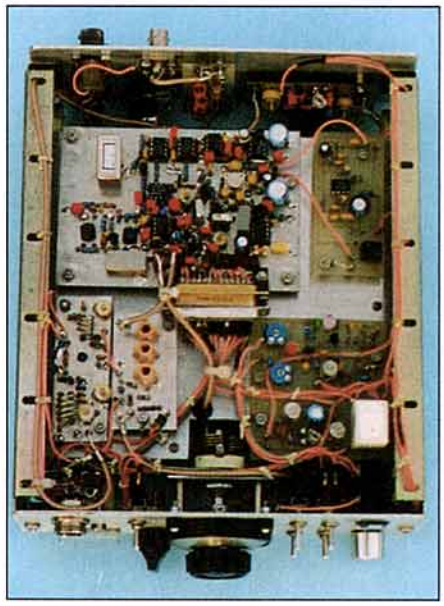
The overall plan of attack is firstly to adjust all the RF tuned circuits to the required resonant frequencies, and then to ensure that all the oscillator circuits are operating within their assigned frequency limits. Provided that there are no component or constructional faults, the remaining final adjustments are carried out on the completed transceiver under simulated operational conditions. Before carrying out any alignment checks or adjustments, it is advisable to allow a 30 minute warm up period.

## MODULE ALIGNMENT

### SSB Processor – Fig 2

Connect the frequency counter test-probe to the cathode of diode D105. Switch between the USB and LSB carrier frequencies and note whether the frequency counter indicates 10.7015MHz and 10.6985MHz respectively. To obtain these results, adjust trimmer capacitors C137 and C136.

It is worth noting that most modern frequency counters have sufficient sensitivity to monitor the crystal oscillator stray RF field. Place the counter test probe very close to the crystal – this method could save a lot of time and effort.



**The LPF and power amplifier are mounted on the rear panel.**

### VFO and Mixer – Fig 3

Next, the frequency counter test-probe is connected to the buffer amplifier output, junction of inductor L9 and the source of FET TR5. Fully mesh and unmesh the tuning capacitor VC13, and note that the indicated frequency varies between 7.0MHz and 7.2MHz. To achieve these limits adjust both trimmer capacitor TC1 and inductor L7. With the aid of an accurate gate dip oscillator, tune (by slug adjustment), the tuned circuit of L3 to 126MHz, and the tuned circuits of L5 and L6 to 133.5MHz. Transfer the frequency counter probe to the junction of resistor R7 and capacitor C7.

Place a temporary short circuit link across the tuning capacitor VC1, and select the range from 144.0MHz to 144.2MHz by applying +12 Volts between the open end of resistors R14 and R15 respectively. Make sure that the frequency counter indicates 126.3MHz followed by 126.5MHz. To obtain the best all-round results for both frequencies, some adjustment of inductor L2 may be required.

### RF Driver Modules 3 & 4 – Fig 4

With the aid of a GDO, tune by slug adjustment the tuned circuits of inductors L1, L2 and L3 of Module 3 to 133MHz. In the case of Module 4, the tuned circuits should be adjusted to resonate at 144MHz.

### 144MHz Band Pass Filter – Fig 8

With the aid of a GDO, tune by slug adustment inductors L1, L2 and L3 to resonate at 144MHz.

## FINAL OVERALL ALIGNMENT – RECEIVE MODE

COUPLE A SIGNAL GENERATOR, with CW output frequency 144.000MHz, to the transcelver aerial connector. Apply the 12 volt DC power. Ideally the local oscillator driver module should be adjustable to deliver a 7dBm, 133MHz waveform into a 50Ω resistive load, but for this measurement a VHF RF Millivoltmeter with a 50Ω input impedance would be an additional test equipment requirement.

An alternative alignment method is as follows:

Tune the transceiver VFO to the applied input signal, then decrease the input signal level until the transceiver 'S' meter needle lifts just above zero. Adjust the local oscillator driver inductor L4 and the trimmer capacitors TC1 and TC2 (module 3) for maximum 'S' meter indication. The local oscillator driver board is correctly aligned, when with the input signal is removed, the 'S' meter needle returns to zero.

Fine readjustment of the tuned circuits formed by inductors L5, and L6 (module 2) and L1, L2, and L3 (module 3), should further improve the receive sensitivity as observed by the 'S' meter indication. As an additional check, connect a frequency counter to the output terminals of the local oscillator driver (module 3). Tune the VFO between the upper and the lower frequency limits and note whether the frequency counter indicates between 133.3MHz and 133.7MHz +/– 10kHz.

With the transceiver connected to the input signal source, carefully adjust the preamplifier (Fig 6), by means of trimmer capacitors TC1, TC2 and TC3, tune the preamplifier for maximum 'S' meter deflection. Remove the input signal to the transceiver and observe that the 'S' meter indication falls to zero.

## FINAL OVERALL ADJUSTMENT – TRANSMIT

CONNECT A 50Ω, 1 WATT dummy load, via a mllliwatt through-line power meter, to the RF output terminals of the RF Driver (module 4, Fig 4). Also, connect the microphone and the headphones/speaker to the transceiver. Next, switch on the 12 volt power supply. Select 'CW' mode via the front panel 'SSB/CW' switch, then ground the 'key' input line.

Adjust the tone oscillator trimmer potentiometer RV2 of Module 9 (Fig 9), for sufficient headset/speaker 1kHz side tone volume. Then rotate the wiper of RV1 (o/p 1) two-thirds fully clockwise.

Trimmer capacitors TC1 and TC2 (module 4) are adjusted for maximum observed power on the through-line milliwatt power meter, remove the chassis ground from the 'key' input line and note that the indicated power instantly falls to zero. Achieving this result may also entail slight stretching or compression of inductor L4 of module 4.

Select 'SSB' mode via the 'SSB/CW' mode switch, and blow into the microphone a few times noting that the indicated power of the milliwatt through line power meter rises and falls in sympathy. Slightly readjust inductors L1, L2 and L3 of module 4 to maximise the indicated output power peak and trough ratios.

If, because of excessive circuit instability, these results cannot be met, then it may be necessary to overcome the problem by installing interstage screening bulkheads on the ground plane side of the PCB. Next, readjust the tone oscillator potentiometer RV1 for the minimum 1kHz output to fully drive the SSB Processor board to give the rated CW RF power output.

Connect the output of the RF driver (module 4), to the input of the 600mW PA, (module 10 – Fig 10). Connect the milliwatt through-line power meter, plus the 50Ω dummy load to the transceiver aerial connector.

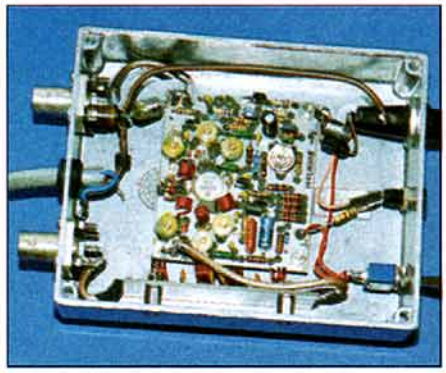
Next, apply the 12 volt supply and select 'CW' mode via the front panel 'SSB/CW' mode switch, and ground the 'key' input line. Adjust the PA trimmer capacitors TCI, TC2, TC3 and TC4 (module 10 – Fig 10), for maximum indicated CW power (approximately 600 mW). To achieve this result it may also be necessary to stretch or compress inductors L1 and or L2 of the PA module. Select 'SSB' mode and blow into the microphone. Note that the observed output power rises and falls in sympathy.

## DIAL MECHANISM

THE TRANSCEIVER VERNIER DIAL should be calibrated against the measured frequency of its RF carrier output, as indicated by a VHF frequency counter. From this, a frequency conversion chart or table, can be compiled for both the upper and lower frequency tuning ranges. Since the transceiver VFO is designed to operate from 7.0MHz to 7.2MHz, it is also possible to cross check the VFO dial calibration against that of an accurate HF Receiver dial frequency readout. For example, when the lower frequency range is selected, 7.0MHz equates to 144.0MHz and 7.2MHz to 144.2MHz. Transceiver transmit/receive frequencies on the upper range are 200kHz higher – ie 144.2 to 144.4MHz. In other words, 200kHz is added to the frequency on the lower range.

## CONCLUSIONS

ALTHOUGH THE TRANSCEIVER OUTPUT power is limited to 600mW, this was found to be sufficient to make local SSB contacts with other stations within a radius of 30 miles, using a loft mounted Slim Jim aerial. Where more RF radiated power is required, the transceiver output power is more than enough to drive an external linear Power Amplifier, such as the Wood and Douglas type 144-Lin-10B which is now back in production. A home-built amplifier could also be used – see the *RSGB VHF/UHF Manual* (chap 5), G R Jessop, G6JP. If the particular amplifier used shows up excessive harmonic radiation, an additional low-pass filter (LPF circuit and construction as given for module 11) should reduce this to an acceptable level.



**The 144 Lin 10B from Wood and Douglas boosts the output to 10 watts.**

The finished product performs well and compares very favourably with commercially built equipment within the 'budget' price range. The cost of building the complete transceiver, excluding hardware, should be well under half that of a commercial transceiver at today's prices.

It is advisable to wait a few minutes from power-up before operating, to enable the transceiver oscillator circuits sufficient time to stabilise. After the warm-up period the transceiver was found to have a very slow cyclic frequency drift of approximately +/– 300Hz. By fitting a 5pF airspaced bandspread tuning capacitor in parallel with the main tuning capacitor (VC1), there was no problem in tracking stations and compensating for the slow frequency drift.

Wood & Douglas Communications have pointed out that their 144PA4 amplifier (circa 1981) used a very similar circuit to the RF preamplifier (module 6) in the second part of this feature. They mention that the bias network is suitable for the original 3SK88*k* MOSFET, and the current 3SK88*l* type may require some experimentation with the values of R1/R2/R3 for optimum performance.

## COMPONENT KITS AND PRINTED CIRCUIT BOARDS

NOTE THAT COMPONENT kits are parts only (PCBs must be ordered separately).

**G3TSO SSB Processor (module 1)**
Component kit: £69.00 (excl filter and xtals)
Filter and xtals for above: £35.40
Printed circuit board: £8.75

**VFO/Mixer (module 2)**
Component kit: £12.50 (excl xtals)
Xtals for above: POA
Printed circuit board: £7.00

**133MHz Driver (module 3)**
Component kit: £11.50
Printed circuit board: £3.95

**144MHz Driver (module 4)**
Component kit: £11.50
Printed circuit board: £3.95

**Control circuit (module 5)**
Component kit: £3.60
Printed circuit board: £2.50

**RF Pre-amplifier (module 6)**
Component kit: £4.60
Printed circuit board: £2.50

**750Hz audio filter (module 7)**
Component kit: £5.60
Printed circuit board: £2.50

**144MHz Band-pass filter (module 8)**
Component kit: £4.00
Printed circuit board: £2.50

**Tone oscillator (module 9)**
Component kit: £3.50
Printed circuit board: £2.50

**600mW Linear amplifier (module 10) and 144MHz Low-pass filter (module 11)**
Component kit (2 modules): £5.50
Two printed circuit boards: £3.50

The above kits of components are available from: **JAB Electronic Components**, The Industrial Estate, rear Queslett Motors, 1180 Aldridge Road, Great Barr, Birmingham B74 4JF.

Printed circuit boards are available from **Badger Boards**, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. A complete set of boards for the project is available at the specially reduced price of £25.50 inc p&p.

## LINEAR AMPLIFIER KIT

MANY READERS MAY wish to boost the 600mW RF output from the transceiver. The 144Lin10B, 10 watt PEP output, linear amplifier kit from Wood & Douglas has been found particularly useful in this role (see photograph). These are now available from the company, price £35.00 + VAT, and full assembly instructions are included.

The first ten PCBs will be sold as assembled boards at the kit price. These have been professionally built to ensure that operation is entirely satisfactory in this application. Ordering address is: **Wood & Douglas Communications Products**, Lattice House, Baughurst, Basingstoke, Hampshire RG26 5LL. Tel: 0734 811444.

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For example you now have ALINCO's patented circuit that retains full operation with dry cells even when battery voltage falls by 50%. Great for emergency applications. You get a programmable auto power off feature, battery saver, digital telephone dialler and three output power levels. And we've only just started! Key in a special code on the keypad and your rig will turn into a fully operational automatic crossband repeater. Key in another code and you will open up the receiver for AM airband reception and frequency segments up to 950MHz! You can even use the DTMF feature to send and receive two digit code messages.

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*UK "Gold Seal" Warranty*
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## Specification

| | |
|---|---|
| **Tx** | 144-146MHz<br>430-440MHz |
| **Rx** | AM 108-143MHz<br>FM 130-174MHz<br>FM 400-470MHz<br>FM 810-950MHz |
| **Steps** | 5, 10, 12.5, 20, 25kHz |
| **Memories** | 42 |
| **Power Output** | 2.5/1.0/0.3 Watts<br>5 Watts with 12V DC |
| **Scan** | 8 Modes |
| **Tones** | 1750Hz plus DTMF and CTCSS built in |
| **Sensitivity** | 12dB SINAD -15dBu |
| **Size** | 140x58x33mm |
| **Weight** | 410g |

**Accessories**
Ni-Cad pack, AC charger, belt clip, carry strap, dual band antenna, and CTCSS unit.

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RADCOM TECHNICAL FEATURE

# Design Of Active Butterworth Filters

Part 1 of an article by Dr G Brown, B.Sc, Ph.D, C.Eng, FIEE, G1VCY

BUTTERWORTH FILTERS have a long and distinguished history in electronic engineering. Until recently, they were composed of passive devices - inductors, capacitors and resistors. However, the increasing need to implement filters with easily-controlled characteristics at lower frequencies has caused the passive realisation to give way to the active version, using operational amplifiers.

Although the active filter does give easily-controlled characteristics, it is perhaps more important to the designer that the use of inductors is no longer necessary. This is doubly attractive at lower frequencies, where the size of the inductor (both in value and in physical dimensions) becomes problematic. This article provides a simple guide to the design of active Butterworth filters up to 8th order, emphasising the building-block approach by cascading stages of first and second order, due consideration being given to the calculation of stage gain to achieve the required characteristics.

Sufficient detail is given in the text upon which to base a simple computer programme. Calculations can be performed easily on a hand calculator, but repetitive use of the same functions cries out for a programme to be written. I can vouch for the fact that the time spent in programme-writing is well worthwhile, particularly for 'what if' investigations, provided that they are not used as replacements for the thought process!

## FILTER CHARACTERISTICS

A SIMPLE FILTER HAS three descriptive parameters. A pass-band is the region where input frequencies pass through unaltered to the output. A stop-band describes the region where input frequencies are prevented from reaching the output. A cut-off frequency represents the boundary between the two bands. An ideal low-pass filter response is shown in **Fig 1**.

The pass-band is on the low-frequency side of the cut-off, the stop-band being above it. In this case, the response is rectangular and the identification of the cut-off frequency is trivial. The response of a practical filter is also shown on the same axes. Although exhibiting the same general features as the ideal filter, it does differ in the following ways.

- The pass-band is not flat-topped.
- The stop-band is not flat-bottomed.
- The cut-off line is not vertical, but merges into both the stop-band and pass-band.
- The stop-band is not infinitely attenuating, but has finite attenuation, and is asymptotic [see Glossary of Terms] to the zero response axis, ie the output is zero only at infinite frequency.

This discrepancy between theory and practice does not surprise most people, even if the reasons are somewhat deep-rooted in mathematics. What concerns us here is that it is the real filter that we have to live with, and thus we must know how to work with and understand the imperfect shape. To this end, it may seem surprising that, in the design of Butterworth filters for general-purpose use, the only parameters of basic interest are the cut-off frequency and the steepness of the cut-off. This argument applies equally to low-pass and high-pass filters.

## AREAS OF APPLICATION

CONSIDER NOW SOME AREAS of interest within amateur radio where the use of low-frequency active filters is invaluable. Everyone will doubtless have his own pet area in which filters could be useful or even vital, but the areas chosen for illustration are Radio Teletype (RTTY), Slow-Scan Television (SSTV) and Morse (CW).

### RTTY

For amateur use, the recommended tones are 1275Hz and 1445Hz, for a shift frequency of 170Hz. The pass-band of the average amateur receiver extends from 300Hz to 2700Hz, so at least 1255Hz of receiver bandwidth above the upper tone and 975Hz below the lower tone are responsible for passing unwanted signals and noise to the terminal unit. Put another way, the receiver is producing and receiving noise over a bandwidth of 2400Hz, only 170Hz of which contains wanted signal components, therefore, the amount of noise being passed to the terminal unit is 2400/170 = 14 times larger than it need be! These figures are very approximate, because they ignore the information bandwidth of the RTTY signal, but serve to indicate the severity of the problem and the need for a good filter.

As was mentioned earlier, an ideal rectangular filter function is impossible to achieve, so the choice of steepness of cut-off becomes a matter of knowing what your RTTY terminal unit can tolerate in terms of out-of-band interference. The equations presented here will make the design decisions fairly straight forward once the magnitude of a particular application problem has been assessed. The preceding discussion assumed that a band-pass filter was to be used, one where the pass-band is sandwiched between two stop-bands. Such a filter is easily implemented by cascading (ie connecting one after the other) low-pass and high-pass sections, as illustrated in **Fig 2**. Note, however, that the pass-band is defined by two frequencies, f1 and f2, with f2>f1; the cut-off of the high-pass section must occur at the lower frequency, and that of the low-pass section must occur at the higher frequency. If this basic design criterion is forgotten, the resulting filter will be of the all-stop variety!

### SSTV

Similar considerations apply here, but whereas a RTTY signal consists of two very narrow-band signals, the SSTV signal exists over an 1100Hz band between sync bottoms at 1200Hz and peak white at 2300Hz. Because this signal requires a bandwidth which is narrower that the 2400Hz receiver band-

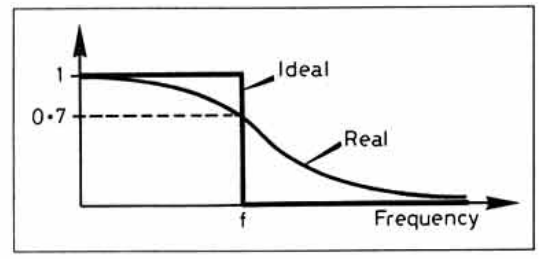


**Fig 1: Practical filters will differ from the ideal case.**

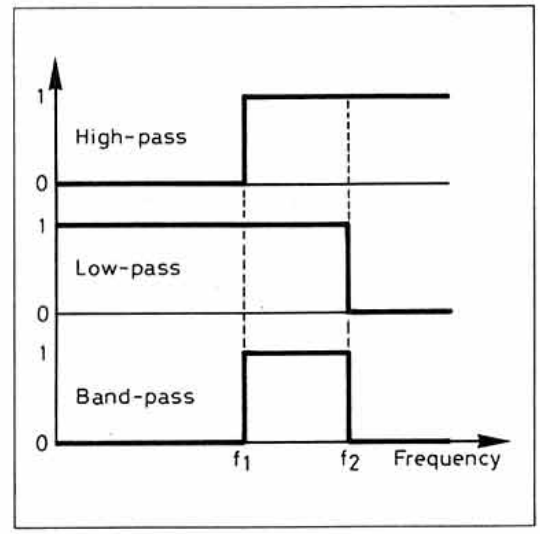


**Fig 2: Band-pass filter made from low and high-pass filters.**

width, much of the available bandwidth is therefore contributing noise and unwanted signals. (This argument applies to the transmission and reception of SSTV by single sideband, as used on the HF bands, but not to the same extent when frequency modulation is used, as on VHF and UHF.) A band-pass filter is again needed to prevent these extraneous signals reaching the SSTV decoder.

There are other areas within SSTV where filtering is advisable, but often overlooked. An example of this is the provision of an anti-aliasing filter. Aliasing is the name given to the production of jagged edges in a picture which consists of discrete picture elements, or pixels. A typical SSTV picture consists of 128 x 128 pixels, and any line which is not exactly vertical or horizontal may be displayed with a jagged edge. An anti-aliasing filter is a low-pass filter designed to reduce this effect, and is placed in the transmitting equipment before the analogue-to-digital converter (ADC). The explanation of this is outside the scope of this article, but the golden rule, whenever an ADC is used, is never to pass to it any signal frequencies higher than half the sampling (clock) frequency. Whether or not a particular system will benefit markedly from an anti-aliasing filter can be seen by defocusing the camera slightly. Most pictures will show an improvement, and some will be enhanced enormously.

In the receiving system, a low-pass filter should be used after the digital-to analogue converter (DAC). Most simple SSTV designs use a resistive DAC, and produce a fast-scan output resembling a chequer board. This is because the fast transitions between individual pixels are being faithfully passed by the slow- to- fast scan converter. A low-pass filter designed with a cut-off at around half the clock frequency will blur these transitions without noticeably degrading the picture.

Low-pass filters having the correct characteristics can easily be incorporated into existing designs, and the experimenter will find little difficulty in evaluating the cut-off frequencies required.

### CW

Having got to this stage, there is little to say in terms of the application of a good band-pass filter to the decoding of CW transmissions, either aurally or automatically. The pass-band for CW depends to a great extent on the performance of the automatic decoder or the preference of the human operator. Typically, frequencies over a range of 250 to 500 Hz cover most requirements. The steepness of the two cut-off frequencies is very important here, and cascading two high-order Butterworth filters may not be the best solution. The reader is referred to an excellent article by G0CKZ in *Radcom* [1].

In concluding this section on typical applications of active filters, it must be stated that the best filtering (in most cases) should take place in the receiver IF stages, and active filters of the type under discussion are intended for those who find their receiver selectivity performance less than adequate, or who do not have any form of IF shift and width controls.

### REFERENCE

[1] Active eliptic audio filter design using op-amps, D H G Fritsch, G0CKZ, *RadCom*, Feb/Mar 1986

***. . . to be continued***

## GLOSSARY OF TERMS

**Asymptotic**

Imagine the curve y = 1/x. As x increases, y decreases. As x approaches infinity, y approaches, but never reaches zero (the x axis). In such a case we say that y is asymptotic to the x axis.

**Coefficient**

In an expression such as;

$$Ax^3 + Bx^2 + Cx + D = 0$$

A, B and C are coefficients, ie constants which multiply the variable.

**In-Band**

This is a term used to describe a frequency (or frequencies) lying within the pass-band of any filter. For a low-pass filter, in-band frequencies lie below the cut-off, and for a high-pass filter they lie above the cut-off.

**Polynomial**

A polynomial is an algebraic expression containing more than one term. For example;

$x^2 + 4x + 2$ is a polynomial of order 2 (the highest power of x).

**Quadratic**

(a) Equation. A quadratic equation is a polynomial of order 2, eg;

$$x^2 + 5x + 6 = 0$$

(b) Factor .The above equation can be split into factors which, when multiplied together, are equal to the original expression.

For example (x + 3) and (x + 2) are the factors of the previous equation, because

$$(x + 3)(x + 2) = x^2 + 5x + 6$$

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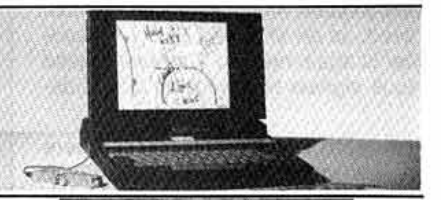

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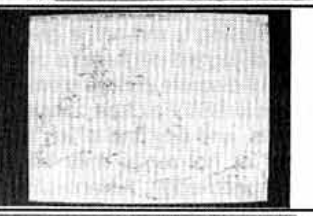

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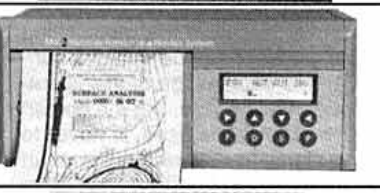

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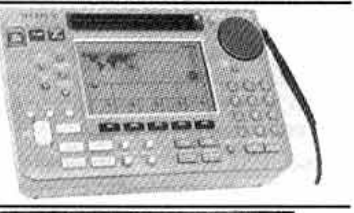

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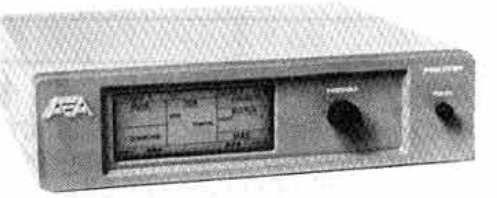

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RADCOM NEWS FEATURE

**This year, the RSGB celebrates the Diamond Jubilee of the Society's most popular and enduring annual HF contest – National Field Day.**

# HF NFD

## A Retrospective View

**by Hilary Claytonsmith, G4JKS**

IN THE TWENTIES experimental wireless association members would emerge from the oppressive atmosphere of the towns and cities to enjoy their radio alfresco.

A decade later, RSGB President Henry Bevan Swift, G2TI, was promoting a more organised approach to field days, based on competition between the RSGB Districts.

A germ of a scoring system existed to encourage friendly rivalry, but the primary objective was to "prove that a group of portable stations, located in all parts of the British Isles was capable of maintaining reliable communications with other amateur stations using low power apparatus. The event also would clearly demonstrate that if the necessity arose, an emergency network of stations could be placed into operation at short notice". So was born the first National Field Day in June 1933.

Each district could run an 'A' station on 1.7 and 3.5MHz with the 'B' station operating on 7 and 14MHz [of course it was Mc/s in those days, but we've used MHz throughout this article to avoid confusion - Ed]. The input to the valve delivering power to the aerial was limited to 10W on 1.7, and 25W on the other bands. The aerial was not to be higher than 45' above ground and the whole event took place over a 27 hour period.

George Spencer, G2KI, recalls being part of the 'A' station in District 15, along with Les and his brother Harold Wilkins, G6WN, G2LA, G2IY and others, operating from Denham Bucks, aided by the boy scouts who provided tents, dug trenches and cooked for them. The operators were distracted during the weekend by activities at the Denham Studios just below them, where 17 year old Margaret Lockwood was making a film. This may have contributed to them only managing to make 81 points (30 QSOs). However, the 'B' station with G6YK, G2BY, G5CV, G2UV and G6CJ proved to be rather more successful. The Post Office had just closed down its station GKB at Northolt which had some rather nice lattice masts - very convenient. However, the adjudicators said "Criticism has been levelled against one district because they suspended their aerial . . . . to the mast of an old commercial station . . . . in doing so they unthinkingly placed themselves at an advantage . . . .". The advantage being, they scored the highest points of any station - 283 (34 QSOs).

1933 NFD winners, G6WN, operating from Denham, Bucks, in RSGB District 15.

ZL1AH (ex G3AH) tells of the 1936 Region 1 'B' station operating from Grants Tower Farm, Bury, where the rig was powered by a PE set which had a main bearing which ran hot. It had to be lubricated every few minutes with an ether-based graphite compound. They took turns to do a stint of 'dripping' but unfortunately as the ether evaporated off the bearing it tended to anaesthetise the dripper.

During the early days of NFD several unofficial stations joined in the fun. Surrey Radio Contact Club was one such station, operating from the top of the Croydon Water Tower. Using a vertical aerial dropped from the top, they were doing well until one of the helpers got the water and paraffin cans mixed and made a large pot of tea. It was a long way down to the nearest toilet.

At that time, concern was being expressed by 'Clarry' G6CL, over the transmission of harmonics during NFD. "In at least one case a 3.5MHz station claimed points for a contact with a 'B' station operating on 7MHz and vice versa".

1937 brought rule changes. Each district could operate four stations, the contest was shortened to 24 hours and so that everyone knew which band you were really on, transmissions had to be signed off with the band in use - ie 1.7 = 1, 7MHz = 7, etc.

At this time NFD was well established and the rules had settled down. However, things were not so settled elsewhere . . . .

## Formative Forties

THE *RSGB BULLETIN* in 1947 reported "Experience gained in the pre-war field days proved to be invaluable to the many who were engaged in the recent hostilities. In the USA, New Zealand and other countries which have been hit by floods and earthquakes the radio amateur has always been quick to take advantage of such experiences".

Because of an increase in membership, competition was now based on towns or areas. Groups were encouraged to improve the quality of their equipment; any station receiving constant tone reports below T8 were disqualified. Stations still had to sign off with the band in use!

The 1947 NFD brought out around 200 portable stations. Southgate Amateurs at G5FA/P and G6ZO/P made 244 points and 339 respectively. Most groups using the classic VFO, buffer and PA setup with 264' antennas. HROs predominated as receivers - state of art at the time.

Petrol rationing was still in place, and to avoid groups having to transport bulky-large capacity accumulators, the use of dry batteries for HT and LT was made compulsory. Judicious selection of valves was now neces-

QSL cards 1933-36. The letter P was added to the two-letter callsigns to denote portable.

sary! The maximum power was reduced to 5W on all bands and each station could only have one transmitter and two receivers - one to be used to search on other bands.

In 1948, the Edgware and Hendon 'B' team was criticized for its use of a two element rotary beam on 14MHz. However the adjudicators decided they should not be, as the modern trend was towards such systems.

## Fluctuating Fifties

THE FIFTIES PROVED to be a period of change, the only thing remaining fairly constant being the names of Bristol and Gravesend in the lists of NFD Shield winners.

In 1950 aerials had to consist of single wire radiators, not larger than 285 feet for the 'A' station and 70 feet for the 'B' station excluding non-radiating feeder systems. Only one receiver per station was allowed. Then began the first of a series of interesting contest exchanges.

**In 1951, Falkirk became the first Scottish NFD Shield winner.**

Operators had to send RST plus time, when in contact with portable stations in 1950. By 1952 it had changed to RST plus the first three letters of the operator's surname. 1957 saw the emergence of the rising serial number.

In 1951 the Falkirk team carried the NFD Shield off to Scotland for the first time. To celebrate the event, the following year GM3HVC made the present Scottish NFD Trophy. Edinburgh, Glasgow, and Dunfermline also appeared in the top twelve places.

Bristol began a three-year run at the top and in 1955 presented the Society with the Bristol Trophy for the highest single station entry. In 1952 they were using a 6L6 VFO, 807 PA/Doubler, half-wave dipole on each band, HRO receiver with 132' long antenna and 110v AC petrol generator. In the same year the sections were changed. Each station could operate either as before or run an 'A' station on 1.7 and 7MHz and the 'B' station on 3.5 and 14MHz. Separate log sheets came in for each band, greater scope of aerials was permitted, the start time was put forward one hour, and either one or two transmitters could be used at each site.

With NFDs come disasters. Torrential rain did not deter the Rochester group when the tent leaked. The operators were covered with a plastic mac propped up by beer bottles. Another group put paraffin in the batteries instead of distilled water, and couldn't work out why they had shocking headaches.

Around this time, much correspondence was received by the RSGB regarding the purpose of NFD. The following statement was issued: "This event is not regarded, nor has it been so for many years, as a simulated emergency exercise and no attempt is made to shape the rules as though this were the case. It is firmly believed that the administrative, technical and operating experiences gained in the planning, designing and working of portable stations is of great value to the community".

