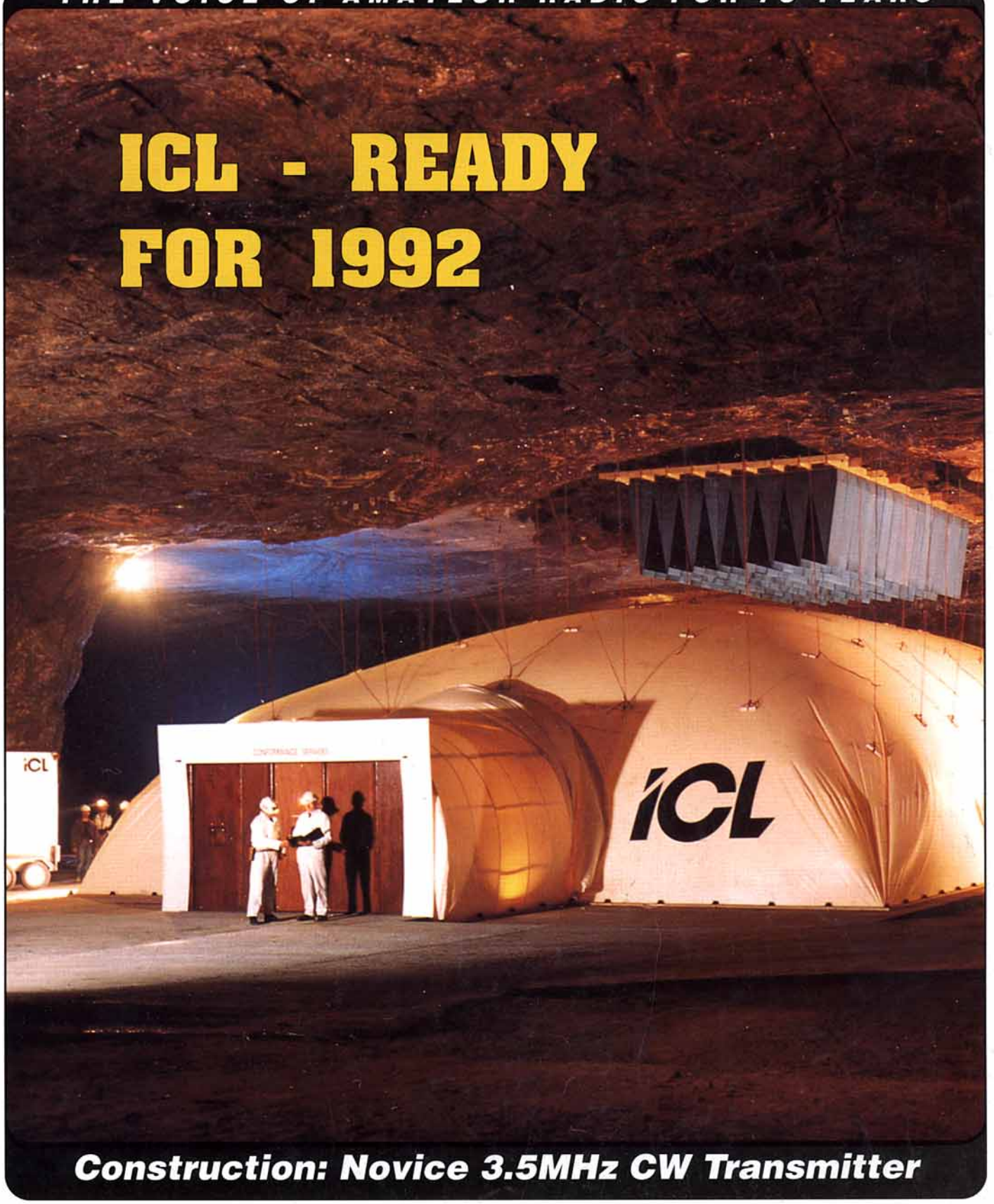
Radio Communication

The Journal of the Radio Society of Great Britain

December 1991

Volume 67 No 12

THE VOICE OF AMATEUR RADIO FOR 78 YEARS



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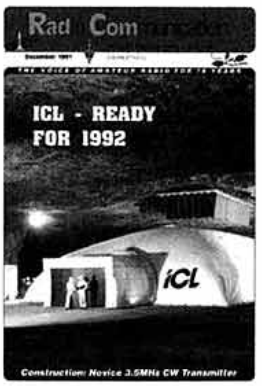
Radio Communication

A Merry Christmas to all RSGB Members at home or abroad.

*** Turn to pages 40 - 45 for hosts of ideas for Christmas presents for friends and relatives, young and old, or even for yourself.**

NEWS AND REPORTS

TECHNICAL FEATURES



COVER PICTURE:

Ready for next year's implementation of the EC EMC Directive, ICL's new EMC test-laboratory is located where external RF noise cannot reach. But where is it? See this month's *EMC* column (page 60) to find out.

Photograph: ICL Press Office

REGULAR ARTICLES

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS
Founded in 1913 incorporated 1926. Limited by guarantee
Member society of the international Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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Electronic Mail Via Dialcom/Telecom Gold: 87 CQQ083
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Correspondence to honorary officers should be passed directly to them (QTHR), not to RSGB HQ.

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Corporate Members: UK and Overseas (*Radio Communication* sent by surface post): **£30.00**
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UK students over 18 and under 25: £19.20 (Applications should give applicant's age at last renewal date and include evidence of student status)
Affiliated club or society/registered group (UK): £30.00 (including *Radio Commmunication*): **£17.95** (excluding *Radio Communication*) (Subscriptions include VAT where applicable)

Membership application forms available from RSGB HQ

Abuse on Amateur Radio

The Role of the Radiocommunications Agency's Radio Investigation Service (RIS)

A CORE FUNCTION of the RIS is to investigate and do its best to resolve causes of interference to authorised radio services. The RIS works across the whole of the radio spectrum and our priorities, agreed by Ministers, are towards the protection of the emergency services and work for business radio. I hope these will be seen as reasonable priorities.

As far as the amateur bands are concerned, I know that interference caused deliberately within the bands is frustrating for the vast majority of amateurs who use the facility in the way it was intended. The RIS does not have limitless resources and we must concentrate on our priorities, so my policy concerning abuse on amateur radio is quite clear. I want those in the hobby to take some responsibility by trying to influence those who abuse the few rules that are set for the benefit of everyone.

I am therefore delighted that the RSGB is working with us to tackle abuse and I welcome the re-launching of the Amateur Radio Observation Service (AROS). It takes a special sort of person to take a lead role in such an organisation and Geoff Griffiths (G3STG), whom I have known for some years now as a dedicated amateur, is just that sort of person.

I hope that all amateurs will support AROS and make it the success that it deserves to be. I have said to Geoff Griffiths that the RIS will play its part by taking up some of the intractable cases that AROS cannot resolve within the hobby. We have already had two successful prosecutions against persistent abusers in Nottingham and Kent resulting directly from information supplied by AROS.

Last year I reinstated a programme of random inspections of amateur stations by the RIS. These will increase and I intend to link them in with the AROS work and target them on problem areas. So, watch out for the knock on the door!

Misuse of amateur radio often centres on repeaters; perhaps the obvious needs to be restated. Repeaters were instituted for mobile-to-mobile working, not for fixed-station contacts. Some repeaters cover a far greater area than is really needed and they overlap with the coverage enjoyed by other repeaters. They thus become a target for abusers who can secure a large audience for their mindless pastime. In those areas where repeater abuse has been a particular problem, the RIS and AROS have met with local groups to discuss the problem in more detail. This process will continue. The RIS has cut down the coverage of the South London repeater by liaising with the local repeater group and agreeing the fitting of an attenuator. We are discussing a similar tactic with repeater groups in Birmingham. My colleagues in the Agency's Licensing Section are talking to the RSGB about more effective local management of repeaters, and repeater groups having better local control arrangements. I welcome that sort of dialogue. This puts the responsibility squarely on those who want these facilities. The RIS has also closed down particular repeaters when abuse has been so bad as to remove all enjoyment from the hobby. These are all legitimate tactics to deal with the problem and I will not shirk any of these tactics if they are the appropriate ones for particular localities.

When people are caught offending against the privileges in their licences then penalties can be severe. As well as fines and costs imposed by the Courts, the RIS may also seek forfeiture of any equipment used in connection with offences. The Agency may also feel that people may have demonstrated that they are not capable of keeping to their licence conditions and so far this year the Agency has revoked or refused to issue eleven amateur licences.

We do mean business and, within the constraints of our resources and our priorities and by working together with those in the hobby who care for its fine traditions, we want to see an improvement in operating standards. Youngsters are coming into the hobby and the creation of the Novice Licence should increase the interest of youth. We want to see all that is best in amateur radio flourish so that these youngsters can enjoy their new pastime. That is vital for the future of the hobby.

B A Maxwell
Head R5 / Director RIS

NEWS & REPORTS

HQ NEWS

YOU WILL by now have had a chance to digest the accounts for the year ended 30 June 1991 and you will realise the extent to which our finances have improved. This improvement has continued in the first quarter of the new financial year and is reflected in the substantial level of funds the Society now has on deposit. October seems to have been even better than expected and we have substantially more on deposit than I had budgeted for. Accounts can be interpreted in different ways depending on whether one is an optimist or pessimist so it is gratifying to see the results of everybody's effort in cash. Cash of course is only one of the assets which the Society needs to protect; another is the building, and contractors started the re-wiring in early November. This should take about three months and may involve some fun and games for the staff trying to keep our operation going during the work period.

It seems to be open season again for our denigrators on the packet network, from the imminent physical collapse of Lambda House to the financial collapse of the RSGB predicted so emphatically, even personal attacks on members who have worked hard for the good of the Society. To that silent majority who have patiently put up with this sort of tabloid criticism I want to say thank you for your support and encouragement. It is very greatly appreciated. I think you realise that with assets well over £1,000,000, much of which is liquid stock, debtors and cash, the Society is well past its critical days.

I am now concentrating on addressing our administrative anomalies which cause so much frustration and produce so much correspondence that should be unnecessary. To improve response time from HQ I have asked all staff who deal with correspondence to send out acknowledgement cards within 24 hours of receipt of your query at HQ. You should have either an answer to your query or a card bearing a reference in the top right hand corner. That reference will bear the date your communication was received here and the initials of the person dealing with it. Please quote that reference when following up any query. I shall extend this system to all committee chairmen, council members, RLOs and other volunteers as soon as I can get stocks of cards out to them. I will write more on this subject as I obtain feedback on its effectiveness.

I look forward to seeing as many of you at the AGM as possible. There is room for 250; I hope it will be full.

Philip Smith
General Manager

How Amateurs in Ecuador will run 1.5W to HCJB's 24-element quad without leaving their shacks

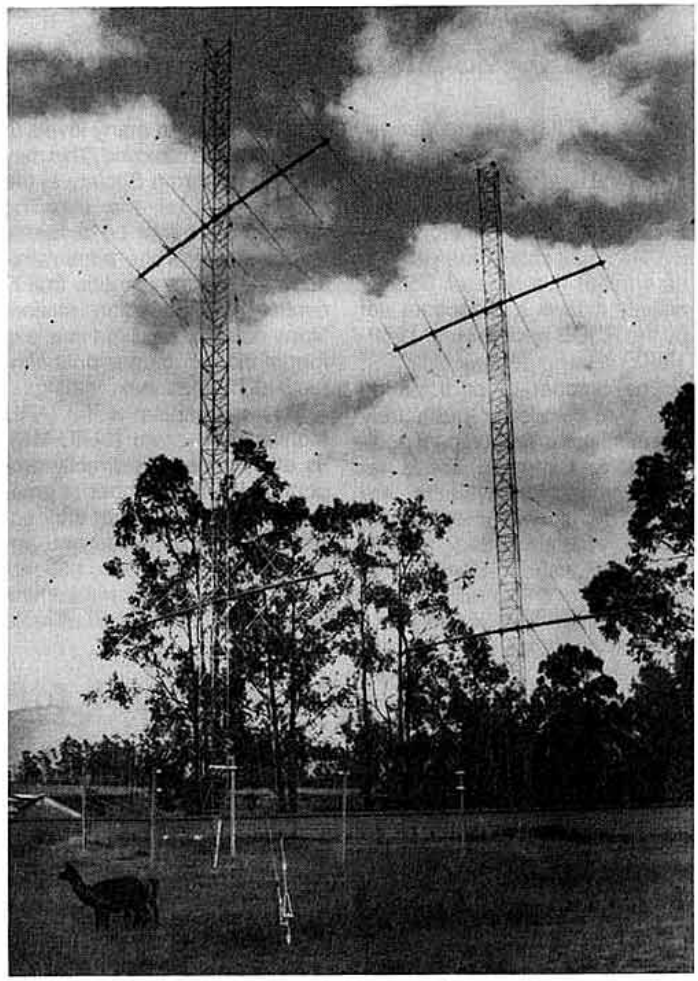
Quito's Quads

HERALDING Christ Jesus' Blessings is the slogan of one of the most powerful short-wave broadcast stations in the World, HCJB near Quito, Ecuador. The station, which features DX programs and news and cultural information in addition to its primary religious role, celebrates its 60th anniversary on Christmas Day this year.

Radio amateurs in Quito will operate HC60JB on 14, 21 and 28MHz from 2100 on 6 December to 0300 on the 8th. What is unusual is that the operators will stay at home during the event. They will use telephone lines to connect with a microwave system, eventually linking up with some of HCJB's Siemens SSB broadcast transmitters at Pifo, 18 miles away. The reason for the remote operation is the severe interference which would be encountered if operating directly alongside HCJB's twelve high power transmitters.

The Siemens transmitters

continued on page 8 ▶



A 24-element cubical quad antenna dwarfs a pair of llamas at HCJB's international transmission site at Pifo.

A Christmas Message from the President

IT SEEMS just a few short weeks since I stood in Cardiff Castle and received the Presidential Chain of Office from Frank Hall, GM8BZX, the outgoing President. Now the year is fast running out and it will not be long before I hand over to Terry Barnes, GI3USS.

In spite of the rate at which the time has appeared to have passed, the year has been an extremely busy one for myself and other members of Council. We hope to end the year with the Society in a very much better situation than that in which it began and I would like to thank both the staff and the volunteers for the help and encouragement which I have received throughout what has proved to be a very difficult period.

1991 has seen several innovations in the field of amateur radio and I am personally pleased with the development of the Novice Licence training scheme and the success of the first students in obtaining their new callsigns. They start with a wonderful advantage of having a call which for some time to come will be highly sought after. Please give these new amateurs as much help as you can (they may well find themselves at the bottom of a 'pile up' and have some trouble dealing with it) and as with all newly licensed amateurs, be patient. We can look forward to 1992 with much hope and enthusiasm as the Society moves towards a period of success and prosperity. On a personal note may I wish you all a very happy Christmas and all the very best for 1992. Thanks for your support.

Ewart J Case, GW4HWR,
President

The IARU Monitoring System

by IARU-MS International Coordinator Bob Knowles, ZL1BAD

MANY NATIONAL amateur radio societies have established a system to deal with non-amateur signals heard in bands allocated exclusively to the Amateur Service. As far as I have been able to determine, this type of Society activity follows a precedent set by the RSGB back around 1959-1960.

The number of participating Societies is slowly but surely increasing, the most recent addition being Denmark. These national reporting systems are known by such names as 'Intruder Watch', 'Band Watch', 'AIRS', 'Monitoring Service' and so on. This article will refer to them by the generic name of Intruder Watch. Operational details of the Intruder Watch vary from country to country but they share a common aim: the detection, identification and removal of all non-amateur signals appearing in our exclusive bands.

The Legal Process

SOCIETIES THAT operate an Intruder Watch submit monthly summaries of the monitoring reports received from their members to their administrations, with a request for corrective action, as provided for in the International Telecommunications Union (ITU) Radio Regulations. The Societies also send copies of the summaries to their International Amateur Radio Union (IARU) Regional Monitoring System Coordinator. The three Regional Coordinators collate the reports and produce a Regional Summary which they forward to the International Coordinator.

From the Regional Summaries, the International Coordinator extracts details of world-wide problems and refers these to the IARU Administrative Council (AC) for information and action. The AC is investigating a method of getting this information to the official notice of the International Frequency Registration Board (IFRB) of the ITU.

There is a continuous cross-flow of intruder information at all stages of the reporting chain and action is taken at many levels to have intruders removed. This may be a letter from a Society to the management of the intruding station or it might be a formal complaint from one administration to the administration that licenses the offending station. Many cases are solved in a less formal fashion by personal contacts at international meetings.

This mechanism is the IARU Monitoring System (IARU-MS). Its effectiveness is directly proportional to the number of amateurs filing reports with their societies, the willingness and aggressiveness of the national society, and its national administration to act on behalf of radio amateurs.

This is a Job for You

SOME NATIONAL Societies claim that they cannot find a person suitably qualified to act as National Coordinator. Experience has shown that it's better to have a Coordinator who learns as he/she goes along than to have no Coordinator at all! Many Amateurs profess an inability to differentiate between an intruder and a legitimate amateur signal, yet how often do these amateurs operate alongside intruders and complain, in great detail, about them?