In 1957, the power increased to 10W and six bands were made available, including 21 and 28MHz, to be split between the 'A' and 'B' stations. Equipment at any station was not to exceed three transmitters and one receiver. Towards the end of the fifties amateurs were entering NFD using the names of their Clubs or Affiliated Societies.

## The Steady Sixties

ALTHOUGH THINGS were swinging elsewhere, NFDs in the 60s seemed quite sedate affairs.

In spite of the declining sunspot cycle, record scores were achieved; the 1.8 and 3.5MHz bands attracted extra points; scoring rates at Stamford & District Group were averaging about 93 points per hour in 1960.

**The Thames Valley ARTS 1971 station used a mix of commercial and home-built equipment. By the seventies, operation from caravans was permitted.**

1960 winner, G3FUR/P, used a receiver with banks of crystal controlled converters feeding into a tunable IF strip at 1.5 - 2MHz. The direct calibration could be read to 0.25kHz. The second IF was at 465kHz, and used a phasing type crystal filter, half and full lattice filters, linear detector and Q multiplier. In all, it used 40 valves - 25 of which were in circuit at any one time!

V-Beams and cubical quads were becoming popular and the word transistor was appearing more frequently in connection with power supplies. By 1964 There were fully transistorised transceivers, receivers, and DC to DC converters. In 1966 the power rule changed - "The valves energising the aerial shall have total maximum rated anode dissipation not exceeding 13.5W."

The Frank Hoosen, G3YF Memorial Trophy (14MHz leader) was received by the RSGB and awarded to the Exeter Group, G3ID/P. With modified KW2000s and commercial gear being used more often, station inspections were introduced.

In 1964 Plymouth RC's Dartmoor site became a 9" deep lake. The tent collapsed with half the group inside, the top band aerial came down, the generator suppressor then packed up resulting in S9+40dB hash. In the middle of the night the mast snapped. Things then went smoothly - for 15 minutes until the generator cover caught fire.

## Striking Seventies

DURING THE DECADE some fundamental changes took place in the rules. The sections were changed in 1972 and again in '76 with the introduction of the Open and Restricted Sections. Bonus points were available on 28MHz and 1.8MHz. With the increasing use of commercial gear capable of 100W, full licence power was allowed.

1978 was the worst year of the decade for conditions, both radio and meteorological. A large solar flare caused a radio blackout during Friday followed by disturbed conditions with high levels of sporadic E activity on 28MHz. On the Saturday static levels built up causing problems on LF. Localised thunderstorms wreaked havoc, with several stations being forced to close down. For those who continued there were near misses - transceivers were damaged, ATUs were fused, keyers malfunctioned and fingers were burnt. The HFCC was horrified at the risks some groups were willing to take. Their advice at the time was "close down and take cover in a car; you may lose an hour of operating but death is so permanent!" The North London CW Club reported "when lightening struck nearby, we ran for our lives as the quad came

**Cris, G4FAM, operating G3GRS/P in 1985, the third year that Gravesend took the trophy. Inspiration was drawn from the previous year's presentation photo.**

## 1930S NFD SHIELD WINNERS

| Year | Winner District | Area | Points |
|---|---|---|---|
| 1933 | 15 | W London & Middx | 364 |
| 1934 | 5 | Western | 361 |
| 1935 | 8 | Home Counties | 427 |
| 1936 | 12 | North London | 586 |
| 1937 | 16 | South Eastern | 517 |
| 1938 | - | Northern Ireland | 612 |
| 1939 | 4 | East Midlands | 655 |

| Year | Winner | Calls | Points |
|---|---|---|---|
| 1947 | Southgate | G5FA/P, G6ZO/P | 583 |
| 1948 | Edgware & Hendon | G3HT/P, G2IM/P | 774 |
| 1949 | East Molesey | G6GB/P, G6NB/P | 914 |
| 1950 | Cheltenham | G3LP/P, G5BM/P | 847 |
| 1951 | Falkirk | GM4JQ/P, GM4MF/P | 931 |
| 1952 | Bristol | G2IK/P, G6GN/P | 1123 |
| 1953 | Bristol | G6GU/P, G6GN/P | 1054 |
| 1954 | Bristol | G2IK/P, G6FW/P | 1091 |
| 1955 | Gravesend | G6BQ/P, G3IEW/P | 1186 |
| 1956 | Bristol | G2IK/P, G3RQ/P | 1186 |
| 1957 | Slough | G6NA/P, G6CJ/P | 1393 |
| 1958 | Gravesend RC | G6VC/P, G3IEW/P | 1651 |
| 1959 | Gravesend RC | G6VC/P, G3IEW/P | 1530 |
| 1960 | Stamford & District | G3ARS/P, G3FUR/P | 2239 |
| 1961 | Stourbridge & DARS | G3BMY, G8GF/P | 1894 |
| 1962 | Stourbridge & DARS | G3BMY/P, G8GF/P | 1908 |
| 1963 | Port Talbot Group | GW4CG/P, GW5VX/P | 2276 |
| 1964 | KW Electronics RC | G6VC/P, G8KW/P | 2185 |
| 1965 | Cardiff Group | GW5BI/P, GW4FW/P | 2156 |
| 1966 | Exeter Group | G3ID/P, G3JW/P | 2430 |
| 1967 | Surrey RCC | G3BFP/P, G6LX/P | 2061 |
| 1968 | Cannock Chase ARS | G4CP/P, G3ABG/P | 2334 |
| 1969 | Guilford DRS | G8GS/P, G3KMO/P | 2375 |
| 1970 | Port Talbot | GW4NZ/P, GW5VX/P | 2336 |
| 1971 | SRCC | G3BFP/P, G6LX/P | 1984 |
| 1972 | SRCC | G3BFP/P, G6LX/P | 2674 |
| 1973 | SRCC | G3BFP/P, G6LX/P | 2523 |
| 1974 | Ariel RG | G3BBC/P, G3GDT/P | 2805 |
| 1975 | Channel CG | G3MXJ/P, G4DAA/P | 3329 |
| 1976 | Glenrothes DARC | GM3YOR/P | 2577 |
| 1977 | Channel CG | GE4DAA/P | 3356 |
| 1978 | Channel CG | G4DAA/P | 3055 |
| | Glenrothes DARC | GM4GRC/P | 3055 |
| 1979 | Guernsey ARS | GU3HFN/P | 3346 |
| 1980 | Swansea ARS | GW5ZL/P | 2933 |
| 1981 | Guernsey ARS | GU3HFN/P | 3423 |
| 1982 | Racal ARG 'B' | G3KLH/P | 3453 |
| 1983 | Guernsey ARS | GU3HFN/P | 3620 |
| 1984 | Gravesend RS | G3GRS/P | 3319 |
| 1985 | Gravesend RS | G3GRS/P | 3765 |
| 1986 | 3 A's CG | G0AAA/P | 4555 |
| 1987 | Verulam ARC | G3VER/P | 4476 |
| 1988 | Marple CC | G3VMW/P | 4831 |
| 1989 | Marple CC | G3VMW/P | 4144 |
| 1990 | 3A's CG | G0AAA/P | 4619 |
| 1991 | Reading DARC | G3ULT/P | 4698 |
| 1992 | Reading DARC | G3ULT/P | 5279 |

**NFD eighties-style. Computerised logging with band openings and scoring rates on the wall of a tow-a-van. Operating G3VER/P are G3JKS and G3UJV.**

down - with 60' high conductors and the prevailing weather it was more like a Hammer horror film than NFD."

The Surrey Radio Contact Club became only the second group to win the NFD Shield three years running. This year also saw a unique event - not a cats whisker separated the Channel Contest Group and Glenrothes DARC as overall leaders resulting in the shield being shared.

In 1979; three groups used home brew transceivers but most chose FT101s over the TS820s. Antennas in the open section varied from yagis to rhombics on HF and on 7MHz there were at least seven rotary beams.

## Eighties and Nineties

COMPETITION SCORES, temperatures, winds, and antennas were all high during the eighties. an average of 116 stations were out portable with the points total breaking the 4000 mark. Temperatures soared into the nineties, winds reached gale force 10. The antennas in the open section were up at 65' and ranged from rotary beams to yagis through rhombics, sterbas and stacked quads. It would have been understandable if during the eighties large numbers of groups had given up as stamina and endurance were tested to the limits. Competition reached fever pitch between the leaders but the leveller turned out to be the weather.

Most successful clubs have some formidable role models on which to base their operations. Gravesend is just one such club. In the thirties G6BQ and G6VC established a winning combination with G3JLB, G3DCV and G3IEW continuing the success in the fifties. In the sixties G3MXJ and G3SXW came on the scene. G4BUO and G4FAM formed the winning combination in 1984, 85 and 86 when Gravesend topped the Open Section.

Southgate won the Frank Hoosen Memorial Trophy in 1980, 33 years after winning the NFD Shield and they're still going strong. During the 70s and 80s dedicated groups emerged, adding a higher level of competition. The Channel Contest Group, the 3As and the Marple Contest Group being among the more notorious. With the competition came the emergence of on-site computerised logging and duping systems. Verulam ARC used fully inter-reactive computers by 1983. Later, programs such as K1EA appeared on the scene. The FT101 was overtaken by the

**Mobile towers were being used more often by 1988 when this photograph of Ayr ARC's NFD station was taken.**

TS930s as a CW contest rig. Tents were being used less often, with a move to caravans, campers, tow-a-vans and horse boxes.

In 1983 down south, there were thunderstorms, electrically charged rain and hail stones the size of tennis balls. The electrical discharges took a heavy toll of transceiver front ends, keyers, power meters, SWR bridges and other solid state equipment. Hastings closed down for eight hours and the Channel Contest Group gave up at 1400. A Sussex group found their tent on fire, while one check-logger singed his hair on the feeder. 1984 brought flash floods, lightning and gale force winds which brought antennas and masts down. 1987 was the worst year of the decade with gusts over 100mph showing how vulnerable unguyed mobile towers were. Such was the resilience of NFD groups that 122 stations were operational.

## Field Days are Fun

WHY DO SO MANY people subject themselves to this annual ritual? What is the attraction of NFD? All I can say is, that as a new girl of only 12 NFDs I have learnt a great deal about amateur radio from field days.

I have learnt operating skills, to assemble and erect masts, put together beams, cut dipoles, maintain generators - all in torrential rain. I learnt how to use a great circle map, about grey-line operation, long and short path openings, sporadic E and trans-equatorial propagation. I also discovered who I could operate with, and who I couldn't. But the greatest lesson of all was that field days are fun!

RADCOM USER REVIEW

# Two Views of the SRW CobWebb

## A five band HF Antenna

The *RadCom* team was lucky enough to have the opportunity of trying out one of these antennas. At the same time Alan Carpenter, G3RQT, sent in his user review, so we decided to combine efforts as follows.

### 1: Alan P Carpenter, G3RQT

MY ATTENTION was drawn to this aerial by a local amateur who had recently purchased one. On our Sunday morning net he told me what he had worked and how it generally performed. Having a very small garden not suited to full size beams for HF, I decided to obtain one myself.

A telephone call to Stephen Webb (G3TPW) of SRW produced several sheets of notes and information on the CobWebb. Some of the points raised in these notes were most interesting, as the specifications show.

#### PARTS SUPPLIED.

THE INDIVIDUAL parts supplied are shown in the photograph opposite, before assembly. More than enough screws are supplied (40 required, 50 supplied!), and the same applies to the tags for the element corners. Purchasers even receive two pieces of tubing, predrilled, to practise screwing together before tackling the aerial itself!

All that is needed is a vertical support (pole) and the feeder to the shack. It comes with a PL259 plug soldered to a short coax lead which is connected to the feedbox. An inline PL259 type connector is required to connect the feeder to the CobWebb.

#### UNPACKING AND ASSEMBLY

THE AERIAL KIT was supplied well packed in a generous covering of bubble wrap polythene. With the component parts laid out on the floor and sorted into various sizes. instruction sheets were read carefully and found to be clear. No problems were found during assembly, but it is recommended that this be done on a flat surface. The sequence given in the instructions was followed before clamping the spreaders to the baseplate.

Finally the wire elements were placed around the corner tags and the ends tied as shown in the photograph. Each band element forms a square, with cable ties used to hold the wires in place.

#### COBWEBB ON TEST

THE COBWEBB WAS secured to the top of a 6ft pole. The tuning can be checked while the aerial is at 6ft above ground, and changes can be made by folding back the ends of the element for a particular band. Guidelines are given in the instructions as to how much should be folded for a given frequency shift to keep the antenna resonant.

Each band was checked in turn for resonant frequency and was found to be initially resonant at the lower end of the CW portion. It was anticipated (correctly, as it turned out) that the resonant frequency would increase when the aerial was raised to it's final height - in my case 21ft (6.5m). S.R.W., I am told, will supply an antenna pre-resonated at the CW end on request. After raising the CobWebb to 21 feet, the resonant frequencies were again checked on each band and found to be as follows:

| SWR | Frequency |
|---|---|
| 1.15:1 | 14.095MHz |
| 1.1:1 | 18.070MHz |
| 1.1:1 | 21.100MHz |
| 1.1:1 | 24.900MHz |
| 1.1:1 | 28.400MHz |

Raising the CobWebb to a reasonable height would increase the resonant frequencies slightly further, and some trimming might be necessary. As I use digital modes more than SSB, the resonant frequencies shown above suit me fine.

#### ON THE AIR

BEARING IN MIND the height of the CobWebb was only 21 feet, (any higher and I was possibly in need of planning permission), the following were worked:

**20m** numerous W's, ZS's, VO1, VK's, 9K2, CU, 9X5, TR8, ZL, HI8, FY0. Reports ranged from 5-3 to 5-9 plus 20dB.

**17m** ZL 5-1, W4 5-6/7, ZS5 5-8/9.

**15m** 8P9 5-5 report, W's 5-5 to 5-6.

**12m** Only Europeans worked 5-7 to 5-9.

**10m** VO1 5-5, and many Europeans.

These were worked during just one month in 1993 with only 100 watts output. Despite the rather spasmodic conditions during the month, it seemed a good spread of QSOs. Naturally a three-element beam at 40 feet will out-perform the CobWebb but listening to UK stations on 20m when conditions allowed and noting the signal reports they were giving out, there was an estimated 3-6 dB difference between their antennas and the CobWebb. This was after allowing for power differences and their aerial heights.

There was the occasion when the station they were working could not even be heard, but that UK station *was* using a six-element at a much greater height than the CobWebb!

#### CONCLUSIONS

THE COBWEBB PERFORMED very well and the short term results have been most satisfying.

## MANUFACTURER'S SPECIFICATIONS

a) Covers five HF bands. Typical 2:1 SWR bandwidths are 250kHz on 14MHz and 500kHz on 28MHz.
b) Omnidirectional - no rotator required.
c) Horizontally polarized which vastly reduces EMC problems compared to verticals.
d) 50Ω coaxial feed.
e) Ferrite toroidal coaxial choke balun.
f) Feedbox and resonators all pre-assembled.
g) No tuning or resonating required.
h) Full size half wave dipole performance on each band.
i) Fibre glass construction. No corrosion or metal fatigue problems.
j) Total assembly is pre-drilled. No soldering required.
k) Size - 2.5 metres each side.
l) Weight - under 6kg (assembled).
m) Fixes to a mast up to 2in diameter. Fixing clamps and plate supplied.

Raising it up to 40 feet will of course improve the reports and probably by two S-points. For a QTH with a small garden and where high aerials are prohibited this should fit the bill. Although the CobWebb has only 8 foot sides it's performance is excellent. It represents very good value for money and I would like to thank the Directors of SRW who have been most helpful.

## 2: *RadCom* Team

WORKING DX WITH an indoor antenna is not impossible, and the CobWebb was installed in the roof space of a second floor apartment at about 35ft (11 metres) high. As it turned out to be a particularly rainy Sunday afternoon, one of the few advantages of an indoor antenna soon became apparent!

## DO-IT-YOURSELF RADIO

THE ANTENNA WAS supplied with a PL259 plug - an SO239 line socket would have been more useful for most purchasers, as line sockets are rather difficult to obtain. Assembly was straightforward using a screwdriver, 10mm spanner and pair of cutters. In fact, anyone with experience of Meccano and/or MFI furniture should have no problems! The fibreglass construction means that the main structure is lightweight. Having said this, the box containing the matching ferrite transformers is fairly heavy, and offset from the centre of the structure. Therefore a well secured mast is recommended for the antenna.

It took about two hours from opening the box, to final completion (excluding adjustments). This included one tea-break.

## ELECTRICAL ADJUSTMENTS

PRIOR TO TRIMMING, some impedance measurements were carried out. The frequencies which gave the best 50Ω match were as follows: 13900, 18020, 20980, 24700 and 29500kHz.

Small adjustments to the length of each element were then made, and transmit tests carried out. After a couple of hours testing, optimum matching was obtained at the following frequencies (the 1.7:1 SWR bandwidth is shown in brackets): 14100 (90kHz), 18110 (100kHz), 21150 (120kHz), 24940 (130kHz) and 28450 (150kHz). It is important that any length adjustments are made to *both* elements for any particular band. Otherwise, it's possible to achieve resonance but incorrect matching, or a 50Ω match to a non-resonant antenna.

## RESULTS AND OBSERVATIONS

CONSIDERING THE SMALL size of the antenna, good results were obtained on all five bands. Most tests were carried out on 20m as here the CobWebb could be compared with a 20m dipole used as a reference antenna.

Both antennas were fitted into the loft space, with the dipole just below the apex of the roof. As the CobWebb is about 2.5 metres square and horizontal, this had to be placed about 1.5 metres lower down, due to the slope of the roof.

The effects of this were twofold: Firstly, the CobWebb was closer to the house mains wiring and consequently the receive noise level was slightly higher. Secondly, the slight reduction in height may have resulted in marginally lower signal levels on both transmit and receive.

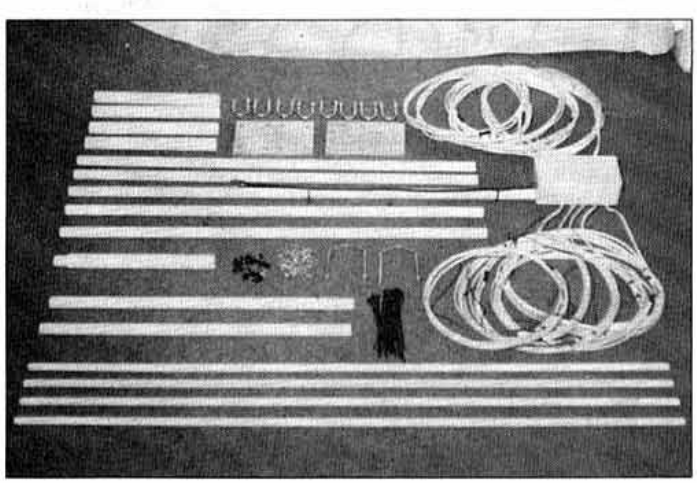
The CobWebb is claimed to be omni-directional and tests with European stations certainly confirmed this. For QSOs with stations to the east (eg Russia and Czech Republic), reports were about one S-point down compared with the dipole in it's best direction. To the south, however (eg Malta and southern Italy) the dipole is more-or-less 'end-on' and here the CobWebb performance equalled that of the dipole. For contacts at greater distances (North and South America), the dipole seemed to have a definite edge.

## CONCLUSIONS

IF YOU'RE LOOKING for a compact five-band antenna, and can raise the CobWebb even a few feet clear of surrounding objects, at a reasonable height above ground, then the CobbWebb should give good results and worldwide QSOs under the right conditions. This could also be an excellent antenna for serious short wave listening.

The horizontal polarization is claimed to reduce the possibility of TVI, and certainly no problems were experienced during an intensive period of testing (yes, the TV antenna was also indoors!)

In fact the only disadvantage appears to be the bandwidth restriction, but this was not a problem on 12m or 17m, or for either SSB only or CW only operation in the relevant segments of the other bands. An ATU would extend the tuning range, if required.



SEE REVIEW IN THIS ISSUE

**G3TPW 'CobWebb'**

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**NO POWER LIMIT.** No losses means nothing heats up (1kw tested). Ideal for QRP work, when you need a very low loss (ie QRO) antenna!
**PROPER 50Ω MATCH.** No compromise. Double gamma tee match gives low SWR resonance on all 5 bands. PL259 plug fitted on short lead.
**SMALL SIZE & WEIGHT.** Only 8 foot square (2.5 metres) and under 6kg. No need for tower or heavy mast. 'U' bolt fixing to 2in aluminium pole.
**NO PLANNING NEEDED.** Generally OK if you fix mast to rear or side of house and height does not extend above roof ridge.
**FIBREGLASS CONSTRUCTION.** No corrosion or metal fatigue. 100mph wind tested.
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The four PCBs completely replace the original receiver sections and are mounted above the existing boards. The P.A. boards are also replaced, in order to reduce insertion loss on rx. The SO239 connector for 2m is replaced with an N-type. Selectivity is also improved by use of an 8-pole xtal filter.

### Specification

| | Original Spec. | Mutek |
|---|---|---|
| **2m Section** | | |
| Noise Figure | >18dB | <2dB |
| Image Reject. | >60dB | >70dB |
| Itermod. free dynamic range | 80dB | 90dB |
| **70cm Section** | | |
| Noise Figure | >18dB | <1.5dB |
| Image Reject | >60dB | >70dB |
| Itermod. free dynamic range | 70dB | 80dB |

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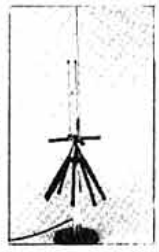

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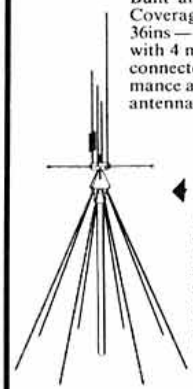

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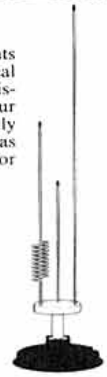

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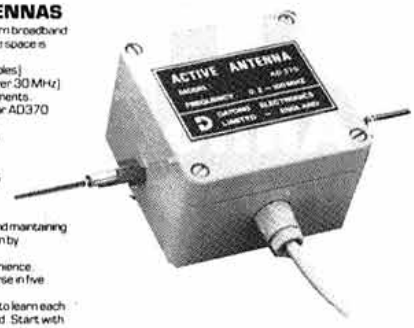


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# Q R P

**REV GEORGE DOBBS G3RJV**
St. Aidan's Vicarage, 498 Manchester Road, Rochdale OL11 3HE

THE AUSTRALIAN QRP CLUB has enjoyed a revival in recent years and is now an active club with international membership. It's aims are simple and summed up in one sentence, "Promoting Low Power CW Mode Communication and Home-brewing in the Amateur Radio Service". Their motto is "We do more with less". The club produces an interesting journal, *Lo-Key*, which is a mixture of news, activities and construction projects. *Lo-Key* has gone from strength to strength under its lively editor, Don Callow, VK5AIL. The club also has a scheme of awards and activity events using 5W, or less, on CW.

Membership is open to any radio amateur, with an annual fee of $A10 for VK members, $A12 for ZL members and $A14 for DX members. Applications for membership, or enquiries, can be made to Kevin Zietz, VK5AKZ, 41 Tobruk Ave, St Marys, SA 5042, Australia.

## RF POWER: HOW MUCH IS ENOUGH?

. . . APPEARS AS THE cover article in the March 1993 edition of *QST*, the official journal of the ARRL. An odd title to head the official magazine of the hobby in the country that is so often identified with the big power stations of amateur radio. I doubt if many people in the UK know, I didn't, that the FCC (Federal Communications Commission) rules state that "an amateur radio station must use the minimum power necessary to carry out the desired communications". The article, written by Diehal Martin, N5AQ, and David Newkirk, WJ1Z, is worth reading by radio amateurs anywhere. It is long and informative but I would like to pull out two simple statements.

"How far your signal travels has nothing to do with how much power you run." As long as you run a power greater than zero, your signal will travel everywhere propagation allows it to travel. Increasing power does not make the signal go further, it just makes the signal stronger. The trick is to use just enough power to allow it to be usefully copied in the place you want to contact.

"Excessive power is actually worse than waste: It is potential interference." Additional power just lets you be heard further beyond the station you are trying to reach. That is interference to other stations on the band. It can disallow successful frequency re-use where it might otherwise be possible: stations sufficiently remote from your target area wishing to use the same frequency.

The authors go on to suggest practical ways of using power wisely including receiver selectivity, signal processing and directional antennae. It also suggests that the use of greater power is no substitute for correctly adjusted transmitters and receivers. Well worth reading, the article skilfully links the ethical and technical sense of power management. The same issue of *QST* has a practical article on Automatic RF Power Control for AMTOR Operation.

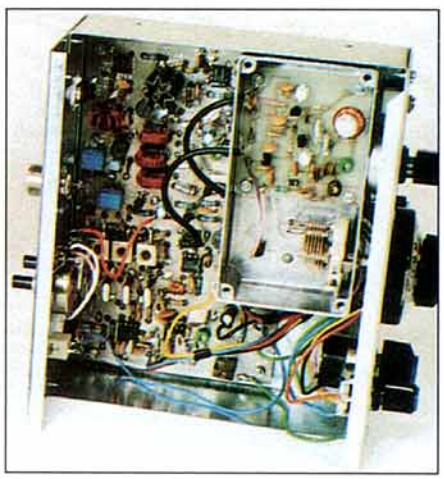
Not content with two major articles on power management, *QST* features QRP in its editorial by David Sumner, K1ZZ. He suggests that QRP operating is a speciality that offers some lessons to all of us. My favourite bit is, "Home construction is popular with this group, and those with the talent to milk high performance from simple equipment are highly regarded by their peers; they're the gurus of what might be termed 'low-impact hamming'. One of my favourite operating periods of the year is between Christmas and New Year's Day, when QRPers make a point of getting on the air to exchange greetings - not as a contest, but in celebration." He must mean the G QRP Club Winter Sports - thank you David, we like it too!

## A NEW QRP TRANSCEIVER KIT

A MORE RECENT NAME in the UK amateur radio kit market is Hands Electronics of Llanfyrnach. They issue an interesting free catalogue and amongst the current list of products is a new QRP Transceiver kit. The TCV/7 Transceiver Kit is a VFO controlled 7MHz CW transceiver capable of up to 7W of RF output. The transceiver includes an RIT and has a pi-pad on the board to control the output to lower levels for the *official* QRP level of 5W or less.

Before this kit came to production Hands Electronics sent me a prototype to try on the band and offer advice and comments. I found the transceiver performed well on 40 metres and I enjoyed a good range of contacts all around Europe over a few nights of operating. The transceiver is another example of the QRP equipment based around the NE602 oscillator/mixer chip. An NE602 mixer can be a little 'iffy' as the front end mixer in a 40 metre receiver, but Hands appear to have done their design homework well on the input bandpass filter. The example I tried coped very well with evening conditions on the band. My prototype proved to be a very lively and viable little transceiver and pleasant in that it could achieve my desired 5W output level with power to spare.

The TCV/7 kit sells for £85 complete with VFO and everything, except the case and hardware. The main board, less VFO, is available for £69, which would enable an existing VFO, or the Cirkit VFO, to be used, perhaps for another band. Versions will soon be available on other bands and some of these versions would be attractive as a Novice transceiver if set to give the required 3W RF output. The kit, or details, can be obtained from Hands Electronics, Tegryn, Llanfyrnach, Dyfed SA35 0BL. Telephone: 0239 77427.



**The new Hands Electronics TCV/7 for 40 metres. See 'A New QRP Transceiver Kit'.**

## PLEASE QRS!

MOST EXPERIENCED CW operators seem to quickly forget what it was like when they first used their key 'in anger' on the bands. I have had a recent reminder of the horrors and frustrations of the new CW operator on the HF bands. After many years of holding a Class B Licence (G1IJW), my wife has just become G0OWH. Her first log page on the HF bands puts my first page to shame. The first QSO was working me on a very crowded 7MHz band the evening she received the callsign: I was in Birmingham visiting G4LQF and her 4th log entry is working me again, this time on 21MHz when I was signing G3RJV/W8. It took me 3 years to work my first American station, in fact it took me 2 years to get off Top Band! Standing over her shoulder, offering advice, I soon began to understand the problems of a new CW operator in the 1990's. The HF bands are full of stations badly paddling electronic keyers at a speed just in excess of what they can manage to send with accuracy. Spraying extra dots around the bands is not a good way to show skill! There are, of course, many good readable operators around. "Don't be daunted", I said, "call a station that is sending easy to read CW and send 'PSE QRS' during your first over". Either they do not understand this particular Q Code group or they consider its implication to be difficult because almost none of the stations will comply. This may well explain why so many Class A operators pass the Morse Test and then quickly give up CW operating on the air. Shortly we are to have an influx of new Novice Licence holders, keen but inexperienced, who will be seeking our help on the air. Please remember that when you hear these strange new callsigns or a new G0 callsign on the air if, and how, you respond to them will determine the future of our hobby. Wire up a straight key in parallel to your bug, you are going to need it . . . . if you can use it! Please QRS or else we may lose new blood in amateur radio.

# EMC

**MEGAN SMITH, G0MEG**
EMC Committee Secretary

I HAVE HAD LOTS of letters this month, thanks for all your comments. Top of the list are the old favourites - televisions, telephones and alarm systems. A couple of intrepid folk sought me out on top of a damp, cold hilltop during a 2 metre contest earlier this year to deliver the letters personally. Serves me right for advertising my presence with 400W into 2 x 17 ele Tonnas courtesy of the Eleventh Hour Contest Group! I hope everyone enjoyed RSGB'93 at the NEC, my June column deadline was before the exhibition so I will have to write about it in August *RadCom*.

## BURGLAR ALARMS TURN THE TABLES

MY USUAL PROBLEMS WITH burglar alarms are those associated with amateurs accidentally setting them off while transmitting. This time the situation is reversed and the subject is RF emissions from an alarm system. Shaun, G8VPG, wrote to me from Bristol. He wears many 'hats' as he is the RLO for Avon as well as an EMC Coordinator for the area. A local amateur has recently had installed a cordless burglar/smoke alarm, the ATI 6000 by Advanced Technology Industries of Bristol.

Apparently this works on 172.225MHz but his particular one appears to emit 'sproggies' at 50kHz intervals throughout the two metre band which are audible on a hand-held up to 20 metres away from his house. The amateur is dealing with the company direct to resolve the matter, but Shaun was interested if any readers had come across anything similar.

## BOUQUETS AND BROWNIE POINTS

STILL ON THE SUBJECT of alarms, it is nice to know that some companies are getting it right. Gerald, G4ZMH, wrote from Lincoln to say that he has been using one of the G-TRON PIRs from Glazertron Ltd of Lower Upnor, Rochester in Kent (tel: 0634 712699). He says that he has had no problems with HF, VHF or UHF. Gerald said that he would have no hesitation in recommending them to others from the RF point of view.

The company manufactures several PIRs for different uses as well as other components for alarm systems such as power supplies etc. Unfortunately G4ZMH didn't say which model he used, so I am unable to pass on the exact details.

Our EMC Chairman Bob Peace, G8SOZ, (or Chair, as I like to call him) has had to take a back seat for a while for family reasons, and Vice-Chairman Robin Page-Jones, G3JWI, has taken over the Chair until the election in June (this month). This does serve to emphasise that all EMC Committee members, corresponding members and coordinators are volunteers who give up a substantial amount of their own time for the hobby. Anyway I am sure that readers will join me in thanking Bob for all his work during the three years he has been in the Chair.

He has been researching car alarms recently and has sent me details of the new 'Vecta' key system. The manufacturers have given him some test results for us to publish to show the level of RF immunity for the system. With a test Vecta system fitted in a car the immunity figures were as follows: 10MHz to 80MHz, not less than 50 volts/metre modulated 99% with a 1kHz square wave. Similar results were achieved with frequencies 30MHz to 200MHz and 200MHz to 1GHz. With an antenna mounted on the boot of a car and RF radiation not less than 100W (modulated 99% with a square wave at 1kHz and frequencies swept from 20 to 200MHz) there was no malfunction of the security system. This sounds as if it could stand up to the most ambitious mobile transmissions.

## HOT-LINES!

I HAVE QUITE A COLLECTION of items on telephones. All of them could have fitted nicely into the 'Bouquets and Brownie points' paragraph so it is all good news for a change. I wasn't sure about the following at first though!

G8BQX wrote about his experiences with 2 metre SSB breakthrough to various neighbours' telephones in the Hastings Electronics and Radio Club newsletter *Vital Spark* some time ago. Apparently the automated remote testing equipment used by the BT 151 fault reception clerks is unlikely to detect breakthrough, especially if it is only present on the local telephone and not on the line itself, so the computer does not register a fault and the enquiry is 'cleared'. The neighbour, of course, then complains to the amateur that it must be their fault as BT said the line was OK! Poor G8BQX "had four different people moaning at me" so he decided to write to BT Customer Services to ask for a maintenance engineer to arrange tests.

After eight days he telephoned as he had heard nothing, and it took BT several hours to find his letter. They eventually rang and promised to send an engineer for tests. G8BQX writes "From that moment, things went like clockwork! The very next day the engineer phoned me, I beamed at one of the affected addresses, and, once he persuaded the person to switch off their TV, Hi-Fi and computer which were also receiving my transmissions, he heard the breakthrough, swapped the horrible Tribune for a Vanguard, and all was well as regards the telephone."

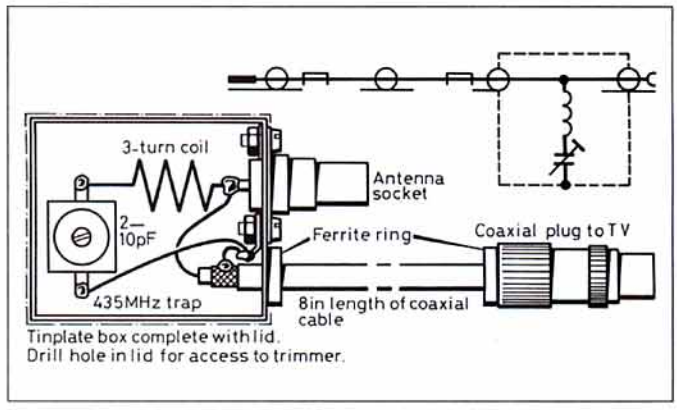
Over the next few days the others were also successfully dealt with by BT exchanging phones for models with better RF immunity or by telling the owners of other types politely that they should contact their supplier. So a belated bouquet was due after all!

Robin Page-Jones, passed on a letter from newly licensed G0TCE about telephones and RF immunity. He works for a company which makes special telephones and communications products and has developed a telephone "with a large degree of RF immunity" called the EMC Berkshire (pictured). Two radio amateurs have used them successfully to replace troublesome instruments in their own or neighbour's homes. G0TCE didn't give any technical details for the telephones but anyone interested can contact Ascom Telecommunications Ltd of Cypress Drive, St Mellions, Cardiff on 0222-777800.

One of the brave (mad?) souls who ventured up to our contest hill site was Harry, G3SBV, who is an 80 metre fan. He had received a visit from the Radio Investigation Service of the RA following complaints of breakthrough. One of the items affected was the neighbour's telephone. He rang RSGB Headquarters to see if they could offer advice and they put him on to EMC Committee Member Hilary Claytonsmith, G4JKS. Hilary suggested that it would be worth-while trying the plug-in Freelance RFI Filter available from BT retail shops. Harry tried one on his own telephone and found it cleared the break-

PHOTOGRAPH: ASCOM HASLER LTD

**The EMC Berkshire from Ascom Telecommunications Ltd is designed to have "a high degree of RF immunity". See 'Hot-Lines!'**




**Seventy centimetre band-stop filter built by G8MNY in a box made from a cat-food tin lid! See 'Junk Box Filter'.**

through, but unfortunately, his neighbour refused his offer of a filter. Harry also mentioned the filters to Steve, G3UFY, who has used them successfully to sort out two more telephones. Although the cost is around £10 per filter, they have the advantage of being fully approved equipment for fitting to telephone lines. I hope to be able to include some technical details on some of the equipment mentioned in a future column as G0SNO has volunteered to do some tests.

Another issue which Harry has highlighted indirectly is the shortage of EMC coordinators in the South East of England. Strictly he should have phoned his local coordinator first, and then possibly the EMC Hot-line answering machine if there was no coordinator, rather than RSGB HQ. The local coordinators can be found in the *RSGB Call Book*, and from time to time a list is published in *RadCom* [see June '92, page 59 - *Ed*].

So, if you feel that you can contribute to the hobby by advising on EMC problems please let the Committee know.

## WATCHING NEIGHBOURS

ONE OF THE WORST PLACES for a radio amateur to live must be in a block of flats. I never cease to be amazed by the ingenuity of people fixing up 'invisible' antennas, hanging long wires out of windows via balloons etc. In many cases the enforced QRP operating turns every contact into an adventure. However, the EMC traps for the flat-dwelling operator are many, and one of the usual ones is the communal TV aerial system.

Phil, G0RKF, has written with a tale illustrating that a methodical approach and being on good terms with your neighbours pays dividends. As you can gather from the foregoing, Phil lives in a block of flats. He installed a W3DZZ trapped dipole and discovered from neighbours that he was wiping out their TV pictures. Further enquiries revealed that he was affecting every TV in the block! He arranged some tests with his near neighbours to establish whether his signal was entering the mains electricity supply, onto the TV coaxial downlead or into the TV distribution amplifier itself.

A set-top aerial was tried on one television and full power test transmissions made on all bands. No interference was noted, ruling out direct breakthrough or RF getting into the mains. This left either the individual downleads to each flat (which would have required twenty one high pass filters to be made or bought) or the input to the distribution amplifier. Phil wrote, "Human nature being as it is I decided to try the cheaper option first and fitted a high pass filter to the input of the TV distribution amplifier. Further tests proved that the problem was now cured and no more complaints were received." Phil already had a suitable filter left over from his CB operating days, a commercially made unit which cost around £6.50, but a homebrew one could have done the trick.

Very wisely, G0RKF pointed out that although the fitting of the filter was a relatively simple modification to the communal TV system, it is vital that anyone contemplating a similar situation must contact the maintenance company/committee for the flats and get permission first. He found the old booklet from the DTI *How to Improve Television and Radio Reception* useful in explaining what he wanted to do. (Unfortunately this is not published any more.)

In fact you shouldn't really touch anyone else's equipment, as you are likely to be blamed for anything which goes wrong even if it is nothing to do with you. You should try and explain what is required so that the owner can arrange for the appropriate filter to be fitted by the service engineer. However, if they decide to let you do it, as it is more convenient, then obviously it is up to them. This is probably the hardest part of the problem, as finding out who to contact for different parts of a system in a block of flats can be like unrolling a ball of string after a kitten has played with it! It also shows how important maintaining good relations with your neighbours can be when dealing with EMC problems which require their cooperation to solve.

The other matter which G0RKF raised was that if the block of flats had had an FM broadcast receiving aerial in parallel with the TV aerial, the distribution amplifier might have been used to boost signals in the 88 to 108MHz range. A high pass filter with a cut-off frequency of approximately 75MHz would have been needed for the system.

## CATS HELP WITH TVI

ANOTHER SUCCESSFUL TALE of calming a TVI problem was brought to my attention by John, G8MNY. He is a keen amateur TV operator, an enthusiastic participant in field days and contests and enjoys building or modifying equipment on all bands up to microwave. He was asked to help with a case of TVI in High Wycombe where the neighbour said that a satellite TV system was suffering from the effects of nearby (50 yards away) packet radio nodes on 432 and 70MHz. These nodes were temporarily shut down out of courtesy until an amateur testing team could visit.

When they arrived, they found the source of the problem was the 6W 432MHz signal swamping the neighbour's distribution amplifier, which had been placed after two satellite receiving systems on the UHF loop. They had not been expecting a normal broadcast aerial system as well and so had to make a simple 'suck-out' filter for 70cm on the spot. It was made from two turns of wire and a 2-10pF variable capacitor mounted in a box made from a cat food tin lid (at least the cat must have enjoyed the afternoon if it had to eat an extra dinner to provide the lid!) and covered neatly with plastic tape. This was based on a design which John had published in BATC's *CQTV* Volume 160, the details of which are given below. The filter was tuned up using test gear and gave some 30dB rejection, but needed a final tweak after fitting in position to null out the unwanted signal satisfactorily.

The neighbour was very pleased with the outcome, especially as the service was free, from the not so local Caterham Radio Group, but G8MNY didn't think they would have been quite so happy to pay for professional engineers' time.

## G8MNY'S JUNK BOX 70CM TVI FILTER

THIS IS THE DESIGN on which the filter used at High Wycombe was based. It originally appeared in the BATC magazine *CQTV*.

Parts:

- Tin plate (cat food lid, steel soft drink can etc!)
- Belling Lee TV plug
- Belling Lee Chassis TV socket (metal type)
- 8 inches 75 ohm TV coax
- 2 'polo mint' size ferrite cores
- 2" 22SWG silver/enamel copper wire
- 2-10pF trimmer capacitor
- paint or plastic tape (to make it presentable)
- glue, solder

### CONSTRUCTION NOTES:

1. Cut tin plate into a cross shape (with tabs to solder up) so that it can be folded up into a box 1" x 1" x 0.5".
   *WARNING SHARP EDGES!* (You could experiment with a paper shape first).
2. Drill and mount the socket on one of the 0.5" sides.
3. Connect plug onto coax and feed the two ferrite rings on the coax.
4. Cut a hole for the coax in corner of box, and solder in, then connect the core to the socket centre.
5. Wind the wire into coil three turns approx 0.25" diameter and solder to socket centre.
6. Make tuning hole, and mount trimmer from coil to ground (shaft earthed).
7. Fold up box, tack solder a few tabs temporarily.
8. Connect to an aerial (50 ohms does not matter too much) and 70cm receiver and null out a signal.
9. If all OK, solder up properly, glue coax firmly in place, fix rings tight to plug and box. Heat glue is useful for this.
10. Paint and label '432MHz Trap G . . . . .'
11. Re-tune for best dip and cover up trimmer hole.

G8MNY said that he had measured 30dB rejection on the best one, with only about 1.5dB insertion loss (550MHz). He added that in strong signal areas, an attenuator can be all that is needed. Improved interference performance is obtained if an attenuator (3-6dB) is included in the box and the suck-out connected across the middle 'T' section. This is because any bad SWR of the aerial system will not then de-tune the filter.

RADCOM NEWS FEATURE

**Roger Ballister, G3KMA, gives an update on one of the RSGB's most prestigious Awards**

# Islands on the Air Award

THE IOTA programme consists of 18 separate awards which may be claimed by any licensed radio amateur (who in the UK is a member of the RSGB) who can produce evidence of contact on the HF bands with the required number of stations located on islands around the world. Many of the islands are DXCC countries in their own right; others are not, but by meeting particular eligibility criteria also count for credit. Part of the fun of IOTA is that it is an evolving programme with new islands/groups being activated for the first time - currently there are over 760 listed with reference numbers.

The basic award is for working stations located in 100 islands/groups. There are higher achievement awards for working 200, 300 through to 700 islands/groups as well as continental and regional awards. A Plaque of Excellence is available for confirmed contacts with at least 750 islands/groups.

The new 1993 60 page IOTA Directory provides all the necessary information to get started. It is available from the IOTA Director, Roger Balister, G3KMA, La Quinta, Mimbridge, Chobham, Woking, Surrey GU24 8AR, price £6 post-paid (£7 outside Europe).

## The Honour Roll

THE IOTA Honour Roll lists the callsigns of stations who have a checked score which equals or exceeds 50% of the islands/groups which have been activated since 1945 and who have secured a certificate or updated during the last two years. The Annual Listing lists the callsigns of stations who have a checked score of 100 or more islands but less than the qualifying threshold for entry into the Honour Roll and who have secured the IOTA 100 Islands or other certificate or who have updated during the last year.

The last date for mailing updates/applications for inclusion in the 1994 listings is 1 February 1994. The checkpoint for UK stations is Philip Marsh, G4WFZ, 28 Orcheston Road, Charminster, Bournemouth, Dorset BH8 8SR.

## IOTA Contest 24/25 July 1993

PARTICIPANTS planning to operate during the contest from an island should check the IOTA Directory to make absolutely sure for which group it qualifies. Not all islands qualify for IOTA! Stations located on the mainland of Great Britain (G/GM/GW) should quote the reference number EU-005, as should stations participating from Brownsea, Canvey, Foulness, Hayling, Mersea, Sheppey and Walney Island - they all count for the main island Great Britain, and not for a different group.

### EU-22

LAGAN VALLEY ARS, GI4GTY, will operate from Copeland Island (EU-22), 54° 41' N, 5° 33' W, OTHL IO74FQ, WAB J58, 11 - 13 June, all bands from 3.5 - 28MHz.

## SWL Listing May 1993

| | |
|---|---|
| M Stippschild, DE0MST | 679 |
| R Small, BRS 8841 | 547 |
| C Gibbs, BRS 47426 | 514 |
| M Rustige, DL-9286 | 501 |
| K Corson, W0-6437 | 482 |
| G Szucs, W0-20276 | 340 |
| J Holterman, WDX3JFH | 330 |
| Geoff Watts, BRS 3129 | 225 |
| B Egloff, WDX2TAU | 223 |
| H Weidmann, DL-20064 | 222 |
| D Burt, EI-982/G | 169 |
| C Hodas, OM3-28013 | 142 |

## Honour Roll - May 1993

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| F9RM | 703 | IK1GPG | 638 | CT4NH | 556 | K6DT | 458 |
| I1ZL | 702 | ON5NT | 633 | GW3ARS | 550 | DK6NJ | 453 |
| VE3XN | 691 | G4RFV | 633 | DL7CW | 548 | W3KH | 453 |
| I8YRK | 686 | IK1JJB | 630 | G3MLX | 547 | Y37XJ | 442 |
| I1HYW | 684 | DK1RV | 629 | G3YAA | 544 | I1TBE | 437 |
| G3AAE | 679 | F6AJA | 628 | G3TOK | 543 | N3CWP | 431 |
| I1SNW | 676 | DK6NP | 627 | OE3WWB | 543 | I2VDX | 426 |
| 9A2AA | 675 | I2MWZ | 623 | I2FUG | 539 | OK1JKM | 425 |
| GM3ITN | 674 | 9A2TW | 621 | KC8PG | 537 | VE6PW | 420 |
| VE7IG | 674 | ON4AAC | 620 | HB9BVV | 532 | IK1AOD | 420 |
| W9DC | 674 | OZ4RT | 620 | F9MD | 530 | HB9CZW | 416 |
| W9DWQ | 674 | FE6CYV | 612 | W9NZM | 527 | IK8JWA | 415 |
| ON5KL | 673 | ON4XL | 611 | G3VJP | 521 | EA4KK | 410 |
| W4BAA | 671 | F6AXP | 611 | K2EYJ | 517 | CT1DIZ | 409 |
| OH2QQ | 669 | ON4FU | 606 | YL1XZ | 515 | G4IJW | 408 |
| DL8FL | 669 | ON7EM | 605 | F6FHO | 515 | IN3ANE | 406 |
| I8KNT | 667 | CT1UE | 595 | IK2MLY | 514 | 4Z4DX | 406 |
| EA4MY | 667 | OM3JW | 594 | K8DYZ | 512 | DJ4XA | 406 |
| DL8NU | 664 | K2VV | 591 | WT2O | 508 | EA5KB | 404 |
| ON6HE | 661 | I1CAW | 589 | EA5AT | 506 | KM4RX | 404 |
| I1JQJ | 659 | F6DLM | 587 | HB9RG | 502 | WD8MGQ | 402 |
| I8YZP | 658 | G3ZAY | 582 | IK8TWV | 488 | G3EZZ | 397 |
| I8XTX | 656 | S51TE | 577 | F2BS | 488 | ON4ADN | 396 |
| IK1AIG | 654 | EI7CC | 574 | KE4I | 482 | IK2IGX | 392 |
| G3GIQ | 653 | KD7SO | 572 | W1ENE | 470 | I2YDX | 391 |
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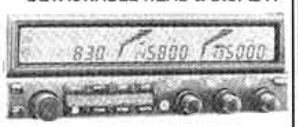

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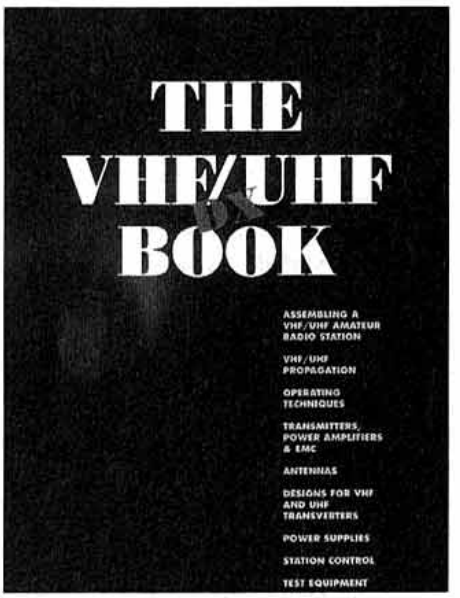


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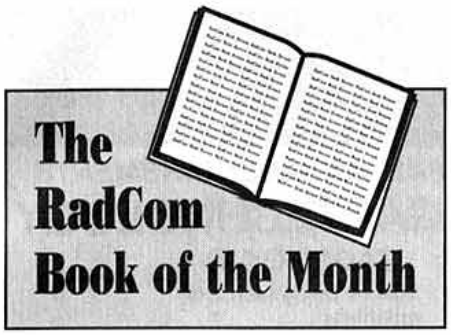


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● Eric Fielding, G4IHF has a Multimeter (about 10 years old) known as **Supertester 680R** made by ICE Milano, Italy, and distributed by Electronic Brokers Ltd, 49/53 Pancras Road, London NW1 2QB and is looking for the present address or telephone number of Electronic Brokers Ltd., if still in business. Information to 6 Thornton Ave., Lytham St. Annes, Lancs, FY8 3RL or Tel: 0253 726685.

● Operating manual/circuit diagram for a **Tandy/Micronta** Model No. 21-522 3 meter CB tester, Power/Modulation/SWR and a monitoring socket, is required by Mr S Slater, G0PQB, 24 Lullington Garth, Borehamwood, Herts WD6 2HE, or tel: 081 953 2164.

● Ray Hill, G0IMV, need a circuit diagram for a **Solartron Schumberger** A100 Oscilloscope, with A101 Y-amps, A112 Dual timebase, front panel end pieces and carrying handle. Any help welcomed. His address is Marclecote, Ledbury Road, Ross-on-Wye, Hereford, HR9 7BE, or tel: 0989 62906.

● David Murray, G7HME needs any information on the xtal controlled, **PMR Telefunken** D679 VHF/UHF duplex hand-held Transceiver. Please write to 55 Granville Park, Aughton, Lancs, L39 5DT.

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● Paul Simpson, G0RUR, needs any information/manuals for a **LINK** monitor with PC Term keyboard and system ROM V2.8. Happy to reimbursed any costs. His address is 231 Caxton Street, Sunnyhill, Derby DE3 7RB.

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● Derek Pantony, G3KXB, needs any information (circuit diagram/power requirement) for a **German Airborne DF Receiver** Type EZ6 and a Circuit diagram only for US Signals Corps Panoramic Receiver BC-1031-B (450Khz). He will be pleased to reimburse any expense. His address is Springmead, 6 Longtye Drive, Chestfield, Whitstable, Kent CT5 3NG.

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● Circuit diagram for oscilloscope made by **Solartron 'Solarscope** CD104.3'. Any costs will be reimbursed. Details to Mr J Proctor, G0DCH, 5 Bank Top Hamlet, Whickham, Newcastle upon Tyne. NE16 4DD or tel: 091 488 5210.

● Technical information/circuit diagram for **Phillips** portable communications **Receiver L6X38T**, early tansistorised model. Also Volumes 1 & 3 of the paperback 'Radio Servicing' by G N Patchett published by Norman Price Ltd, required by Jim Cookson, G4XWD, QTHR or tel: 0562 823674.

● Circuit diagram for the **Collins 516F-2 PSU** and/or information to convert from 110V to 220V required by Ron Thompson, FP/VE1KM, B P, 383 Saint Pierre, 97500 Saint Pierre & Miquelon, or via Vince Lear, G3TKN, who is QTHR.

● Any details, ratings, characteristics and connections for two transmitting valves: **Raytheon RK-715** and **Mullard TY-125**. Any expenses will be re-inbursed. Information to Mr M D Fowler, GW3GKZ, Ty Gwyn, Abergwynant, Dolgellau, Gwynedd LL40 1YF or Tel: 0341 422447.

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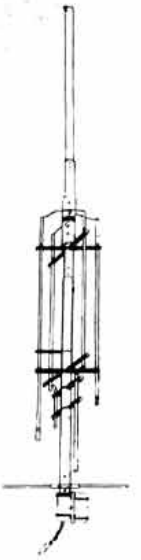

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Short term stability — better than $1\times10^{-9}$ (1 sec)
Typical — $\pm2\times10^{-9}$ (1 sec)
Long term — tends to $2\times10^{-12}$ (1000 sec)

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| | |
|---|---|
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| | | | |
|---|---|---|---|
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# CONTEST CLASSIFIED

**All rules should be read in conjunction with the General Rules published in *Contest News* January 1993**

## HF RESULTS

### AFFILIATED SOCIETIES' TEAM CONTEST

For the first time since 1976, there was a disappointing reduction in entries for CW AFS with 17 fewer teams (47 fewer stations) submitting logs. Conditions were widely reported as poor for the event and this may have been a contributory factor; it is also very likely that some operators, unable to support both events, have 'defected' to SSB AFS. However, it has been noted that, particularly in the last two or three years, many clubs have been experiencing difficulty in raising a full team of five and it has been suggested that the size of teams in CW AFS should be reduced to three, as in the SSB event. This suggestion will be considered by the HFCC before publication of the rules for 1994 . . . . any comments or observations would be welcomed.

Leading stations *increased* their tally of QSOs over 1992, but poorer conditions meant weaker signals and more mistakes! The individual honours this year were decided by accuracy, giving the closest ever result - only *six* points separating the leading three entrants. Congratulations to Peter, G3KDB, also the 1992 winner. Because of the five-year rule he is not eligible to receive the Marconi Trophy, which passes down to Dave, G4BUO, pipped for the lead by an infuriating single point! Congratulations also to Neil, G3OAY, another previous winner, this year taking third place. A special welcome to Tom, 2E0ACY, the first Novice to enter AFS.

The same five groups took the leading positions as last year. However, it was 'all change' for placings except for Lichfield, who yet again collected the Edgware trophy. Despite poor propagation, Aberdeen (43rd last year) moved up to 41st place to re-state their dominance of the event from north of the Border.

Checking AFS has never been easy but this year seemed more onerous than for some time. Thanks go to G3KKQ, G3MCK, G3WRR and G4IQM who provided invaluable assistance and are now receiving counselling and hair transplant therapy! Logs ranged from excellent to just plain shoddy and some were accepted only because the adjudicators were unwilling to spoil a team effort because of a single offender. Grateful thanks go to all those who took the trouble to present their entries properly and especially to G0KUC, the RAFARS Contest Manager, who himself produced excellent dupe sheets for every one of his entrants!

All adjudicators are unpaid volunteers who give up *their* free time to run *your* contests. Please help them (and yourselves) by adhering to the following:

**Use RSGB Log Sheets** or keep to the format.

**Print** handwritten data in BLOCK CAPITALS, and in **ink**.

**Dupe sheets** should be *only* a list of all the callsigns worked and the serial number sent or time of QSO, sorted into alphanumeric order (by whole call, or first or last letter of suffix). Any *more* information decreases readability and wastes time and paper . . . . any *less* renders the dupe sheet useless and a waste of your time an effort.

**Log all QSOs**. Don't just omit the duplicates and re-use the numbers. This practice is penalized when detected.

**Read through the log** for transcription errors (eg G3Q— calls have not been issued!) and, if computerised, typing 'oh' instead of 'zero', which will cause dupe checks to fail.

**Don't place absolute trust in computers!** This year, one computerised log contained an unmarked dupe, believed to be due to a blank or non-printing character included in the callsign field! Another failed to print the last eight QSOs on one page, an error which was not detected by the entrant. A third corrupted data and lost its user over half his QSOs . . . . I could continue.

**If the entry is submitted on disk**, no Dupe sheets are required, only a summary sheet for each station.

If every AFS entrant spent just one minute doing something that the adjudicator would otherwise have had to do (for example, separating fan-fold log sheets and assembling them in order) then the adjudicator would have FIVE HOURS less work.

As last year, the third character in the equipment code group has been omitted, since no-one claimed to have more than a single-element antenna! If other characters are missing it is because no details were given with the log. Centre-fed antennas are clearly the most popular and of those, well over 50% were G5RVs. Where are the long-wires and Marconis that are capable of such good performance from a small site in a local event like AFS? *G3UFY*