Our exclusive bands have been hard won and it is the responsibility of every amateur to do what he/she can to protect them. Instead of tuning through intruders' signals, take a moment to note the date, time, frequency and type of transmission the intruder is using and send that information to your national Society's headquarters (RSGB in the UK). This action serves several purposes: (1) it gives the Monitoring System information, (2) it alerts the National Society to your concern, and (3) it gives you the opportunity to *do something* about intruders.

Armed for the WARC

THE IARU-MS also undertakes band occupancy studies to support positions that may have to be taken at a World Administrative Radio Conference (WARC). One such study ran from February 1990 to March 1991 and involved more than 150 amateur operators and short-wave listeners throughout the world. These people compiled more than 550,000 reports on a wide range of frequencies that were monitored for 24 hours every eight days. While any one operator was only asked to work a two-hour shift each eight days, their dedication to the task was truly impressive and reflected their desire to return something to the hobby. The information thus obtained will prove to be of value at WARC-1992. The Members of the IARU-MS are not supermen, just ordinary amateurs who believe that amateur radio is worth protecting. Isn't it time *You* did your bit? Additional information on the IARU-MS can be obtained from G0OES or one of the following:

IARU-MS Region 1 Coordinator. Ron Roden, G4GKO, 27 Wilmington Close, Hassocks, W. Sussex BN6 8QB.

IARU-MS International Coordinator. Bob Knowles, ZL1BAD, Onewhero R.D.2, Tuakau, New Zealand. Fax: 64-923-83884.

The RSGB's Monitoring System

by David L Owen G0OES

THE MONITORING System of the RSGB is alive and well and is in the process of being improved. Some time ago, members were asked to offer their assistance. Since then Martin Atherton, G3ZAY, and the newly appointed coordinators John Cleeve G3JVC and myself have been working behind the scenes to improve and up-grade the service.

As stated in the article above, we are primarily concerned with intruders from outside these Isles. Problems with internal intruders should be addressed to the Amateur Radio Observation Service (AROS) Coordinator, G3STG, QTHR.

The level of these intrusions can only be described as phenomenal, but we have had our successes this year. Two notable triumphs include the removal of a European broadcast station from 40m and the cessation of activity from a number of African Embassies within our spectrum.

Because of the pressure for frequencies by commercial organisations, each time we allow intruders to use our bands we run the risk of losing those frequencies.

We should realise the magnitude of this threat especially when in negotiations for frequencies. How can we justify our case if commercial organisations can prove unchallenged activity over a long period of time? We quite simply cannot unless we have evidence. Unfortunately complaints from members are few and far between.

The new system will improve matters but we still depend on you, the active SWL and amateur. My address and telephone number is below, do not hesitate to contact me. If you do, the following information will be of use.

1) Date and Time (UTC)
2) Frequency
3) Type of emission
4) Any identification given
5) A tape recording of the interference is beneficial

The several-hundred people who responded to the Society's request for volunteers will be focusing their attention on the current intruders. If you do have any special problems please contact me: RSGB Monitoring Secretary, David L Owen, G0OES, 9 Cornfield Drive, Lichfield, Staffs, WS14 9UG. Tel: 0543 254 622, giving as much attention as possible. Observations over a period of time are preferred.

Fighting for free frequencies is the responsibility of all our community. With your help we can strive to free our bands of this botheration. Imagine working a conversational net or DX without the chance of annoying and destructive interference.

World Administrative Radio Conference

IARU Committee Chairman Tim Hughes, G3GVV, explains this important event

WHY SHOULD all radio amateurs be interested in a conference which will take place in Spain next February and where amateur radio is not even on the agenda? After all, WARCs are where bureaucrats meet in mahogany-panelled congress halls, negotiating international treaties amidst thick piles of carefully worded position papers and technical studies. It is radio's version of a superpower summit meeting where delegates wear headphones and listen to what is being said translated into a choice of languages. So why is the RSGB and many more of the 127 national amateur radio societies and the IARU investing so much time, effort and money in it? WARC-92 is a tidying-up process following three previous specialised conferences: WARC HF-BC (broadcasting), WARC MOB-87 (mobile services) and WARC ORB-88 (space communications). All three have requested additional spectrum space and the task of the conference will be to try to find it.

At the last WARC (79) amateur radio came away having gained three new HF bands and achieved new accesses for amateur satellites. At that time the room available to the amateur service was inadequate and it was a much needed outcome. But if we hadn't been very actively involved this would not have happened. WARC-79 lasted eleven weeks and we were very successful but at great cost both financially and in volunteer effort by radio amateurs.

This time things will be different because amateur radio is, strictly speaking, not on the agenda. *However*, we will be carefully watching what the professionals are proposing to do to see whether it might impinge on areas important to us!

There are a number of entirely new services hoping to be given spectrum allocations this time - in some cases very large pieces indeed - particularly in the VHF/UHF/Microwave area. These include LEOs (Low Earth Orbit Satellites), mobile satellite services (these want 5MHz, involving sections above and below - and uncomfortably near - the 144MHz band), satellite broadcasters, wind profilers, and FPLMTS (Future Public Land Mobile Telecommunication Services) - the last making enormous demands. Any of these might affect us in some way; remember, the radio spectrum cannot be stretched, so when new allocations are made, quite often somebody has to move.

WARCs are attended by very nearly all members of the ITU, to which most countries in the world belong. Recognised international organisations such as the IARU are admitted as observers. In this we have a great privilege. Individual member societies are not allowed to attend.

One of the more obvious points which will concern us is the situation around 7MHz. At present, Region I (that includes us) and Region III have only a 100kHz-wide band; Region II has 300kHz. We all know how broadcasting signals do not mix well with amateur signals and what a useful band 7MHz is. The CCIR is the expert body which advises the Conference on technical matters, and it has already pointed out that Amateur and Broadcast Services are not compatible. Hopefully some harmonisation can take place in this area and as a result we just might make some gain in our Region. Another key area is the 2.4GHz band which we share but where it is being proposed that several other services need improved access. This could cause serious problems for our low-power long-distance experiments and we will be watching this situation carefully.

The Conference will last from 3 February to 3 March and, of course, a full report will appear in *RadCom* after it concludes.

WARC: A Long History

From *QST* – Dan Bergerson, KB4IYK

MOST HAMS are aware of WARC-92 (if you weren't, you are now) and WARC-79 (especially because it resulted in new amateur bands at 10, 18 and 24MHz, still called the 'WARC bands'). But you may not know that there have been conferences like WARCs for nearly 90 years, or that there have been ten major conferences since the turn of the century! Here's an abbreviated look at some of the milestones:

Berlin 1903: The first WARC (it wasn't actually called that) was attended by nine nations. It dealt mostly with the standardization of equipment and not with frequency allocations.

Berlin 1906: Twenty-nine nations participated in this conference, called to establish procedures for ship-to-shore communications. It was the first conference to assign specific wavelengths. This second Berlin conference instituted three-letter call signs (the first formally issued call signs), specified the use of international Morse, designated SOS as a distress call and established the principle of holding similar conferences from time to time.

London 1912: Attended by 43 nations, the London Conference mostly expanded upon the 1906 treaty and regulations. It was here that Q signals came into being

Washington 1927: With 78 nations participating, the Washington International Telegraph Conference was the largest international gathering on any topic up to that time. Great strides had been made in the radio arts since 1912. New uses had been found for radio and the number of radio services increased from two to ten. Telephony had given birth to the broadcasting industry.

For the 'amateur', life would never be the same. Among the resulting regulations, the conference defined a 'private experimental station'. For the first time, amateur radio achieved international recognition. Also at the Washington Conference, the radio spectrum was first divided into segments, with the various services being allocated certain segments or groups of segments for their use. (The Allocation Table was only a guide. It wasn't until the Madrid Conference of 1932 that countries actually agreed to make their internal assignments according to the Allocation Table). We can trace the development of the 160, 80, 40, 20, 10 and 6 metre (then it was 5 metres) amateur bands to this conference. Also, amateur licensees were required to demonstrate the ability to send and receive 'by ear' the International Morse Code. The code speed and proficiency requirement was left for each country to determine.

Madrid 1932: The second of the 'modern' conferences. Madrid saw the introduction of restrictions on international message traffic by amateurs. For the first time, the Amateur Service was separately defined.

Cairo 1938: Existing commercial services were expanding and new ones were being introduced. There was considerable pressure on HF bands allocations, and among other changes, amateurs in Europe had to share part of the 40m band with broadcasting interests. At Cairo, the ITU divided the world into regions - a concept that has stayed with us to this day.

Atlantic City 1947: The first post war general WARC, Atlantic City was a mixed blessing for Amateur Radio. Attendees had to consider the introduction of several new services, including radar, radio navigation and international aviation. Spectrum space had to be found. Further compartmentalization of the 40m band took place among the three ITU regions, and we lost the upper 50kHz of the 20m band and the upper 300kHz of the 10 metre band. In compensation. We gained a new, exclusive 15m band and new VHF segments as well.

Geneva 1971: This conference, called to deal with the rapid developments in satellite telecommunications, was a set-back, fortunately a temporary one, for amateur satellites. The only 'window' for amateur satellites that could be obtained between 146MHz and 24GHz was at 435-438MHz.

Geneva 1979: WARC-79 was a major success for Amateur Radio. We not only obtained three new bands and improved our status in others, but existing Amateur Radio bands remained intact and we obtained new access for amateur satellites. Amateur Radio's success in 1979 can be traced to extensive planning, organisation and the fact that we had one international voice, the IARU. It was tremendous team effort, and a blueprint for our WARC-92 efforts.

Quito's Quads

continued from page 5

will be de-tuned down from 30kW to a mere 1.5kW for the HC60JB operation but the signal is still likely to be very strong because some of HCJB's 31 massive aerials will be used, having gains of up to 25dBi! These will include a rhombic (8 to 13dBi) and a 30-storey high curtain antenna with eight parallel-fed dipoles. The most interesting antenna in use will be the cubical quad invented by HCJB engineer Clarence Moore in 1939 to overcome problems with high power broadcasting in the rarified air to be found 9,300ft up in the Andes. HCJB's quad has 24 elements with four parellel-fed arrays, each six elements deep.

Amongst the amateurs involved with HCJB are International Radio Director John Beck, HC1QH, and HC60JB's event coordinator Keith Clukey, KC6SMW/HC1. Further information about HCJB can be obtained from HCJB World Radio, PO Box 553000, Opa Locka, Florida, 33055.

SSL get licensing contract

FROM 1 APRIL 1992, the contract for amateur and CB licensing has been awarded by the DTI to Subscription Services Ltd (SSL) a wholly owned subsidiary company of the Post Office.

CB licensing is currently carried out over the counter at post offices but will be centralised with the change-over to SSL. Until next April, amateur licensing, which is already centralised, will continue to be dealt with by the Radio Amateur Licensing Unit at Chesterfield. All licensees will receive notification of the change, including the new address to write to and how payment should be made.

Thanks

THE FOLLOWING are retiring from Council at the end of December: Frank Hall, GM8BZX; John Greenwell, G3AEZ; and Angus McKenzie, G3OSS. They are thanked for the service given to the Society over many years.

New RLO

THE NEW RSGB Liaison Officer for Nottinghamshire is Mary Lowe, G0NZA, 25 Manor House Court, Kirby in Ashfield, Notts, NG17 8LH; tel 0623 755288.

Stolen

FROM BATH in September, Yaesu FT-470 S/N OK270922. Information to Bath Police.

Alinco Vice President Toyoaki Komatsu flew in from Frankfurt to support UK distributors, Waters and Stanton, at the Leicester Show. Mr Komatsu was particularly struck by the enthusiasm and friendly atmosphere that marked the relationship between the amateurs and the trade. He was obviously pleased by the high profile enjoyed by his company's products in this country. Pictured with Peter Waters and Mr Komatsu is Miss Mieko Twasaki, JN1UUJ, who was on the stand to help promote Alinco to the British amateur.

RSGB HQ General Manager Philip Smith opening the new shack of the White Rose Amateur Radio Society on 2 October.

Tallest Ship

PICTURED ON last month's cover was the Polish Training Ship *Dar Mlodziezy* in Belfast's Pollock Dock during this year's Tall Ships Race. Built in 1982, it is the second-longest sailing ship in the world (311ft) and has the tallest mast of any sailing ship afloat - over 200ft to the waterline. Aerials are mounted on top of all three masts and between them.

AGM

A REMINDER that the Society's Annual General Meeting takes place at 2pm on Saturday 7 December at the Royal Society of Chemistry, Scientific Societies Lecture Theatre, New Burlington Place, off Savile Row, London, W1. Full details were inserted in the November edition. If replacement inserts are required, contact Justine Coles at RSGB HQ *urgently*.

QSL

● THE QSL Sub-Manager for Novice licensees is Michael Shread, GM6TAN, 2a Seatown, Gardenstown, Banff, AB45 3YQ.

Novices Go to the Palace

FOUR NOVICE 'firsts' went to Buckingham Palace on 20 November to meet RSGB Patron HRH Prince Philip, Duke of Edinburgh, KG. They were: The first Novice 'A' licencee, Hugh McNeill, 2E0AAA; the first Novice 'B' licencee, Jonathan Page, 2E1AAA; and the first two lady Novice licencees, Vicky Foster, 2E1AAD and Natasha Weir, 2E1AAE.

The visit, in Prince Philip's 70th birthday year, celebrated the successful outcome of a major part of Project YEAR which he launched in 1988 at the RSGB 75th Anniversary Convention. Also included in the party was Sir Richard Davies, G2XM, who was President in 1988; John Case, GW4HWR, the 1991 President; and Hilary Claytonsmith, G4JKS, Project YEAR Co-ordinator.

Full story next month.

CEPT

Czechoslovakia and Hungary have signed CEPT TR61-01. UK amateurs no longer need reciprocal licences for those countries.

1992 Presidential Installation

THE RSGB's 1992 President, Mr J T Barnes, GI3USS, will be installed at an evening reception and dinner on Saturday 11 January (7.30 for 8.00pm). The venue is The Council Chamber, Town Hall, Bangor Castle, Castle Park Avenue, Bangor, Co Down, NI. Tickets for this prestigious event are £10 per head. Members wishing to attend should apply to Justine Coles at RSGB HQ by Friday 20 December, marking the envelope 'Presidential Installation'.

Introducing the *DRAKE R8E* Communications Receiver

- ★ Wide frequency coverage (100KHz to 30,000KHz) plus additional VHF bands (35-55MHz and 108-174MHz) with the optional VHF converter. Multi-mode reception includes AM, FM, RTTY, CW, USB and LSB.
- ★ Five built-in filter bandwidths... for reception of most signals under virtually any conditions.
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- ★ Multiple scan functions... for scanning by carrier, time or seeks modes of frequency or selected memories.
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- ★ Two operating VFOs... for increased flexibility and convenience.
- ★ Built-in pre-amp and attenuator... for improved reception of extremely weak signals, as well as very strong signals.
- ★ Timer function... for automatic operation. Very useful for recording purposes.
- ★ Dual time zone built-in clock.
- ★ Built-in dual mode noise blanker... for reduced electrical interference.
- ★ Passband offset... for the reduction of nearby interfering signals while maintaining maximum intelligibility.
- ★ Selectable AGC... for improved reception of fading signals.
- ★ Built-in speaker. ★ PLL synthesised.
- ★ Dual antenna inputs.
- ★ Optimum tuning step selection for each operating mode.
- ★ Connections for an external speaker and tape recorder.

£965
including VAT

WARNING
The R8 is manufactured for Europe as the **R8E**, *the* **E** *model meets European safety specifications and is the only version that comes with Drake's full warranty for operation in Europe.*

DRAKE IS BACK!

Drake have been known for their craftsmanship and superior communications products, proudly made in the USA, since 1943.

After a few years break, we are pleased to announce the launch of our new **R8E** Communications Receiver. In the new **R8E** Receiver, you will find that we have gone beyond ordinary shortwave receivers to give you the only receiver you will ever need to own.

The **Drake R8E** has been designed as a "complete package" — in fact, the only peripherals you may wish to add are a VHF converter and an external speaker.

Drake are also pleased to announce the appointment of **Nevada Communications** as their sole UK distributor. Nevada have over twenty-two years experience in the Communications Industry and the management are all Drake enthusiasts. They will be pleased to offer advice and a full service back-up on the new **Drake R8E** Receiver. Call them now or write in for further details.

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CHRISTMAS OPENING HOURS

HQ SHOWROOM

DEC 24	9.00am - 1.00pm	DEC 25/26	CLOSED
DEC 27	9.00am - 5.00pm	DEC 28	9.00am - 1.00pm
DEC 30/31	9.00am - 5.00pm	JAN 1	CLOSED
JAN 2	Open as usual.		

BRANCHES

Please contact the relevant branch for their opening times. Last deliveries - Latest deliveries will be by Interlink (next day) on Christmas Eve. After this next deliveries will be Jan 3.

Closed lunchtime during holiday period 1.00 - 2.00pm

SERVICE DEPARTMENT - CLOSED - FROM 1.00pm DEC 24 to 9.00am JAN 2.