### AFFILIATED SOCIETIES TABLE

| POSN | CLUB | STATIONS CONTRIBUTING TO SCORE | | | | | TOTAL |
|---|---|---|---|---|---|---|---|
| 1 # | LICHFIELD ARS 'A' | G3KDB | G3NKC | G3SJJ | G3VHB | G4CBQ | 12362 |
| 2 + | DE MONTFORT UNIV ARS 'A' | G3OAY | G4BKI | G4ARI | G4JGV | G3SDC | 11948 |
| 3 + | VERULAM ARC 'A' | G3RTE | G3VER | G2BAP | G4JKS | G3UJV | 11794 |
| 4 | MID-BEDS CA | G4BJM | G4MBC | G5LP | G4ALR | G4GIR | 11706 |
| 5 | ADDISCOMBE ARC | G3UFY | G3RQZ | G3VYI | G4ALE | G3SJX | 10218 |
| 6 | GRIMSBY ARC | G3TBK | G3RXP | G3RSD | G4EBK | G3JKB | 9782 |
| 7 | SOUTHGATE ARC 'A' | G3SFG | G3RWL | G3ZVW | G4SXT | G3KTZ | 9339 |
| 8 | GUILDFORD & DRS 'A' | G3SYM | G5OD | G0EFO | G3EIZ | G3YXX | 8429 |
| 9 | RNARS COLCHESTER | G3GLL | G3YEC | G3YAJ | G4LZB | G0PSA | 8379 |
| 10 | RAFARS YORK | G3PSM | G2AFV | G4IUF | G3JGB | G3IGU | 7931 |
| 11 | EDGWARE & DRS 'A' | G4IUZ | G3WUX | G3ASR | G3SHY | G4HMD | 7434 |
| 12 | RNARS PORTSMOUTH | G3LIK | G3JTG | G3JFF | G3BZU | G0LKO | 6920 |
| 13 | DE MONTFORT UNIV ARS 'B' | G3ORY | G4EOF | G4CZB | G5MY | | 6661 |
| 14 | VERULAM ARC 'B' | G4DJX | G3NOH | G3HJF | G4SUP | | 6616 |
| 15 | CRAWLEY ARC | G3GRO | G3JKF | G3TNO | G3WSC | G3KAU | 6599 |
| 16 | PLYMOUTH RC | G0IVZ | G4OFR | G0JNZ | G3ULN | | 6502 |
| 17 | STOCKPORT RS 'A' | G3KAF | G0JQI | G3HOH | G4BJU | G4FAS | 6376 |
| 18 | FLIGHT REFUELLING 'A' | G3VMO | G4RFR | G2HLU | G3PFM | G0NUM | 6202 |
| 19 | SUTTON & CHEAM RS | G3OLX | G4HSD | G0AXA | G3DCZ | G0BXC | 5982 |
| 20 | BROMSGROVE & DARC | G4AAL | G3ITH | G3MRC | G3TQD | G4IVJ | 5728 |
| 21 | CROYDON (SRCC) | G3BFP | G6LX | G4GTO | G8TB | G3MCX | 5687 |
| 22 | RAFARS HALTON | G3HEJ | G3IMK | G3III | G4SQC | G2CWY | 5634 |
| 23 | RAFARS N LUFFENHAM | G4KGG | G3TCQ | G3JRY | G0ORJ | G0KUC | 5541 |
| 24 | READING & DARC 'A' | G3XTT | G4AEP | G0OPB | G0RMR | G3WGV | 5467 |
| 25 | SCUNTHORPE ARC 'A' | G4OGB | G3PDL | G3KNU | G4JRY | G4GZB | 5325 |
| 26 | GRAVESEND RS | G4BUO | G4FAM | | | | 5278 |
| 27 | S MANCHESTER RC 'A' | G0LZL | G3SVW | G3FNM | G3VIW | G0NID | 5217 |
| 28 | RNARS BIRMINGHAM | G4SFO | G4IP | G4PTX | G4OKL | G4TNI | 5059 |
| 29 | CHELTENHAM ARA | G4PDQ | G4VXE/P | G4UAZ | G3NKS | | 5018 |
| 30 | ECHELFORD ARS | G4TSH/P | G3KKQ | G3MCK | G3EAO | G3JUL | 4884 |
| 31 | MAIDENHEAD & DARC | G3WYK | G3RZF | G3TWG | G3LVW | | 4812 |
| 32 | LEICESTER ARS | G3LRS | G3HYH | G0AIZ | G3TQF | G0FRV | 4727 |
| 33 | WESTON-SUPER-MARE RS | G0CAC | G0JQN | G3BLO | G4KMB | | 4662 |
| 34 | HEREFORD ARS | G4CNY | G3EPV | G3WRQ | G4JSN | G4GOG | 4655 |
| 35 | RNARS MIDDLESBROUGH | G3HKO | G3AWR | G4FCH | G3KTT | G3MXZ | 4594 |
| 36 | GLOUCESTER ARS | G4YYR | G3MA | G0ECJ | G0HBB | G4CIB | 4566 |
| 37 | RNARS LIVERPOOL | G3HZL | GW3JI | G4HWK | GW3IVX | G4RBE | 4561 |
| 38 | YEOVIL ARC | G3GC | G4JBH | G3CQR | G3ICO | G0JVG | 4341 |
| 39 | NORFOLK ARC | G4ODC | G4DYC | G3PDH | G3HYJ | G3DKO | 4144 |
| 40 | CHESHAM & DARS | G3XZG | G3VRY | G3NCL | G3AYS | | 4065 |
| 41 + | ABERDEEN ARS 'A' | GM4AFF | GM3WTA | GM3DZB | GM0JKF | GM0MYV | 4063 |
| 42 | CENTRAL LANCS ARC 'A' | G0FDX | G4ZYN | G0GVA | G0LRE | G4TZR | 4050 |
| 43 | AXE VALE ARC | G3HAL | G3DIC | G3VW | G3FFH | G8CA | 3911 |
| 44 | TORBAY ARS | G3HFG | G3LHJ | G0NOB | G0OXT | G3ABU | 3587 |
| 45 | NEWBURY & DARC | G3ZGC | G0ORH | G3NVO | G4GZQ | G4GNK | 3584 |
| 46 | STRATFORD ON AVON & DRS | G0OGN/P | G3MXH | G0CDO | G0MRH | | 3439 |
| 47 | HORNSEA ARS | G4DRS | G3PWN | G4IGY | G3TLI | G0DEB | 3417 |
| 48 | CLIFTON ARS | G3GHN | G0GQT | G0HUZ | G4TJE/P | G0PDZ | 3318 |
| 49 | RNARS BARROW | G3IZD | G3KKJ | G4USW | | | 3316 |
| 50 | SOUTHDOWN ARS | G3AGF | G3WQK/P | G3SVL | G3DQY | | 3032 |
| 51 | RAFARS SEALAND | G4KGK | G3GMM | G3LDT | | | 3007 |
| 52 | RNARS BRISTOL | G3SWH | G4KJD | | | | 2747 |
| 53 | RNARS PLYMOUTH | G0JCY | G4KKZ | G3AQM | | | 2610 |
| 54 | HARWICH ARIG | G4EYE | G4WHK | G3YYZ | G4JPI | | 2474 |
| 55 | RNARS LONDON | G4FRN | G3YYF | G3OZY | G4PTE | | 2411 |
| 56 | THREE As CC | G3WVG | | | | | 2327 |
| 57 | CROWBOROUGH & DARS | G3TXZ | G0NOA | G4DRV | | | 2277 |
| 58 | HORNDEAN & DARC | G0MBQ | G3COO | G0DHZ | | | 2241 |
| 59 | HARWELL ARS | G0ADH | G4DQW | | | | 2234 |
| 60 | RAFARS LOCKING | G2FIX | G3FVC | G0HKC | | | 2028 |
| 61 | GUILDFORD & DRS 'B' | G4BCY | G8GS | | | | 1877 |
| 62 | LICHFIELD ARS 'B' | G4OBK | | | | | 1827 |
| 63 | RAFARS CLEVELAND | G3ISL | G4PUI | G4XJV | | | 1814 |
| 64 | RNARS LOWESTOFT | G0DID | G8NT | | | | 1754 |
| 65 | APPLEDORE & DARC | G0KKG | G3YGJ | G0URZ | G0FCL | G4ETJ | 1438 |
| 66 | SOUTHGATE ARC 'B' | G0ASA | G3GUL | | | | 1428 |
| 67 | STEVENAGE & DARS | G4DDX | G0GAZ | G4ISO | | | 1330 |
| 68 | CORNISH RC | G4ODV | | | | | 1150 |
| 69 | RAFARS DORSET | G3ICH | | | | | 1120 |
| 70 | CHESHUNT & DARC | G3URA | G3WFM | | | | 1057 |
| 71 | FLIGHT REFUELLING 'B' | G0IJE | G2BDV | | | | 1047 |
| 72 | S MANCHESTER RC 'B' | G4HON | G0CBJ | | | | 1038 |
| 73 | STOCKPORT RS 'B' | G4SYC | G0GDN | | | | 1007 |
| 74 | READING & DARC 'B' | G4ELY | G4UXG | 2E0ACY | | | 904 |
| 75 | RNARS SWANSEA | GW4XQK | | | | | 870 |
| 76 | EDGWARE & DRS 'B' | G0IGP | | | | | 820 |
| 77 | RNARS THURSO | GM3CFS | | | | | 820 |
| 78 | RNARS ROSYTH | GM3UM | | | | | 770 |
| 79 | SCUNTHORPE ARC 'B' | G4NFX | G0HDV | | | | 760 |
| 80 | SUBMARINE ARC | G0LKX | | | | | 743 |
| 81 | CENTRAL LANCS ARC 'B' | G4UEW | G3KQY | G0LBT | | | 667 |
| 82 | ABERDEEN ARS 'B' | GM3VEY | | | | | 575 |
| 83 | DUNDEE ARC | GM2AOL | GM3EFH | | | | 480 |
| 84 | MAIDSTONE YMCA ARS | G3TRF | | | | | 100 |

# Edgware Trophy
+ Certificate of Merit

### CW AFS INDIVIDUAL STATIONS TABLE

| Posn | Call | QSOs | Eqpt | Score |
|---|---|---|---|---|
| 1 + | G3KDB | 280 | 4C6 | 2778 |
| 2 # | G4BUO | 283 | 4C5 | 2777 |
| 3 | G3OAY | 285 | 4C5 | 2772 |
| 4 | G3NKC | 276 | 4C5 | 2715 |
| 5 | G4BJM | 274 | 4C6 | 2691 |
| 6 | G3RTE | 269 | 4C4 | 2639 |
| 7 | G3SJJ | 267 | 4C6 | 2618 |
| 8 = | G4FAM | 257 | 4C5 | 2501 |
| 8 = | G3TBK | 254 | 4C6 | 2501 |
| 10 | G4BKI | 265 | 4C5 | 2498 |
| 11 | G4MBC | 252 | 3C5 | 2497 |
| 12 | G3VER | 247 | 4C | 2417 |
| 13 | G3UFY | 242 | 4W3 | 2410 |
| 14 | G3VHB | 254* | 4C3 | 2397 |
| 15 | G3SFG | 242 | 4C | 2344 |
| 16 | G4ARI | 238 | 4C4 | 2338 |
| 17 | G3WVG | 234 | 4Q5 | 2327 |
| 18 | G4JKS | 235 | 3C4 | 2308 |
| 19 | G2BAP | 241 | 4C | 2285 |
| 20 | G5LP | 246 | 3C | 2276 |
| 21 | G3RXP | 230 | 3C4 | 2270 |
| 22 | G4CNY | 228 | 3C | 2264 |
| 23 | G3SYM | 230 | 4C5 | 2251 |
| 24 | G3HEJ | 226 | 4Q5 | 2240 |
| 25 | G4JGV | 233* | 4C6 | 2187 |
| 26 | G3ORY | 221 | 4C5 | 2168 |
| 27 | G0IVZ | 218 | 4C5 | 2161 |
| 28 | G3SDC | 225 | 4C9 | 2153 |
| 29 | G3UJV | 216 | 4C | 2145 |
| 30 | G4ALR | 221 | 3C | 2140 |
| 31 | G3PSM | 222 | 4C | 2137 |
| 32 | G4AAL | 221 | 3C4 | 2108 |
| 33 | G4GIR | 213 | 3C5 | 2102 |
| 34 | G4PDQ | 211 | 3C6 | 2090 |
| 35 | G3RWL | 207 | 4C | 2070 |
| 36 | G3WYK | 208 | 3C | 2061 |
| 37 | G3RQZ | 209 | 4W2 | 2054 |
| 38 | G3VYI | 207 | 4W3 | 2040 |
| 39 | G3KAF | 205 | 3C | 2034 |
| 40 | G3XTT | 203 | 4C3 | 2020 |
| 41 | G3YEC | 203 | 3C | 2011 |
| 42 | G3GLL | 212 | 4C2 | 2001 |
| 43 | G5OD | 210 | 4C3 | 1992 |
| 44 | G4ALE | 199 | 4C1 | 1987 |
| 45 | G3VMO | 207 | 3C4 | 1971 |
| 46 | G3OLX | 199 | 3C | 1960 |
| 47 | G3NOH | 197 | 4C | 1940 |
| 48 | G3ZVW | 195 | 4C | 1914 |
| 49 | G4KGG | 191 | 3C3 | 1910 |
| 50 | G4OFR | 199 | 4C5 | 1894 |
| 51 | G4ODC | 189 | 3C | 1860 |
| 52 | G4CZB | 187 | 4C3 | 1858 |
| 53 | G4CBQ | 190 | 4C4 | 1854 |
| 54 | G3LIK | 184 | 3C | 1840 |
| 55 | G4DJX | 211** | 4C3 | 1837 |
| 56 | G4OBK | 183 | 4W2 | 1827 |
| 57 | G3GRO | 186 | 4C4 | 1821 |
| 58 | G3JKF | 182 | 3C | 1817 |
| 59 | G3RSD | 179 | 3C | 1790 |
| 60 | G3BFP | 179 | 3C2 | 1780 |
| 61 | G4IUZ | 178 | 3C3 | 1758 |
| 62 | G3SJX | 174 | 4G | 1727 |
| 63 | G4OGB | 174 | 3C5 | 1707 |
| 64 | G3JTG | 173 | 3C3 | 1690 |
| 65 = | G0EFO | 168 | 3C3 | 1677 |
| 65 = | G3PDL | 171 | 3C2 | 1677 |
| 67 | G4EOF | 218** | 4C4 | 1665 |
| 68 | G3LRS | 170 | 3C6 | 1660 |
| 69 = | G0JNZ | 168 | 4C2 | 1650 |
| 69 = | G2AFV | 165 | 4C | 1650 |
| 69 = | G3SWH | 166 | 4W | 1650 |
| 72 | G0CAC | 171 | 4C | 1641 |
| 73 = | G3YAJ | 165 | 3C3 | 1640 |
| 73 = | G3TCQ | 167 | 4C5 | 1640 |
| 75 | G4EBK | 163 | 3C3 | 1617 |
| 76 | G3JKB | 162 | 4C3 | 1604 |
| 77 | G3WUX | 162 | 3W | 1580 |
| 78 = | G3GC | 158 | 3C3 | 1560 |
| 78 = | G0LZL | 156 | 3C2 | 1560 |
| 80 | G3IZD | 157 | 4C3 | 1544 |
| 81 = | G4SXT | 170 | 4C | 1541 |
| 81 = | G3ASR | 156 | 3C3 | 1541 |
| 83 | G3HJF | 154 | 4C | 1537 |
| 84 | G4LZB | 153 | 3C | 1517 |
| 85 | G4VXE/P | 154 | 3Q | 1514 |
| 86 | G3SVW | 154 | 3C3 | 1510 |
| 87 | G3XZG | 151 | 3C | 1500 |
| 88 | G0FDX | 149 | 4C3 | 1480 |
| 89 | G3KTZ | 148 | 4C | 1470 |
| 90 = | G3JGB | 146 | 4C | 1460 |
| 90 = | G4IUF | 150 | 3C | 1460 |
| 90 = | G6LX | 153 | 4W | 1460 |
| 90 = | G0JQN | 150 | 3W2 | 1460 |
| 90 = | G3HZL | 148 | 3C1 | 1460 |
| 95 | G4TSH/P | 145 | 3C | 1447 |
| 96 | G4RFR | 142 | 3C4 | 1387 |
| 97 | G3SHY | 138 | 3C2 | 1368 |
| 98 | G3VRY | 137 | 3C | 1360 |
| 99 | G0JQI | 139 | 3C | 1357 |
| 100 | G4YYR | 137 | 3C | 1354 |
| 101 = | G3JFF | 147* | 3C | 1350 |
| 101 = | G3IMK | 136 | 3W | 1350 |
| 103 | G3BZU | 135 | 3C | 1340 |
| 104 | G3EIZ | 132 | 3Q | 1320 |
| 105 | G4KGK | 134 | 3C | 1310 |
| 106 | G4SUP | 144 | 3C | 1302 |
| 107 | G3KKQ | 130 | 3Q3 | 1290 |
| 108 | G3TNO | 131 | 3W2 | 1287 |
| 109 | G4HSD | 130 | 3C2 | 1284 |
| 110 | G3ZGC | 128 | 3Q2 | 1280 |
| 111 | G3MA | 129 | 3C | 1267 |
| 112 | G3HFG | 126 | 3C | 1244 |
| 113 | G3GHN | 124 | 3C3 | 1240 |
| 114 | G4SFO | 129 | 3C | 1234 |
| 115 = | G2HLU | 123 | 3C2 | 1230 |
| 115 = | G0OGN/P | 123 | 3C1 | 1230 |
| 117 = | G3IGU | 123 | 3W | 1224 |
| 117 = | G3AGF | 124 | 3C | 1224 |
| 119 = | G0PSA | 131 | 3C6 | 1210 |
| 119 = | G3ITH | 128 | 4C | 1210 |
| 119 = | G3TXZ | 122 | 3C3 | 1210 |
| 122 = | G3MCK | 122 | 3C | 1207 |
| 122 = | G0ADH | 122 | 3C | 1207 |
| 122 = | G4EYE | 128 | 3C | 1207 |
| 125 | G3YXX | 123 | 3C2 | 1189 |
| 126 | G4HMD | 124 | 3C | 1187 |
| 127 | GW3JI | 119 | 3C | 1184 |
| 128 | G4DRS | 119 | 3C | 1180 |
| 129 | G3LHJ | 118 | 3W | 1174 |
| 130 | G3MRC | 117 | 3C5 | 1170 |
| 131 | G4ODV | 132* | 4W4 | 1150 |
| 132 | GM4AFF | 117 | 3C | 1142 |
| 133 | G3AWR | 115 | 3Q | 1140 |
| 134 | G4DYC | 114 | 3C3 | 1127 |
| 135 = | G4PTX | 112 | 3C | 1120 |
| 135 = | G3ICH | 112 | 3C | 1120 |
| 137 | G3MXH | 114 | 3C2 | 1118 |
| 138 | G4IP | 114 | 3C | 1110 |
| 139 | G3HYH | 112 | 3C4 | 1100 |
| 140 = | G4KJD | 121* | 4G4 | 1097 |
| 140 = | G4BCY | 117 | 3C | 1097 |
| 142 | G0AXA | 114 | 3C | 1091 |
| 143 | G3HKO | 118 | 3C | 1090 |
| 144 | G4GTO | 108 | 3C | 1080 |
| 145 | G3EPV | 109 | 3C | 1070 |
| 146 | G3DCZ | 107 | 3W3 | 1067 |
| 147 | G0JCY | 106 | 4C | 1060 |
| 148 | G3HAL | 105 | 3C2 | 1047 |
| 149 | G4FRN | 105 | 3C | 1040 |
| 150 | G4BJU | 108 | 3C3 | 1030 |
| 151 | G4DQW | 105 | 4G | 1027 |
| 152 = | G4FAS | 105 | 3C | 1024 |
| 152 = | G0DID | 104 | 3C4 | 1024 |
| 154 | G4AEP | 102 | 3C | 1020 |
| 155 | G3BLO | 107 | 3C | 1014 |
| 156 = | G3TQD | 104 | 3C | 1010 |
| 156 = | G3TWG | 101 | 3W | 1010 |
| 156 = | G0ORH | 104 | 3C | 1010 |
| 159 | G3YYF | 102 | 3C2 | 1001 |
| 160 | G4JBH | 102 | 4C | 1000 |
| 161 | G3KKJ | 102 | 3C | 978 |
| 162 | G5MY | 98 | 3G | 970 |
| 163 | G4UAZ | 101 | 3C6 | 964 |
| 164 | G3PFM | 102 | 3C4 | 950 |
| 165 | GM3WTA | 94 | 3Q3 | 940 |
| 166 = | G0OPB | 99 | 3C | 937 |
| 166 = | G3FVC | 95 | 3W | 937 |
| 166 = | G3PWN | 95 | 3C | 937 |
| 166 = | G0MBQ | 95 | 3C | 937 |
| 170 = | G3HQH | 134*** | 3C | 931 |

| | | | | | |
|---|---|---|---|---|---|
| 170 | = | G2FIX | 100 | 3W | 931 |
| 170 | = | G0ASA | 97 | 4C | 931 |
| 173 | = | G0RMR | 96 | 3C | 930 |
| 173 | = | G3III | 95 | 3C | 930 |
| 173 | = | G4DDX | 96 | 3C2 | 930 |
| 176 | | G3LVW | 93 | 3C | 927 |
| 177 | | G0ECJ | 99 | 3C | 925 |
| 178 | | G3DIC | 94 | 3C2 | 920 |
| 179 | = | G4OKL | 92 | 3W | 910 |
| 179 | = | G3GMM | 91 | 3C2 | 910 |
| 181 | | G4HWK | 91 | 3Q | 907 |
| 182 | | G3FNM | 92 | 3C3 | 890 |
| 183 | | G3CQR | 100* | 3C | 881 |
| 184 | | G4FCH | 91 | 3C | 874 |
| 185 | = | G3JRY | 89 | 3C | 870 |
| 185 | = | GW4XQK | 88 | 3C | 870 |
| 187 | | G4KKZ | 86 | 3C | 860 |
| 188 | | G3WSC | 90 | 3C | 847 |
| 189 | | G4SYC | 89 | 3C3 | 837 |
| 190 | | G3KAU | 83 | 3C | 827 |
| 191 | = | G3KNU | 84 | 3W | 820 |
| 191 | = | GM3CFS | 82 | 3W2 | 820 |
| 191 | = | G0IGP | 82 | 3 | 820 |
| 194 | | G3RZF | 109** | 3C | 814 |
| 195 | = | G0GQT | 83 | 3C | 807 |
| 195 | = | G0NOA | 85 | 3C | 807 |
| 197 | | G3ULN | 80 | 3W2 | 797 |
| 198 | | G4USW | 80 | 3W | 794 |
| 199 | = | G3LDT | 82 | 3C | 787 |
| 199 | = | G4ZYN | 85 | 3C | 787 |
| 201 | = | G3SVL | 78 | 3W3 | 780 |
| 201 | = | G8GS | 80 | 3W2 | 780 |
| 201 | = | G4WHK | 81 | 3C | 780 |
| 204 | | G0AIZ | 87 | 3C3 | 779 |
| 205 | = | G3VW | 79 | 3C2 | 770 |
| 205 | = | GM3UM | 77 | 3W | 770 |
| 207 | = | G3COO | 77 | 4C | 767 |
| 207 | = | G3WQK/P | 89 | 3C | 767 |
| 209 | | G3KTT | 76 | 3W | 760 |
| 210 | | G8TB | 78 | 3C | 757 |
| 211 | | G3NVO | 77 | 3C | 750 |
| 212 | | G0LKX | 80 | 3C2 | 743 |
| 213 | | G0GVA | 82 | 4C | 741 |
| 214 | = | G3MXZ | 75 | 3C | 730 |
| 214 | = | G8NT | 73 | 3C2 | 730 |
| 216 | | G3ISL | 72 | 3W | 720 |
| 217 | | G3WRQ | 80 | 3W1 | 717 |
| 218 | | G4IGY | 81 | 3C | 710 |
| 219 | | G0LKO | 71 | 3C | 700 |
| 220 | | GM0JKF | 71 | 4C | 691 |
| 221 | = | G3ICO | 69 | 3W2 | 690 |
| 221 | = | G3AQM | 70 | 3C | 690 |
| 223 | | G4TNI | 70 | 3C | 685 |
| 224 | | G3EAO | 79* | 3C | 670 |
| 225 | = | G0ORJ | 67 | 3W | 667 |
| 225 | = | G4JRY | 73 | 3C | 667 |
| 227 | = | G0NUM | 70 | 3C3 | 664 |
| 227 | = | G3NCL | 73 | 3C | 664 |
| 227 | = | G0KKG | 71 | 3C | 664 |
| 230 | = | GW3IVX | 68 | 3C | 660 |
| 230 | = | G3VIW | 66 | 3W2 | 660 |
| 232 | | G3FFH | 66 | 3C5 | 657 |
| 233 | | GM3DZB | 79* | 3C | 650 |
| 234 | | GM0MYV | 65 | 4C | 640 |
| 235 | | G0LRE | 68 | 3W | 635 |
| 236 | | G0IJE | 68 | 3C2 | 630 |
| 237 | | G3MCX | 62 | 3C3 | 610 |
| 238 | | G3TQF | 63 | 3C3 | 604 |
| 239 | | G3URA | 60 | 2C2 | 600 |
| 240 | | G3PDH | 73* | 3C | 599 |
| 241 | | G0NID | 63 | 3C | 597 |
| 242 | = | G0FRV | 60 | 3C | 584 |
| 242 | = | G4JSN | 61 | 3C2 | 584 |

| | | | | | |
|---|---|---|---|---|---|
| 244 | = | G0BXC | 59 | 3C2 | 580 |
| 244 | = | G0HBB | 58 | 3C | 580 |
| 246 | | GM3VEY | 61 | 3C | 575 |
| 247 | | G4PUI | 63 | 3C | 574 |
| 248 | | G0CDO | 62 | 3C | 571 |
| 249 | | G4SQC | 64 | 3C | 564 |
| 250 | | G3WGV | 56 | 2C6 | 560 |
| 251 | | G2CWY | 55 | 2C | 550 |
| 252 | | G4HON | 57 | 3C | 548 |
| 253 | | G4KMB | 80** | 3C | 547 |
| 254 | | G3AYS | 66 | 3C0 | 541 |
| 255 | | G0DHZ | 56 | 3C | 537 |
| 256 | = | G0OXT | 52 | 3C | 520 |
| 256 | = | G0MRH | 53 | 3C | 520 |
| 256 | = | G4XJV | 52 | 3C | 520 |
| 259 | | G8CA | 54 | 3C2 | 517 |
| 260 | | G0HUZ | 53 | 3G | 500 |
| 261 | | G3GUL | 55 | 3C | 497 |
| 262 | = | G3TLI | 49 | 4C | 490 |
| 262 | = | G0CBJ | 49 | 3C2 | 490 |
| 264 | | G3WFM | 50 | 4C | 457 |
| 265 | = | G0KUC | 47 | 3C1 | 454 |
| 265 | = | G4GZB | 50 | 3C2 | 454 |
| 267 | | G4TJE/P | 51 | 3W | 451 |
| 268 | | G3NKS | 45 | 3W | 450 |
| 269 | | G4CIB | 44 | 3C | 440 |
| 270 | | G4ELY | 44 | 3C | 427 |
| 271 | | G2BDV | 45 | 3C3 | 417 |
| 272 | | G3ABU | 47 | 3C | 408 |
| 273 | | G4TZR | 42 | 3C | 407 |
| 274 | | GM2AOL | 53* | 3C | 400 |
| 275 | = | G0HDV | 39 | 3C | 380 |
| 275 | = | G4NFX | 40 | 3C | 380 |
| 277 | = | G4RBE | 35 | 3C | 350 |
| 277 | = | G3YYZ | 35 | 3W | 350 |
| 279 | = | G4GZQ | 37 | 3G | 340 |
| 289 | = | G3HYJ | 34 | 3C | 340 |
| 281 | | G3YGJ | 34 | 3C | 337 |
| 282 | | G3KQY | 35 | 3C | 327 |
| 283 | | G0PDZ | 33 | 3Q1 | 320 |
| 284 | | G4UXG | 33 | 3 | 307 |
| 285 | | G3JUL | 27 | 3W | 270 |
| 286 | | G3DQY | 42* | 3W | 261 |
| 287 | = | G4DRV | 29 | 3C2 | 260 |
| 287 | = | G4UEW | 38* | 3W | 260 |
| 289 | | G0JRZ | 31 | 3C | 257 |
| 290 | | G0NOB | 61*** | 3C | 241 |
| 291 | | G0GAZ | 24 | 3C | 240 |
| 292 | | G4IVJ | 24 | 4W | 230 |
| 293 | | G3DKO | 25 | 3C | 220 |
| 294 | | G0JVG | 21 | 3C | 210 |
| 295 | | G4GNK | 22 | 2W | 204 |
| 296 | | G3OZY | 20 | 4C | 200 |
| 297 | = | G4PTE | 17 | 3G | 170 |
| 297 | = | 2E0ACY | 18 | 1C2 | 170 |
| 297 | = | G0GDN | 18 | 3C | 170 |
| 300 | = | G0HKC | 17 | 3C | 160 |
| 300 | = | G4ISO | 16 | 3C3 | 160 |
| 302 | | G4JPI | 16 | 3C | 137 |
| 303 | = | G0DEB | 10 | 2W | 100 |
| 303 | = | G0FCL | 10 | 3C | 100 |
| 303 | = | G3TRF | 10 | 3C | 100 |
| 306 | = | G4ETJ | 9 | 2Q | 80 |
| 306 | = | G0LBT | 8 | 3C | 80 |
| 306 | = | GM3EFH | 19* | 3C | 80 |
| 309 | | G4GOG | 3 | 2W | 20 |

Checklogs gratefully acknowledged from G3FXA and LA1IE

# Marconi Trophy

+ Certificate of Merit

* Unmarked Duplicate QSO

# VHF RESULTS

## 144MHZ LOW-POWER (1992)

This contest brought plenty of activity and an excellent entry. All three sections were closely contested and congratulations go to all winners and runners-up. It is sad to again have to announce the lack of SWL entries. Our thanks for checklogs go to GI4KSO/P, G3SFG/P, G3WMR/P and G3UOL. *G4XUM*

### ALL OTHERS SECTION

| Pos | Callsign | Score | QSO | Mult | Loc | Best DX | km |
|---|---|---|---|---|---|---|---|
| 1 | G8LNC/P | 173810 | 271 | 65 | 90JO | DG1BCU | 742 |
| 2 | GW0RDI/P | 139748 | 235 | 62 | 82JJ | DL2OM | 771 |
| 3 | GW4MGR/P | 87104 | 182 | 64 | 83JA | ON6OO | 584 |
| 4 | GW1VDF/P | 83288 | 184 | 58 | 81KW | DJ2JS/A | 717 |
| 5 | GM0MGR/P | 69930 | 104 | 54 | 74TO | GU8NIS | 597 |
| 6 | G0ODX/P | 67771 | 169 | 61 | 83RO | ON7EG | 520 |
| 7 | G2BQY/P | 60600 | 154 | 60 | 81VG | GM4VAW | 521 |
| 8 | G6ARC/P | 57304 | 148 | 58 | 92FM | DJ2JS/A | 616 |
| 9 | G0GJV/P | 48960 | 132 | 51 | 80ST | GM4ZUK/P | 681 |
| 10 | G4DDC/P | 48730 | 151 | 55 | 91RU | GM4ZUK/P | 580 |
| 11 | G4SSD | 42168 | 118 | 42 | 80FI | ON4QQ | 567 |
| 12 | G1WKS/P | 39690 | 121 | 49 | 01ED | GI4KSO/P | 555 |
| 13 | GU8NIS | 36090 | 86 | 45 | 89RK | GM0MGR/P | 608 |
| 14 | G4ITF/P | 34580 | 126 | 52 | 90MX | GI4KSO/P | 504 |
| 15 | G4DDL/P | 23414 | 101 | 46 | 91MP | DJ2JA | 685 |
| 16 | G6QM | 19773 | 65 | 39 | 94DB | G8LNC/P | 386 |
| 17 | G6CTU/P | 17248 | 66 | 44 | 91XG | GI4KSO/P | 524 |
| 18 | GM4ZUK/P | 14304 | 33 | 32 | 86RW | G8LNC/P | 709 |
| 19 | G4IRC/P | 14216 | 70 | 36 | 02OD | GM0MGR/P | 465 |
| 20 | G1AYM/P | 5740 | 43 | 28 | 81TT | GM0MGR/P | 346 |

### SINGLE OPERATOR PORTABLE SECTION

| Pos | Callsign | Score | QSO | Mult | Loc | Best DX | km |
|---|---|---|---|---|---|---|---|
| 1 | G3UAX/P | 87290 | 193 | 58 | 91GI | DL2OM | 636 |
| 2 | G0CLP/P | 81361 | 200 | 59 | 93AF | ON2AGC | 505 |
| 3 | G8JAY/P | 40144 | 131 | 52 | 91AW | GM4ZUK/P | 556 |
| 4 | G8DOH/P | 23739 | 76 | 41 | 01LE | GM0MGR/P | 528 |
| 5 | G4XUV/P | 15015 | 59 | 39 | 80WP | GI4KSO/P | 487 |
| 6 | G0HAS/P | 13200 | 40 | 33 | 70NM | GI4KSO/P | 432 |
| 7 | GW8ZRE/P | 7616 | 54 | 32 | 83LC | G8LNC/P | 295 |
| 8 | GM7GUC/P | 7020 | 25 | 26 | 86JF | G3UAX/P | 554 |

### SINGLE OPERATOR FIXED STATION SECTION

| Pos | Callsign | Score | QSO | Mult | Loc | Best DX | km |
|---|---|---|---|---|---|---|---|
| 1 | G4WKN | 55449 | 144 | 61 | 92OG | DJ2JS/A | 566 |
| 2 | G0RTL | 53375 | 120 | 61 | 92WU | DG1BCU | 610 |
| 3 | G3MEH | 39788 | 128 | 49 | 91QS | DJ2JS/A | 544 |
| 4 | G0CPE | 28704 | 126 | 46 | 91PF | GI4KSO/P | 495 |
| 5 | G8HHI | 28371 | 95 | 49 | 91OH | DJ2JS/A | 557 |
| 6 | G8JWF | 11900 | 52 | 34 | 81VH | GM0MGR/P | 436 |
| 7 | G7GAB | 11027 | 62 | 43 | 92IJ | GM0GMD | 445 |
| 8 | G4SBX | 9517 | 45 | 31 | 81IK | GI4KSO/P | 370 |
| 9 | G0JBA | 8120 | 40 | 29 | 01II | GM0MGR/P | 502 |
| 10 | G7AZP | 7260 | 43 | 30 | 90AS | GM0MGR/P | 464 |
| 11 | G4IOM | 5829 | 41 | 29 | 91WC | GM0MGR/P | 489 |
| 12 | G3KZE | 868 | 14 | 14 | 92VD | G4SSD | 245 |

## 1ST 1296MHZ FIXED CONTEST

The most polite comments regarding conditions for this contest were that they were flat - however, a number of the entrants supplied more graphic descriptions of grim conditions. Let's just hope the troposphere is a little more helpful for the 2nd event during November. A word of congratulation should go to G3JYP for a good entry from a more remote part of the country. Congratulations and certificates go to the Sutton and Cheam RS, the South Birmingham RS, David Cox (G8OPR), and Derek Poulter (G3WHK) as the winners and runners-up in their respective sections. *G4PIQ*

### SINGLE OPERATOR SECTION

| Pos | Callsign | Points | QSOs | Loc | Pwr | Ant | Best DX | km |
|---|---|---|---|---|---|---|---|---|
| 1 | G8OPR | 3329 | 23 | 91FE | 100 | 55Y | G3JYP | 380 |
| 2 | G3WHK | 2331 | 25 | 91VJ | 100 | 55Y | G3JYP | 383 |
| 3 | G3JYP | 2038 | 7 | 84SN | 32 | 2m | G3OLX | 392 |
| 4 | G3MEH | 1354 | 19 | 91QS | 100 | 1.05m | G8OHM | 114 |
| 5 | G0JBA | 1225 | 11 | 01II | 6 | 4 x 23Y | G8OHM | 216 |
| 6 | G8ZQB | 863 | 11 | 92JN | 50 | 27QLY | G3JYP | 237 |
| 7 | G6SPS | 694 | 10 | 01IS | 20 | 2 x 23Y | G8OHM | 195 |

### MULTI OPERATOR SECTION

| Pos | Callsign | Points | QSOs | Loc | Pwr | Ant | Best DX | km |
|---|---|---|---|---|---|---|---|---|
| 1 | G3OLX | 3231 | 36 | 91VH | 80 | 55Y | G3JYP | 392 |
| 2 | G8OHM | 2660 | 23 | 92AJ | 120 | 4 x 23Y | G3JYP | 243 |
| 3 | G4DSP | 2603 | 19 | 92WS | 200 | 1.2m | PE1EWR | 288 |
| 4 | G4SSD | 704 | 8 | 80FI | 110 | 15/15 | G4FCD | 236 |

## 1992 1.3GHZ AND 2.3GHZ TROPHIES

Entries were disappointing in view of the coordinated date with Europe, and we received a number of entries for the concurrent IARU contest which did not include separate cover sheets for the trophy contests where the stations would have had reasonable scores. I have tabulated these stations in the overall trophy results, but put an * by their calls rather than a valid position - certificates will only be awarded to those who specifically entered for the trophies.

There were also comments that holding the trophies concurrent with the multi-band microwave event meant that you had to try either for a good all band score, sacrificing 23 and 13 trophy scores by using these bands for talk-back to the higher bands, or go all out for trophy scores, and lose some attempts on the higher bands. Unfortunately, if you want activity from coordination, you have to accept that this is the weekend with the greatest microwave activity in Europe. Perhaps a partial solution to this is to make sure you can set your frequencies and dish headings on the high bands with absolute confidence, without needing recourse to talk-back. This would mean that, with good organisation at each end - perhaps a key point being the use of fixed 1 minute periods - contacts should be able to be made with only a frequency and locator needing to be passed on the talk-back band, thus freeing up the 23cm or 13cm station to get on with the trophy. This system works for EME where signals are often much weaker than on the terrestrial microwave bands! If you fail, there is always another 16 hours of the IARU event after the end of the trophies.

Conditions were poor. The Three Spires CG, G4IEV/P, commented that advocates of QRP will be delighted to see the 125kW EIRP is hopelessly ineffective, and suspected that their rivals were deploying L-band chaff against them. Having only worked three G stations on 13cm during the event, they asked how many UK stations were active - I counted 14 different G calls in the trophy logs - there's some way to go yet till you work everyone!

Many congratulations to John Quarmby, G3XDY, who takes the VHFCC cup for winning the 23cm contest - a remarkable feat for a single operator fixed station; and to the Windbreakers CG, G4JAR/P who take the G6ZR Memorial Trophy for winning the 13cm event. Congratulations and certificates also go to Roger Piper, G3MEH, The Northern Lights, G0EMG/P &G4XUM/P, and David Cox, G0RRJ. *G4PIQ.*

### 1.3GHZ SINGLE OPERATOR SECTION

| Pos | Callsign | Points | QSOs | Loc | Pwr | Ant | Best DX | km |
|---|---|---|---|---|---|---|---|---|
| 1 | G3XDY | 13212 | 52 | 02OB | 300 | 4x23Y | DF0CI | 626 |
| 2 | G3MEH | 4466 | 34 | 91QS | 100 | 1.05m | PA0WMX | 425 |
| 3 | G0RRJ | 3399 | 20 | 91FE | 100 | 55Y | DF0HS/P | 529 |
| 4 | G8FBG | 3087 | 27 | 91SG | 45 | 55Y | G4XUM/P | 349 |
| 5 | G4EQD | 2329 | 12 | 93QN | 80 | 49QLY | G0FRR/P | 321 |
| 6 | G4WKN | 1685 | 18 | 92OG | 50 | 4x23Y | G0JBA | 215 |

### 1.3GHZ MULTI OPERATOR SECTION

| Pos | Callsign | Points | QSOs | Loc | Pwr | Ant | Best DX | km |
|---|---|---|---|---|---|---|---|---|
| 1 | G4JAR/P | 8997 | 35 | 02TG | 250 | 2.5m | DF5HD | 570 |
| 2 | G4XUM/P | 5119 | 23 | 94RJ | 150 | 8x55Y | PE1MVQ | 480 |
| 3 | G4IEV/P | 4623 | 31 | 01KJ | 400 | 1.8m+3.6m Pillbox | PE0AGO | 397 |
| * | G0FRR/P | 3323 | 26 | 80UU | 100 | 4 x 50Y | GD4GNH | 399 |
| * | G1OHM/P | 1810 | 21 | 92GB | 120 | 2x55Y | G4EQD | 176 |
| * | G4DDN/P | 1220 | 9 | 01QX | 200 | 55Y | PA0EZ | 263 |

### 2.3GHZ SINGLE OPERATOR SECTION

| Pos | Callsign | Points | QSOs | Loc | Pwr | Ant | Best DX | km |
|---|---|---|---|---|---|---|---|---|
| 1 | G4EQD | 528 | 3 | 93QN | 10 | 49QLY | G4DSF/P | 261 |
| * | G8ZQB | 500 | 6 | 92JN | 4 | 27QLY | G0EMG/P | 208 |
| 2 | G0RRJ | 233 | 2 | 91FE | 35 | 25Y | G4DSF/P | 169 |
| * | G4LRT | 45 | 2 | 92LJ | 6 | 46QLY | G6PHJ | 23 |

### 2.3GHZ MULTI OPERATOR SECTION

| Pos | Callsign | Points | QSOs | Loc | Pwr | Ant | Best DX | km |
|---|---|---|---|---|---|---|---|---|
| 1 | G4JAR/P | 1661 | 9 | 02TG | 50 | 2.5m | G0EMG/P | 276 |
| 2 | G0EMG/P | 1402 | 7 | 94RJ | 65 | 1.5m | PA0WWM | 412 |
| 3 | G4DSF/P | 1216 | 6 | 01KJ | 25 | 1.8m | PA0EHG | 268 |
| * | G8GDZ/P | 443 | 5 | 92GB | 30 | 1.2m | G4EQD | 176 |
| * | G6SFR/P | 213 | 1 | 80UU | 10 | 1.5m | G6PHJ | 213 |

## HF CONTESTS CALENDAR

| | |
|---|---|
| **5/6 Jun** | NFD (Feb 93) |
| **19/20 Jun** | *All Asia SSB* |
| **26/27 Jun** | Summer 1.8MHz CW (May 93) |
| **3/4 Jul** | *Venezuela SSB* |
| **10/11 Jul** | RSGB SWL Contest |
| **10/11 Jul** | *IARU Championship* |
| **17/18 Jul** | *SEANET CW* |
| **17/18 Jul** | *HK DX CW* |
| **18 Jul** | Low Power Field Day (May 93) |
| **24/25 Jul** | IOTA SSB (Mar 93) |
| **24/25 Jul** | *Venezuela CW* |
| **1 Aug** | RoPoCo-II (note change of date) |
| **7/8 Aug** | *YO DX (CW/SSB)* |
| **14/15 Aug** | *WAE (CW)* |
| **4/5 Sep** | SSB FIELD DAY |
| **4/5 Sep** | *JARL AA SSB* |
| **5 Sep** | *LZ DX CW* |
| **Sep/Oct** | QRS Cumulatives II |
| **11/12 Sep** | *WAE SSB* |
| **18/19 Sep** | *SAC CW* |
| **25/26 Sep** | *SAC SSB* |
| **25/26 Sep** | *CQ WW RTTY* |
| **2/3 Oct** | *VK-ZL SSB* |
| **3 Oct** | 21/28MHz Telephony(Apr 93)(note change of date) |
| **9/10 Oct** | *VK-ZL CW* |
| **17 Oct** | 21/28MHz CW (May 93) |
| **30/31 Oct** | *COWW DX SSB* |

## RSGB 1993 VHF/UHF CONTESTS CALENDAR

| | |
|---|---|
| **13 Jun** | 50MHz Trophy (Feb 93) |
| **19 Jun** | 432MHz FM (Feb 93) |
| **20 Jun** | 70MHz CW (Feb 93) |
| **3/4 Jul** | VHFNFD (Mar 93) |
| **24 Jul** | 144MHz Low Power (Feb 93) |
| **25 Jul** | 432MHz Low Power (Feb 93) |
| **22 Aug** | 2nd432 MHz Fixed (Feb 93) |
| **31 Aug** | 144MHz CW Cumulative (Feb 93) |
| **4/5 Sep** | 144MHz Trophy (Feb 93) |
| **15 Sep** | 144MHz CW Cumulative |
| **19 Sep** | 70MHz Trophy (Apr 93) |
| **30 Sep** | 144MHz CW Cumulative |
| **2 Oct** | 1296MHz Trophy |
| **2 Oct** | 2320MHz Trophy |
| **2/3 Oct** | 432MHz-24GHz & IARU Contest. (Apr 93) |
| **5 Oct** | 1.3/2.3GHz Cumulative (Apr 93) |
| **13 Oct** | 432MHz Cumulative (Apr 93) |
| **15 Oct** | 144MHz CW Cumulative |
| **20 Oct** | 1.3/2.3GHz Cumulative |
| **28 Oct** | 432 MHz Cumulative |
| **31 Oct** | 2nd 1296/2320MHz Fixed |
| **1 Nov** | 144MHz CW Cumulative |
| **4 Nov** | 1.3/2.3GHz Cumulative |
| **6/7 Nov** | 144MHz CW, Marconi/6/24 hr |
| **12 Nov** | 432MHz Cumulative |
| **18 Nov** | 1.3/2.3GHz Cumulative |
| **29 Nov** | 432MHz Cumulative |
| **5 Dec** | 144 AFS / Fixed |
| **6 Dec** | 1.3/2.3GHz Cumulative |
| **14 Dec** | 432MHz Cumulative |
| **26,27,28** | |
| **29 Dec** | 70/144/432MHz Fixed |

For details of rules for European contests, contact G4PIQ, QTHR.

# DIRECTION FINDING

## TORBAY QUALIFYING EVENT

**Date**: 4 July 1993

**Map**: 202 (Torbay and South Dartmoor)

**Assembly**: 1300 for start at 1320

**Location**: Orley Common, Ipplepen, NGR 827 666.

Competitors requiring tea should notify Paul Clark, tel: 0803 523599, no later than 28 June.

## FOREST OF DEAN 2M ARDF WEEKEND

**Dates**: 10 and 11 July 1993

**Maps**: Outdoor Leisure 14 - 1:25000, Wye Valley & Forest of Dean, or Landranger 162 - 1:50000, Gloucester & Forest of Dean area.

**Assembly**: Saturday, 1030 and 1600. Sunday, 0930.

**Location**: Forestry Commission's Braceland camp site located at SO560130, which is 5k (3m) east of Monmouth.

More details are available from Phil Smith, GW1XBG, tel: 0792 642001.

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**Melbourn Science Park, Melbourn, Royston,**
**Herts SG8 6EE.**

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Government Communication Headquarters

## Radio Officer

GCHQ requires experienced **RADIO OFFICERS**. If you are looking for a career which will build on the training you have received, contact **GCHQ.** We require skilled and motivated staff, with a high sense of purpose, to study our communications across the whole spectrum, from DC to light. To qualify you require a minimum of 2 years recent and relevant radio operating experience. We would prefer you to be capable of reading morse at 20 wpm, but if not, full training will be given at our Training School.

For candidates without radio operating experience, the following qualifications are necessary:

BTEC National Diploma or HNC/HND in a Telecommunications Electronics Engineering syllabus which must include radio communications modules. City and Guilds 777 (advanced level), or MRGC.

Preferred age range for experienced Radio Officers and for those who do not possess the full range of skills is 18-45.

When your training is completed you can look forward to:

- Good career prospects
- Varied work (opportunities for moves within the UK and overseas)
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**Salary** during training (£9757). On completion of training, salary is then performance related but will start at inclusive rate of £17,958.
Given normal progression, standard pay will be reached in 5 years. Currently standard pay is:- £22,378

**GCHQ is an equal opportunity employer**
APPLICANTS MUST BE BRITISH NATIONALS

For further information and application form contact:
Recruitment Office, Room A/1108, GCHQ Priors Road, Cheltenham, Glos, GL52 5AJ or telephone (0242) 232912 or 232913
All completed forms must be received in the Recruitment Office by 9 July 1993.

GCHQ

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| R5 | 20-10m ½w Vertical |
| AP8 | 80-10m ¼w Vertical |
| A50-5 | 6m 5 element Beam |
| 17B2 | 2m 17el Boomer |
| 13B2 | 2m 13el Boomer |
| 124WB | 2m 4el Boomer |
| ARX2B | 2m Co-linear |
| ARX450 | 70cm Co-linear |
| AR270 | 2m/70cm Vertical |
| A430-11 | 70cm 11el Beam |
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| TH3JR | 20-15-10m 3el Beam |
| TH2mk2 | 20-15-10m 2el Beam |
| DX88 | 80-10m Vertical |
| 14AVQ | 40-10m Vertical |
| 66DX | 6m 6el Beam |
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| T2X | Tailtwister Rotator |
| HamIV | The "classic" Rotator |
| CD45 | Medium duty Rotator |

**MIRAGE/KLM**

| | |
|---|---|
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| KT34A | 20-15-10m 4el Beam |
| 6M7 | 6m 7el Beam |
| 6M5 | 6m 5el Beam |
| 2M16LBX | 2m 16el Beam |
| 2M13LBA | 2m 13el Beam |
| 2M22C | 2m 11XY Oscar |
| 2M14C | 2m 7XY Oscar |
| 432-30 | 70cm 30el Beam |
| 435-40CX | 70cm 20XY Oscar |
| 435-18C | 70cm 9XY Oscar |
| 440-6 | 70cm 6el Beam |
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VHF/UHF pre-amps also available

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| 2M5WL | 2m 17el Beam |
| 2M12 | 2m 12el Beam |
| EB144 | 2m Eggbeater |
| 432-13WL | 70cm 39el Beam |
| 432-9WL | 70cm 28el Beam |
| EB432 | 70cm Eggbeater |
| 23CM35 | 23cm 35el Beam |
| 2M2P | 2m 2w Power Divider |
| 2M4P | 2m 4w Power Divider |
| 70CM2P | 70cm 2w P.Divider |
| 70CM4P | 70cm 4w P.Divider |
| 23CM4P | 23cm 4w P.Divider |

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17 & 12m Add-on kits also available.

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| B215G | 2m 2-150w g/f rx |
| B108G | 2m 10-80w g/f rx |
| B1016G | 2m 10-160w g/f rx |
| B2516G | 2m 25-160w g/f rx |
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| D26N | 70cm 2-60w |
| D1010N | 70cm 10-100w |
| D3010N | 70cm 30-100w |

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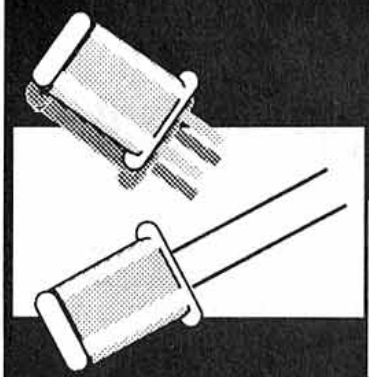

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# Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Ads for CB equipment will not be accepted. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*.

***Warning:*** *Members are advised to 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.*

## FOR SALE

**"SAILOR"** Marine Equipment, Receiver, Exiter, Amplifier, Power Supply and charger. Complete with all connections and Cabinet also Redifon Marine Tx type G474 and Sait MF Tx type MT430B. All in good condx. Offers, info. G4ZCN, QTHR. (Hartlepool) 0429 275571.

**ALINCO** 2 metre Mobile DR112, almost new, 25/5W, with mobile Mag-mount Antenna: £125. G Foote, G7NCR. (Didcot, Oxon) 0235 816958.

**ANTENNAS** for Sale: Hokushin HS-WX1 2m/70cm Collinear: £40. Cushcraft 2m Boomer 4218XL 18 ele 17.2dBd gain Beam: £70. Tonna 13 ele 2m Beam: £25. All first class condx. Buyer collects G1XFG, 6-9pm. (Doncaster) 0302 786999.

**ASTATIC** D104 Base Mike: £50. Icom 228H 50W, boom Mike with T/burst: £250. Standard C150E 2 mtrs H/held, charger +extras: £175. Kenwood MC80 Base Mike: £40. All in good condition. Phone (Wembley, Middlesex) day 0992 624429 or evening 081 904 3282.

**BRAND NEW** boxed Valves, all £3 each: 12BH7, 5763, 6AS7G, 5R4GY, 5U4G, 6P25, 6080, AC/P, D63, DH63, EF50/55, EL38, GZ32/34, H63, KT33C, KTW61/2/3, KT81, OC3, PL38, PL504/509, PY500(A), PD500/510, SP41/61, 3A/167M, EL360, 5A/180M, 6BK4, U24, UU8, KT67, N78, 807, DM70, T41,7475. Several available each type. Please add £2 Postage. Cheques to:- Mr K Bailey, 40 Seymour Close, Selly Park, Birmingham, B29 7JD.

**BRAND NEW** Valves. All: £1 each. DAF91, DK91, DF96, EB91, EL81/85, ECC81/2/4, EF80/85/91, EF95/42, EF183/184, EBC90/81, EBF80/90, ECL83/4/5/6, ECH84, EH90, EZ81, 12AT6, 12K7GT, 12SC7, 12SQ7, 20L1, 20P1/PS, 30C1, 30C15, 30C17, 30C18, 30F5, 30FL1, 30FL12, 30FL14, 30FL2, 30L1, 30L15, 30L17, 30P12, 30P16, 30P18. Assorted resistors 400+: £1. Assorted transistors 100+: £4. P&P: £2.50. Cheques to:- K Bailey, 40 Seymour Close, Birmingham B29 7JD.

**COULD** Probably make the best DX QTH in the South of England. Situated on top Chiltern Hills 650 ft ASL near Henley-on-Thames. Spacious Bungalow in quiet village, comprising 3 Bedrooms, sitting, dinning rooms modern fitted kitchen. Large back garden backing on to common. Price: c.£95000. For further particulars phone. (Clydebank) 0389 73741.

**FOR SALE** owing to 100db loss of Hearing, going QRT. TenTec Omni + Osker VSWR Atten switch, 100W load: £375 ono. BBC B series7, sideways Ram/Eprom Board, 5.5 Drive, H/res Mono, Printer: £165 ono. Philco VSWR/Power Meter 25mHz-1000Mhz Milliwatt Kilowatts FSD 1.08:1 VSWR: £135 ono. 10Hz/1Mhz Marconi Oscillator: £15. 150k/220Mhz Signal Generator: £35. Boxes of Co-Axial connectors and adaptors from 25p each. (Wheathampstead) 0727 862743.

**FRG8800** Receiver 150Khz to 30Mhz HF, 118-174Mhz VHF, complete with manual, original packing, plus Discone antenna VHF. Excellent condx: £450. G3CGQ, QTHR. (Luton) 0582 25519.

**FT225RD** MuTek front end, boxed, manual, Base Mike: £500 ono. DR49 Panasonic Comms Rx AM/FM/SSB all HF bands: £230. 30 foot Tower, never used, with winch, cables, rotator cage tiltover base mount included: £300. G7BPR, QTHR. Sale forced by ill health, no time wasters Please. (Boston, Lincs) 0205 79620.

**GESTETNEC** Electrical Duplicator type 1560, complete with manual and three drawer cabinet: £75. In good working order. Buyer collects. G0FQT, QTHR. (Enfield) 081 440 2394.

**KANTRONICS** Data engine 1200BD x2, 9600BD x1 with developers Toolkits, complete: £325. D4-10 Data Radio: £300. G8-100 HF Vertical Aerial with 12m + 17m coils, new in original packing: £50. Icom IC901 2m/70cm Tcvr with UT129 23cm Module, EX766 Fibre-optic Remote control pack: £700 ono. 2m/70cm Diplexer: £10. (Leeds) 0532 390054.

**KENWOOD** R5000 Receiver, mint condition fitted with VS1 Synthesiser and VC20 converter: £625.

**KENWOOD** TS680S HF + 6M, mint, c/w Mic, Marchwood 30A P/S, service manual and boxes. Will include 2el 6M Beam: £725. G4GRU, QTHR. (Manchester) 061 440 0556.

**MAGNETIC LOOPS** Capco AMA3/AMA5 3.5-30Mhz inc WARC, Control box and cabling, cost £800+. No ATU, no tvi, no planning permission required, 3.5-11Mhz: £220, 13.9-30Mhz: £180. The Pair: £375. Could deliver. Olympia Electronic Typewriter, spare ribbons, various typefaces, 5 reams paper, manual, excl condition, bargain: £125. John, G0OAF. (Derby) 0332 677017.

**R5 HF** Vertical 20, 17, 15, 12 and 10. Used but in vgc: £185 inc carriage. Phone (Edingburgh) 031 346 0591 evenings.

**R7000** mint with TV conv: £690. Trio TS930 + AATU: £630. Kenwood 70cm TH45E + accessories, mint: £220 ono. (Ipswich) 0473 311665 after 7pm.

**SILENT KEY** G3OVJ. Yaesu FT747GX 160-10m General Coverage Receiver 0.1-29.9Mhz: £800 ono. Matching 20 Amp PSU: £50. As new in original cartons. G3MYE, QTHR. (Banbury) 0295 78331.

**SILENT KEY** Sale, GW2FWD. Boxed equipment, GWO as seen. GW3BAZ will demo. Icom IC740 100W HF: £375. Yaesu FT747 100W HF: £365. Kenwood TM241E 2m Mobile: £210. Icom IC PS15 20 amp Supply suits above: £60. Kenwood TH25E H/held 2m, extras: £120. Sony ICF7600DS synthesised VHF FM Broadcast Shortwave to 30Mhz: £55. SAE for list. Cheaper items: rotators, antennas, testsets, SWR, switches etc. (Cardiff) 0222 757556.

**SILENT KEY** Sale. Comms Receiver Icom ICR70: £450 or offer mint Yaesu FRV7700 Converter FRT7700 Antenna Tuner: £50 each or Offers. Contact G0PCY, QTHR. (Surbiton, surrey) 081 397 2542.

**STANDARD** AX700 Scanner(Panoramic display), little used: £360. Miracom WS4000 modem CV2123: £25(new cost £125). Icom IC25S 144Mhz: £50. Kit built Airband Rx: £20. WANTED: EC10 mk2. (G4IJF, shack clearance 1993) (Ipswich/Colchester) 0206 396610.

**STRUMECH** 75 Feet H/D Mast with 4 ele HF Beam. 16x8 Ham Shack, lovely 4 Bedroom old Farm House, 6 Acres outbuildings, lovely views over farm lands. Close A34 & M4, only: £265k. G4GVF, QTHR. (Newbury) 0635 201533.

**TATUNG EINSTEIN** Computer, CPM, twin Disk drives, 80 Column card, colour Monitor, Printer lead, software, cover, All manuals and original packing: £150. Yaesu FT23 2m H/held, with Mobile PSU, Mic and earpiece, dry cell case, carry case: £125. (Manchester) 0942 876796.

**TRIO TR9500** 70cm M/mode, manual, memory back-up. 9 element Tonna, mint condition, any trial: £325. G6EBI, QTHR. (Hornchurch) 0708 553495.

**TEN-TEC** Century-22 CW Tcvr immac, boxed: £200. Datong Morse Tutor: £40. SSM Z-match: £40. Codar AT5 with mains PSU: £20. Various Homebrew QRP Tcvrs/Test gear. Phone for details. 12v/4A PSU: £10. Magazines, books, valves, etc. G4BZI, QTHR. (Chester) 0244 351357.

**TENNAMAST** 35 feet Wind Up and tiltover Mast with friction break winch and ground post plus head unit, all ex condx: £200. Commodore 64 computer with latest disk drive and plenty of Amateur software. As new: £150 ono. No time wasters please. Phone after 5.30pm. (Wolverhampton) 0902 664482.

**TONO** B9100 AMTOR CW/RTTY etc, word processor, keyboard, monitor term/unit: £350, or Exc QRP Trx, ATU etc. Standard 8800 2m Trx, mobile bracket, magmount Ant: £160. Eurosonic Fwd/Rev SWR meter: £5. Swop or part exc All for FT101ZD ono. John, G4NEN, QTHR. (Lancs) 0524 62734.

**35FT BOX** Section Mast as new, never used: £250 ovno. Buyer Collects. (Durham) 091 373 4459.

**35ft CRANK** and Tilt Tower H/Brew: £105 ono. PF 1's, 3 trans, 7 Receivers, Xtals, batteries. Night call units x 2: £40 ono. (Tamworth) 0827 284184.

**50 YEARS** of RadCom(1942-1992) plus SWM(1950s-1980s) plus Radio Constructor, HRT, also various old handbooks (ARRL 1936, RSGB 1940): £100 the lot plus donation towards carriage! May sell some separately. Ring for details. G4IJO. (Middlesbrough) 0642 318237.

**6M AKD** TRX for sale. Ideal for QRP or Novice use. Aerial included. Still boxed with manual: £115. (Preston) 0772 743801.

**ALINCO** DJ180 2m H/held as new, boxed: £155. G7NTG. (Kettering, Northants) 0536 521718.

**AMSTRAD** 1640 Computer, enhanced colour Display Monitor, 20Mb hard Drive, word processor, log book program, spread sheet, propogation programme, packet programmes. All installed on hard disk. Buyer inspects and collects. First offer of: £550 cash secures. Software manuals. Stuart, GM0CAQ. (Macduff) 0261 33298.

**ANTENNAS** 19 element 70cm: £25. 17 element 144Mhz: £35. 5 element 50Mhz: £30. All by Tonna. Spectrum Plus 3 with Morse Tutor: £60. Datong Morse Tutor: £45. G1IYC. (Doncaster) 0302 724509.

**AOR AR1500** Portable Receiver still under warranty. AC chgr, Nicads, 12v DC lead, soft case, earphones, AM-FM(N), FM(W), SSB: £250. (Kent) 0474 823797.

**ATARI** STE Morse RTTY Transceive: £5 each. Mr V McClure, 43 Roman Way, Seaton, Devon EX12 2NT. (Seaton) 0297 23421.

**AVO8 Mk5** Multimeter and weather case, with new batteries. Offers over: £30 Please. Dave, (Abingdon) 0235 526543.

**BBC B** Viglen Case, 40/80T floppy, Watford sideways Rom board, Green Monitor, manuals, software: £200. Watford sideways Rom board: £30. UDM ADFS board: £20. BBC B faulty for spares: £30. Epson MX20 Portable Computer c/w Printer, tape drive, TV adaptor, handbooks, technical manual, software: £200! GM6AMP, QTHR. (Glasgow) 041 422 1175.

**BBC B**, 40+ games, recorder, B/W 14inch TV. The lot: £95. No Offers. Also Microwave Module MM70/144 Transverter as new: £65. No offers please. Prefer buyer collects or carriage extra. G1EYL, QTHR. Or phone (Dronfield) 0246 415667 after 5.30pm.

**BBC MASTER** 128, Monitor, disk drive, Printer, manuals, various software. Inspect and collect: £350. G4URJ. (Hindhead) 0428 605501.

**COMMODORE** 64, 1541 Disk drive, Datasetts, 1525 Graphics Printer, Joystick, mouse, all books: £145. Shure 444 Mic: £20. Pair 813s: £35. G4CJY, QTHR. (High Wycombe) 0494 530018. EASY sa**PC PCB** Drawing package plus Library symbols: £60. Black Star Orion PAL/Video Colour Pattern Generator: £148.

**WELZ CH20A** Antenna Co-ax Switch (new): £19. JVC CX60GB 6inch TV/Monitor (mint): £145. Wood and Douglas 1250 200mW/1W 23cm Amplifer: £46. 3 Meter FSJ50 Flexible Heliax plus 4 connectors(male) (new): £35. Tel: Paul, G4XHF, QTHR, evening. (Crawley) 0293 515201.

**COMPLETE CAMERA** outfit Vivitar V2000 SLR 28-70mm Zoom. Optomax 2.8 135mm. Tamron 2x 7el Converter. All cases. High spec Double Flash Unit. Pullman holdall plus load accessories, exceptional condition, less than half cost. Price: £165 ono. Tripod included also available Weston Master two and Invercone: £25. Most items boxed. Minimal use for two years. (SE London) 081 857 8096.

**CUSHCRAFT R5** in nearly new condx, works very well: £165. (Southend, Essex) 0702 712775.

**DATONG D70** Morse Tutor, mint cond, boxed: £45 ono. G0TGT, QTHR. (London) 071 704 1078 evening.

**DATONG FL3** or FL2 and VLF. Also Racal Rcvr RA17 type. Within 50 miles of Hull. Please ring. (Hull) 0482 708407.

**DATONG** Morse Tutor boxed: £35. Commadore 64 with Morse Tutor and Decoder, boxed: £60. RRC full RAE course with answers: £35. (Liverpool) 051 734 0328.

**DEE-COMM** 3 Band HF Vert Antenna, minimal use, mint condx, very well made: £65. To include Interlink delivery. GW4RLP, QTHR. (Caernarfon) 0286 675264.

**DRAKE** SPR4, good condx: £150. ERA Microreader as new: £70. Buyer collects. G3JLB, QTHR. (Gravesend) 0474 534694.

**DRAKE** TR7, RV7, PS7, 7077 Mic, all filters fitted, workshop manual: £650. Yaesu FT102, all filters: £495. All good condition. (Trowbridge) 0225 753166.

**EDDYSTONE** Receiver EC10: £75. 770/R, 770U/2, 730/4: £95 each, Cash plus carriage. All in vgc. Contact Lepino. FAX 0372 454381. (Great Bookham) 0374 128170.

**EXPLORER 14** Hy-Gain HF Tribander Beam, 12 mths use, very good condx, dismantled and boxed ready to go: £250. G4ZZN, QTHR. (London) 081 850 1440.

**FREE 60foot** Versatower 20m Quad and rotator if you purchase 3 Bedroomed House near Mold, N Wales. Easy access to coast, Chester, Liverpool, Manchester. Located mid terrace block of 4, gas c/h, d/gl, car parking. 16x10ft fully insulated shack/workshop. Excellent order throughout. Photos available: £44950. (Mold) 0352 771520.