CHRISTMAS AND NEW YEAR SPECIAL

FT470 Dualbander £329

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A SAVING of over £110 on the RRP.
This offer is on a first come first served basis and is only available whilst stocks last.

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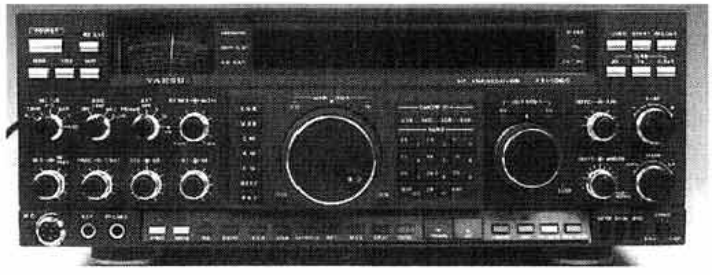
The Best of The Best - *the FT-1000*



Designed with no spared effort or expense for optimum performance and operability, the FT-1000 is the fruit of over 25,000 man-hours of intensive research and development by Yaesu's top design engineers. Instead of merely offering incremental improvements on existing designs or adding bells and whistles to an old model, the FT-1000 project involves a wholly new approach to the application of the latest digital and RF technologies to today's most demanding needs on the HF bands. Extensive surface-mount component technology allowed six microprocessors and five Direct Digital Synthesizers to be harmoniously integrated with a simple operator interface into a highly reliable full-features transceiver optimized for serious HF applications.

BRIEF SPECIFICATIONS

- ★ General Coverage Receiver 100kHz-30MHz
- ★ Ham bands TX 160-10m
- ★ Modes CW, USB, LSB, AM, FM, RTTY and Packet
- ★ VFO steps 10Hz CW, SSB, RTTY, 100Hz AM, FM, PKT
- ★ Auto antenna impedance range 16.7 to 150 ohms
- ★ Selectable receiver bandwidths 2.4kHz, 2kHz, 500Hz, 250Hz
- ★ Dual band receiver tuning and monitoring with balance control
- ★ Power output up to 200W P.E.P. 50W AM
- ★ Sensitivity pre-amp on SSB/CW 0.25 microvolts 10dB S/N
- ★ D.D.S. Direct Digital Synthesiser
- ★ Dual Selectable noise blankers with adjustable threshold
- ★ 99 Memories

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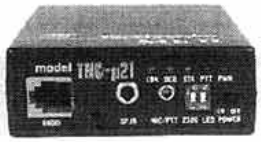
Two new TNC units, the TNC24MkII and TNC Micro, are both compact full featured designs, built to exacting standards for the discerning packet operator. The TNC Micro is the ideal companion for use with portable transcievers being only the size of a cigarette packet.

TNC 24MkII £325



TNC Micro £209

- ★ PACKET, CW, RTTY & FAX modes.
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WHY NOT DROP US A LINE FOR MORE INFO!

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RS-9	Mini Trunk Mount (Black)	£6.25	A	CA-21HR	15m Monobander	£33.95	B
CX-702	6m/2m/70cms Tribander	£46.95	B	CA-50HR	6m Monobander	£33.95	B
CA-7HR	40m Monobander	£33.95	B	CA-285	6m/2m Dualbander	£20.75	B

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HANDHELD ANTENNAS

CH72S	2m/70cm BNC 0dB/3.2dB 2m/70cm	£12.25	A

MOBILE ANTENNAS

CA2x4MB	2m/70cm 4.5dB/7.5dB 2m/70cm	£38.50	C
CA2x4KG	2m/70cm 6.0dB/8.4dB 2m70cm	£40.75	C

DUPLEXERS

CF-305	50/144 Duplexer UHF conn.	£25.00	B
CF416MN	144/430 Duplexer UHF/N conn.	£26.00	B
CFX-514	50/144/430 Triplexer UHF conn.	£36.75	B
CFX4310	144/430/1200 Triplexer UHF/N conn.	£36.75	B

MOUNTS

TBR	Adjustable trunk mount	£11.50	B
RS17	Mini trunk mount	£12.75	A
RS16	Mini Gutter mount	£12.75	B
CK-3LX	Mini Cable Assy for RS16/RS17	£16.25	B

MINI MOBILE ANTENNAS

CHL21J	2m/70cm 0dB/2.15dB 2m/70cm	£14.75	B
CHL23J	2m/70cm 2.15dB/3.8dB 2m/70cm	£17.35	B

BASE ANTENNAS

CA350DB	6m/10m 2.15dB/6.5dB	£139.00	D
CA2x4WX	2m/70cm 6.5dB/9.0dB	£80.72	C
CA2x4MAX	2m/70cm 8.5dB/11.9dB	£102.12	C

FILTERS

CF-30MR	HF Cut off 32MHz 1kW P.E.P.	£38.75	B
CF-50MR	6m Cut off 54MHz 1kW P.E.P.	£38.75	B
CF-30H	HF Cut off 32MHz 2kW P.E.P.	£80.75	A
CF-30S	HF Cut off 32MHz 150W cw	£19.35	A
CF-50S	6M Cut off 57MHz 150W cw	£20.35	A
CF-BPF2	2m Band Pass 150W cw	£31.65	A

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CM-420	2m/70cm 15-50W Mini	£36.75	B
CD-120	1.8-200MHz 15/60/200W	£76.60	B
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CD-270D	140-525MHz 15/60/200W	£79.65	B

COAX SWITCHES

CSW-20	2 way DC-1000MHz SO239	£26.50	A
CSW-20N	2 way DC-1500MHz N	£45.95	B

ACCESSORIES

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CES-M2	Mini Clip on Speaker 3.5mm jack	£5.62	A
CHM-M4	Mini mic + PTT 2.5mm jack	£9.15	A

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HC400L	160-10m 350W P.E.P.	£203.00	C
HC2000	160-10m 2kW P.E.P.	£365.00	D

PRICES FOR POSTAGE ON ALL THE ABOVE ITEMS ARE CODED AS FOLLOWS:

A = £1.95 D = £11.00
B = £4.75 E = £16.50
C = £6.60

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HT106	6m Transceiver 10W P.E.P. SSB/cs	£306.50	C
HT120	20m Transceiver 10W P.E.P SSB/cw	£305.50	C
HT180	80m Transceiver 10W P.E.P. SSB/cw	£305.50	C
HP100S	Power Supply for HT series	£99.00	B
HC100	A.T.U. 80-10M 5 band 200W P.E.P.	£109.00	B
HCF100	CW Narrow filter HT series	£39.85	A
HNB100	Noise Blanker HT series	£19.95	A
HBK100	Mobile Bracket HT series	£10.20	A

LINEARS

HL2K	160-10m HF Linear 2kW	£1450.00	E
HL1K	160-10m HF Linear 1kW	£899.00	D
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HL1000/20	20m 10W in 100W ouput P.E.P.	£182.00	C
HL100B/80	80m 10W in 100W output P.E.P.	£182.00	C
HL66V	6m 10 in 50-60W output	£131.75	C
HL166V	6m 3/10W in 80/160W output	£255.00	C
HL37V	2m 3W in 32W output	£90.95	B
HL62V	2m 10W in 60W output	£137.95	C
HL110V	2m 2/10W in 100W output	£220.00	C
HL180V	2m 3/10/25W in 170W output	£299.00	C
HL36U	70cm 6/10W in 25/30W output	£138.00	B
HL63U	70cm 10/25W in 50W output	£220.00	C
HL130U	70cm 3/10/25W in 120W output	£397.00	C

TRANSVERTERS

HX240	2m to HF 80, 40, 20, 15 & 10m 2.5W/10W in 30-40W P.E.P. output	£254.50	B
HX640	6m to HF as above	£254.50	B

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- *Same day despatch wherever possible.*

ANNOUNCING THE IC-P2ET
NEW HANDHELDS WITH ARTI

Icom announces the debut of the VHF IC-P2ET and the UHF IC-P4ET, these multi-functional handhelds both feature artificial intelligence that allows you much easier operation and can even evaluate ability.

Design concept

The IC-P2ET and IC-P4ET were designed with the following points in mind:

- Contains all the features in the "ST" series.
- New body design and colour.
- Artificial intelligence function that allows easier operation.
- Trial mode to evaluate user ability.
- Star selection mode that allows you to select a number of functions manually.
- Seldom-used functions can be hidden.
- Cartridge-type battery packs that can be easily inserted into the transceiver.
- A keyboard that activates functions quickly.
- Compact, but not too small to hinder use.

Easier operation with AI

This is an exciting new feature not previously available on handhelds. By adopting the sophisticated AI (Artificial Intelligence) function, these handhelds 'learn' the order of used functions.

The last-used function is automatically allocated to the AI key. The allocated function is shown in the AI indicator, you can then activate it with one touch.

Also, your favourite function can be allocated to the AI key manually by utilising AI mode.

IC-P4ET
shown here much
larger than actual size

AND IC-P4ET, TWO CLEVER FICIAL INTELLIGENCE ABILITY

Automatically evaluates user's ability: Trial mode
Using the newly developed trial mode, simple operations for beginners or multi-function operations for more advanced users are selected automatically. Depending on the users ability this mode hides or allows access to various functions.

By assessing the users answers to 15 questions this mode automatically evaluates ability and awards a number of star marks.

When desired the operating level can be manually selected via the star selection mode.

Compact, rounded body design
At just 49(W) X 105(H) X 38.5(D) mm including supplied BP-111 battery pack, the new IC-P2ET and IC-PE4T handhelds are small, smart and fit everyones hand comfortably.

Easy-to-see function display
Day or night, the larger function display indicates all the required information clearly.

Illuminated keyboard
A variety of function settings are possible via the keyboard. For night time operation, the keyboard is illuminated.

Numerous channels
Many channels are included for operating convenience. 100 memory channels and 1 call channel store the operating frequency, offset direction, offset frequency and sub-audible tone frequency independently (an optional UT-50 Tone squelch unit is required for subaudible tone frequency)

For programming scan, 2 edge channels are provided independently.

Full 5 Watt output power
By connecting an external 13.8V DC power source, a full 5W of output power is available. 3.5W, 1.5W or 500mW low output power are also selectable for longer operating times.

Miscellaneous convenient functions:
- Dual tuning system: the keyboard or the main dial on the top panel.
- High sensitivity receiver.
- Full, programmed, memory scans and priority watch with skip function
- Auto power off timer.
- Auto power saver.
- 10 DTMF code channel for auto dialling
- 1750 Hz tone call.
- 5, 10,12.5, 15, 20, 25, 30 or 50 kHz tuning steps.
- Dial select function for 100 kHz or 1 MHz tuning steps and quick memory channel selection.
- Memory masking function.
- Memory transfer function.
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- Optional pager and code squelch functions.

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Call sign: .....Tel:.....Dept: RC

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

G5MY HAS written a most interesting letter to me concerning the VK-ZL-Oceania contest. He believes that quite a few take part but because their score seems low they do not bother to send in an entry. In fact it is a pity that this competition is not better supported from the UK.

He mentions that he has been trying out a 'magnetic loop' antenna 80cm in diameter made of 10mm copper tubing bought in a roll - four circles soldered with a blowlamp and Faraday loop coupled. It covers 14 to 28MHz and has remotely controlled tuning.

It was originally meant as a standby until Hal found that when tuning it using only 10W and with it on the bench near his elbow he was called by a YU! He has no TVI from it although indoor quads and dipoles have always been a problem. Has anyone else discovered this?

DX NEWS

BRIAN, ZL1ACX, has written to say that he is now on **Nauru** where he expects to remain until March 1993. His callsign is C21BR and for the time being activities will be confined to 14 and 21MHz SSB only, and probably mostly on 14.210, 14.265, and 14.305MHz between 1700 and 2000 weekdays and until 2400 Fridays and Saturdays. He mentions "additionally 1845 - 1930 daily 14.220MHz plus or minus 20kHz". 21MHz activity is likely to be confined to weekends.

Brian's equipment is a rebuilt KW Atlanta giving 500W pep output and a TA33Jr beam brought from New Zealand. He has no TVI worries - there is no television on the island !

There is a possibility that KH6JEB might have returned to **Kure Is** in mid-November to become KH6JEB/KH7 again. According to *DX'press* there is an amateur with the new shift which has recently gone to **Kermadec Is**. His name is George and he will be ZL8GBS and be on Raoul Is for a year. He has an FT747 and dipoles but is - as yet - inexperienced. VK0LL is on Casey Base, **Antarctica** and is VK2LL when at home. He is sometimes on 14.170MHz around 1530. It appears that the application for **Jarvis Is** to be given separate DXCC status has been rejected by ARRL.

If you still need a QSL for a contact with VP5/G0AZT (Oct 88, Jan 89), C6A/G0AZT (Oct 89) or ZF1RY (Sept 90) they are still available from the address given for V2/G0AZT in *QTH Corner*.

Very good news indeed from **Bangladesh** where - thanks to stirling efforts by Saif Shahid, president of the Bangladesh Amateur Radio League and Jim Smith, VK9NS, amateur radio is now legal. Saif is S21A and Nazim - secretary of BARL - is S21B. Jim and Kirsty Smith have been issued with the callsigns S21ZA and S21ZB respectively and, following operations by them, licences will be issued to other foreigners - WZ6C included.

Bob Parkes, G3REP/P29PR/VS5RP, is currently in **Sri Lanka** as 4S7/G3REP and at the time of writing to me was confined to 7MHz only. However, all band operation is being planned . . . . A45ZZ in the **Sultanate of Oman** is Tony, G3LNP, who is newly licensed and has been worked on 18MHz.

Christine and Paul Wise - formwely 3DA0BX and 3DA0BW - are now in **Malawi** and back on the air as 7Q7BX and 7Q7BW. According to *RSGB DX News Sheet* the club station in **Mozambique**, C9TDM, is often to be found near 28.515MHz around 1400. C9RAA has been reported from the USA to come on 10.103MHz at 0230 before moving to the low end of 7MHz. The same source says that D2ACA, operated by UT3UY and LZ2DF, should have been on the air again by now from **Angola**. UT3UY says that neither UT4UM/D2 nor RT5UY/D2 was properly licensed.

JX3EX, operated by LA3EX, is scheduled to leave **Jan Mayen Is** in the middle of this month but LA9EHA will be on the island as JX9EHA until next April. The ZA1A project succeeded in making more than 70,000 QSOs and at the time of writing 12 local amateurs had graduated and were to be given callsigns in the series ZA1TAA - ZA1TAL.

The callsigns of foreign visitors will have a suffix beginning with Z. Unfortunately I understand that some of the activity by the Hungarians was considered illegal and that they was closed down by the police. N7NG, at the RSGB HF Convention, said that personal calls would indicate the area in which they were located - ZA1T (Tirana), ZA1D (Durres) etc. Several other ZA calls have now appeared including ZA1ZVX (F2VXX), ZA1ZXV (F6EXV), ZA1ZMX (F6FMX), and ZA1ZSW (W7SW).

DXPEDITIONS

SOME TIME ago I mentioned a voyage which was going to be undertaken by the Barrackpore ARC (VU2NSA). This was going to go from Calcutta to Singapore and back using an eight by twenty-two feet wooden raft. It was postponed because of the problems in the Gulf area but is now re-scheduled to leave Calcutta at 1100 local time on 26 December and the whole trip is expected to take 120 days. One member of the radio club (VU2MFY) will be aboard and he will have an FT757 as main equipment backed up by a simple crystal controlled transmitter on 14.055MHz. The expedition will be publicised by All India Radio and TV Bangladesh, the *National Geographical Magazine* and others.

Latest news on the **S Sandwich** expedition is that it is still on course to start on 21 March and to last for two weeks. There will be ten operators running three stations which will be on three different bands from 1.8 to 50MHz.

Left to right: Ken, G4PTE; Pat, ZL2AIL; Liz, ZL2JZ; James, KB6WHT (visiting John); John, ZL2ALR.

CONTESTS

ARRL 160M CONTEST

2200 6 December to 1600 8 December

Single-operator QRP (less than 5W output), low power (less than 150W output), and high power (more than 150W output). Send RST. W/VE will send RST and ARRL/CRRL section. Multipliers are ARRL/CRRL sections plus VE8/VY7 (maximum 77) plus DXCC countries other than W and VE. I have copies of the rules (SASE please).

ARRL 10M CONTEST

0000 14 December to 2400 15 December

No more than 36h operating/listening time allowed. Use of spotting nets not allowed. Single operator CW, phone, or mixed classes and there are three divisions according to power output - High (over 150W), Low (less than 150W) and QRP (less than 5W). Multi-operator is mixed mode only. Work anywhere and give RS/T plus serial QSO number from 001. US and Canadian stations will give state/province. Two points per phone QSO, four for CW, and eight if you work a US Novice. Multiplier is the 50 US states (plus DC), Canadian provinces and DXCC countries (except W and VE) contacted per mode. I can supply photocopies of the rules - recommended reading if you enter seriously (SASE please). This could be an interesting event.

Results of the **1990 VK-ZL-Oceania DX Contest** have now been published. In the phone section UK scores were: G5MY 360 points, G0JDK 322. In the CW section G3WPF scored 4032 points, G3DYY 884, and G5MY 720.