**FT101E** +FM module, fan, excellent condition, boxed, manual: £295. FRG7 General Coverage Receiver, manual, excellent condition: £150. G4TCI.(Kingswinford) 0384 279769.

**FT290** + Batts charger, case, remote Mike. Part Exchange for 2mtr H/held or £225. 18 ele 2m Beam + Rotator: £40. Farnell Dual Beam Oscilloscope with probes, book, vgc: £40. Buyer to Collect/examine, pay carrage. G4BNH, QTHR. (Shipley) 0274 593153.

**FT690R** 50 Mhz 2.5w M/mode Portable Tx/Rx gwo, but case scratched, hence only: £175. Would Px towards HF Tx/Rx. Sextet Modem V21 to V32BIS with MNP4/5 and V42/V42BIS: £80 or Swap 2m or 70cm FM Tx/Rx. Epsom RX80FT Printer 9pin Dot Matrix with friction and tractor feed: £80 or swap 2m or 70cm FM Tx/Rx. Mike, G4KFK. (Slough) 0753 540520.

**GEC** Army Tx/Rx RT264A, covers 1010-1110Mhz, contains 3x 2C39A, 115v supply: £40. 20inch B/W Video Monitor: £20. D14/181GH CRT: £5. (Alfreton, Derby) 0773 831562.

**GENERATOR** Kawasaki GD700AS 240VAC 2.5A, 12VDC 8.5A, very Portable, electric starter, unleaded petrol. One year old, immac: £350. Buyer collects. Yaesu FT101ZD Mk3, FM, WARC, VGC, GWO, with Fan and workshop manual: £380. No offers. George, G4RNI. (Gateshead) 091 438 5375.

**GOOD DX** QTH, WAC(50Mhz), 3-Bedroom Terraced House in Grays, Essex. Central heating, partial double glazing, quiet road, close to all amenities and convenient for London and M25. 40 foot Tiltover Tennamast

Tower to remain: £47500. G6CRX, QTHR.(Grays) 0375 384179.

**HAMMERLUND HQ170** Receiver. Hallicrafter S27 Receiver. Murphy A4(s/n 7719) Radio. Price and Details QTH. (Isle of Man) 0624 621720.

**HEATHERLITE** Hunter Linear Amp, handbook, boxed: £750. Tennermast telescopic, foldover: £300. Yaesu G600 Rotator, controller, 75ft multicore cable: £150. All as new, silent key sale. Buyer collects. LAR omni match: £12. TS9130 gdo mobile mount, Mic, boxed: £300. G4GBN. (Yeovil) 0935 862505.

**HEATHKIT** HW101 HF Tvcr complete with Power supply, Microphone and manuals, good condition: £150. Call Standford, G0JIZ, QTHR. (Great Yarmouth) 0493 780579.

**HQ1 MINIBEAM** : £75. FT290R: £245. Daiwa LA206 2m linear: £75. Mutex SLNA 2m Preamp: £25. 144/9 Yagi + AR30 Rotator: £75. IC02E 2m H/held: £125. BBC-D issue 7, DFS8271 +interword +GX2 FAX/SSTV, high resolution Monitor +Software: £385. Wordwise-Plus: £40. TX3 FAX/SSTV TX/Rx, incl Interface. Spectrum+ Alphacom Printer +FAX3/SSTV+Interface: £95. G4KTX, QTHR. (Chelmsford) 0243 33233.

**HRO** Mint un-modifed c/w PS, ETC 1945. Collectors item: £150. Also Candlestick Telephone very old: £50. Peter. (Guisborough) 0287 634397 daytime 9-5.

**HYGAIN TH2** Mk3 2 el Beam, dismantled, vgc. Prefer buyer to collect. Norman, G4RYS, QTHR. (Leeds) 0532 663846.

**HYGAIN** Vertical 12AVQ 20-15-10 metres, 13.5 ft, boxed, unused: £50, cost £99. Two Metre 4 elem Beam: £12.50. Microwave Modules Morse keyboard MM1001KB sends Morse, four buffers: £45, cost £120. Microwave Modules Morse talker MMS-1: £75. VHS Video tapes, top quality, used once, E240 x3, E180 x10, E150 x1, E120 x1. G3IJL, 16 Bloemfontein Avenue, Shepherds Bush, London, W12 7BL. (London) 081 749 1454.

**ICOM 726** 6m MF AM/FM fitted, Icom P515 20A PSU, Sem Zmatch ATU, Butternut HF6V-X, MFJ 1274 TNC 2, Boxes, instructions. Offers? (Newbury) 0635 200108.

**ICOM IC-R7000**, absolutely pristine condx and boxed: £570. Would Exchange for Kenwood TS440S or similar. Must be mint and boxed. (Aberdeen) 0224 649451.

**ICOM IC-W2E** 2m/70cm H/held, hardly used, exc condx, with charger and a speaker Mike: £360 ono. First to see will buy. Steve after 7pm. (Altrincham, Cheshire) 061 980 5506.

**ICOM IC02E** with case, charging lead, charger, etc, in good clean condition and in original packing: £190. G4LUF, QTHR. (Totnes, Devon) 054 882442 evening.

**ICOM IC251E** 2m Multimode Transceiver: £350. Alinco DR110 2m FM Mobile Transceiver 45w output: £170. Both Boxed, vgc. (Worthing) 0903 262129.

**ICOM IC2SA** 2m Walkie-Talkie Radio, measures only 2.5inch high x 2inch wide, with fast charger, batteries not so cherry, hence only: £160. (Half price) Icom IC228E 2m 25w Tcvr: £160 (W/B receive). Scanner MVT7000: £260 100Hz up to 1.3Ghz. G4MVL. (Nuneaton) 0827 713652.

**ICOM IC725**, HM12 Mic, AM/FM board, 500Hz CW filter: £480. Ted, G0LMJ, QTHR. (Horncastle) 0507 588219.

**ICOM** IC745 with FM, perfect with box: £700 ono. Part Ex with TS120S or 130S. G0IMK. (Clows Top) 0299 832279 daytime.

**INSTRUMENTATION** EIP 351D 18Ghz Frequency Counter, Excellent with H/B: £400. Chris, G8JFJ. (Waterlooville) 0705 596836.

**JAYBEAM** Minimax MM3 Tribander. 18 months old and in ex condx. Ready to take away: £250. Phone Dave, G0JPL. (Wellingborough) 0933 222472.

**KANTRONICS** Data Engine: £280. Yaesu FT707: £350. FC707 Antenna Tuner: £50. Datong Morse keyboard: £40. Pace 300 baud Prestel Modem: £100. 4'19" Rack: £5. Quinkey BBC B Keyboard: £10. Class D Wavemeter, offers. Eddystone 990R Rx 25-250Mhz: £150. John, G3UUT, QTHR. (Cambridge) 0223 843546.

**KENWOOD** TH26E 2m H/held, mint condition, boxed, less than 12 months old, also battery box: £165 ono. (£200 if new). (Newcastle upon Tyne) 091 2627532.

**KENWOOD** TM241E Mobile 2 Mtr Tcvr, extended Receive coverage, PWR o/p 5, 10, 50W, multifunction Mic, features inc DTSS, pager etc, Mint Condx: £235. Also Icom IC-R7000 Comms Rx 25Mhz to 2000Mhz, built-in Speech Synth. The No 1 All Mode scanning Rx: £650. Phone G3IWE. (Warrington) 0925 601485.

**KENWOOD** TM75E Dual Band H/held, extended receive, base charger, 2 Nicads and cases, exc cond, boxed: £280. Standard C8900 2mtr FM Mobile 10watts with mounting bracket: £100. G4NYZ, QTHR. (Redditch) 0527 545800.

**KENWOOD** TR751E 2m Multimode, absolutely immaculate, never used mobile: £495. Consider Exchange with Kenwood TS790E plus cash adjustment. G0RAN, QTHR. (Bury) 061 796 5296.

**KENWOOD** TR751E Multimode: £400. Kenwood AT230 ATU: £150. Yaesu FT470 2m/70cm: £225. Trio TR7730 2m: £100. Kantronics Linear 2m 2-30: £80. Diamond X50 2m/70cm Antenna: £30. Kenwood MC85 Desk Mike: £40. Diamond SX1000: £70. All Ex Condx and boxed. (Derby) 0332 44979.

**KENWOOD** TS120S HF Tcvr, matching VFO 120, ext Speaker, PS30 PSU and MC50 Mic: £350. Kenwood ATU230: £110. GM0RDA, QTHR. (Burntisland) 0592 872858.

**KENWOOD** TS130V, VFO120 ideal QRP Station, plus Yeasu FL110 100W Linear used Mobile successfully: £280 ono. Yeasu FRT7700 Rx ATU: £30. G3ELH, QTHR. (Petersfield) 0730 264971

**KENWOOD** TS140S HF Tcvr, all bands, Gen coverage receive. Boxed, hardly used, never mobile: £575. G0MZZ, QTHR. (Batley) 0924 474548.

**KENWOOD** TS440S with Auto ATU, boxed and in pristine condition. Inspection welcome: £830 ono. G4WQL, QTHR. (Nr Redruth) 0209 890450 evenings.

**KENWOOD** TS440S with internal ATU and filters YK88CN and YK88C. Fitted with PS430. Mint condx all boxed: £950 ovno. (Oswestry) 0691 657696.

**KENWOOD** TS790E 2/70 Multimode TCVR, PS31 PSU, SP31 Loudspeaker, MC60A Microphone. All vgc: £1250. G6DBX, QTHR. Phone evenings before 9pm. (West Sussex) 0444 248767.

**KENWOOD** TS850S Auto ATU, 500Hz Cw filter, Mic, as new: £1200. PS52 Matching PSU: £150. TenTec Corsair 2t, Mic: £700. TS520, 250Hz CW filter: £300. Cushcraft A4 4 el HF TriBander: £180. Yaesu FC102 1KW HF ATU: £180. Icom IC210 2m FM Homebase 1-10w, Desk Mic: £180. Yaesu G400 Rotor with 20m cable: £50. Owner gone QRT. (Falkirk) 0324 32594.

**KENWOOD** TS930S 9-Band HF TCVR. Pristine condx. Fitted 6Khz and 270Hz filters, with Hand Mic, manual and box: £750. Also AT230 HF 9-Band ATU. Excellent condx, boxed: £150. Ring (Cheshire) 0606 554178 any time..

**KR 500** Ele Rotator and controller: £100. N-type 2 way power splitter: £25. CMOS Memory Keyer: £50. FL3 Filter: £85. (Epsom) 0372 742476.

**KW2000E** TCVR with PSU, also Mobile PSU and spare valves, manuals, No Mic: £160. Buyer collect. (Manchester) 061 794 8804.

**LATTICE TOWER** Sections 13 inch Triangular by 13 feet. Three available, buyer must collect: £60. High Voltage Capacitors, oil filled, suitable for QRO power supplies, 10mfd 10Kv working. Quite Large!!!!, several available: £15 each. G3XBN, QTHR. (Brighton) 0903 834904 day time, 0273 557766 evenings.

**LINN AXIS** Turntable with Basik tonearm. Free Mc cartridge, vgc: £250. Also Sony Walkman-Pro WM-D6C Portable Cassette Recorder, vgc: £150. (Rugeley) 0889 583692.

**MFJ949C** De-Luxe Versa Tuner, twin needle meter, 300 watt Dummy Load: £85. Trio JR310 1.8-30Mhz Receiver as new: £125. G3FCV, QTHR. (Gillingham, Kent) 0634 854682.

**MICROVITEC** Cub RGB Monitor, gwo: £55 each. Prefer Buyer collects. 40 ft Lattice Tower: £150 or if Buyer dismantles: £120. G8BCA, QTHR. (Mildenhall) 0638 714051.

**MINIMITTER** 80-10Mtr Valve Converter (believe 4-6 IF). R1155 Hand Book. Class D Wavemeter Handbook. ARRL Handbooks 1957, 1986, 1987. ARRL Antenna Books 14 & 15th Editions. Will accept any reasonable offer plus Postage. G0KTN, QTHR. (Melksham) 0225 703726.

**NATIONAL** Panasonic Tcvr, solid state 100W, 9 bands, memories, comp 3 speed tuning: £350 or Exchange Argonaut 515/509. G3XKF. (Bucks) 0296 614128.

**NAVAL** Receivers. Marconi B28: £70. Rare VLF Marconi B29: £100. Both GWO. VLF Receiver B47 less PS module: £80. Coverage of both VLF 15-500KHz. US Navy Oscilloscope AN/USM-38: £30. Army R107 Receiver: £35. Collins valved civil Aircraft Rx, Tx available. (Burton on Trent) 0283 44677.

**NAVICO** 1000 2m FM, Heatherlite Mic, 5/8 whip, guttermount: £125. Yaesu FT230R 2m H/held, case, charger: £90. SX200 Scanner AM/FM 26-88Mhz, 108-180Mhz, 380-514Mhz, charger: £75. Yaesu FT290R, case, charger: £230. Sharp Car Stereo radio cassette, speakers: £40. Fuji SLR STX-1N Camera, extra 28mm Lens, case: £70. All ono. (Lichfield) 0543 263919.

**NAVICO AMR1000** 2m Mobile: £135. Traps 7Mhz 1Kw (unused): £25. Tiny 2 W/PMS: £95. TH21E 2m H/held, VOX headset, Car DC converter: £100. G3VWH, QTHR. (Shrewsbury) 0743 365061.

**PK232** Multimode Data controller as new, exc condx, with leads and manual plus Pkfax software: £250 ono. Phone Steve after 7pm. (Altrincham, Cheshire) 061 980 5506.

**POLYSKOP** Rhode & Schwarz complete with operating table, detailed handbook, fittings, adapters, diode probes. Buyer must inspect before collecting: £250. Phone any time. G3DVV, QTHR. (Chipping Norton) 0608 644371.

**PYE MOBILE** Radio Equipment. Comprising one Reporter MF6AM, one M293, two Westminster W30AM and one F30 Basestation. All Low Band AM. Good condition, offers. Also Eddystone 840C vgc: £75. (West Glamorgan) Tel 0267 233481 x1422 day or 0646 692688 evening.

**QTH FOUR** Bedroom Detached, double Garage, approx Quarter Acre, 30ft Tower 10/15m Quad. Room for 200ft wire.(300+ countries confirmed). Offers around: £175,000. G3PLP, QTHR. (Solihull) 021 706 0759.

**RACAL** 9082 Signal Generator good order 1.5-520Mhz AM/FM synthesised: £450. Schlumberger Variable Attenuator 1 to 40db in 1db Steps: £28. G4AJE 6-8pm. (March, Cambs) 0354 741168.

**REALISTIC** 10m Mono Band Mobile Tcvr. USA import. Not CB converted. 5-25W, ex condx: £165 ono. (Bracknell) 0344 486625..

**ROBOT 400** B/W SSTV 8/16 sec send and receive, with Monitor and manual, g/c: £150 ono. Robot 800 keyboard for SSTV, text, RTTY and CW send and receive with Monitor and manual, g/c: £150 ono. (Chorley) 0257 273976.

**RTTY/CW** Set-uP Comprising TX-3, TIF1, BBC-B, 8271 DFS, D/drive. All boxed: £195. Mint boxed BBC-B: 100. Games Joystick: £15. Keith, G0OZK. (Stockport) 061 477 5303.

**NYO** Systems Computer MBC25+ 286, 43Mb hard Drive, 1.44Mb Floppy, Maths Co-Pro, software, handbooks etc, as new. First reasonable offer. Telewave Model 44A In-Line Wattmeter 20Mhz to 1Ghz. Five ranges 5/500 watts, 'N' type connectors: £60. Prefer purchaser inspect/collect. (Bransgore) 0425 479226.

**SB200 LINEAR**: £350 ono. Digi View Gold Digitiser for Amiga computer: £50. Navtex Active Rx Antenna: £25. (G0BVS. (Bedworth) 0203 490483.

**SEXTET MODEM** V21, V22, V22BIS, V23, V32, V32BIS, V42, V42BIS, MNP4/5, Hayes/AT, Autoanswer and Autodial, BT approved: £80 ono. Will Swap 2m or 70cm FM Tx/Rx. H/held Scanner 10chan, Xtalled R0 and R7: £20 ono. Mike, G4KFK. (Slough) 0753 540 520.

**SHACK** Clearance. All items plus Postage. Timestep PC-SAT3 WXSAT/Rx System: £35. Maplin Wxsat Receiver, cased: £35. ERA Microreader: £75. Phillips 12inch Monitor: £45. DX-Edge Software: £10. Dipole/Delight MP3.5/7 Plus MP 7/28: £25 each. ST5C Terminal: £35. Spectrum 128K, Int/face 1, Microdrive: £40. Prism VTX500 Modem: £10. Tascopy for Spectrum: £10. Complete Spectrum Book: £5. Linguaphone Spanish course: £30. 1991 International Call Book: £5. G0KTN, QTHR. (Melksham) 0225 703726.

**SHACK** CLEAROUT. Racal RA17L: £150. Monochrome CCTV Camera: £30. Bird 43 (meter u./s): £25. AEL HF (2-22MHz) SSB Tcvr 100W on 80m: £85. Jaybeam Rotary Dipole for 10, 15, & 20m: £50. Met 5 ele 6m Beam: £40. Open to offers. Wanted 70/23cm Equipment. Phone Ian, 6-10pm or weekends only. (Gravesend) 0474 814809.

**SILENT KEY** (G1LYA). Yaesu FT480R 2mtr M/mode, exc condn: £240. Sony ICF2001D Rcvr: £180. Also Sony AN-1 active Antenna: £30. Or both items: £200. Virtually New HF Linear 3-32Mhz B/band, 4-7W input 100W out, M/mode: £45. Contact Gordon, G4PIF, QTHR. (Sunderland) 091 528 4955.

**SILENT KEY** Sale G4MKO. FT720 2 metre FM Mobile: £125. FT767GX +6 metres +2 metres: £1200. FC901 ATU: £125. Tono RTTY Terminal 0-9000E: £150. Daiwa DC7011 Rotator: £50. Stolle Rotator: £20. FT203R FM H/held: £100. Datong Morse Tutor: £40. G4UXC, QTHR. (Evesham) 0386 831508.

**SILENT KEY** Sale G4ZKL. Complete HF Station FT707, FC700, FP707, FV707DM: £530. FT208R: £110. FT230R: £180. HAM-1 Rx: £55. 7Amp Power supply: £55. YM24A mike: £20. (Camberley) 0252 549898.

**SILENT KEY** Sale, G0GNB. Capco Magnetic Loop 10, 15, 20m: £150. BNOS 2mtr Linear 100w: £150. J-Beam 2mtr 4ele Quad: £25. Alinco ELH260D Linear 2mtr 60W: £45. Daiwa DP610 Digital SWR/PWR Meter: £90. 2mtr 9el Portable Yagi: £25. All mint. G0OIG, QTHR. (Maidenhead) 0628 25435.

**SILENT** KEY Sale. 30ft Altron Tower, 3 element TET Tribander, Kenpro KR400RC Rotator. Buyer dismantles, collects: £200 complete. G4OAA, QTHR. (Hoddesdon, Herts) 0992 464795.

**SRW KILLOWATT** HF Linear Amp, 6 months old, under warranty, absolutely as new condx bargain at: £300. No Offers. (Guisborough) 0287 652822.

**SURPLUS** to Requirements. Power Splitters 70cm Professional Quality, machined from solid aluminium. Completely sealed with solid dielectric and "N" type sockets. Two Port, ideal for circular polarisation of crossed Yagis: £37. Four Port: £46. G0BGN, QTHR. (Bakewell) 0629 813369.

**TEN-TEC** Paragon with all CW filters, FM, Voice module, matching PSU, also 2kw ATU. Boxed, manual. Immac: £1275. Dave, G3RCQ. (Romford) 0708 374 043.

**TENNAMAST** 35' Tilt Over fully galvanised: £275. G6000RC Rotator complete: £75. Both vgc. G0PDM, Not QTHR. (Southend-on-Sea) 0702 299348.

**TENTEC PARAGON** Tcvr, excellent condition with filters 6kHz, 2.4kHz, 1.8kHz, 500Hz and 250Hz. Superb performance. Requires VCO adjustment: £595. G5BM, QTHR. (Newent, Glos) 0531 820960.

**TOKYO** HI Power HL180V 2m Linear, 6 months old: £225. AMT3 AMTOR/RTTY Terminal, IBM-PC software: £90. (Bideford, Devon) 0237 451065.

**TOKYO** HyPower 70cms 100w PA, preamp/metered: £215. BNOS 13.8v/25A Metered PSU: £130. Panasonic A1 Video Camera/psu (mint): £55. Paradise PC VGA Card: £25. Tonna 23cms 2way aerial Splitter: £20. Welz CH20A Coax Switch (2way): £20. (new) Sony SLV353VB VCR: £185. (new) Black Star Video Patern generator, multi output: £145. Must sell everything. Tel: Paul, G4XHF, QTHR. evenings. (Crawley) 0293 515201.

**TONO** 9000E Communications terminal RTTY, ASCII, CW, Word Processor, including VDU: £300. G0NXX, QTHR. (Scarborough) 0723 584405.

**TRIO** 830S Transceiver: £575. Yaesu Linear FL2100B: £375. Microreader Mk1 wit Tutor: £78. IC24D VHF FM Transceiver: £88. Heathkit HW202 2m Tcvr and Heathkit HW202-1 Power supply: £80. (Isle of Man) 0624 621720.

**TRIO** 830S, Yaesu FT227, two headphones, two Power Supplies, Trio filter ET1, Howes 7 mtr mic 353, Ant's. RadComs. Close down of shack 84 yrs. Many odds. No offers. (Birmingham) 021 357 2009.

**TRIO** R2000 Receiver with VHF Convertor and CW filter: £250. AKD6001 6Mtr FM Tcvr: £100. Cushcraft R7 Multiband Vertical as new: £275. Cushcraft D3 10, 15, 20 Mtr Dipole: £100. Yaesu FRG965 VHF/UHF Rx 60-900Mhz no manual hence: £200. Tokyo 50Mhz Linear 10w in, 50-60w out: £70. (Ashton-u-Lyne) 061 308 2277.

**TRIO** SM220 Station Monitor with Band Scope, mint with handbook, boxed: £375. Icom IC251E Multimode, Mutek front end, mains and 12v leads, handbook and circuit. Buyer Collects: £375. sa**DRDOS6** original 5.25 inch Disks plus 3.5 inch if required, handbooks, unregistered: £35. GW3ECH. (Brecon) 0874 84266.

**TRIO** TS120V inc Spkr: £220. TL120: £180. PS30: £80. All as new in original packing. Also Mike and LPF, Offers? (Northwich) 0606 888680.

**TRIO** TS711E 2m M/mode 25W Base station, AC/DC with DCS, 40 memories, voice synthesizer, Mike, box and manual. Excellent Condition: £525. MC60A Desk Mike built in preamp: £40. G1VMT. (Broadstairs) 0843 863445.

**TRIO** TS830S, mint with deluxe tuning knob: £450. Akai GX-265D Auto reverse Reel to Reel Stereo tape deck: £80. G0KDX. (Standish) 0257 422547.

**TS120V** HF Tcvr, TL120 Linear, DFC230 Controller. All good condx, offers. Steve, G0EVJ. Phone weekends, cash preferred. Inspect and collect. (Lichfield) 0543 251915.

**TS520SE**, boxed, manual, recently re-valved and serviced by professional: £300. Also MC50 Desk Mic, as new: £30. G0RUL, QTHR. (Malvern) 0684 572364.

**TS950S** mint, mike, manual, carton. Standby Tcvr, little used, lid never lifted, save £800, reluctant Sale: £1700. Johnson 1Kw Low-pass Filter: £20. B&W 6-way Coaxial Switch: £30. BC221AJ modulated charts, P/pack: £25. Claude-Lyons Variac: £40. Letters Only:- 71 Lichfield Avenue, Evesham, WR11 5EB.

**UNIDEN** 2830 Multimode 20w 10 metre Mobile, boxed as new, with Heatherlite mobile Mic: £150. Yoko F1 5inch B7W DXTV, boxed, as new: £40. Carriage extra. G4KEL. (Taunton) 0823 332919.

**WORKING LUCAS** freelite Wind charger with control panel and 15ft wooden post. 12 volt. Prop needs slight attention. Complete with original manual and propeller drawing: £150. Buyer collects. 25ft Square section Steel Mast plus sliding fit 20ft round section pole. A gift at £20. G3CRH. (Lichfield) 0543 686364.

**YAESU** FLDX400+FRDX400 Tx+RX pair, gwo, orig boxes, manuals: £220. Extra Rx: £110. All Three: less 10%. Comprehensive BBC-B Computer set-up, over £500 worth, circa: £350

or may consider QRP swap (Argosy II, FT77S +CW) or 2m Rig TR9130. Please collect! G0OZK. (Stockport) 061 477 5303.

**YAESU** FRG8800: £350. VGC boxed, AR2200 Rotator: £75. Pye Westminster 4m FM + PSU + £ ele Beam: £50. Heathkit DS2 CRO: £10. (Romsey, Hants) 0794 516007.

**YAESU** FT101ZD Mk III, WARC, CW Filter, FM, fan, Mike, gwo: £425. Trio 9R59DS valved SW Rx gwo: £30. Alan, G0KMC, evenings. (Aylesbury) 0296 658037.

**YAESU** FT107M 160-10m inc WARC, solid state HF Tcvr, memory unit, power supply, speech Processor, Mic, CW filter, vgc: £400. FT290R 2m M/mode, Mic, case, Nicads, charger, vgc: £200. FT690R 6m M/mode, mic, DC lead, vgc: £200. (Sheffield) 0246 414995.

**YAESU FT200** immaculate, boxed, handbook, Mike, all crystals: £185 plus carriage, might p/ex wanted: recent ARRL Handbook, Pre-1985 Equipment Brochures. (Castle Cary) 0963 24319.

**YAESU** FT290-2 with FL2025 Linear, battery case, charger: £380. FRG7700 Receiver SWL, ATU: £220. Yupiteru MVT7000 Scanner 0.1-1300Mhz no gaps as New: £250. Yaesu FT411E 2m Handie, nicad and charger: £160. As new, Buyer collects. Cash ONLY. Ask for Graeme. (Kidderminster) 0562 822806.

**YAESU** FT290R2 with Nicads, charger: £300. Trio R600 Rx 0.5-30Mhz: £200. Both mint, boxed. Icom IC240 145Mhz Mobile: £100. Transcom CB with Sprectrum conversion 25w linear LPF: £40. G0OIW, QTHR. (Reading) 0734 483593.

**YAESU** FT480R 2m M/mode Mobile Tcvr 10w+ output, twin VFO, good condition: £290 ono. Sota Linear 2m PA SCL 144/100: £90. 2m 5/8wave Mobile whip, PI259 base: £10 as new. G7OLM. (Paignton) 0803 521699.

**YAESU** FT980 fitted with all options plus additional 2.1Khz SSB filter, workshop manual, microphone. Best offer over: £650. G3FYS.****

# WANTED

**ANY HEATHKIT** Amateur Radio equipment, in particular SB300 and SB400 and Accessories. Will consider Eqpt of any condition and am intersted in any stock holdings of spares. Good price paid, will collect or pay postage for delivery. Please contact in the evening or at Weekends during the day. (Sheffield) 0742 455216.

**VIBROPLEX** Lightning Bug. Vibroplex Champion Bug. CW Enthusiast seeks well loved example of each. Please dont let your Bug die in a Collectors cabinet. Let it live on in the hands of a caring user. All replies answered. John, G3JVC, QTHR. Or please phone after 6pm. (Surbiton) 081 398 0939.

**AP1086 issue 1** (RAF Radio Stores Ref No's) Also Air Publications relating to Radio, Radar equipment. Exc price offered. Would purchase Post-War to current Magnetrons, Klystrons, T/R cells, Photo-Multipliers, Microwave and special CV types. Required Static or Rotary Inverter, AC or Dc I/P with O/P of 80/115v 1500/2000 Hertz. Also Rx Type R1355 10D/13032 unmodified. Please phone any time. (London) 071 511 4786 or 071 790 2846.

**AUTOPLEX** All brass Bug Key made by David Marshall in Glasgow, c.1932. Any condition, complete or incomplete. G3TSS, QTHR. (Corbridge) 0434 633125.

**CIRCUIT** Marconi Instruments 40khz-50Mhz Oscillator TF1246. Also service data and circuits for Sony TC-K7 II Cassette recorder, all expenses reimbursed as agreed. G0NBQ, QTHR. (Cheadle Hulme) 061 485 2054.

**KENWOOD** TS930S, TS940S, TS850S must be as new, not over five years old. Can collect within 75 miles. Philip, G0JTM. (Huddersfield) 0484 843388.

**KENWOOD VFO120** and DFC230 must be VGC. Please write Peter, G4ADJ, 3 Yew Tree Close, Worcester, WR5 2LH or phone before June 10th. (Worcester) 0905 356583.

**VERSATOWER** 45-60 ft Wall Mount. Also 50 Ohm Coax approx 100ft low loss. 200/400W VHF Amplifier. 400w or over SWR/Power Meter. 14-17 ele 2m Antenna or complete 2m Bank for EME work. Best price please. (Slough) Phone eves 0628 605210 or days 0753 518082.

**WANTED** TWO 455Khz IF Transformers capable of 250 volts working (Electroniques or similar type and size). G3JKZ, QTHR. (Witney) *****NO PHONE NUMBER.******.

**10 WAY JONES** connector for (CDN)58 Set. Handbooks for Admiralty Wavemeter G79/W3355A A. AM Wavemeter W1117. Phillips Oscilloscope PM3230. No. 10 Crystal Calibrator. (Glasgow) 041 556 6985.

**ANY** PREWAR Wireless Books and Rcvrs, Crystal Sets, Gramophones. Also early Telephones. Wanted for my collection. G3OYI, QTHR. ( Huddersfield) 0484 662824.

**ATU** 1.8 to 30Mhz MFJ948 or Similar. Brian, G0KJG, QTHR. West Midlands. Will collect 50 miles radius. (Rowley Regis) 021 559 5882.

**ATU No5** for WSC12 Hallicrafters S27 Receiver, R210 Receiver. Technical Info required as follows:- Substantial deposit paid to loan for photocopying or purchase WS19 EMERS SCR609/610 Tech Manual, Phillips L6X38T Circuit. Needs WS19 6/12 pin sockets, etc. Please phone Jim. (Kidderminster) 0562 823674.

**BEARCAT** UBC175XL circuit diagram or even copy of Service manual. Uniden PCB PH-021AC, will copy or pay reasonable costs whatever. G4EMM, NOT QTHR. Phone (Romsey, Hants) 0794 516007.

**BOOKS** CP/M Assembly Language Programming - Ken Barbier. CP/M Techniques - Ken Barbier. Publisher Prentice Hall. G3WPM, QTHR. (Solihull) 021 745 2915.