UBA SWL COMPETITION

0000 1 January - 2400 31 December 1992

Listeners log as many different DXCC countries as possible on 1.8 - 28MHz (excluding the WARC bands). Each counts as one point on each band and each country heard counts *once* as a multiplier. Five categories - Phone, CW, Digital, Image (SSTV, FAX), and all-mode (restricted to club stations or multi-operators). More than one category may be entered. Complete rules, log sheet, summary sheet, and countries list are available from Marc Domen, Postbus 188, B-2600 Berchem 1, Belgium, and I very strongly recommend asking for these.

1991 INTERNATIONAL NAVAL CONTEST

1600 21 December - 1600 22 December

3.5 to 28MHz (no WARC) in IARU contest preferred segments where applicable. Photocopies of rules available (SASE please).

JT-80 ANNIVERSARY CONTEST

0000 21 December to 0000 22 December

1.8 to 28MHz (no WARC bands) CW or phone *but not both*. This is being organised by the Mongolian Radio Sports Federation to celebrate the 80th anniversary of the national liberation movement of Mongolia. Single and multi-operator multi-band and listener categories. Send RS/T plus serial QSO number from 001. JTs will send RS/T followed by the last two digits of the year they were first licensed. QSOs with Mongolia count five points, with other continents three, and with own continent one. The multiplier is the number of DXCC countries and different JT stations worked on each band added together. Final score is total QSO points times sum of multipliers from all bands. Gold, silver, and bronze trophies will go to the top three in each class - and awards will be made to those who make more than 80 contacts. Submit separate logs for each band and include the usual signed declaration. Send to JT-80 Contest Commission, P.O.Box 639, Ulaanbaatar-13, Mongolia, to be received by 20 February 1992.

QRP WINTER CONTEST

1500 1 January - 1500 2 January

Nine hours rest time obligatory - in one of two blocks. Single-op on 3.5, 7, 14, 21, and 28MHz CW. VLP (up to 1W output). QRP (5W output), MP (to 25W output), and QRO (higher power) categories. Exchange RST, QSO serial number, and category. I have photocopies of rules (SASE please).

THANKS

TO ALL those who have supported the column during 1991 and also to the authors of the following for news items extracted during the year: the *Ex-G Radio Club Bulletin* (WA8TGA), the *Long Island DX Bulletin* (W2IYX), the *RSGB DX News Sheet* (G4DYO), the *Lynx DX Group Bulletin* (EA2KL), *DX'press* (PA3DZN), the *Heard Is DX Bulletin* (VK9NS), and *DX-NL* (DL3RK).

Very best wishes to all for Christmas and the New Year. Please get material for **February** issue to reach me no later than **16 December**. There will not be a 28MHz table next year (final entries by March closing date please) - so in 1992 collect your scores for 10, 18, and 24MHz and we will see what can be done to get more activity on these bands.

QTH CORNER

C21BR PO Box 478, Republic of Nauru, Central Pacific.
C9RAA DK7PE, Kleine-Untergasse 25, D-6501 Niederholm, F.R.Germany.
P40W N2MM, H Miller, 61 Mill Rd RFD 11, Vincentown, NJ 08088, USA.
T20XV (direct only) R V Crosby, VK2BCH,Box 344, Forster, NSW 2428, Australia.
TT8SA F6FNU, Box 14, F-91921 Arpajon CEDEX, France.
V2/G0AZT (direct only) Box 5194, Richmond, CA 94805, USA.
VP2M/G0AZT (direct only - see above).
XX9AW S M Wheatley, KU9C, POB 50521, Indianapolis, IN 46250, USA.
ZL8GBS G Simpson, Raoul Is, Overseas Mail Branch, GPO Auckland, New Zealand.
4S7/G3REP R Parkes, PO Box 1794, Colombo, Sri Lanka.
7Q7BW via N5MHZ.
7Q7BX via N5MHZ.
9M6NA JE1JKL, S Nakamura, 3-16-6 Shibakubo, Tanashi, Tokyo 188, Japan.

BAND REPORTS

Not a bad month with an assortment of ZAs calling *CQ* on most bands! A nice lot of reports too - and thanks to those who sent them including G2HKU, GM3CSM, G3s GVV, LPS, YRM, G4DJC, GW4KGR, G4's LDS, MUW, NXG/M, OBK, XRV, G8KG, G0's AML, DOO, KDS, and OFE.
As always stations listed in italics were on CW.

7MHz

0000	*VP2M/AA5AU, ZA1HA*
0100	*C9RAA, UW0AF, 9K2KM*
2100	*JT1/SP5DRH, VK5FE, ZA1A, ZS6ANL*
2300	*TZ1AB, OK3CLA/5N31, ZA1A*

14MHz

0600	*FO5FO*
0800	*FK88FS, 3D2VJ*
0900	*KH8/SM5BOQ*
1000	*KL7/AA6DX*
1100	*FW/AA7AF*
1300	*BY8AC, JT1CS, V85AA*
1500	KH2/WB6STU, V63AO, 3B7/3B8CF, 9M8FH
1600	*FR5BT*, KL7/WH6ASW, ZA1A
1700	V63AO, YA2CW, 3W8RR
1800	HS1BV
1900	V73AX
2100	S01A, VP8CGR, ZA1DX, *ZA1QA*

18MHz

1600	*U0AL, 3C1EA*
1900	*C9RAA*
2000	*FH5EJ, 4U1ITU*

21MHz

0600	KH0/KB4TXM
0700	BY1AC, BY5RY, VK9ND, 3C1EA, 3D2XV
0800	KH3/KA3HMS, P29DX, ZA1ZXV
1000	A35KB, PY0FF, T20WW, V73AX
1300	*V85AA*
1400	FR5ZN, JT1BY, XW8KPL
1500	AP2JZB, BV4VB, TT8SA
1600	SV2ASP/A, YI0EB, *ZA1A*
1800	FR5ZU/G, HS1BV, *S79MX*, XV3UU, 7Q7BW
2000	HF0POL, NH6WG, ZD7CRC

28MHz

0800	KH0AC, ZL1BMU
0900	BV2FA, KH2EI, KH6IRT, P29PL, YJ8RN, ZA1A, ZA1ZVX, *3D2UJ*
1000	A35KB, A41KB, FK0BP, H5AW, JT1BY, ZL
1100	FK8FR, H44KA, KB6QE/KH0, P29NCS, S79MX, SU1ER, VK9NS, ZA1QA
1300	A61AD, TT8SA, XY0RR, YI1BGD
1400	C9TDM, FH4EH, P43WLP, S01A, VP8CGK, ZA1ZMX, ZF1HJ, 5V7JG, 8R1UN
1500	HK0NZY, KG4DD, VS6CM, V51EG
1600	C53GB, J88NCD, VE6-VE7, VQ9WS, W6-W7
1800	VP8CFM (S.Ork), ZD9BV, 3B8CF/3B7, 9L1US
1900	KH6LT
2100	HI8OMA, ZL4JO (L.P)

EIGHT BAND TABLE, NO.8

Call	1.8	3.5	7	14	18	21	24	28	Total
G3KMA	138	256	311	322	215	321	200	312	2075
G3XTT	162	222	274	311	197	306	169	286	1927
G3GIQ	71	211	275	323	175	321	146	307	1829
G4BWP	112	243	282	318	134	313	124	295	1821
G4GIR	109	242	279	319	107	315	72	299	1742
A92BE	58	156	206	312	196	294	182	272	1676
G4LJF	43	217	255	314	53	298	46	274	1500
GM3PPE	68	164	183	252	182	239	144	215	1447
G3NOF	5	101	106	320	129	323	158	292	1434
G3TXF	72	169	217	295	26	295	13	259	1346
G3YMC	82	121	207	257	105	266	72	218	1328
G4OBK	123	155	202	277	67	251	25	226	1326
G3JXN	42	104	163	248	123	247	125	261	1313
G3JJG	51	102	186	226	131	253	114	199	1262
G4NXG/M	2	33	75	217	75	233	119	227	981
AVERAGE	76	166	215	287	128	285	114	263	1534

Please send scores to reach G3GIQ (QTHR) by 8 January 1992 - and note that it will be a *nine* band table and will include 10MHz. (Prepared by G3GIQ).

1991 28MHZ COUNTRIES TABLE

G0DOO	215	(SSB)	GM4CHX	88	
G0OFE	214	(SSB)	G4YNG	76	
G0JZA	202	(SSB)	G2FQR	71	(SSB)
G0KDS	184		G4NXG/M	66	
G0AEV	175		GM0GEI	55	
G4DXW	159		G0DUS/M	54	
G4MUW	150		G4XAH	43	(RTTY)
LA0GC	137	(SSB)	G2AKK	31	(CW)

VHF/UHF NEWS

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

THE 50MHZ BAND produced some spectacular openings to the Pacific area and Australia in the period covered by this report. Albania, a country devoid of legitimate amateur radio activity for decades, has been available on 50MHz. There were a few average auroras.

BEACON NEWS

THE 144MHZ Lerwick Beacon is back again on 144.965MHz. Mike Dorsett, G6GEJ, of Mutek Limited who built the new PA, was due to travel to Shetland to install it in mid-October. I heard GB3LER on tropo at G3FPK - QRB about 1000km - during a slight lift on 22 or 23 October.

Andy Steven, GM4IPK, is the amateur we have to thank for master-minding this ambitious and expensive project. While several well known companies have either donated hardware or supplied it at cost, he has spent hundreds of pounds of his own money on it.

The other GB3LER beacons are on 50.064MHz, running 20dBW ERP and 432.965MHz running 25dBW ERP. The 144MHz transmitter runs 30dBW ERP and all are located at IP90JD. Due to the long Shetland winter and the very exposed site, heavy duty antennas from the Jaybeam Ltd range have been installed.

It would be an appropriate gesture if all those who participate in the tables and contribute to *VHF/UHF News*, and similar columns in other magazines, and who haven't yet done so, contributed a few pounds towards this comprehensive project. Christmas is coming, so how about it? Andy's QTH is; 27 Dalsetter Wynd, Dunrossness, Shetland, ZE2 9JJ.

TABULAR MATTERS

SEVERAL contributors have suggested that 70MHz be included in the Squares Table so this will be accommodated commencing with its next appearance in February. The starting date is 1 January 79. There are just over 50 land squares in the British Isles, some of them pretty remote with no regular activity.

If you have worked Gibraltar and Cyprus, those squares can be included as can any others from where there has been legal activity. The figures in this table are what participants claim to have worked; you do not need to have confirmations. All modes are permissible, eg tropo, aurora, Es, MS, EME, FAI, but not satellite, repeater or packet radio contacts.

The Annual VHF/UHF Table will start again on 1 January and there are no changes in the bands or rules. It will alternate with the Squares Table and the final placings for 1991 should be published in the March issue. The first 1992 figures will appear in the May edition.

Ted Collins, G4UPS (DVN), sent some data from the Wireless Institute of Australia (WIA) which keeps comprehensive details of VHF, UHF and microwave distance records. These cover all bands from 50MHz to 10GHz, broken down into VK divisions, and modes with additional categories for EME, digital, ATV and mobile.

The 6 June update lists the VK3OT/G4UPS QSO on 19/2/91 as the VK3 record distance of 16921.6km. These 'new records' are confirmed by a Certificate of Achievement, ". . . . to give recognition to amateurs . . . . who have set a high standard of technical and operating skills on the VHF/UHF bands"; to quote from the accompanying letter.

METEOR SCATTER

THE GEMINIDS

This is the major stream in December and, according to the IMO's *1991 Meteor Shower Calendar*, the suggested visual peak is around 1200GMT on the 14th. At maximum the Right Ascension (RA) is 112°, the Declination (DEC) +33° and the Solar Longitude (LS) 262.1°.

My MSD1 program shows that reflection efficiencies exceed 50% as follows: NE/SW 2100-0200 and 0500-0930; E/W 0030-0400; NW/SE 1900-2300 and 0230-0730; N/S 1900-0100 and 0330-0900. The ZHR is 110 and the radiant is above a mid-UK horizon from 1630-1230.

The Geminids stream is usable 7-17 Dec and, due to possible mass-sorting across the stream, best radio reflections could occur a day earlier than the visual maximum, ie at LS 261.2°. (Note that one degree of solar longitude equates to 24h.21min).

THE URSIDS

The ZHR for this stream is usually around 15 but 50+ was reported in 1986. The RA/DEC are 217/+75° respectively, and in the UK the radiant does not set. The peak should be on 22 Dec and the stream is particularly favourable for E/W paths, but poor for N/S ones. Best times for NE/SW are 0900-2400 and for NW/SE 1700-0800.

To quote from the IMO's 1992 calendar; ". . . . so little work has thus far been carried out that absolute statements concerning the Ursids cannot be made with any degree of accuracy." So if you have the time - and this could be a useful exercise for SWLs - monitoring Radio Gdansk on 70.31MHz for pings and bursts should give a good idea of activity.

THE QUADRANTIDS

This all-day stream is active 1- 5 Jan and the IMO predicts the visual peak at 0500 on the 4th with a ZHR of 110. Again, mass-sorting results in a radio peak around 14 hours earlier, ie 1500 on the 3rd. The RA/DEC figures at visual maximum are 230/+49° respectively and the LS 283.13°. Best times are: NE/SW 1100-1800; E/W 1500-0300; NW/SE 2300-0600 and around 1130 and N/S 0100-0700 and 1030-1630.

Most amateur prediction programs appear to use the LS at *visual* maximum. However, mass-sorting can result in large numbers of tiny meteors, too small to produce trails visible to the naked eye, ahead of a stream of fewer, larger ones. It is this greater total mass of meteors that we detect by radio and which defines our peak.

MOONBOUNCE

THE BEST EME opportunity this month is the 21/22 Dec night sked perigee weekend when the Moon's declination varies from +24.8° to +20.4°. The WA1JXN program gives the following data for central England: 0000 on the 21st, az/el 190/61° with moonset at 0815 at 312° and a North American window from 0515 for a couple of hours.

The next moonrise is at 1605 at 48° with an Asian window till 1730; maximum elevation 59° at 0035 with Sunday moonset at 0910 at 310° and a two hour North American window from 0615. Sunday moonrise is at 1730 at 54° with an Asian window till 1845; at 2400 the az/el are 139/51°.

50MHZ

GENERAL NEWS

Like G1SMD (October *VHF/UHF News*) Darrell Moody, G0HVQ (GLR), didn't hear any random SSB MS activity on 50.350MHz in the Perseids. Most activity is usually around 50.110MHz, which is bad news. He suggests we consider a QRG in the 50.130-50.200MHz section, but what is wrong with 50.350?. What do you think? Do we want another band plan revision?

Mike Theiss, LA5SAA (JO29XB), is looking for CW MS skeds. He uses a TS-680S running 10W to a 2-ele quad from home. He also has a weekend cottage in JO39AB sporting a 3-ele quad. Speeds up to 800LPM are suggested. If you send him your details and telephone number indicating the times of day you prefer, he will get back to you to propose dates. His QTH is; Raunev 1, N-4120 Tau, Norway.

The following comes from G4UPS's *6m Information* notes. PA0FM will be operating from Aruba as P43FM until the end of March 1992. When PY5CC leaves his keyer on he now uses the call PY5XX. KM1E will be in the Bahamas from 1 Dec to mid-Jan signing C6A/KM1E; he plans to be back there for the whole of March.

The eagerly awaited ZA1A operation from Albania commenced on 5 Oct. G3WOS worked the group at 1115. They contacted 14 countries that day including ZS and other African stations. 9X5NH (KI58BB) in Rwanda had his first QSOs on 5 Oct to ZS. Next day Hans worked into I, YU and 9H and was heard in England by G4UPS and others. His home call is DK5SY and his QSL manager is DJ6EA.

BV2DP worked into Italy from 0920-1035 on 19 Oct, believed to be the first Taiwan/European 50MHz contacts. The same day saw the first Europe/Macao opening when XX9JN was worked; he contacted about 20 Gs from 0938. QSL via KU9C. Charles Coughlan's, EI5FK, new QTH is 12 Forest Bridge Crescent, Wilton, Cork, Irish Republic.

EA4CGN confirmed that the Spanish PTT published details of restricted 50MHz operation in the official *Gazette* in September so some permits could have been issued by the time you read this.

The October issue of *Six News*, the UK 6m Group's newsletter, includes a balanced selection of awards news, activity reports, QSL information and construc-

tional articles. The joint editors are John Livesey, G0JJL, and Neil Carr, G0JHC; Geoff Brown, GJ4ICD, does the artwork and layout. The group has over 600 members in nearly 50 countries; details from secretary Chris Gare, G3WOS, who is QTHR.

ACTIVITY

In late September there was Es propagation to DL, I, OE, YU and 9H on the 24th; to OE, YU and 9H on the 29th and to SM on the 30th. Central and southern African stations were reported heard/worked on all days except the 26th. These included A22BW, TR8CA, ZS9A, 3DA0BK, 5V7JG, 7Q7RM and 9J2HN. GJ4ICD copied a CU (Azores) beacon on 50.877MHz at S9+ at 1615 on the 25th.

The first Oceania opening this season was on 28 Sept when VK8ZLX was working into PA from 0745. He contacted a few Gs later including G3JVL and G3IBI. Next day GJ4ICD heard a beacon on 50.1093MHz whose call began with a B. Any suggestions?

October began with a long Es opening on the 1st to Scandinavia lasting till 1640. There was an aurora next day and Es to the Mediterranean on the 3rd. African stations were heard/worked on most days via TEP mode in the afternoons.

GJ4ICD heard VE1YX via backscatter at 200° around 1600 on the 7th and from 1635 Geoff heard/worked 38 stations in South America in CX, LU and PY; LU4EJ (GF11) was a new square. He heard KG6DX in the morning of the 13th and VK6PA was received weakly in England around 1000.

From Jersey, the 14th was a terrific day. Weak Australian TV was heard on 46.249MHz at 0913 after which GJ4ICD worked VK2FLR (QF56OD), a QRB of 17,235km, almost certainly a new British Isles record. Geoff went on to work 27 VKs in the 2, 3, 4 and 6 divisions, but didn't hear any VK8s.

V73AT (Marshall Is.) was on and JAs were in for ten minutes at QTE 110° - the Indian Ocean anomaly again? This opening barely reached southern England; G4UPS worked VK6PA (OG89UI) at 0938 and Ted heard VK2, 4 and 5 but all had faded by 1100. However, Terry Chaplin, G1UGH (SFK), heard VK6PA 1008-1058 peaking S3.

19 Oct was another memorable day, the highlight being XX9JN (OL62) in Macao. Many people missed this one as he was working split frequency, a common practice adopted by DX stations on the HF bands. When GJ4ICD switched on at 0806, the band was full of VK4s, followed by lots of JAs, VK6, VK8 with BV2DP heard at S4. In the afternoon, there was a good Es opening to I and YU, along with African stations.

In the morning of the 20th there was strong scatter propagation into F, DL and Scandinavia. VK6PA was heard in parts of G and PA and GJ4ICD worked more VK4s, JA and YC2ASB. At 0910, GM3WOJ heard SV and T70A. Next day there was a strong aurora around 1600 and SSB signals from GM were very distorted.

70MHZ

TO CELEBRATE its Diamond Jubilee and 30 years of amateur activity on 70MHz, the Irish Radio Transmitters Society is promoting the EI 70MHz Activity Award for 1992. The aim is to promote activity on the band and to encourage crossband contacts with other countries.

UK stations must work 30 different stations with a maximum of ten in any one country. Note that you may only count a callsign once ie if worked fixed, subsequent -/M and -/P QSOs are invalid. All applicants will receive ". . . . a unique hand painted parchment endorsed as required."

The first station to qualify will also receive an engraved cut-glass Galway crystal trophy. Applications to Paul Martin, EI2CA, 15 Merrion View Avenue, Dublin 4, Irish Republic. No QSLs required, but a log extract certified by two other radio amateurs is necessary. There is no charge for this award even though the certificates are said to be worth at least £20.

Ian Cornes, G4OUT (SFD), missed the first two hours of the Trophy Contest on 29 Sept. His best DX were GI4TVV/P (DWN), GM4BVY/P (SCD) and EI9FK/P (IO62WV). No other 70MHz activity reports were received.

144MHZ

THIS USED to be the band that carried all the traffic but I sometimes wonder if everyone has now got fed up with it following the digital revolution? At G3FPK the band is full of little carriers, plus the foreign-speaking pirates on FM on 144.100MHz in the London area.

Unless there is an opening of some sort, the SSB/CW section is usually devoid of QSOs. For example, Lyn Leach, GW8JLY (GNS), wrote; "I was fortunate to find an aurora in progress during the evening of 2 October. Although it was reasonably strong, activity on SSB was abysmal." He worked a couple of GMs and heard a DL and two Gs.

Arlen Pardoe, GM0HUO (FFE), had CW auroral contacts with Germans on 25 Sept from 2234; with SM5BSZ (JO89) at 1630 on the 26th; with LA, OZ, PA and SM from 1658 on the 28th; with DL, G, LA, ON and OZ from 2117 on 1 October and with DL, EI, F and G from 1538 on the 2nd. The QTEs for these last two were 40-70° and there was a high noise level.

There was another aurora on the afternoon of 21 Oct, but I wasn't QRV for it. I heard it being discussed later and, although there were some good Scandinavian signals around, once again it seems that activity was very low.

LOCATOR SQUARES TABLE
STARTING DATE: 1-1-1979

Callsign	50MHz	144MHz	430MHz	1.3GHz	Total
G4RGK	142	314	166	55	677
G1LSB	73	177	144	-	394
G3IMV	360	457	125	52	994
GJ4ICD	475	264	119	59	917
G4XEN	66	301	115	6	488
G6HKM	317	232	114	51	714
G4TIF	231	204	111	-	546
GW4LXO	367	258	108	48	781
G4PIQ	-	289	108	-	397
G0GMB	-	202	103	-	305
G4SSO	-	267	99	-	366
G4MUT	160	155	94	34	443
G8LHT	169	192	93	17	471
G0EHV	-	175	81	-	256
G4RRA	-	292	80	-	372
G0CUZ	-	364	75	-	439
G6TTL	26	100	73	-	199
G6YIN	163	158	72	-	393
G4DEZ	141	251	62	56	510
G1SWH	201	166	62	9	438
G0EVT	186	221	57	-	464
GJ6TMM	162	151	52	-	365
G6MXL	84	100	52	22	258
G6ODT	-	33	49	-	82
GW8JLY	-	267	36	-	303
G8PYP	228	122	35	-	385
GM4CXP	50	201	32	-	283
G0NFH	136	92	28	12	268
G3FIJ	1	77	21	-	99
GM0EWX	404	211	18	-	633
GW6VZW	273	143	6	-	422
G0FYD	162	191	6	-	359
G4IJE	415	338	5	2	760
G7BXB	18	66	5	-	89
G7CLY	-	100	2	-	102
G6HCV	355	241	-	-	596
G0JHC	371	48	-	-	419
G0OFE	264	152	-	-	416
G4DHF	-	342	-	-	342
G1SMD	206	112	-	-	318
G0HVQ	214	71	-	-	285
G4YTL	-	269	-	-	269
GU7DHI	194	73	-	-	267
G8XTJ	130	121	-	-	251
G3FPK	-	246	-	-	246
GW4VEQ	-	241	-	-	241
GW4FRX	-	235	-	-	235
G1UGH	120	106	-	-	226
GM0GEI	224	-	-	-	224
G4DOL	-	223	-	-	223
GW4VVX	81	120	-	-	201
G4XBF	-	176	-	-	176
GM1XOG	169	-	-	-	169
G4TGK	-	139	-	-	139
GM1ZVJ	72	48	-	-	120
GM0CLN	-	116	-	-	116
GM1BVT	92	23	-	-	115
GM0GDL	-	55	-	-	55
GW7EVG	-	28	-	-	28

No satellite, repeater or packet radio QSOs.
'Band of the month' 430MHz.

PERSEIDS 1991

IN THE OCTOBER *VHF/UHF News* Colin Morris, G0CUZ, reported ". . . . a small peak on 12 August, 1500-1700." Alastair McBeath, vice-president of the International Meteor Organization, has since supplied some further important information on this Perseids phenomenon.

As observed in Japan, far from being a small peak, it proved to be a wholly unexpected burst with a Zenithal Hourly Rate (ZHR) in excess of 400. This is four to five times the usual figure. It was not so noticeable in the British Isles as the stream's radiant was almost at its lowest at about 24° and it was broad daylight.

In Tokyo at this time the radiant would have been 42° above the

continued on page 75 ▶

Propagation NEWS

Compiled from reports supplied by G3FKM, G3FPK and the Propagation Studies Committee

THE G8KG REPORT this month goes as follows: "The opening weeks of the 1991/92 DX season saw conditions on the higher bands varying from fairly good to very good.

From mid-September to mid October the 2800MHz solar flux was on something of a plateau with limits of 221 and 170 and an average value of 178sfu, higher than at the same time last year.

Propagation conditions were, therefore, mainly controlled by the state of the geomagnetic field. This was generally quiet both at the beginning and end of the period but more disturbed late in September and early October.

These phenomena were reflected in some excellent HF band conditions in the second and third weeks of September and again in the second week of October. During these periods MUFs were consistently high as evidenced, for example, by long 28MHz band openings to the Far East and Oceania in the mornings with the path to North America opening before mid-day while the F2 skip distance on that band was down to less than 2000km for long periods during daylight - which helped many to that first 28MHz contact with Albania.

The good spell in October included the Sunday of the RSGB 21/28MHz Telephony Contest during which any lack of DX must be blamed on activity (or lack of it) rather than on propagation conditions, as witness the flood of JA stations in the opening hours!

It is worth noting that the two recent very good spells show a very distinct 27-day periodicity which, if maintained, would point to good spells beginning around 5 November and 2 December. When this appears in print the first of these will be history. Whether the second will materialise remains to be seen!

VHF

ALTHOUGH SUNSPOT maximum for cycle 22 was in July 1989, ionospheric propagation is still excellent. The 50MHz band has produced some superb openings to Oceania, the Far East and parts of the Pacific.

Afternoon and early evening TEP propagation to central and southern Africa has been widely reported. Sporadic E openings to Scandinavia and the Mediterranean occurred into the second half of October.

The 19th was a DX-ers delight. It began with backscatter propagation to Denmark around 0730 as Danish stations were working Japan. English operators worked VK4s and stations in Hong Kong, Macao, Japan and Guam till about 1100. From around noon there was good Es propagation to Italy and Yugoslavia until around 1815 with some Trans-equatorial Propagation (TEP) to ZS6 to round things off.

Other interesting propagation paths included Malawi to Hong Kong and Japan over the North Pole on 6 October; from southern England the 9L1US beacon peaked at 210° during an aurora around 1600 on the 21st, at 215° in 'normal' conditions at 1110 the next day and again on the 23rd from 1300.

On 9 October at 1000, GJ4ICD worked into Malta via backscatter by beaming southwest. The CT0WW beacon and GI stations were also copied on this beam heading. There seems to be something 'magic' about this direction.

For instance, on 7 October GJ4ICD heard VE1YX at S2 via backscatter around 1600. Another phenomenon is the 'Indian Ocean anomaly' which has again been mentioned.

While stations in various parts of Australia peak up at the great circle azimuths, Japanese stations are frequently strongest at 100-110°. The true heading is 30°.

Auroral propagation on 144MHz at the beginning of October was accompanied by high noise levels, as observed by GM0HUO in Fife. Signals were unstable, varying quickly in strength. Optimum beam headings changed rapidly, usually in a clockwise direction from about 40° to 70°.

HF F-LAYER PROPAGATION PREDICTIONS FOR DECEMBER 1991

The time is represented vertically at two-hour intervals 00(00)GMT for each band, ie 00=0000, 02=0200, 04=0400 etc.
The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1.8MHz openings are indicated by a plus (+) sign in the 28 and 3.5MHz columns.

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	....7++94...	....99997...	....999991..	...1998993..	1..587789821	663765567986	887532235888	++42....25++
MALTA	....79886...	....999982...	....999995..	....9889982.	11.487789972	773764458998	888632236898	+++3....3+++
GIBRALTAR	....18776l..	....499882...	....799996..	....9989982.	98778971	553275557997	988753224799	++++2...25++
ICELAND	.....5886...	.....7998...	.....99993..	....299996..	....7888992.	353.86678984	888353346788	+++52...34++
** ASIA								
OSAKA	....61......	....83......	....96......	...1871.....	1..3753111.2	1..153234635	....2..13673	.........34.
HONGKONG	....9971....	...19983....	...28886....	...167772...	1....4556642.	2....12236872	1.....13685	453
BANGKOK	...1+++94...	...289996...	...258898...	....377892..	1....5568722	3....2236887	2.....13687	454
SINGAPORE	...189894...	...279996...	...2588981..	...1377893..	1....5568722	2....2236886	1.....13685	452
NEW DELHI	...2++96....	...37998....	...457883...	...226785...	1....3568222	731...236777	72.....13687	4.........455
TEHERAN	...2+++94...	...588996...	...7668981..	...7447894..	311511568843	8642..236888	772....13678	44........445
COLOMBO	...2+++95...	...368997...	...2368992..	.....47895..	3....1568843	62....236888	5.....13678	2.........445
BAHRAIN	...3++984...	...5779961..	...6558983..	...62368961.	4213..468964	873...136888	772....13678	44........445
CYPRUS	...1++++71..	...3999992..	...68889961.	1..887889831	541765678985	986532357999	8862...24788	5+3.....25+5
ADEN	...2++8971..	...4778983..	...53469972.	2..412489952	7412..168997	983....36888	771....13677	44........344
** OCEANIA								
SUVA/S	.....3562...	.....5774...	....17887...	....378881..	....665685..	...1533464..	...12..131..	....
SUVA/L	....4321.232	1...65421453	11..87654752	...18766783.	...3744576..	...3411253..	...12...21..	....
WELLINGTON/S	....16751...	....38872...	....68886...	....888881..	....765683..	...1532463..	....2..131..	....
WELLINGTON/L	..........1.	.........1..	11..221..111	53211321	...17433551.	....1421252..	....2...2...	....
SYDNEY/S	....76783...	...188895...	...288898...	...2877891..	....6556861.	....3224672.	.....135..	.........2..
SYDNEY/L	.....1.....	....221...11	....4531.132	66531452	....6545574.	....3212562.	....1...23..	....
PERTH	...277755...	...378877...	...3588892..	...1377895..	1....5568842	2236873	13651	.........42.
HONOLULU	..........1.	.........1..	.........4..	.1..1...16..	.34.412.561.	.262522263..	..352..131..	...3........
** AFRICA								
SEYCHELLES	...2567641..	...3568864..	...32368872.	2..1.1489952	74....168997	951....36889	73.....13678	4.........345
MAURITIUS	...2578872..	...34679851.	1..223699641	31.1..389973	74....168998	84.....36899	61.....3688	3.........355
NAIROBI	...18788741.	...36679962.	2..533489962	52.411279985	8712...48999	983....16898	772.....3677	44........354
HARARE	....4567762.	1..2455788851	31.323369985	64.3.1148998	9811...17999	983.....4899	761.....1688	43........355
CAPETOWN	45678741	2...55568873	53.132248997	85.31..26999	9822....3899	984.....1589	761.....368	43.........45
LAGOS	....9+889752	21..97679974	53..85358997	86.262127999	99363...5899	88851...2699	7782.....488	445........55
ASCENSION Is	68767642	1...77667864	43..85335897	761.72112899	99625....699	98862....379	7774.....58	445........25
DAKAR	....5++89841	1...78768973	32..97436997	652.85115899	986172..2699	88964....489	77761....168	4453.....35
LAS PALMAS	....5++9972.	....7999984.	99889972	22..98778995	765186556899	999663224799	888741..1478	+5+4.....5+
** S. AMERICA								
Sth SHETLAND	34455431	1...56666553	32..77655566	541.87533356	6751642..125	355331.....2	12321.....	....
FALKLAND Is	25567741	47666663	21..77533466	542.8731.147	787174....16	688541.....3	36652.....	.332........
R DE JANEIRO	17544541	38545663	21..67332486	532.8511.278	887.72....58	98955.....26	77762.....3	4453........
BUENOS AIRES	24445741	46545652	11..78422265	432.872....47	877.75....16	789452.....3	57762.....1	2453........
LIMA	.....++873.	1976641	13843343	1.2.35721125	657.654....5	7894521.....2	46762.....	.443........
BOGOTA	.....++873.	976651	1853353	1.2..3721145	647..55...16	8884322....4	67762.....1	3443........
** N. AMERICA								
BARBADOS	.....4++883.	6975751	8833574	2.2..7611276	657.153...58	8884421...27	77762.....4	4443........
JAMAICA	.....8++72.	.....98764.	1863352	1.2..2741145	546.3551..16	8884532....4	67762.....2	4443........
BERMUDA	.....19++82.	.....398884.	6865772	1.2..7743575	546.3551.258	8884532...27	77662.....4	4433........
NEW YORK	.....7++71.	.....89883.	2887761	1.1..4775673	546.35542367	88845321..36	76662.....3	4333........
MEXICO	.....9+71.	.....9862.	186331	1.1.1.383122	446.52451...3	58845223...1	36762.....	.343........
MONTREAL	.....7++71.	.....89983.	3888861	..1..5787773	546.35554567	8884532221236	76662.....14	4333........
DENVER	.....285..	.....4971.	.....7873.	..1.1..77541	446.41165224	688452232..3	36762.1....	.343........
LOS ANGELES	.....75..	.....86..	.....862.	.11.1..28521	355.42.56212	478453133...	15762..1....	.243........
VANCOUVER	.....12..	.....35..	.....671.	.11.....773.	355.43.37653	4783531353 22	25762..12...	.243........
FAIRBANKS	....	....	.....12..	.1..121235..	354.44457832	567253246654	24552..13322	..23........