**CRT BRIMAR SE5/2A31** or Equivalent for Solartron CD1400 Scope. Will pay up to: £20 plus shipping for tube in good condition. Will pay more for NEW CRT. Grateful also for info on where new Tube obtainable. G3NID, QTHR. (Huntingdon) 0480 468693 evenings.

**DC-DC CONVERTER** for Trio TS830S. EI2EZ, QTHR. (Bray, Wicklow) 01 2863409.

**DENCO COILS** All Types, ranges, transistors, valves, dual, etc. Used, unused. Yaesu Active Aerial FRA7700. (Leigh) 0942 604674.

**DESIGN** DATA for Mullard Ferroxcube Vinkor Pot Core type LA2705 Permeability or Inductance factor. E Jackson, Thule, Gidleigh, Chagford, Newton Abbot, Devon TQ13 8HT.

**DIGITAL** Display DG1 Complete for Kenwood TS820. GD0PLR, QTHR. (Douglas, IOM) 0624 624102.

**EXT VFO** to suit FT102. Also FL2100Z. Sensible Price Paid. GI3HNM. ( Belfast) 0232 483460.

**FILTER CW** for FRDX400 Rx, type MF455-03AZ or Equiv. John, G3UFW, QTHR. (Romsey) 0794 22592.

**HANDBOOK** and/or Circuit Diagram for Sommerkamp TS788DX. Your price. GI4RYP. (Armagh) 0861 524267.

**HF LINEAR** wanted, Heath SB220 or TL922 type. Also Welz AC38M ATU and TS440. G3TCO, QTHR. (Bristol) 0272 681068 after 6pm.

**IC740 FM** board. (Belfast) 0232 483460.

**ICOM IC202**, IC215, IC402, IC415. Also Vibroflex Bug Key in good condition. Also Mutek TVVF50a 10m> 6m Transverter. G4UDT. (Wembley) 081 902 5995.

**ICOM** M700UK Marine Tx/Rx. Plus AT120 ATU in perfect working order. Phone Paul. (Isle of Wight) 0983 78756.

**INFORMATION** for Nolton Nova 24Z 10 chan Mobile, Circuit Diagram, Service or Alignment Information. Costs re-funded. Please NO information from G.W.M as I have this already. G1EYL, QTHR. or Phone (Dronfield) 0246 415667 after 5pm.

**INSTRUCTION** Manual/Photocopy for AVO Douglas Coil Winding machine (Wave winding motor driven version). G3JSP, QTHR. (Nottingham) 0602 604563.

**KW2000E** , KW77, WS18, WS62, Eddystone 888A, Eddystone EA12. Anthony, GW4RYK. (Montgomery) 0686 632255.

**OLD CALL** Books Wanted for vintage collection. G4TZB, QTHR. (Manchester).

**PSU** For FT200 TCVR. (PT200? )Bill, G3PGI, QTHR. (Plaistow, London) 081 470 1795.

**RACAL** 17L mint, also Racal 1217 VGC, also REME Unit for aligning Racals includes Scope and Wobbulator. Best Offers. All with Manuals. (Oxford) 0865 872300.

**RAF** R1273 HF DF Rx, TGRI 5070/5333. Historical, operational and technical Information required to assist with restoration project. RAF PU298, TR9, TR11, R1082, T1083 and ccts/ info for Eureka IIIC and PU298 also sought. WHY? Martin, G4NCE, QTHR. (Birmingham) 021 357 6139.

**REDIFON** RT106 Safari RF Modules for Band 'C'. Also 250pF single and twin Capacitors for 150W ATU. South Croydon) 081 688 2564.

**SOLID STATE** Inverter 24/28DC in, 115v 400Hz 300VA out. G8LIU, QTHR. (Uxbridge) 0895 230006.

**TEN-TEC** Century 22 in GWO. Yaesu FT70, any version. Marine VHF H/held. G3RHP, QTHR. (Ipswich) 0473 890007.

**TRIBANDER** 3 Element wanted. Must be in good condition. (Nr Christchurch) 0425 72927.

**TS530S** Service Manual, buy/borrow (Bias/ALC info urgent), M50 Desk Mic, YK88C filter. FT227R Mobile brackets + Desk support. Advance TC12/TC12A manual, IC info, mains plug, spares. 2mtr Co-linear, modestly priced but reliable, matchable, waterproof! (Pref local - non driver) Keith, G0OZK. (Stockport) 061 477 5303.

**VALVE HOLDERS** Hammarlund Ceramic Octal and Moulded UX6 1.5inch Fixing. Bernard Litherland, G4IMT, QTHR. Tel anytime. (Chippenham) 0225 891254.

**VFO** for FT75 HF Transceiver. Brian, G3VVG, QTHR. (Plymouth) 0822 852867.

**WANTED** Murphy Rover (might be called 820) Dash Mount high or low Band. Working or not. GM8KCS. (Edinburgh) 031 445 5182.

# EXCHANGE

**70CMS 17** elm Yagi Antenna, exchange for 2 metre Yagi Beam antenna. Call G0CTE. (Croydon) 081 688 4563.

**ALINCO** DJ580 2m/70cm FM Tcvr + airband receive, mint cond, rarely used. Exchange for Compact Camcorder, cash adjust, if necessary. G4IFK. (Stourbridge) 0562 883804.

**KENWOOD TH25E** with box, packing, charger, VOX headset, YLS very little use. Exchange for 70cm Mobile or H/held good cond. G0GKY. (Redcar) 0642 476127.

**RACAL** PRM4031 HF Transceiver USB/LSB/AM/CW, 1.6-30Mhz with circuit diagrams for good 2m M/mode. (Chippenham) 0249 659328.

**STANDARD** C528 Dual Band H/held with all mods, excellent condition for good 2m Mobile in same condition. G0OPD, QTHR. (Fareham) 0329 844032.


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**SECOND USER EQUIPMENT.** This month apart from PC systems for sale starting at £125, I am after your broken PCW, PC or monitor so if you want to dispose of them give me a call and I'll make you an offer.
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# CLUB NEWS

DEADLINE - Items for inclusion in the August 1993 issue must be sent to HQ marked "Club News - DIARY", to be received by 18 June latest. If news is received by the published deadline, it should appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given.

### AVON

RSGB CITY OF BRISTOL GROUP - 21, Bristol DXpedition Alderney; 27, Longleat Rally. Details 0272 672124.

SOUTH BRISTOL ARC - 2, Astronomical Evening; 9, 80m activity evening; Bulls Eye at North Bristol AR Club; 16, talk 'At the Speed of Light'; 23, Preparation for Longleat rally; 27, Longleat Rally: 30, Home Brew-1st evening-Terry's Trophy. Details 0275 832222 Wednesday eve only.

### BEDFORDSHIRE

DUNSTABLE DOWNS RC - 4, Informal meeting; 11, Junk sale. Details 0525 211249.

SHEFFORD & DARS - 3, Pedestrian DF hunt; 17, NFD planning; July 8, BBQ. Details 0462 700618.

### BERKSHIRE

BURNHAM BEECHES RC - 7, Quiz; 21, talk 'Safety Testing', G4XDU; July 5, Getting ready for McMicheal'93 Rally. Details 0628 25720.

MAIDENHEAD & DARC - 15, talk 'Sparks in the Ether(1925 and all that)' by G3TWG; July 1, Fox Hunt. Details 0628 25952.

NEWBURY & DARS - 20, Annual Radio Boot Sale; 23, Talk 'Paknet' by G Kearns. Details 0635 863310.

READING & DARC - 10, VHF NFD Planning. Details 0734 476873.

### BUCKINGHAMSHIRE

CHESHAM & DARS - 2, HF NFD planning; 9, Wet String QRO Contest; 16, Resus course with St John Ambulance; 23, Tech Topic 10GHz Operation with G8KQW; 30, VHF NFD Final planning; JULY 7, NFD Review and discussion. Details 0494 676391.

### CAMBRIDGESHIRE

CAMBRIDGE & DARC - 4, Visit to the Medical Physics Dept at Addenbrookes Hospital; 11, talk 'VHF Propagation' by John, G4BAO; 18, Morse training; 25, DF event. Details 0763 243570.

### CHESHIRE

CHESTER & DARS - 1, Radio ideas & discussion; 8, talk 'Valves and things!' by Phil, G3SES; 15, talk 'Japanese Morse' by Norman, G3CSG; 22, talk 'Microwaves' by Mike, G3PFR; 29, Operations night, Club field. Bring your own gear! Details 0244 336639.

MID-CHESHIRE ARS - 2, Junk Sale; 16, Questions and Answers; 23, Video night; 30, Contest Planning. Details 0606 331210.

STOCKPORT RS - 9, talk 'DXpeditions' by HS0/G3NOM. Details 061 439 4952.

### CLWYD

CONWAY VALLEY ARC - 3, AGM; July 1, Construction Display Evening. Details 0492 530725.

WREXHAM ARS - 1, Junk Sale; 15, Field Evening; July 6, Quiz. Details 0978 845858.

### DERBYSHIRE

BOLSOVER ARS - 9, 3rd DF hunt; 23, 4th DF hunt. Detail 0246 822856.

BUXTON RA - 8, Quiz night; 22, Talk by Castle Electronics. Details 0298 25506.

DERBY & DARS - 2, Junk Sale; 9, Illus talk 'The Carsington Reservoir Project' by John Jepson of Severn-Trent; 16, Talk by Castle Electronics; 23, Radio in the St John Ambulance service by Alan Jones; 30, Video; July 7, Junk Sale. ***NEW SECRETARY*** Mrs Haley Winfield, (2E1AJI) 2, Hilts Cottages, Crich, Matlock, Derbyshire, DE4 5DD. Tel: 0773 856904.

### DEVON

APPLEDORE & DARC - 21, Talk/video/Demonstration on Satellite TV by Graham, G1ZTJ. Details 0237 477301.

EXETER ARS - 14, Talk by Richard, G2DYM. Details 0392 214204.

EXMOUTH ARC - Change of Meeting Place. Club now meets at the YMCA in Victoria Street, Exmouth at 7.30pm on alternate Wednesdays. 9, Talk by Crime prevention Officer; 23, Treasure hunt. Details 0395 279574.

SOUTH DEVON RC - 2, Contest Talk; 13, 50Mhz Trophy; 19, 432 FM; 23, Project night; 30, NFD Planning meeting. Address for details and direct QSL cards: SDRC, PO Box 4, Brixham, Devon TQ5 8QH. Details 0803 522995.

PLYMOUTH RC - 1, Discussion Night; 15, Table Top Sale; 29, Club visit (to be confirmed). Details D C Perryman, G7NMA, 50 Bellingham Crescent, Plympton, Devon PL7 3QP.

TORBAY ARS - 18, talk 5B4 Christmas by Andy, G4UPM. Details G4VTO, QTHR.

### DORSET

DORSET POLICE ARS - 3, Visit to Bournemouth International Airport Tower & Radar; July 1, Visit by Hampshire Police Amateur Radio Society. Details 0202 229351.

### EAST SUSSEX

SOUTHDOWN ARS - 7, talk 'Antennas - Slim Jim to HF Beams'; July 5, BBQ. Details 0323 412699.

### ESSEX

BRAINTREE & DARS - *** NEW SECRETARY *** Mr J F Button, G1WQQ c/o G4JXG (QTHR), 88 Coldnailhurst Avenue, Braintree, Essex CM7 5PY. Details 0376 327431.

CLACTON RC - *** NEW SECRETARY *** Mr M Jackson, G0SMJ, 44 Dulwich Road, Holland on Sea, Essex CO15 5NA. Details 0255 815207.

VANGE ARS - 3, Junk Sale; 10, Talk 'First Aid' by Tony, G0BTS; 17, Talk 'QRP' by G3IOI, G4VZF and G4XTS; 24, Discussion evening. Details 0268 552606.

### FIFE

DUNFERMLINE RS - 3, VHF Operating Evening and DX Hunt preperation; 10, HF Evening with Class B Supervised Operating; 17, VHF DX Hunt evening; 24, HF Operating Evening and Work Party; July 1, Talk 'Early days in Radio' by Tom Hughes. Details 031 331 4340.

### GRAMPIAN

MORAY FIRTH ARS - Club meets every Thursday at 7.30pm. Details 0343 86395.

### GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 15, Pre Low Power Field Day. Details 081 749 9972.

COULSDON ATS - 14, Talk 'Secret Listeners' by Brian, G8DIU. Details 081 684 0610.

CRAY VALLEY RS - 3, Talk 'Receivers (part II)' by G6WRP; 17, Annual DF Hunt; July 1, The 'Camel' Trophy 1992 and 93. Details 081 850 1386.

CRYSTAL PALACE & DRC - *** NEW SECRETARY *** Mr W E Taylor, G3DSC, 39 Woolstone Road, London SE23 2TR. Details 081 699 5732.

EDGWARE & DARS - 10, Talk 'Experiences in Sri Lanka' by Doug, G0LUH; 24, Morse Training evening. Details 081 204 1868.

KINGSTON & DARS - 17, Talk 'Radio with Computers' by Jim, G4XLM and Peter, G3XTC. Details 081 398 1128.

SURREY RCC - 7, Talk 'History of the Original London Aerodrome - Croydon'; July 5, Talk 'Amateur Remote Imaging' by John Tellick. Details 081 660 7517.

SUTTON & CHEAM RS - 17, Talk 'Computers in Amateur Radio' by Jim, G4XLM & Peter, G3XTC; July 8, Informal. Details 081 644 9945.

THAMES VALLEY ARTS - 1, Talk 'Radio Controlled Aerial Photography' by John Crampton. Details 0483 284279.

WIMBLEDON & DARS - 11, Talk 'Dip Oscillators and their Use' by George, G3DWW; 25, Talk 'Intruder Watch' by John Cleeve, G3JVC. Details 081 397 0427.

### GREATER MANCHESTER

ECCLES & DARS - 1, Discussion '432Mhz Low Power Contest'; July 6, Lecture 'Retinitis Pigmentosa' by G8PMX. Details 061 773 7899.

### HAMPSHIRE

BASINGSTOKE ARC - 7, Construction Competition & VHF NFD Planning; 27, 2m DF Competition - OS185 - Fox: Dave, G4WIZ; July 5, Perfomance Racing Cars with vehicle. Details 0256 25517.

HORNDEAN & DARC - 3, A talk on Astronomy by Mr A Dowdell. Details 0705 472846.

ITCHEN VALLEY ARC - 11, Visit & Talk from RSGB President, Peter Chadwick, G3RZP: Other Clubs welcome; 25, Hampshire Ambulance Services: Open to visitors. *** NEW SECRETARY *** Les Kennard, G3ABA, QTHR. Details 0703 732997.

SOUTHAMPTON ARC - Club now reactivated. Meets 1st Monday of the month at Millbrook Community School, Green Lane, Maybush, Southampton. Also on the 3rd Monday at the home of a member. Details G1UWL, QTHR or SARC, PO Box 249, Southampton SO9 7SU.

SUBMARINE ARC - Meets on Thursday evenings at HMS Dolphin, Gosport, Hants. Details 0329 283646.

WINCHESTER ARC - 18, Talk 'Ham Radio, an old man dying on his feet?' by Steve, G4JGS. Details 0962 860807.

### HEREFORD AND WORCESTER

BROMSGROVE ARS - 8, Aerial Construction; 22, Night on the Air(HF). Details 0527 546075.

### HERTFORDSHIRE

CHESHUNT & DARC - 9, DF Hunt, Baas Hill Common, Broxbourne; 23, DXing in SriLanka by Doug Goodison, G0LUH; July 7, Junk Sale. Details 0992 464795.

DACORUM AR&TS - 15, Talk 'Radar Counter measures in WW2' by John, G3WFM. Details 0442 259620.

HODDESDON RC - 24, Operating from Tolmers Scout Camp. Details 081 804 5643.

STEVENAGE & DARS - ** NEW CLUB VENUE ** Stevenage Day Centre, Chells Way, Stevenage. 1, Morse for Novice and "B"s (and "A"s); 8, Plans for Museum Exhibition and 10Km run; 15, Pac-Com Demo and Talk by Tony, G0OVO; 19, Exhibition of AR at Stevenage Museum; 20, Letchworth 10km Fun Run - Marshalling the route; 22, Practical HF/VHF on air; 29, Talk 'Antenna Design and Construction' by G0RAM. Details 0438 350882.

WELWYN-HATFIELD ARC - 7, Talk 'OHMS' by John, G7JKN; 21, Preparation for VHF NFD; July 5, Foxhunt. Details 0920 462241.

VERULAM ARC - 22, Talk 'Frequency Synthesisers - how they work & limitations' by Dave, G0SNO. Details 0923 262180.

### HUMBERSIDE

GOOLE R & ES - 11, Logfill Session; 18, VHF NFD Planning; 25, Conload. Details 0405 769130.

GRIMSBY ARS - 5/6, NFD Ciba Geigy site. Details Grimsby 825899.

### KENT

DARENTH VALLEY RS - 9, Construction Contest. Details 0474 703322.

EAST KENT RS - 17, Annual Car Treasure Hunt. Details 0227 364606.

HILDERSTONE RS - Starting late September, Canterbury area, RAE course run by G3JIX for Examination in 1994. Details 0843 869812.

SEVENOAKS & DARS - 21, talk 'Kit Cars' by Alistair Dunlop, G7IET. Details Sevenoaks & DARS, Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.

SOUTH EAST KENT (YMCA) ARC - *** NEW SECRETARY *** Michael Bowers, G7NOR, 3 Prioress Walk, Dover, Kent CT16 2DS. Details tel: 0304 825030, eve or weekends only.

WEST KENT ARS - 4, Informal meeting; 18, talk on Aerials. Details G3OHV, QTHR.

### LANCASHIRE

BURY RS - Club still meets at Mosses Community Centre, Cecil Street, Tuesday evenings. Details 0204 883212.

HESKETH ARC - 8, Honey in the ether; 22, Microwaves; July 6, Battle of the Atlantic. Details 0704 63344.

THORNTON CLEVELEYS ARS - 7, Talk 'Stacking Antennas' by Dave, G8KBH; 14, Planning for VHF NFD; 21, Talk by Mick, G4EZM; 28, Final prep for VHF NFD. Details from G4BFH, QTHR.

ROCHDALE & DARS - 7, talk 'HF Airband' by G0PUD. Details 0706 32502 or 061 653 8316.

### LEICESTERSHIRE

CHARNWOOD ARCC - 6, Contest planning VHF; 20, VHF Contest. Details 0509 232927.

LEICESTER RS - 7, HF/VHF Activity night; 14, HF NFD Post mortem, Committee meeting; 21, HF/VHF night on air; 28, VHF NFD final arrangements. Details Leicester 762241.

LOUGHBOROUGH & DARC - 1, 160 Metre DF, 8pm start Hind Leys, College, Shepshed; 8, Wymeswold link-up with Slow Scan to Shepshed; 15, Open Forum; 22, Annual Reunion, please note new venue: The Bulls Head, Warren Hills Road, Coalville. Details Loughborough 218259.

### LINCOLNSHIRE

GRANTHAM RC - 1, Inter Club Quiz. Details 0476 65743.

LOUTH & DARS - meet on 3rd Tuesday in month at The Wellington, Louth. Details G1XWD, QTHR.

SPALDING & DARS - 6, Jubilee Mobile Rally at Springfields Gardens; 11, Talk 'Wire Aerials & Matching Units' by G4OO. Details 0775 750382.

### MERSEYSIDE

LIVERPOOL & DARS - 1, NFD Preparations part 2; 8, G3AHD on the Air; 15, Construction Techniques by G0IFK; 22, HMS Plymouth(G3SGQ); 29, Surplus Sale. Details 051 722 1178.

### NORFOLK

NORFOLK ARC - 2, Talk 'International Rescue Corps' by Peter Wooster; 9, NARC Rally briefing; 16, talk 'History of sound recording' by Tony, G3NHU; 23, Debate: Scanners - Has their misuse affected the Amateur image?; 30, QSLs, bring your most intersting QSL cards. Details 0603 618810.

### NORTHAMPTONSHIRE

NORTHAMPTON RC - 24, Mobile DF. Club meets every Thursday, 8pm at 2 Hervey Street, Northampton. Details 0604 401098.

### NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 3, Forum; 10, BBQ; 17, Foxhunt No 3 / activity; 24, Construction/activity. Details 0602 232604.

MANSFIELD ARS - *** Change of day for meetings **** In future, meeting will be held on the second Monday in the Month. 14, talk & demonstration on Packet Update by Denis, G0KIU. Details 0623 755288.

SOUTH NOTTS ARC - 11, Talk 'Construction of High Current Power Supplies'; 13, Club stand at Elvaston Castle rally; 18, Construction at Fairham College; 20, Second Fox Hunt; 25, On Air-HF & VHF.*** NEW SECRETARY *** Julie Brown, G0SOU. All correspondance to:- PO Box 4, Nottingham NG11 9DE. Details 0602 211069.

### NORTH YORKSHIRE

SCARBOROUGH ARS - 1st Monday, Surplus equipment sale. Details John, G0PII, QTHR 0751 73991.

### POWYS

POWYS ARC - 3, NFD Briefing; 10, Talk by Jeff Worrell from Coleg Powys Electronics Dept; 24, Talk on DFing by Glyn, GW0JAI; July 1, Fox Hunt. Details GW3JSW, QTHR.

### SHROPSHIRE

SALOP ARS - 3, 2nd Fox Hunt, starting at The Oak carpark at 7.30pm; 10, RAYNET recruiting; 17, Talk 'Crime Prevention' by Sgt Bob Lloyd. Details 0939 290609.

TELFORD & DARS - 9, Black flag night; 16, DFing Introduction; 23, VHF NFD Preparation; 30, Aerial erection competition at Cosford. Details 0952 588878.

### SOMERSET

WEST SOMERSET ARC - 1, Fox Hunt; July 6, visiting speaker(to be announced). Details G4AJU, QTHR.

YEOVIL ARC - 3, Necessary Licence Tests at your Station, G3MYM; 10, BBQ on Ham Hill - QRP Contest portable; 17, Visit to BBC Transmiter at Rampisham. Details 0258 73845.

### SOUTH GLAMORGAN

CARDIFF RSGB G - 14, Static Electricity Friend or Foe, GW4HWR; July 10, Demo of AR3000B Scanning Receiver, GW3RWX. Details 0446 773212.

### SOUTH YORKSHIRE

MALTBY & DARS - 18, talk 'Switch Mode Power supplies' by George, G6RIL. ** NEW ** Club now meet on Fridays at 7.30pm, Prospect House, Muglet Lane, Maltby, Nr Rotherham. Details Keith, G1PQW, QTHR 0709 798098(daytime) or 0709 814135.

### STAFFORDSHIRE

CANNOCK CHASE ARS - 3, talk 'Crime and punishment' a survey by Mr A J Mitchell, JP G4ICE and G7APS. Details 0543 262495.

STOKE ON TRENT ARS - *** NEW SECRETARY *** Albert, G4DHO. Club meets every Thursday 7.30pm at The White Swan, Honeywall, Penkhull, Stoke on Trent. Each meeting has CW practice, help with the RAE and activity on the air. All welcome. Details 0782 638801.

### STRATHCLYDE

KILMARNOCK & LOUDOUN ARC - 1, Field Day preparations; 15, talk 'Computers in the Shack' by GM0ONX; 29, Talk 'Licensed Station - Test Requirement' by GM3YEH. Details 0563 820052.

### SUFFOLK

FELIXSTOWE & DARS - 7, Night on Air at OPS; 19, Demonstration station at Walton Hobby Fair; 21, Talk 'Amateur Satellites' by Pat, G3IOR. Detail 0394 273507.

IPSWICH RC - 9, talk 'How to layout printed circuits that work' by G0OZS; 30, DF Hunt. Details 0473 742072.

### SURREY

ECHELFORD ARS - 10, Primary Cells Revisited by Ed Gowler; 24, Vintage Radio by Mike Pollard, G8BWA; July 8, Oscilloscopes by Peter Hale, G2HS. Details 0344 843472.

THREE COUNTIES ARC - 9, Live demonstration of sweep generators techniques including an antennae by Gragam, G4WNT; 13, RNARS rally at Collingwood; 19, A family visit to the Bluebell Railway; 23, talk 'Telecommunications of the future. Details 0428 642930.

### WARWICKSHIRE

MID-WARWICKSHIRE ARS - 8, Metalwork & mechanical construction; 22, Fox Hunt, 7pm start. Details 0926 424465.

STRATFORD UPON AVON & DARS - 14, Mobile Operation, Derek, G4ABS; 28, Technical Topics evening. Details 060 882 495.

### WEST GLAMORGAN

PORT TALBOT ARC - 1, Planning meeting for SSB Field Day. **** NEW SECRETARY **** Ted James, GW0NKF, 1 Pellau Road, Margam, Port Talbot, West Glam SA13 2LF. Details 0639 892311.

### WEST MIDLANDS

BROMSGROVE & DARC -July 3, Bromsgrove Carnival, GB0BC; 9, Talk 'Shortwave Listening' by Arthur Muler. Details 0562 710010/710025.

SOUTH BIRMINGHAM RS - 2, My Amateur radio experinces by Dennis, G3YKO; July 7, Demo by Ward Electronics. Details 021 458 1603.

### WEST YORKSHIRE

DENBY DALE ARS - 2, Fox Hunt, 7.30pm start; 16, Pre-Rally Meeting; July 7, Homebrew Test Equipment, John Townend, G3BBD. Details 0484 429238.

HALIFAX & DARS - 15, Modifying PMR equipment by Philip Morley, G4FSQ. Details 0422 202306.

KEIGHLEY ARS - 3, Natter night; 10, Radio

Controlled Models; 17, Natter night; 24, Fox Hunt. Details 0274 496222.

TODMORDEN & DARS - 7, Fault Finding by Tony, G8LTC. Details 0422 882038.

**WILTSHIRE**

TROWBRIDGE & DARC - 2, 144 Fox Hunt, 7.30pm start Southwick VH; 16, Planning of July SES. Details 0225 864698 (evenings).

# RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

**4 JUNE**

BANGOR & DARS - Open Night and Exhibitition Station in the Bangor Technical College at 8pm. Events:- RSGB Video; Talk on Novice Licence; Demonstration of Club Station; Display of AR books and literature; QSL cards; Talk on Raynet. Details from Des, GI3HCP on 0247 460251.

**6 JUNE**

25th SPALDING Mobile Rally - Springfield Gardens, Spalding. All under cover in the new Exhibition Halls. Details: Mr T Kettlewell, G4TWR, 0775 722940.

**13 JUNE**

24th ELVASTON CASTLE National Radio Rally - Elvaston Castle Country Park, nr Derby. 150 trade stands, technical bookstall, bring and buy marquee. Flea market from 9am. Craft marquee. RSGB stand. Band performances, children entertainments, catering. Talk-in on 2m and 70cm. Car parking £2, coaches £10. Details from John Robson, G4PZY, tel & fax: 0332 767994; trade enquiries: Peter Neal, G3WFU, tel & fax 0332 700265 (eves).

33rd RNARS Annual Mobile Rally - new venue Sports Field, HMS Collingwood, Fareham, Hants. Doors open 10.00am to 5.00pm. Details: Cliff G4UJR, 0703 557469.

**20 JUNE**

4th ANNUAL BELFAST Radio Rally - ** CHANGE OF DAY AND VENUE **. Held at Chimney Corner Hotel, 630 Antrim Road, Glengormley. Convenient to the Glengormley turning off the M2. Doors open 12 noon, Disabled admitted at 11.30am. Trade stands, bring & buy, lucky dip and meals available. Talk-in on S22. Details 0232 471370 or FAX 0232 471980.

DENBY DALE & DARS Annual Mobile Rally - Shelley High School (6 miles SE of Huddersfield on B6116). Doors open 11am (10.30am for disabled visitors), traders, car boot sale, refreshments and ample parking. Talk-in S22 and SU22. Details from Phil, G4FSQ 0484 644827.

NEWBURY & DARS Annual Car Boot Sale - Ackland Hall, Cold Ash. Details: N Jaques, 0635 863310.

**26 JUNE**

WREXHAM ARS 1st Mobile Rally - Clwyd Veteran and Vintage Machinery Society's 17th Annual Steam and Vintage Machinery Show at Plassey, Eyton, Nr Wrexham. Talk-in on S22 by GB1WXM. Details 0978 845858.

**27 JUNE**

36th LONGLEAT AR Rally - Longleat House, near Warminster, Wiltshire. Details from Shaun, G8VPG, QTHR 0225 873 098.

**4 JULY**

KINGS LYNN ARC Rally - Cattle Market, Kings Lynn. Details 0553 841189.

NEWPORT ARS 1993 Junk and Boot Sale. Brynglas CEC, Brynglas Road, Newport, Gwent. Open 10.30am to 1pm, 10am for disabled. Talk-in on S22 by GC1NRS. Details from GW7BSC, QTHR or Tel: 0633 262488

YORK Radio Rally. Tattersall Building , York Racecourse. Doors open 11am, 10.30am for disabled visitors. All the usual favourites, bring & buy, Morse tests, amateur radio, electronics & computers. Arts and crafts. Ample car parking. Details from Andy Suter, G0GXI 0904 708164.

**10 JULY**

CORNISH RALLY - Penair School, Truro. Doors open 10.30am, 10am for disabled visitors. Usual traders,ample parking, refreshments. Details from Barrie, G0NNR on 0872 862046.

**11 JULY**

GALWAY Radio Experimenters Club - Annual Radio Rally. Convent of Mercy, New-Townsmyth, Galway. Doors open 12 noon. Large trade show and bring & buy. For the entire family. Free parking and refreshments available. Talk in on 2m. Details EI7DIB on 091 53592.

HORNCASTLE AR Electronics and Computing Fair. Queen Elizabeths Grammar School Sports Hall, Horncastle, Lincs. Bring and buy, club stands, catering by Horncastle Youth Club Staff and Members. Talk-in on 2m. Further info and booking forms from T Nightingale, G6CZV, 0507 522482.

SUSSEX AR&C FAIR at Brighton Racecourse. Start 10.30am. Trade stands, bring and buy stall. Picnic area, refreshments, car parking. Free shuttle to Brighton sea front. Details tel: 0273 501100.

**12 JULY**

SUSSEX AR and Computer Fair - 10.30am to 4pm. Trade stands, bring and buy stall, picnic area. refreshments, car parking. Childrens entertainment and a free shuttle service to Brighton sea front. Details from 0273 501100.

**18 JULY**

RSGB WOBURN Rally. Details from Norman Miller, G3MVV, 0277 225563. (See panel on page 40).

**25 JULY**

COLCHESTER Radio & Computer Rally. New Venue - St Helena School, Sheeper Road, Colchester, adjacent to Colchester inner bypass, Avenue of Remembrance. Door opens 10 - 4pm. Admission £1. Wide range of radio and computer traders and component suppliers. A car boot sale, bring and buy. Refreshments and licensed bar. RSGB Morse tests on demand, bring your passport size photographs. Ample parking, easy access for wheelchairs. Signposted from A12. Talk-in on S22. Details from Frank, G3FIJ on 0206 851189.