The provisional mean sunspot number for October 1991 issued by the Sunspot Data Centre, Brussels was 143.6. The maximum daily sunspot number was 248 on 29 October and the minimum was 81 on 22 October. The predicted smoothed sunspot numbers for December, January and February, are respectively: (classical method) 128, 126, 123; (SIDC adjusted values) 133, 133, 131.

SWL NEWS

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

IT IS WITH regret that I heard that Frank Parkhurst BRS10996, an avid HAB enthusiast passed away in September. Readers will recall that he had written quite recently with news of his achievements in the HAB field. Indeed, Dennis, GW6JNE, had the privilege of presenting him with a well deserved award at this year's WAB Annual General Meeting for hearing over 4,200 WAB areas. He will be sadly missed by all those interested in the WAB/HAB Award scheme.

CONTESTS AND AWARDS

NEXT MONTH, I shall provide some details about the 11th White Rose SWL contest, which again covers the 18 and 24MHz bands, and the 1992 UBA contest which is also open to SWLs. Contest activity seems to be at a fairly low ebb at present. It would be pleasing for all concerned if 1992 could see an upturn in participation.

On the awards front, I have been advised that the Mansfield ARS has a new award which is available to SWLs - The Sherwood Forest Award. It is available for hearing licensed amateurs in the County of Nottinghamshire. The rules are simple enough - 5 points for hearing the Mansfield Club station (G3GQC or G1GQC), 2 points for Mansfield ARS members and 1 point for hearing any other licensed amateur in Nottinghamshire. 30 points are required and you can go back through your logs to your first day as an SWL to collect the points. The Award costs £2 and can be claimed from G0NRA at 25 Manor House Court, Kirkby-in-Ashfield, Nottinghamshire, NG17 8LH.

While on the subject of awards, John, G3XWK, has asked me to mention the 'Postcode Award' again. The Civil Service RS has had some requests for details from listeners and has indeed issued the first SWL Award. I have seen the certificate, and it is well worth the effort of collecting the various postcodes to have it on the shack wall. G3XWK is QTHR.

Dennis, GW6JNE, reminds me that the HAB 'Winter Activity Award' is available again this winter. The idea is to log WAB areas, counties, districts and bookholders in multiples of 250 from 1 December to 29 February. The Award costs £2.50. Full details are available from GW6JNE at 7 Penrhos Crescent, Rumney, Cardiff CF3 8PB.

BARTG NEWS

IF ANY listener is interested in data communications via amateur radio, the British Amateur Radio Teledata Group will be just the thing. The group has a new Membership Secretary who will be pleased to provide further details. You can write to Peter, G6LZB, at 464 Whippendale Road, Watford, Herts WD1 7PT.

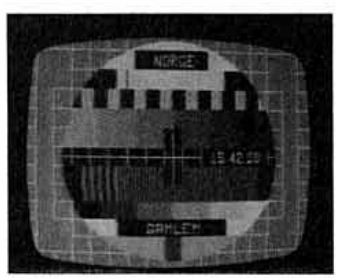
ILA NEWS

THE INTERNATIONAL Listeners' Association published their Members' Handbook in the Autumn. This shows 760 members. Membership is mainly from the British Isles, but they do have members in EI, CT, ON, 9H, I UB5, ZS, DL, OK, W, UL7 and UA. If you would like to know more about the ILA, you can write to GW4OXB at 1 Jersey Street, Hafod, Swansea, SA1 2HF. Their quarterly magazine once agin has something for everyone, covering the Marine bands, the Air Bands, Medium and Long Waves and the Amateur Spectrum.

VHF LOGGINGS

BRIAN UNDERWOOD, BRS93818, provided a further report of activity on VHF. He commented on the good conditions which prevailed at the beginning of September. I covered this period in the last issue, but it is worth noting that Brian heard a number of SPs in JO73, 83 and 93 on the 4th and followed these with many OKs on the 6th. Although conditions were quite 'flat' after the first few days of the month, he heard the Swiss beacon on a number of occasions and HE7STY/P (JN36) on 19 September.

With 50MHz in poor shape during the period, I have no news of openings to report. Surprisingly, however, several OEs and YUs were heard at around 1700 on 5 October.



DX TV pictures from France, Norway and Denmark.

HF NEWS

ON HF, my reporters could not remember a month where there has been so much DX on offer. The most remarkable news is that Albania (ZA) is not now a rare country. The ZA1A expedition did a truly fantastic job, and I am sure that any remotely active SWL managed to log the expedition on at least one band. I have many reports of 5x9 signals on all bands, including 18 and 24MHz, but no-one reported them on 1.8MHz though they were active on that band. As I write this, ZA1HA and ZA1QA are active, and an expedition by some French amateurs is also planned.

There are several good quotes this month. Robert Small, BRS8841, remarks that "ZA, C9, XY, XV and YA in such a small period would have been unthinkable not many months ago", while Phillip Davies, G1EMD, remarked on the XY that "my last XZ was on 14MHz on 24 December 1959, the day before 9N1GW".

A good quote from the ZA boys was mentioned by three listeners. During the Scandinavian SSB Contest, an OH asked for a contest number. ZA1A said tersely "No numbers from this station . . . . QRZ!"

As well as the ZA success story, and activity from C9 (Mozambique), XV (Vietnam), XW (Laos), YA (Afghanistan), 3B7 (St Brandon), and 3D2 (Royuma Is), a good many signals from the Pacific were copied on 21 and 28MHz. All-in-all, quite a remarkable month. Now for the usual, slightly expanded, band reports.

28MHz: A25AA, A35KB, A92EV, BV2BT, CE9AA, FK8CP, FY5EM, EA1DU/HI8, HL9AA, KH0AC, P29CH, P29PL, S79HX, V73AX, XX9AW, YJ8CW, ZD8AM, 3B8FQ, 3D2XV, 5H3RA, 5V7JG, 5Z4FM.

24MHz: HF0POL, HC8GR, PJ8AD, VP2M/G0AZT, VU2RX, 3B8FE, ZS6AIS/7P8 and VK2DXI/9M2.

21MHz: BV2WA, FR5DX, HL9AA, J88BS, NL7UT (Kodiak Is), T20WW, TT8SA, V73AX, XV9MA, ZD7CRC, ZS9S, 9K2IC, 9L1US and 9X5HG.

18MHz: HK0HEU, KH3AE, JT1CD, VP8CBL (Antarctica), XE1ZLW and 5N0CEP.

14MHz: C9RAA, FP9SPM, AA4FS/HH3, KC6DX, AA6DX/KL7 (North Pole, Alaska), S21NQ, ST0DX, V85FC, VP8CFM (South Orkney Is), YA2CW, 3B8CF/3B7 and 3X0HNU.

10MHz: Nothing reported!

7MHz: XY0RR, VP8CFM (South Orkney Is), ZA1A.

3.5MHz: A92BE, FR5DX, S79HX, VS6VO, 5H3RA and 9Q5TE.

Phillip, G1EMD, also had an interesting comment about pile-ups. He conveyed that he listened to 5N0CEP on 17MHz working Ws at a fast rate. On the same band, VP8CBL on Adelaide Is had no pile-up at all and he was probably rarer DX. The reason? - VP8CBL does not QSL.

Phillip heard him say that he has no manager and there is only one ship per year. Although amateur radio would be very dull without QSL cards, Phillip was left wondering whether the many awards which are now available are the reason that QSL Bureaux and QSL Managers are now so busy. (I bet by the time you read this VP8CBL has a QSL Manager!)

FINALE

ONCE AGAIN, space has well and truly beaten me. Please ensure that material for the February 1991 issue is with me no later than **Tuesday 10 December.**

Novice NEWS

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

BY THE TIME you read this there will be new Novice callsigns on the air with more appearing throughout the month. To those Novices, congratulations and welcome.

Now that Novice numbers have doubled - at least - there should be fewer amateurs complaining they haven't heard one yet. As yet Novices are still a 'rare breed' I am sure that you are much in demand. Go ahead and enjoy yourselves.

Next, a personal plea. Please take a little time from your new-found occupation and drop a line to tell of your experiences. That applies to *all* Novices of course. All of you have something to say that will be of interest and help to those following in your footsteps.

SORRY ABOUT THIS

I WAS invited to man (woman?) a Novice stand at the Wakefield Radio Rally. It was quite busy and there was a lot of interest shown by visitors of all ages. Not much of the literature on display returned home with us!

Four licensed Novices joined me at various times and at one period all four were there together holding the fort. My grateful thanks to Vicky, 2E1AAD, Neville, 2E1ACS, Simon, 2E1AAB, and brother Daniel, 2E1AAH. Without their presence, I would have had little chance to look around.

I forgot to pack one essential item before I left home, and I am still kicking myself. You have guessed - my camera was exactly where I had left it, at home. It would have been nice to have shown a Novice stand manned solely by Novices. Will I ever live it down? *[No! - Ed.]*

WORKED ALL BRITAIN GROUP

IN JULY'S column, the awards available to Novices from the Worked All Britain Awards Group was mentioned, and that they would be welcomed.

Proof of that is here. Brian, G4KSQ, has written to say that 2E1AAL, Rowena and 2E1ACA, Elizabeth both joined the Group at the Convention, along no doubt, with many others. It is certain that they will enjoy 'collecting' squares and make many new friends. Perhaps Rowena and Elizabeth would like to let us know more about their efforts as their list begins to grow?

I have listened to some of the seekers of WAB squares and it struck me that it is an excellent way to learn British geography! Towns can be located on a map and descriptions of different areas are often given. A bonus of course, is the number of people you meet with a similar interest. What a pleasant way to learn. And not a textbook in sight!

REPORTERS WANTED!

MEET SIMON, 2E1AAD, again. He was asked to put his thoughts, suggestions and ideas on paper and send them to me so that I could air them in this column, or send them for possible use in *D-i-Y Radio*. Some of his suggestions would be at home in *Novice News* and I present them here for your consideration.

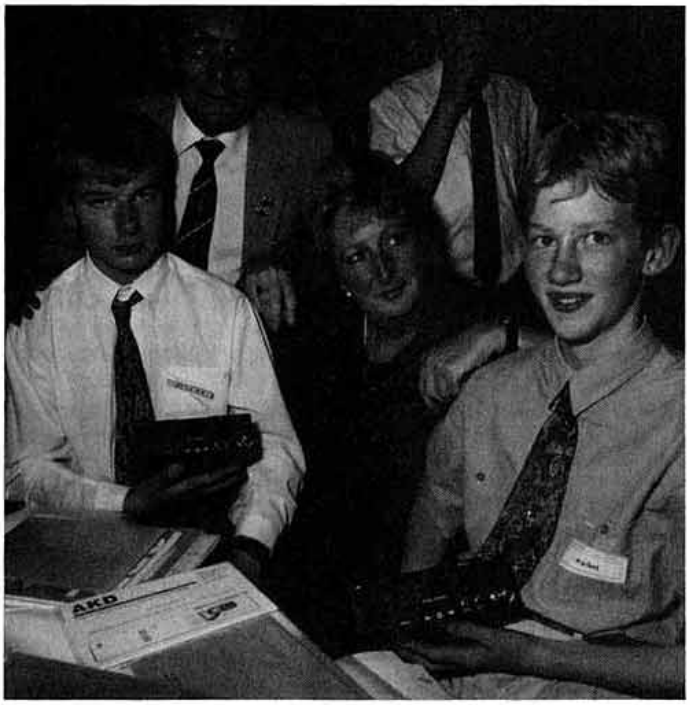
He would like to see some technical aspects of the hobby. There is not enough space for building-projects in this column, but they do appear in *D-i-Y Radio*. As that is intended for new and budding Novices, obviously projects cannot be too ambitious. Reviews are perhaps a possibility in *Novice News*, should anything new come along. I will willingly give up an inch of space for this if anyone finds a suitable subject and reports.

He suggests a 'DX Corner' where a bit of justified boasting can take place. Some contacts have been reported as they have come to me, more will appear as they come to light. Come on Novices! Start boasting!

He did suggest that *D-i-Y Radio* should be staffed by Novices and young SWLs. That may not be practical - there is a lot of work and expertise involved. Time, too, that is not readily available. One other word slipped in to that suggestion that I noticed - reporters. Now that is an excellent suggestion.

Every Novice has a story to tell. Do you fancy seeing your name in print? If each one of you writes that story and sends it to me, it will be reported, in this column or passed to *D-i-Y Radio*. And there will be the chance to 'show off' your latest DX! How about it?

[*D-i-Y Radio* is aimed at pre-Novice and newly licensed Novices and regularly features simple construction projects as well as letters from Novices. Reports of events, visits to rallies etc, accompanied by photos, are welcome and will be paid for if published, as will construction articles. It is expected that once a Novice has been licensed for a while, he or she should be able to benefit from - and contribute to - large parts of *RadCom* and there will be Novice construction projects such the one on page 46 this month - *Editor*].



The first two Novices proudly display their new rigs awarded to them by AKD: (l to r) Jonathan, 2E1AAA; Clive, GW4YKL, Chairman RSGB Training and Education Committee; Hilary, G4JKS Project YEAR Co-ordinator; Hugh, 2E0AAA.

MORSE NOT SPOKEN HERE

ONE LETTER that I have received, contains observations common to many amateurs. Perhaps you recognise yourself. I shall not name the source; I will call him 'X'.

After many, many years listening, he took the plunge and gained his licence. More study followed, the Morse test was passed and the full licence gained. He listened and practised, and improved his receiving and sending speeds to 25WPM which he does comfortably.

I do not know if 'X' transmits using SSB, but he does not use CW. Unlike Shirley (*Novice News*, October), he never got round to that first contact. He lacked the courage to take the plunge, saying: "I know now that I never will; in fact, I do not even wish to".

He listens and gets great pleasure from this, but, apart from practicing, his key stays unused. Do not condemn him, I know many amateurs who passed the Morse test with high hopes and found that they were not prepared for text, numbers and punctuation marks all mixed together - and gave in. Perhaps the Novice Morse Test format is a better idea.

He ends his letter by wishing all Novices much success and hopes that they get as much pleasure from the hobby as he has.

The reason that I have included this item is to encourage all Novices and newly licensed amateurs not to wait too long before they 'have a go' - the longer you wait, the harder it is to make that first effort. Everyone has had to make a first contact. If you hear an obviously new callsign, remember yours - and be patient.

MORE THINKING DAY NEWS

GB4CGG WAS the callsign of the Cumber Claudy Girl Guides' TDOA special event station which was put on by the North West of Ireland ARS. Their activities are worth a mention.

The Club has been very successful in VHF National Field Day, being the leading GI station in the Restricted, and previously the Open section for the last six

consecutive years. NWIARS is also actively involved in the 'publicize amateur radio' campaign, taking the hobby to the general public, Guides and schools with several special event stations this year. Ian, GI4OUN, who sent the information, hopes that other clubs will be inspired by their example.

I am sure that other clubs are doing a great deal. The trouble is that they are not letting the rest of us know about it. Come on, spill the beans! The good ideas you have dreamed up may be just the thing for other clubs in other areas to try.

POOLING IDEAS

SOUTH MANCHESTER Amateur Radio Club members are trying to think up ways to recruit new members to the hobby. One of the problems, of course, is reaching potential Novices. Interest in Jamboree On The Air (JOTA) has led to some contacts, and the fact that Gilwell Park has a regular net on Sundays may provide a starting point. Bill, G0LNA, hopes that a North of England net may be started with some local Scout troops operating from a regular base.

Suggestions from other clubs, who perhaps have had ideas in the same direction, would be welcome. An idea that springs to my mind, is for Club stations to operate using the GX callsign and inviting local youth organizations to see amateur radio in operation, to meet amateurs and perhaps catch the bug. Maybe a poster for the student notice board in the local high school may catch the eye of a future Novice or two. Any artists in the club?

Any ideas could be sent direct to Bill, G0LNA, (QTHR) and/or to me. Apart from passing them on to Bill, this column may reach others needing the same sort of help.

FOUND ALIVE

REPORTED IN July as a forthcoming event (*Wanted alive*), the pilot Novice training course run by the Pontypool Amateur Radio Society took place in August, and Con, GW0FJH, has written to report:

Three youngsters took advantage of the course, with five Club members to instruct. *All* enjoyed the experience. Eleven-year-old Andrew did a 26 mile round trip each day. Damian, also 11, did not get much choice as one of the instructors David, GW3XJA, is his grandad. Fourteen year old Graham was interested enough to turn up at the regular club meeting in the second week. All receivers and audio amplifiers worked first time - which must have been very encouraging for teachers and taught alike.

Con has learned a lesson too. Perhaps the publicity was not put out far enough in advance, but a solution was offered. Mr Jones of a local school asked Con if he would consider talking to the communications classes about amateur radio. Would he just!

The Club response is an offer to set up a special event station in the classroom once each term. I can see this leading to a flood of similar requests from other schools and a certain radio society is going to be rather busy. Never mind lads/lasses, it's all in a good cause!

SCROOGE'S CORNER

TWO TIPS for aerials. Ian G3ROO, remembers with nostalgia, the days when an aerial current meter was considered a 'must' to show instantly if anything went amiss with the aerial. Still nice to know that your pearls of wisdom are reaching the parts that can't be reached by just shouting.

A simple cheap solution, then and now, is to connect a small flashlight bulb in series with the aerial. This will light, giving an indication of current. Presumably, this is for use only at the start as Ian points out that the bulb should then be shorted out as power used to light the bulb is lost power. 'ROO of course is a QRP enthusiast.

For a cheap 'power' meter, David G7GPR, suggests that you wrap some wire round the coax and place the LED across the coil to act as a small transformer. The LED glows when you are radiating. It is not accurate and several turns may be needed for QRP, but it does work - and it is pretty to watch as it flashes

Fancy spending coppers instead of pounds? Of course you do. Ian, G3ROO, points out that Vero market a tool for cutting Vero tracks and clearing holes in PC board, but adds that (a) they are not cheap and (b) after losing their edge they do not sharpen too well, so he looked for another solution; Buy a $^{3}/_{16}$inch drill bit and find a four inch length of wooden dowel. Drill into the end of this for about one inch and force the shank of the drill into the drilled hole. Result - one very useful tool. Cost - about 60 pence.

REPORT OF THE CITY AND GUILDS OF LONDON INSTITUTE ON THE SEPTEMBER 1991 NOVICE RAE

(reproduced by authority of the Institute)

OVERALL RESULTS (UK CANDIDATES)

Examination	No of candidates completing exam	Candidates qualifying for NRAE certificate No	%
June 1991	185	153	82.7
September 1991	188	151	80.3

REPORT ON MULTIPLE-CHOICE QUESTION PAPER PAPER NO.773-1-01

Syllabus Topic or Objective	No of items	Comments on performance of candidates
Receivers and Receiving Techniques	4	Three of the items on receivers were well answered. Many candidates were not sure for which of the blocks a power supply is essential; over a quarter of the candidates thought that power is necessary for the input tuned circuit.
Components, Applications and Units	2	Very well answered. Both items on components attracted high scores.
Measurements	4	A question on a multimeter was badly answered, over a third of the candidates selecting a DC range to measure an AC voltage. 46% of candidates were unable to identify correctly a voltmeter in a simple circuit. The other two items on measurements were quite well answered.
Propagation and Antennas	5	There was a good understanding of the meaning of ground wave and most candidates were able to convert satisfactorily frequency to wavelength. However, a quarter of the candidates thought than an ATU should be adjusted for maximum reflected power, rather than minimum. There was also some confusion between the director and reflector of a yagi antenna.
Transmitters and Transmitting Techniques	10	Most question on transmitters and transmitting techniques were very well answered. There was evidence that some candidates did not understand the difference between high and low standing wave ratio. Many candidates wrongly thought that an AM transmission was less likely than FM to cause audio breakthrough on a television receiver.
Operating Techniques	6	All questions on operating techniques were very well answered.
Station Layout	4	There were three items on station layout which caused difficulty. Many candidates were unsure of the positions of the low pass filter and standing wave ratio meter relative to the transceiver and antenna tuning unit. In another item, a third of the candidates incorrectly chose coaxial cable to connect a transceiver to its power supply. A low pass filter, rather than a dummy load, was chosen by 26% of candidates as a means of enabling a transmitters to be used without radiating.
Construction	0	No items on construction are included in the written paper.
Safety	2	95% of all candidates answered correctly a question about the colours of wires connected to a 13A mains plug. Some candidates chose a filament lamp rather than a neon lamp to indicate that a power supply was connected to the mains.
Licensing Conditions	8	All questions on log keeping were well answered. There was doubt among some candidates of the obligations of a novice licensee to avoid undue interference to any wireless telegraphy. The use of a callsign suffix for a Temporary Location also caused difficulty with half of the candidates; 26% of them thought that the suffix /T, rather than /P, should be used.
General Comments		As with the June paper, the general performance of candidates for the September 1991 Novice Radio Amateurs Examination was encouraging. Of the candidates taking the examination, 80.3% of them were successful. Cognisance has been taken of the report of the June paper and it is hoped that the above comments will be of value to instructors and candidates for future examinations.

● Many Novice Instructors have expressed a desire to see past examination papers. However, it is City & Guilds' policy not to release any exam papers to the public.

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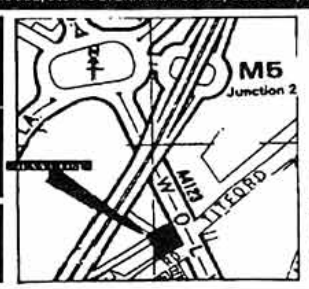

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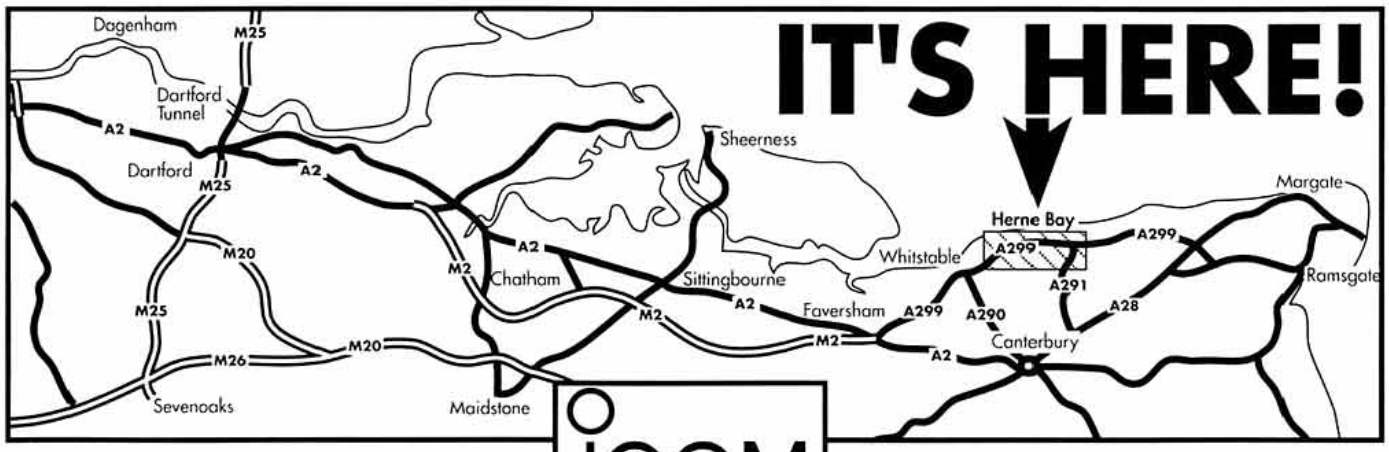

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TOPICS

PAT HAWKER G3VA

BIG MOUTH, LINEARITY & SPLATTER

PROPERLY CONDUCTED two-tone testing of an SSB transmitter will show the maximum level to which a power amplifier can be driven before the onset of 'flat-topping' - in other words the point where the intermodulation products (IMPs) begin to spread the signal out into the adjacent channels as well as distorting the in-band speech. As Bill Orr, W6SAI, explains in 'Intermodulation Distortion (Or why does Big Mouth take up half the band?), *CQ* (Sept 91, pp56-58, 60-61): "Big Mouth doesn't know (or doesn't care) that all SSB transmitters have an overload point. Operating beyond this point won't make the signal louder or more readable. It just takes up more space on the dial and actually wastes useful power in the splatter! . . . . IMD is created whenever a complex signal (such as speech which is composed of many audio tones simultaneously) overloads an amplifier or mixer stage of a transmitter . . . . a CW signal is a single-frequency entity and does not create IMD" [But a poor keying waveform can create clicks which similarly cause the transmission to occupy excessive spectrum - *G3VA*].

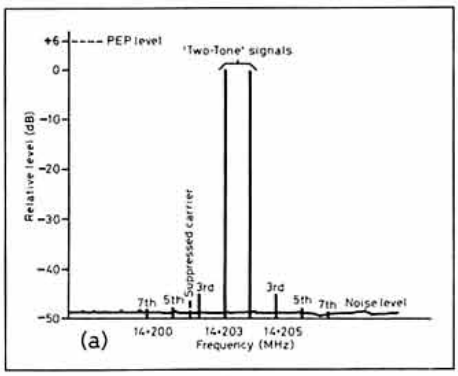
While the two-tone test with a conventional oscilloscope display is extremely valuable in obtaining an appraisal of the overload point, to obtain a quantitive measure of the performance of an SSB transmitter requires the use of a spectrum analyser (professional instruments are usually well beyond amateur budgets!). A spectrum analyser can show (**Fig 1(a)**) the third-order and higher-order IMPs and allow an observer to determine how far down in decibels these are from either one or both tones, (if measured from one tone, this gives a result six decibels less than from the transmitter PEP level). The majority of amateurs, without spectrum analysers, are dependent either on the manufacturer's claimed specification or preferably, an independent equipment review such as those of Peter Hart, G3SJX.

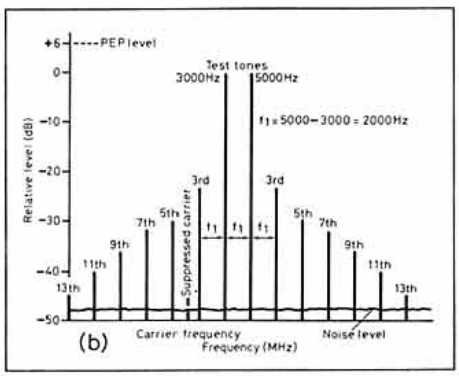
But watch the small print. An amplifier measured at its full rated output will be judged more harshly than when, for example, displayed at 80% (a level used by some reviewers). **Fig 1(b)** from W6SAI's article shows how a 100W local SSB signal, representative of many current transmitters, if received at 20dB over S9 on a receiver of wide dynamic range, would have splatter extending over some 28 to 30kHz. In a section 'Observations on IMD', W6SAI writes:

"Rough rules of performance can be outlined as far as IMD goes. These rules are based upon countless observations on various SSB transmitters. Older rigs using sweep tubes (6LQ6 etc) have IMD third-order figures in the -21 to -25dB range (measured from PEP). That's not very good, judged by today's standards. Other rigs using 6146-type valves exhibit IMD ranges falling between –24 and –28dB below PEP. The famous Collins S-line (which incorporates RF feedback) can better these figures by about 4 to 6dB. That's very good for a tube-type exciter.

"Solid-state rigs seem to run from –34dB to –40dB third-order products, depending upon the amount of RF feedback used and the voltage applied to the amplifier stages. That's good performance for equipment falling in the price that amateurs can afford! Of course, when Big Mouth operates any of these rigs, all bets are off."

I cannot help feeling that W6SAI is being a little charitable in his assessment of current solid-state transceivers, particularly those running directly off 12V - at least to judge from





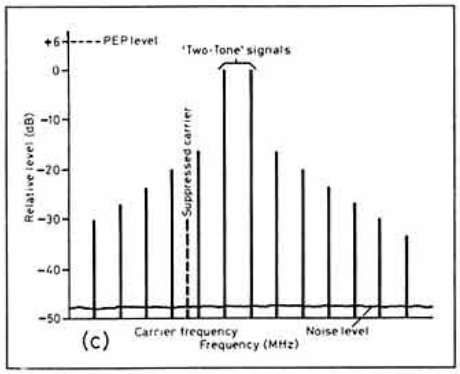


Fig 1: (a) Spectrum analyser presentation of a high-grade (probably professional-type) SSB transmitter driven by a two-tone test signal. Carrier suppressed 45dB below level of tones (51dB below total PEP output). Third-order products 45dB down on test tones with fifth-order products about 48dB down and seventh-order products barely above noise level. Still-higher-order products cannot be observed in this test. (b) Representative of a fairly typical 100W amateur SSB transceiver shown with tones 2kHz apart. The 13th-order products are down only 45dB from the tones and would easily be audible by local amateurs. Splatter would thus be produced over some 30kHz or more spectrum. (c) Representative of an older transmitter using TV "sweep" valves and with no RF feedback. Improperly loaded or over-driven such a transmitter would disrupt reception for many miles around. (W6SAI, *CQ*)

the IMD measurements reported by G3SJX on some recent transceivers.

It should be appreciated that when a transceiver is used to drive a high-power linear, any IMD products in the drive will be amplified along with the wanted signals no matter how linear the final amplifier. Once any stage has been overdriven or is otherwise non-linear, poor IMD performance is inevitable. But, similarly, before accusing any local amateur of excessive splatter you should check that your receiver front end is not being overloaded and hence producing splatter even on a clean transmission. If in doubt reduce the input to the receiver with an RF attenuator (or a short wire as antenna) and check the signal at, say, S9.

Alex Allan, G3ZBE, was interested to note that in the item on the 30-year-old G2DAF valve linear in the September *TT*, the IMD performance for a single 813 was given as some 45dB down with a screen supply voltage derived (with voltage-doubling) from the RF drive. He writes:

"What struck me is that in the past few years we have seen a lot of discussion and recommendations about the need for very stiff screen supplies in order to get good intermodulation performance, especially in connection with the use of 4CX250 valves, yet here we are saying it is possible to get 45dB down on PEP with an 813 with the screen voltage varying at syllabic rate! Why this advice about needing something better than gas stabilisers or zeners? Admittedly the screen voltage in the 2DAF amplifier is normally in phase with the driving signal and not causing a varying voltage drop across a screen resistor. In the case of a correctly loaded 4CX250B the screen current is, we're told, sourcing current! I feel the screen-supply business is being over-stated. I have an ex-RAF Collins SSB linear which has no screen stabilisation at all and equalises the standing current in the two 4CX250B valves by varying the screen resistors, yet still claims excellent IMD figures."

It may well be that the Collins linear uses effective RF feedback and other linearising techniques. Then again, I seem to recall that the advocates of extremely stiff screen supplies were thinking in terms of VHF/UHF operation where the noise-floor is much lower than on HF so that much higher-order products can still be a source of interference. With the G2DAF linear the voltage drops as drive drops.

A section in the 1960 3rd edition of *Fundamentals of SSB* published by the original Collins Radio Company has the following notes on grid-driven tetrode power amplifiers (p7.5): "**Fig 2** is a simplified schematic of a grid driven tetrode power amplifier. This amplifier, operating class AB1 produces 250W per tube using the 4X250B tetrode. In general, the same design considerations exist for tetrode amplifiers as for triode amplifiers. That is, grid circuit swamping is required to hold the input impedance constant if the tetrode is driven into the grid current region, and neutralisation is generally required if the tube is to operate over the entire HF range. However, since the plate-to-grid capacitance is small in the tetrode, neutralisation is much simpler. The tetrode amplifier, being a high-gain tube, requires relatively little driving power

and a relatively small grid swing for operation. This permits the parallelling of tubes with a common input network and a common output network which reduces the number of stages and simplifies tuning. In the tetrode power amplifier, *the screen voltage has a very pronounced effect on the dynamic characteristic of the tube.* (Italics added).

"By lowering the screen voltage, the static current required for optimum linearity is lowered. This permits greater plate RF voltage swing which improves efficiency. The use of lower screen voltage has the adverse effect of increasing the grid drive for class AB2 operation and lowering the power output for class AB1 operation. The tetrode tube can be used in the cathode-driven circuit and can be so used without neutralisation in the HF range."

To judge by this passage, there would seem to be distinct advantages in providing a varying screen voltage derived from the RF drive as in the G2DAF linear - but this is a debate in which I do not feel qualified to enter!

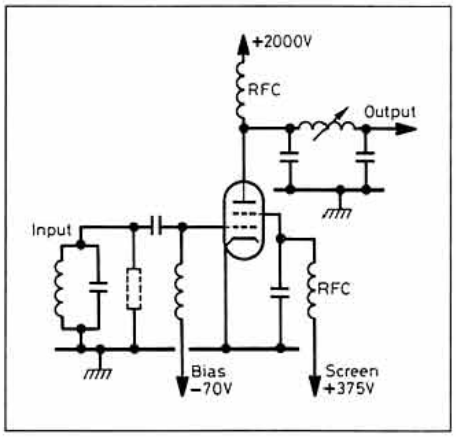


Fig 2: Simplified circuit of a grid-driven tetrode (4X250B) power amplifier. (*Fundamentals of SSB*)

HORIZONTAL LOOPS PLUS 1.8MHZ

WHILE THE 'SUNSPOT MAXIMUM' year of 1989 was, on the whole, rather disappointing in not yielding exceptionally good HF propagation periods, this has not been true of 1991 when the rich mixture of sunspots, geomagnetic activity and solar flares has seen periods when it has been possible to enjoy worldwide contacts with low-power or 'pieces of string' antennas or even both! This means that one may have to discount slightly some claims for antennas put up during 1991.

Nevertheless, there seems little doubt that the large horizontal loop has now established itself as a reliable performer on all bands from 3.5 to 28MHz (and probably also on 50MHz). *TT*, September 1990 and February 1991 presented some of the attractions of the large loop for multiband operation, even when suspended from supports considerably lower than the 50ft masts used by W1FB. As illustrated again in the September 1990 survey, the attractions of large wire loops in either the horizontal or (quad type) vertical planes were outlined by S M de Wet, ZS6AKA, as long ago as June, 1972 (and even earlier by G2PL when he reported excellent results using a quad antenna with its reflector element resting on the ground). Today, at last, this type of antenna is enjoying considerable popularity even among those with only limited-size gardens.