RAIBC Romsey Picnic at Broadlands. All members, families, friends and supporters welcome. Grand draw, junk sale and refreshments. Talk-in on S22. Details John, G4COM 0703 693017.

NORFOLK ARC & Hewett School Radio and Electronics Group Rally. Doors open at 10am. Trade stands, bring & buy, displays. Free parking, all the family welcome. Admission £1 Adults, OAP, disabled and children 50p. Details Sheila, G0KWP, 0603 618810.

SCARBOROUGH Radio Electronics & Computer Rally. North Riding College, Filey Road, Scarborough. Doors open 11am. Many traders, bring and buy. Morse tests availabe on demand, refreshments, snacks and bar. Details from Ross, G4ZNZ 0723 514767

**29 JULY/2 AUGUST**

AMSAT-UK Colloquium - The Annual Colloquium for all users of Amateur Radio Satellites will again be held at the University of Surrey, Guildford between 29 July and 2 August. All welcome. Details from G3AAJ 081 989 6741.

**1 AUGUST**

McMICHAEL Rally and Car Boot Sale - Haymill Youth and Community Centre, Burnham Lane, Slough. (near Burnham railway station) Start 10.30am, admission £1.50. Car boot sale (no adv. bboking) is £6 per pitch on the day. Talk-in on S22. Details Neil, G0SVN or Roy, G4XYN, 0628 25952. (This rally was originally scheduled for 18 July).

**8 AUGUST**

DERBY & DARS Mobile Rally - Littleover Community School, Pastures Hill, Littleover. School on A5250 just off its junction with A38 on south side of Derby. Usual attractions including monster junk sale. Details from Martin, G3SZJ on 0332 556875 or via packet @ GB7LTN.

FLIGHT REFUELLING ARS Hamfest'93. The Flight Refuelling Sports Ground, Merley, Wimborne, Dorset. 10 - 5pm. Usual mix of traders, bring and buy, craft exhibitions, car boot sale and field events. Overnight camping facilities available for Saturday 7th. Talk-in on S22. Details Richard Hogan, G4VCQ 0202 691021.

**15 AUGUST**

SOUTHEND & DRS Rally and Radio Car Boot Sale - Rocheway Centre, Rochford, Nr Southend on Sea, Essex. Start 10am, bring and buy, ample parking. only £5 per pitch. Details G0DFE, 0702 202216.

**22 AUGUST**

WEST MANCHESTER RC Summer Rally. Details: G1IOO, 0204 24104 (evenings).

**28/29 AUGUST**

NORTHERN LIGHTHOUSE Weekend. Radio Amateurs in Scotland and the Isle of Man will activate 11 stations at lighthouses through Scotland and the Isle of Man. Details from Mike Dalrymple on 0292 443127.

**29 AUGUST**

GALASHIELS & DARS Open Day - Doors open 11am till 4.30pm. The usual traders, bring and buy, club stalls, raffle, and refreshments. Details John, GM0AMB 0835 22686.

TORBAY ARS Mobile Rally. Venue, Northern Telecom(was STC) Social Club, Brixham Road, Paignton, Devon. Doors open 10am. Bring and buy. Talk-in on S22. Ample free parking. Refreshments and bar. Details G3HTX, QTHR, 0803 526762.

**30 AUGUST**

HUNTINGTON ARS Annual Bank Holiday Monday Rally. New Town Centre Venue at St Germain Street, Huntington. All pitches and car parking on hard standing. Admission £1, car parking free. 10am start. Pitches £5 per car, £9 for transit van or car and trailer. Hot and cold food available. Talk-in on S22 or via GB3OV on 433.125Mhz. Details David, G7DIU on 0480 432333.

**5 SEPTEMBER**

BRISTOL Radio Rally (incorporating Bristol Computer & Electronics Fayre). Details from Muriel Baker, G4YZR, 62 Court Farm Road, Whitchurch, Bristol BS14 0EG, tel: 0275 834282.

MILTON KEYNES & DARS - 7th Annual Radio Boot Sale. Details Ray, G1LRU, 0908 660798.

TELFORD AR Rally - Usual venue, Telford Racquet & Exhibition Centre, Telford. Contact Bob, G7BWQ 0952 770922

VANGE ARS - Annual Rally. Details Mike Musgrave, G4NVT, 0268 543025.

**11 SEPTEMBER**

SCOTTISH AR Convention (SARC93) - Cardonal College, Glasgow. Details Tom Hughes, GM3EDZ, 041 882 5753.

**12 SEPTEMBER**

BARTG Rally - Sandown Exhibition Centre. Details Peter Nicol, 38 Mitten Avenue, Rubery, Rednal, Birmingham B45 0JB, 021 453 2676.

LINCOLN SWC - Hamfest. Details from Denis, G1XZG, 0522 684214.

**18 SEPTEMBER**

ISLE OF WIGHT - Annual Wight Rally. Details G3KPO, 0983 567665.

**19 SEPTEMBER**

PETERBOROUGH R&ES - East of England Rally. Details from Mike, G0CVZ 0733 222588.

**26 SEPTEMBER**

HARLOW & DARS - 35th Annual Amateur Radio Rally and Computer Show. Usual venue. Details from Mike, G7BNF 0850 487863.

THE THREE COUNTIES Rally - The Three Counties Show Ground, Malvern, Worcestershire. NEW EVENT. All trade enquiries and bookings to Eddy Cotton, G4PQZ, 0905 773181.

9th NORTH WAKEFIELD RC Rally. Details from John, G4RCG, 0924 362144 or John, G0EVT, 0924 825443.

**3 OCTOBER**

GREAT LUMLEY Radio Rally. Details Barry, G1JDP, 091 388 5936.

BLACKWOOD & DARS Rally - Details from Norman, GW0MAW, 0495 227550.

WINCANTON RALLY - details Norman, G4YXX 0749 850432.

**8/10 OCTOBER**

RSGB International HF Convention - NEW DATE: The Beaumont Conference Centre, Old Windsor, Berks. Details G4BWP, 0638 552080 (see page XX).

**9/10 OCTOBER**

THE ALL IRELAND INTERNATIONAL RADIO and HOBBIES EXHIBITION - Armagh & Dungannon DARC and Dundalk ARS. Fairway Hotel & Leisure centre, Dublin Road, Dundalk, Co Louth. Details Raymond, GI8RLE, 0762 870423 or Peter, EI8CZB, 010 353 42 32641.

**10 OCTOBER**

KIDDERMINSTER & DARS - NEW DATE, NEW VENUE: Stourport on Severn High School. Details: Malcom, G8JTL 0384 894019 or Jeff, G0RJP 0299 822206.

SOUTH DEVON RC Computercations 93, Amateur Radio & Computer Rally - Details Bill, G6ZRM on 0803 522216.

**16/17 OCTOBER**

36th JAMBOREE ON THE AIR. Details from Activities Office, The Scout Association, Gilwell Park, Chingford, London E4 7QW, 081 524 5246.

**17 OCTOBER**

HORNSEA (East Yorkshire) RC Rally. Details Duncan, G3TLI, The Old School, Appleton, Nr Hornsea, 0964 532588.

**17/18 OCTOBER**

SCOTTISH TOURIST BOARD RG - Launch of 1993 Airdrie MOD - GB2STB.

**29/30 OCTOBER(FRI/SAT)**

LEICESTER Amateur Radio Show - Granby Halls. Details G4PDZ 0533 871086.

**31 OCTOBER**

BISHOP AUCKLAND Radio Amateur Clubs Rally. Details Mike, G0PRQ, 0388 766264.

**6/7 NOVEMBER**

7th NORTH WALES Radio & Electronics Show. Details B Mee, GW7EXH, 0745 591704.

**14 NOVEMBER**

BARNSLEY & DARC AR Rally. Details Ernie, G4LUE, 0226 716339 (6pm-8pm please).

BRIDGEND & DARC Amateur Radio Rally. Details 0656 722199 or 860434.

MARS/STOCKLAND Radio Rally. Details Norman, G8BHE 021 422 9787.

**21 NOVEMBER**

WEST MANCHESTER RC Winter Rally. Details 0204 24104 (eves).

# SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

| | | |
|---|---|---|
| 2E1AMR | Mr J R Dixon | |
| 8P6BC | Mr H A Reece | |
| G0AML | Mr C D Stewart | 26.02.93 |
| G0MNF | Mr W E Licence | Oct 92 |
| G0NOJ | Mrs J Slater | 06.02.93 |
| G1RRZ | Mr A G Gibbons | 09.03.93 |
| G3BYQ | Mr W G Dunlop | 26.02.93 |
| G3FYW | Sqn Ldr D H Lester | 24.02.93 |
| G3JRF | Mr R G Fox | 23.02.93 |
| G3KYU | Mr J Ashford | 24.02.93 |
| G3MYX | Mr F C Richardson | 08.03.93 |
| G3NCE | Mr R A Wilson | 04.02.93 |
| G3RFC | Mr L Ogden | 27.02.93 |
| G3TJQ | Mr D J Bean | 16.02.93 |
| G3WFV | Mr L Thewlis | 12.02.93 |
| G3WVC | Mr E Cornford | |
| G4CYN | Mr R S Bell | 09.03.93 |
| G5MN | Mr C R S Moon | 16.02.93 |
| G5WA | Mr A Barber | 21.02.93 |
| G7EPI | Mr J Gardiner | 04.02.93 |
| G7FGX | Mr D T Foster | |
| G8BU | Mr L Rooms | 17.03.93 |
| G8DPB | Mr T Hook | 27.01.93 |
| GI4MBO | Mr A Vize | 24.02.93 |
| GM3KZH | Mr A Halcrow | 01.02.93 |
| GM4PSV | Mr R H Ferguson | 16.02.93 |
| GM4XVX | Mr D Myers | 30.12.92 |
| GW0GHC | Mr K Rawnsley | |
| GW0LAL | Mrs P Penlington | April 93 |
| GW0PZL | Mr A P Jones | 26.01.93 |
| GW3LJP | Mr W A Mills | 28.02.93 |

## John Pilags, G8HHI (G0RAW)

JOHN PILAGS passed away on 30 March 1993 after being involved in a tragic road accident whilst on one of his loves, bicycle riding.

Amateur radio was his other main hobby and John was not only proficient at it, but excelled with his main interest on the UHF and microwave bands. He was one of the early holders of the Four Metre and Down Supreme Awards, and was an active member and Vice Chairman of the VHF Contest Committee for many years.

John was also an active member of the 'Hillbillies' and 'Parallel Lines' Contest Groups and has been part of the winning team in many trophy contests and VHF National Field Day.

He will be sadly missed by all who knew him and, particularly, by myself who has not only lost a close amateur colleague, but a very close friend.

*G4HWA*

**WE REGRET that owing to lack of space GB Calls have had to be omited this month**

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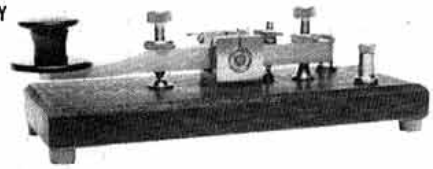

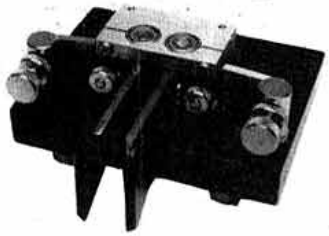

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**TRANSVERTERS** for 1mW 10 metre drive, including buffer board, otherwise as above. Types TRC2-10b, TRC4-10b, TRC6-10b. **PCB KIT £64.25, PCB BUILT £100, BOX KIT £85.75, BOX BUILT £132.**
**TRANSVERTERS** from 2 metres for 4, 6 or 10 metres, 0.5W output. Includes interface to accept 0.5-5W drive. Types TRC4-2i (built only), TRC6-2i, TRC10-2i. New larger box to include linear. **PCB KIT £64.25, PCB BUILT £100, BOX KIT £85.75, BOX BUILT £132.**
**LINEAR AMPLIFIERS** to suit the transverters above. 0.5W in 25W out. Types TA2S3, TA4S3, TA6S3. **PCB KIT £60, PCB BUILT £80.75.**

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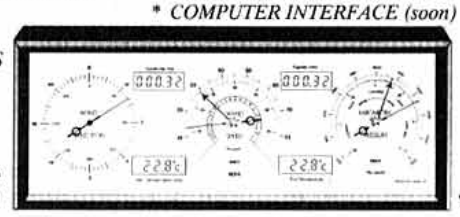

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SOME OF THE RSGB'S TEAM OF VOLUNTEER EXPERTS — AVAILABLE TO HELP YOU

- **RSGB Policy Matters (Zonal Council member):-**

**Zone A (North of England):**

Peter Sheppard, G4EJP, 89 St Catherines Drive, Leconfield, Beverley, North Humberside HU17 7NY. Tel: 0964 550397.

**Zone B (Midlands):**

John Allen, G3DOT, 4 Philip Avenue, Waltham, South Humberside, DN37 0QD. Tel: 0472 825899.

**Zone C (SE England and East Anglia):**

Neil Lasher, G6HIU, 61A Stile Hall Gardens, London W4 3BT. Tel: 081 747 4045.

**Zone D (SW England):**

Julian Gannaway, G3YGF, Dean Hill Barn, East Dean, Salisbury, Wiltshire SP5 1HJ. Tel: 0794 40008.

**Zone E (Wales):**

Clive N Trotman, GW4YKL, 19 Park View, Dolau, Llanharen, Pontyclun, Mid Glamorgan CF7 9RZ. Tel: 0443 226198.

**Zone F (Northern Ireland):**

Ian Kyle, GI8AYZ, 1 Portulla Drive, Pond Park Road, Lisburn, Co Antrim BT28 3JS. Tel: 0846 665034.

**Zone G (Scotland):**

Ian Suart, GM4AUP, 37 Meldrum Mains, Glenmavis, Airdrie, Lanarkshire ML6 0QG. Tel: 0236 765937.

- **For general advice and details on local clubs, or if you don't know who to contact:-**

Your RSGB Liaison Officer.

**RLOs (A-I) appeared in last month's At Your Service.**

**JERSEY** (Zone D) – Syd Smith, GJ0JSY, 31 Jardin-A-Pommiers, Patier Road, St Saviour, Jersey. Tel 0534 38996.

**KENT** (Zone C) – Fred Stewart, G0CSF, Shingles, Ingleborough Lane, St Mary's Platt, Sevenoaks, Kent TN15 8JU. Tel 0732 780721.

**LANCASHIRE** (Zone A) – Bob Catlow, G4ARP, 137 Haven Lane, Moorside, Oldham, Lancs OL4 2QQ. Tel 061 652 8617.

**LEICESTERSHIRE** (Zone B) – Gwynne Harries, G4WYN, 1 St Michael's Close, Ashby-de-la-Zouch, Leicestershire LE6 5ES. Tel 0530 417307.

**LINCOLNSHIRE** (Zone B) – see under South Humberside.

**LOTHIAN** (Zone G) – David Milne, GM1YXM, 13 Caledonian Place, Edinburgh EH1 2AW. Tel 031 313 2882.

**MERSEYSIDE** (Zone A) – Keith Brooks, G0SPH, 43 Norton Wood Lane, Windmill Hill, Runcorn, Cheshire WA7 6QG. Tel 0928 701096.

**MID GLAMORGAN** (Zone E) – David Jones, GW1SQT, 'Beridale', 41 Penrhys Road, Ystrad, Rhondda, Mid Glamorgan CF41 7SJ. Tel 0443 435309.

**NORFOLK** (Zone C) – Bill Higgins, G3PNR, 65 Hayden Court, Eleanor Road, Norwich NR1 2RG. Tel 0603 629150.

**NORTHAMPTONSHIRE** (Zone B) – Mr D J Linnell, G0MJK, 19 Beech Avenue, Northampton NN3 2HE. Tel 0604 711647.

**NORTHUMBERLAND** (Zone A) – Jack Swayne, G3BLE, 12 The Haven, Beadnell, Chathill, Northumberland NE67 5AW. Tel 0665 720601.

**NORTH YORKSHIRE** (Zone A) – NE of Rivers Ouse and Swale: 'Bob' Wilkinson, G4YKO, 8 Laughton Avenue, Scarborough, N Yorkshire YO12 5DB. Tel 0723-352823. SW of Rivers Ouse and Swale: Gareth Foster, G1DRG, 19 Asquith Avenue, Burnholme, York YO3 0PZ. Tel 0904 421392.

**NOTTINGHAMSHIRE** (Zone B) – Mrs Mary Lowe, G0NZA, 25 Manor House Court, Kirkby-in-Ashfield, Nottingham NG17 8LH. Tel 0623 755288.

**ORKNEY** (Zone G) – Bill Wright, GM3IBU, Crosslea, Berstane Road, Kirkwall, Orkney KW15 1SZ.

**OXFORDSHIRE** (Zone D) – Arthur Kinson, G0KOC, 29 Foxhall Road, Didcot, Oxon OX11 7AQ. Tel 0235 815399.

**POWYS** (Zone E) – Paul Essery, GW3KFE, 287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1AR. Tel 0686 28958.

**SHETLAND** (Zone G) – Pete Weller, GM3XOQ, Heimli, Levenwick, Shetland Isles ZE2 9HX. Tel 0950 2354.

**SHROPSHIRE** (Zone B) – David Whalley, G4EIX, 1 Lees Farm Drive, Madeley, Telford, Salop TF7 5SU. Tel 0952 588878.

**SOMERSET** (Zone D) – Post vacant – refer to Zonal Council Member.

**SOUTH GLAMORGAN** (Zone E) – see under Mid Glamorgan.

**SOUTH YORKSHIRE** (Zone A) – Mr A Whitehead, G4JKW, Laburnum Cott, 3 Darley Yard, Worsbrough Dale, Barnsley, S Yorks S70 4SB. Tel 0226 299031.

**STAFFORDSHIRE** (Zone B) – Ken Parkes, G3EHM, 41 Goldborn Avenue, Meirheath, Stoke-on-Trent, Staffs ST3 7JQ. Tel 0782 397240.

**STRATHCLYDE** (Zone G) – Post vacant – refer to Zonal Council Member.

**SUFFOLK** (Zone C) – see under Norfolk.

**SURREY** (Zone C) – see under Greater London (South).

**TAYSIDE** (Zone G) – see under Fife.

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**WARWICKSHIRE** (Zone B) – see under Northamptonshire.

**WESTERN ISLES** (Zone G) – see under Highland.

**WEST GLAMORGAN** (Zone E) – Mr E Hays, GW3RGL, 23 Edgemoor Drive, Upper Killay, Swansea SA2 7HH. Tel 0792 207822.

**WEST MIDLANDS** (Zone B) – Mr P Morrall, G4TMK, 22 Chudleigh Road, Erdington, Birmingham B23 6HB. Tel No. 021 382 8494.

**WEST SUSSEX** (Zone C) – Jim R Harris, G4DRV, Upton, Crowborough Hill, Crowborough, East Sussex TN6 2DA. Tel 0892 655894.

**WEST YORKSHIRE** (Zone A) – Mr D W Allan, G0RZP, 283 Cliffe Lane, Gomersal, Cleckheaton, W Yorks BD19 4SB. Tel 0274 872244.

**WILTSHIRE** (Zone D) – Ron Freeman, G4XTH, 90 Allington Way, Chippenham, Wilts SN14 0JU. Tel 0249 650800.

## RSGB Liaison Officers (J-Z) and Honorary Officers

**The Society has a large number of volunteer experts available to help and advise members on a wide variety of subjects. Each month we will be focussing on a different section of the volunteer workforce, whilst still giving brief details of the main office-holders. See also the Information Directory section of the *RSGB Call Book*.**

---

**HF Awards Manager** – Bill Ricalton, G4ADD.

**VHF (and Microwave) Awards Manager** – Ian L Cornes, G4OUT.

**HF Manager** – Martin Atherton, G3ZAY.

**VHF Manager** – Dave Butler, G4ASR.

**Microwave Manager** – Mike Dixon, G3PFR.

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**Amateur Radio Observation Service Co-ordinator** – Geoff Griffiths, G3STG.

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**Chief Morse Test Examiner** – Roy Clayton, G4SSH.

**Society Historian** – George Jessop, G6JP.

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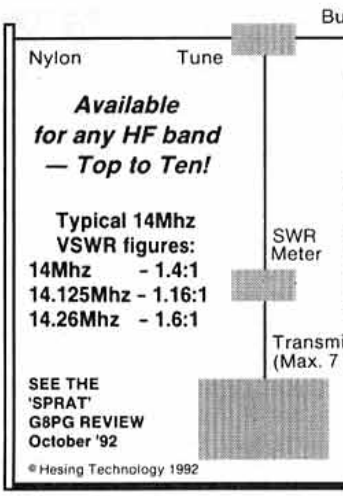
**QSL Bureau Liaison Officer** – John Hall, G3KVA.

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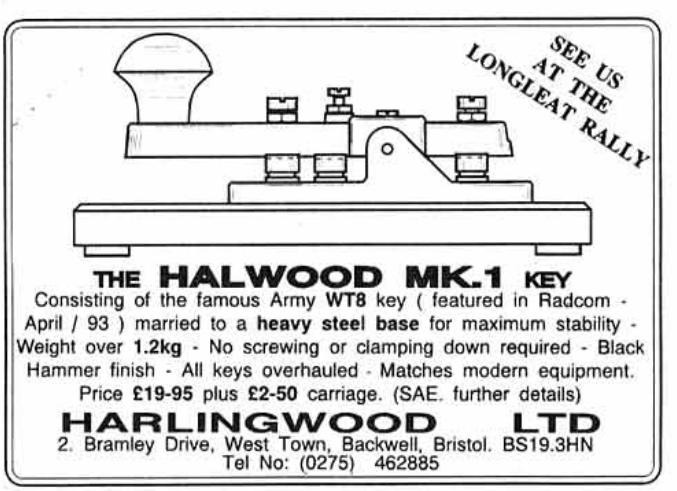

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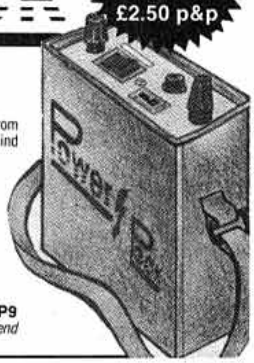

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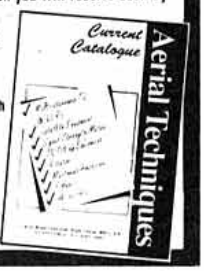


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# The LAST WORD

## NOT WAVING BUT STANDING

THE PUBLICATION in *Technical Topics* (April) and the second part of 'How Big is a Bad SWR' in the same issue was a happy coincidence. In the *TT* article G3NXC writes of the SWR myths that still appear in various articles including those by people who really should know better. Later on G2HCG hates the wretched PL259 plug.

May I add my two penn'orth? The 'Bad SWR' article was useful but it really doesn't need a standing wave to make the reasoning. Just consider a simple dipole with centre impedance of 75Ω connected via a balun to a coaxial feeder also of 75Ω. This condition is covered in the definition of SWR in the first of the articles. But where is the standing wave? The load is purely resistive and the load line will be a line and not an f, and of course care must be taken about incursions into the forbidden areas. But there is *no standing wave* - just a mismatch.

Incidentally, the article stated that the power dissipation at the collector is $I_c \times V_{ce}$. That is certainly the power input, but some power goes out to the aerial (maybe 50%) so the collector only has the rest to dissipate.

G2HCG doesn't like the PL259 plug, but I suggest that it is adequate on HF and not too bad on VHF. It is about 2cm long and therefore 0.02 wavelength long on a transmission at a wavelength of 1m. Put this on a Smith chart and the resultant effect is surely negligible.

*J K Todd G2KV*

## ONE MAG FOR ALL

On several occasions I have written to the Society on the subject of *RadCom* contents, pointing our that some of us are butchers, bakers and candlestick makers, and not electronic boffins able to comprehend very technical articles. This has now been largely remedied by the introduction of the Novice. It could be self-defeating if you are going to continue a separate publication, *D-i-Y Radio* (costing money), for articles aimed at, and suitable for, the butcher, baker and candlestick maker, and allow *Radcom* to continue as is, though in the improved form developed over recent years.

Reading *The Leader*, April, gives some hope of a step in the right direction, but I still believe two publications to be a mistake. Why should the Novice have to pay for two magazines? *Radcom* must be an *all embracing* publication, suitable for *all* members, and that all our members want.

*John Barker G3SAZ*

*[I agree totally that* RadCom *should be all-embracing and have tried to broaden its technical base by including both simpler and more complex articles than would have been included a few years ago. To include in* RadCom *the contents of* D-i-Y Radio *(the equivalent of twelve extra pages for the beginner every month) would destroy the delicate balance between these two extremes - Ed]*

## YOUR SOAR-AWAY RADCOM?

IN THE LIGHT OF current (and what seems to be popular commercial) practice, has the editorial management of the RSGB considered using a tabloid format in preference to what is now being produced?

Tabloid production not only capitalizes on more efficient typesetting systems and much lower cost printing-presses, but more importantly, the paper stock is far cheaper! Other benefits include greater page design flexibility. And as a direct result of this, advertisers, on a cost for cost basis have more space in which to hammer home their respective messages! Without it costing them extra monies.

This would benefit everyone in the long-term (and the short-term for the matter). There is bound to be an emotional furore but if we concentrate on the rationale, I'm confident that most members will 'see the light' eventually. Hands up those members who support the idea of *Radcom* going tabloid?

*Ray J Howes G4OWY*

## RESTORE THE BALANCE

I HOPE THE Society will be sure to trace and acknowledge with the highest honour in its power, the amateur who has from the most appalling situation in Srebenica provided daily contacts with the authorities. It is unlikely that the lay press will afford anything like the publicity it gleefully gave to the avaricious scanner-operators - unfortunately labelled 'radio hams' - who monitored, recorded and sold private conversations, but let us at least attempt to restore the balance.

*Peter Jackson G3ADV*

## THE RIGHT ATTITUDE

TO GIVE MICHAEL Nokes, G0TDT, (*The Last Word*, May) some encouragement, might I be allowed to relate the following story? When I joined the RAF just after the war, I was posted to No.3 Radio School to train as a radio operator. The intake consisted of 200 men. After we had been on the course for a month or two, it became apparent to those in charge that all was not well as many were having considerable trouble with the Morse.

We were duly paraded one morning before Squadron Leader Smith, who asked those who thought that they might not pass the course to step forward. Quite a lot did, and later I discovered that only 31 of us were going to remain whilst the others would be posted to take up new trades. Some told me that the Morse was making them ill, while others couldn't sleep at night thinking about it.

I came to the conclusion that to be successful at learning Morse code, you have to have a special attitude of mind, as with most things, and if you don't have it you will struggle. Those with the right attitude can easily say it's a pushover, but that's nonsense, and if my figures are anything to go by only one in seven has this right mental attitude. It's a case of what you're given when you're born and certainly nothing to feel guilty about.

Years later I worked for the then Air Ministry as a radio operator where the Morse qualifying speed was 28WPM in six months, and again I saw the same problem arise.

Now that Michael has passed, I wish him luck and would advise him to listen to good automatic Morse to start with, just to get the feel of it, and never to send faster than you want to receive, something badly neglected on the amateur bands today.

*Harold McIntyre G3FLJ*

## SOUND IDEA

I SUGGEST THAT consideration should be given to the preparation of an audio cassette on which is recorded examples of the numerous types of signal, including interference, heard on the air, together with their identification. Examples from as much of the radio spectrum as possible should be sampled from both UK and foreign sources.

I recall that an illustrated lecture on this subject was given some time ago by a 'G' but I have no details. His assistance could be of great help. I feel sure that radio amateurs would welcome the chance of obtaining such information at a reasonable price to help sort out the bewildering variety of sounds and signals heard on their receivers.

*T Moore G3AJD*

Please note that the views expressed in *The Last Word* are not necessarily those of the RSGB. We reserve the right to edit letters for publication. All letters are acknowledged and may be passed to the relevant department or committee.

## ARTWORK

I THINK THAT members should be made aware that HQ will now supply PCB artwork for projects appearing in *RadCom* only to the (kit) trade.

*Bruce Edwards G3WCE*

*[This statement isn't strictly true and rather misses the point. A PCB design, which must be reproduced 'same size' and is frequently double-sided plus a component overlay, consumes too much space for the relatively few members who will make their own PCBs, especially for complex projects. Board layouts* are *published from time to time - see this month's marker unit. More to the point, many authors do not provide PCB details and it is only because we ask suppliers such as Badger Boards to design a board that one is available at all. It is our policy to arrange for more and more projects to have kits and boards available as individual component supplies become more difficult to obtain. If you do want to make your own board, an SASE to the author may well bring results - Ed]*

## ODD ODE ON COMPULSORY CODE

*In nineteen hundred and thirty eight*
*I heard ham radio, thought it great.*
*In nineteen hundred and forty four*
*My Morse was pushed to four, no more.*

*In forty nine, a spirit free,*
*I was exempt from the RAE.*
*Surplus bits then home I'd bring*
*Enough to make 'most anything.*

*But Morse was kept my hopes to parry*
*For me there was no George Three Harry,*
*And when I asked what 'twas about*
*Some hams said "It's to keep you out!'*

*On this 'twas natural to frown*
*And wish the PO'd close all down,*
*It's not enough to SWL*
*When you want to join in as well.*

*And Class B did not help the man*
*Whose purpose was to work Japan*
*(Eleven metres was a rage*
*Some won't want mentioned on this page).*

*At last with help from such another*
*And a lot of useless bother*
*Two years hard with quite no zest*
*Scraped me through that awful Test.*

*But the Diehards won, or near enough,*
*I'm on an HF site quite duff,*
*And of course there are no fears*
*I could retrieve the vanished years.*

*And so again they won't be tricked*
*They've gone and made the Test more strict.*
*(Some had to learn their code, I think,*
*When the option was CB*, or Clink!)*

*Now it is odd, I do agree,*
*That radio I did not flee;*
*A lot just say "The hell with it!"*
*And love us not one little bit.*

*A point that you should heed, I guess,*
*When radio needs more friends, not less.*

*A L Dick, GM0IRZ*

**CB: Confined to Barracks, not that CB proscribed by the RSGB.*

## THANKS LORD RIX

I HAVE JUST received my prize for the MENCAP Albania Appeal! Thank you very much, the G4ZPY Pump-Action Morse Key is super - so listen out for me sometime, (usually on CW).

We are very pleased the Appeal was a success; very worthy! Whatever sense of humour I have, I owe it all to two terrific entertainers: Brian Rix and Norman Wisdom! I am probably giving away my age, but these two had me rolling from a very tender age - bring back the old days! Thanks Brian for bringing MENCAP to our attention.

*David Jelly A45IJ (G4UQB)*

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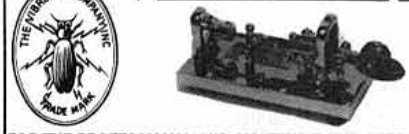

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