Mike Hollebon, G4HOL, is particularly enthusiastic. He writes: "Following the *TT* items on horizontal loop antennas I put one up early this year (1991). A whole new world of DX has opened up for me. Using the familiar 1005/F formula, I cut mine for 3.55MHz, with resonances at approximately 7.1, 14.2, 21.3 and 28.4MHz.

"In switching checks on 3.5MHz in conjunction with my well-trusted 0.25λ sloper (66ft support) the loop was consistently some 9dB better - a tremendous boost for my 50W FT7B transceiver. The DX rolls in on 28/21/14MHz and I flabbergast 3.5/7MHz operators when I tell them I have only a FT-7B. My loop is an irregular four-sided affair fed at one corner with 300-ohm slotted-ribbon feeder. I can tune it nicely from 3.5 to 28MHz with my Nevada TM1000 ATU. As it is only 21ft above ground level, I am patiently waiting for the supporting trees to grow . . ."

A new twist to the use of a modified horizontal loop has come from Jean M Bourdereau, F1LCI, (Champniers, France) who has investigated methods of using his horizontal loop as a top-fed grounded Marconi antenna on 1.8MHz well suited to his attic shack, and with some affinity to the G3BDQ 'Steeple' antenna (or the earlier G8ON 1.8MHz antenna), making it a 'top-fed, top-cap antenna for top-band'.

His ideas took shape in 1990 but he has since upgraded the system and also completed an analysis with ELNEC software. His QTH, with a useful sized garden, is in a small village but near the Angouleme airfield so that a low profile approach is an advantage. He realised that he could take advantage of ZS6AKA's observation that "when the input is balanced, the furthest mid-point may be earthed" (originally adopted to form a static leakage path in thunderstorm-prone South Africa). F1LCI saw that earthing the loop and shorting the balanced feeder would transform the loop antenna into a top-fed inverted-L antenna with, in effect, capacitance loading by the two sides of the loop, providing a vertically-polarized component for DX operation on 1.8 and 3.5MHz etc.

He writes: "My loop is one full wavelength for 3.5MHz, and rectangular (18 by 24m) to fit my garden. Its mean height is 12m (varying between 8 and 14m). The higher (further) end is now grounded and supported by a fishing rod and telescopic mast, placed on a large aluminium plate (1m squared), to which are connected 20 radials and the neighbours' fences (**Fig 3**). The opposite end is connected to open-wire twin-line running 10m to the house roughly horizontally. It comes into the attic where there is a relay which provides the option of two transmission lines to my rig (my shack is in another part of the attic). The relay gives the options of: (a) open wire line and inductive coupler in the shack for 3.5/28MHz, which gives a horizontal loop antenna, grounded against static; and (b) the relay short-circuits the outdoor open-wire line and connects it to coaxial cable, providing the 'vertical mode' for the lower frequency bands. A 2nd 'matchbox' (SPC) tuner is in the shack, but could be moved close to the relay.

"Results: Immunity to static with no more sparks in the inductive coupler due to the permanent grounding of the antenna. In the horizontal mode, grounding the loop at a current maximum does not effect performance and pattern (as stated by ZS6AKA and verified with ELNEC). In the vertical mode, which I prefer to consider as a 'top-fed Marconi' rather than a 'half loop' *à la* VE2CV, since the size is not right for a half-loop and one leg is in the house. There are some points in common with G3BDQ's 'steeple antenna' (*RadCom*, August 1986, pp556-568, 575) which I tried without as much success, as this design.

"Vertical-mode operation is of no interest above 14MHz. On 10MHz it permits filling in some notches in the horizontal-mode pattern. On 7 and 3.5MHz the vertical mode has less high-elevation gain but noise is stronger; again the major lobes are 90° apart. On 1.8MHz the horizontal loop is practically unusable for transmitting. But the ground connection and shorting the feeders (ie vertical mode) makes it function like a top-loaded vertical. The horizontal pattern is quasi-circular, the vertical one seems closer to a pure vertical than a conventional inverted-L, as if the two paths in the loop tend to cancel some radiation from the cap."

F1LCI has provided much information and comments on the ELNEC computer analysis of this antenna but this would require considerable space to reproduce. He does however also provide some constructional tips, as well as mentioning that one of his projects will be to try adding some short counterpoise wires.

On construction, he writes: "Fishing rod (fibreglass cheaper than carbon fibre): choose a non-telescopic one and discard the last segment. Flexibility provides resistance to French gales provided that three levels of nylon cord guys are used. With the loop stretched, the end will stay lightly bent. Inside, use the biggest wire available (eg piece of hi-fi 'esoteric' loudspeaker cable - very expensive - or similar less costly wire).

"Loop: no precise dimensions but the two arms must be equal. One approach is to take a 100m reel and fold it; solder the mid-point to the vertical, with the remainder (after forming the loop) used for the open-wire line (any spacing). The whole system can easily be erected by one man, provided the wires do not get entangled in branches. Make connections between copper wire and aluminium with stainless steel bolts and washers."

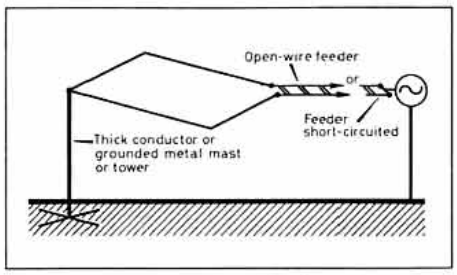


Fig 3: The 84-metre multiband horizontal loop used by F1LCI from his attic shack. It can be switched to form a vertical-mode top-fed Marconi antenna for 1.8MHz DX working.

OSCILLATOR STABILITY WITH VALVES AND FETS

ONE OF THE VERY FIRST widespread applications of solid-state technology in amateur radio was to provide an LC oscillator that reached thermal stability from switch-on in a matter of seconds rather than the 20 minutes or so often required for valve oscillators. But this did not - and does not - mean that a bipolar or FET oscillator is immune to changes in ambient temperature, either changes in shack temperature or changes resulting from the heat generated within high power stages whether thermionic or solid-state. FETs with their high internal capacitance (Miller effect) and silicon construction can be difficult to compensate effectively over the temperature cycling that occurs in practice, whereas the valve with its much greater self-generated heat tends to settle down after its (very long) warm-up period and then becomes much more resistant to changes in ambient temperature.

TECHNICAL TOPICS

Ray Cracknell, G2AHU, - formerly ZE2JV of transequatorial propagation (TEP) fame - was prompted by the September *TT* item on 'The Universal VFO' to recall an experiment he carried out five or six years ago after finding in practice considerable discrepancy between the stabilities quoted for FET VFOs and their performance outside laboratories or temperature-controlled buildings. He writes:

"At the time, my shack was in the loft and suffered from wide swings in temperature. The results are evident from the graph of **Fig 4** based on a purpose-built VFO using 2N3819 FET inverted Hartley oscillator and 2N3819 source-follower operating at the fundamental frequency of 11MHz. It will be seen that the output frequency swung from plus 3kHz to minus 3kHz when slowly heated from 20°C to 60°C over a period of 140 minutes (including a change of some 4kHz in the first 20 minutes). As a result, I built myself a purpose-designed shack!"

"While I agree that the FET VFO has many advantages and especially the lack of pronounced warm-up drift at switch on, I found that I could not replace the 1970 receiver that had stood me in good stead through the Sunspot Cycle 21 TEP tests at ZE2JV with a FET oscillator. It could not match the 18 - 20MHz VFO that used a 6J6 Kalitron oscillator with 6CW4 (nuvistor) cathode-followers feeding the frequency counter and through the triode section to the mixer section of the 6U8 which had an E88CC front-end and independent 4-gang tuned RF.

"I found that the long-term stability of FET oscillators was inferior to the 6J6 Kalitron oscillator which can also produce a T9 note on considerably higher frequencies than 18 - 20MHz. But then we can't turn back the clock, can we?"

In providing (*TT*, November) further information on VK5QG's 'Q-Gate FET oscillator' I gave only the overall drift with the changes of temperature experienced in his shack, omitting the detailed table provided in his letter. However as G2AHU has raised the subject of FET stability it may be of interest to include now **Table 1** which represents average room temperature and average frequency taken over three runs on three different days. The frequency counter used a 1MHz crystal oscillator in an oven at 72°C plus/minus 0.5°C. Zero time was after one-hour warm up time in a room at 14°.

Small frequency shifts in a receiver (or transmitter) need to be minimised for SSB and data modes. The extent to which intelligibility of speech is impaired by the frequency shifting due to slight mistuning or drift was investigated many years ago. A USAF-Montana State College Report quoted at the time that the use of SSB was being investigated for Airborne Mobile Communications (ARINC Characteristic No 533A issued March 11, 1966). The following notes are taken from appendix 6, III, Conclusions:

Part 1: Frequency-shifting of speech in the presence of noise produces marked deterioration of intelligibility dependent upon direction and extent of the frequency shift. Downward frequency shifts produce greater deterioration in intelligibility than do upward shifts. As listening conditions deteriorate the tolerable amount of frequency-shifting is reduced. For optimum listening conditions (S/N ratio = 16 or more) frequency-shifting upward 400Hz or downwards 300Hz appears tolerable for most communication requirements (intelligibility levels of 85% or more). For average listening conditions (S/N ratio = 0 to 8) frequency shifts of +200 or -100 appear to be the tolerable maxima for normal communication requirements (intelligibility levels of 70% or more). For poor listening conditions (S/N ratio = 0 or less) shifts of more than 100kHz are unsatisfactory for normal communication (intelligibility levels less than 60%).

Part 2: The 0.3 to 3kHz bandpass filter appears optimum for frequency-shifted speech. Removing the lower portion of the 0.3 to 3kHz spectrum by means of a 0.5kHz high-pass filter reduces intelligibility of frequency-shifted speech. Extending the 0.3 to 3kHz spectrum by use of a 5kHz low-pass filter reduces intelligibility of frequency-shifted speech. Both removing the lower portion of the 0.3 to 3kHz spectrum and extending it upward to 5kHz produces the maximum deterioration in intelligibility of the filter conditions under study.

Elapsed hours+1	Room Temperature(°C)	Frequency (MHz)
0.0	14	38.996
0.5	16	38.998
1.0	17	39.000
1.5	19	39.001
2.0	20	39.003
2.5	21	39.003
3.0	23	39.004
3.5	23	39.005
4.0	24	39.005
4.5	25	39.006
5.0	25	39.007
5.5	26	39.008
6.0	26	39.007
6.5	26	39.008
7.0	26	39.008
7.5	25	39.008
8.0	25	39.007

A span of some 12kHz over a temperature change of 12°C, ie better than 26ppm/°C - a very good figure for a free-running VHF oscillator

TABLE 1

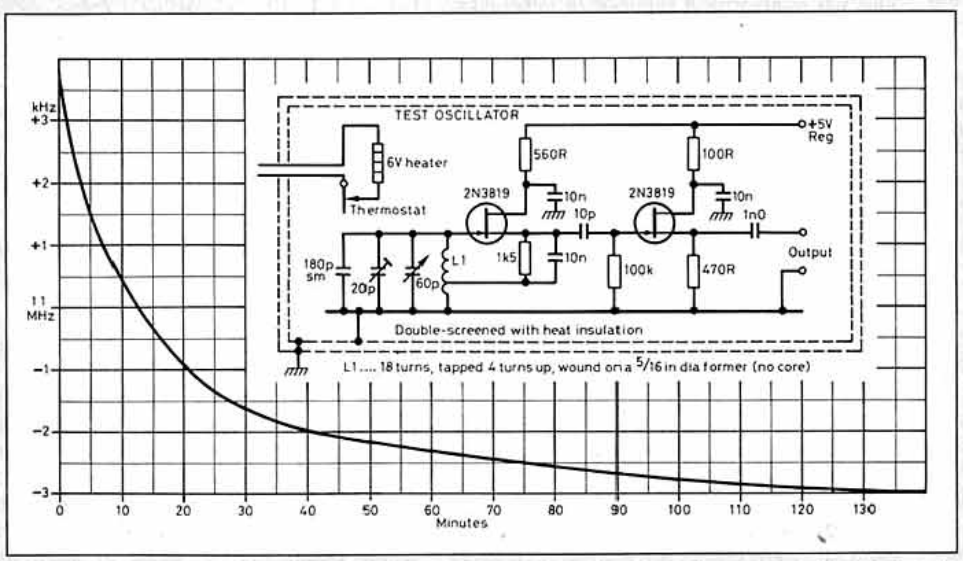


Fig 4:. Variation of frequency with temperature over a range of 20°C to 60°C over a 140-minute period of the FET test oscillator. As measured by G2AHU.

GAIN OPTIMIZATION OF YAGI ARRAYS.

OVER THE YEARS, AMATEURS have built some very large and complex antennas, but I cannot help feeling that the recent efforts of a troika of veteran Californian amateurs (combined ages total 178 years) would take some beating. Jack Hachten, Bud Ansley and Dan Bathker (W6TSW, W6VPH and K6BLG) have drawn on their professional expertise and Method of Moments software in building a gain-optimised 13-element, divided-boom, Yagi array for 14MHz, in an area 10 by 100 metres, with the elements 25 metres above ground. This is briefly described in 'A Modern Giant Yagi' (*IEEE Antennas & Propagation Magazine*, June 1991, pp19-21).

The structure, using MININEC, has thirteen widely-spaced elements mounted on six towers as a fixed beam. It is located in Southern California with a boresight 15 degrees East of True North, a great-circle heading to cover selected portions of Europe and Asia. The azimuth beamwidth is slightly less than +/- 15° to the 3dB points. First used in February 1991, it very quickly became evident that the performance in both transmission and reception equalled or exceeded all expectations. The elements are arranged for a considered balance between forward gain, sidelobe level, impedance level, bandwidth, structural wind survival and construction economies, with emphasis on forward gain. Using Brian Beezley's, K6STI, MN-software some 15,000 machine-aided EM design iterations were made, although it is emphasised also that 'indispensable human judgement, experience and strategy remained necessary ingredients'. But without such (PC-implemented) method-of-moments analysis and weighted, multi-parameter optimization, such a project would not likely to be initiated. The wire and optimization codes have enabled such a large undertaking to be approached with high confidence.

According to the authors, the 100m (divided boom) antenna operates at a centre frequency of 14.150MHz. The design provides a comfortably-high feed-point resistance (30Ω) with an impedance bandwidth (VSWR = 1.5) somewhat more than 2%. In free space, the predicted directivity is +15.8dBi. The predicted directivity is fully +21.5dBi at a favourably-low elevation angle, when arrayed over low conductivity (in fact, good dielectric) ground. The actual power gain is 0.1dB less at the feed point, due to calculated element dissipations, and 0.5dB less again, due to the loss in the 55m of cable between the feed point and the transmitter/receiver. Each element is built with heavy-wall aluminium tubing, starting in the centre with 32mm diameter, stepped twice, and ending with 19mm diameter at the tips. Each of the six, 75mm-diameter boom segments (on the six towers) measures 9m. To assure EM field purity in the six-tower environment, the topmost tower guys are dielectric. A conductor-free zone of a half-wavelength (minimum) radius is thus provided for the intended horizontal polarization.

This monster has been tested in comparison with an adjacent, well-constructed and widely-spaced five-element rotary Yagi, having a similar high feed-point resistance and overall efficiency - an antenna that I guess most of us would be more than content with!

As somebody who continues to believe in KISS and simple, negligible-cost wire antennas (tree and house supported), I nevertheless believe that a remarkable project such as this Californian monster antenna has a valuable role to play. This is emphasised in the accompanying editorial by W Ross Stone, editor of the *IEEE A&P Magazine*: "I once designed and built a professional one-kilometre long, 32-element, vertically-pointed array of crossed Yagi antennas. In doing so, I came to understand just how crazy I really was. It is thus with true awe that I present to you the article on a 100 metre Yagi .... (This) is important for two reasons. First, it provides unequivocal proof of the power of the Yagi design - as well as of the knowledge, the design tools, and the engineering expertise of the authors. Second, it is a testament that the amateur radio roots of our profession are alive, flourishing and continuing to set examples (or, at least, landmarks!) for us."

In the same issue of the *IEEE A&P Magazine*, David K Cheng (Syracuse University) reviews his work in the 1960s on 'Gain Optimization for Yagi-Uda Arrays' (pp42-45) that shows clearly why it has taken some 60 years really to come to grips with this deceptive simple-looking antenna. He writes: "Although the geometrical arrangement of a Yagi-Uda array appears simple, it's optimization is a different problem, mainly because there are many interdependent variables .... Since all the elements are electromagnetically coupled, the adjustment of any one of these variables changes the current distributions on all the elements. The optimization process cannot follow a one-variable-at-a-time procedure; all variables must be adjusted at the same time."

He notes that: "Many early studies of Yagi-Uda arrays made the basic assumption that the current distributions along all the array elements were sinusoidal. This assumption is not true, and the deviations from sinusoidal current distributions are critical in the calculations of the conditions for optimum gain ...."

He concludes: "The evolution of the research work that my former students and I carried out .... went through several stages, and we overcame a number of difficulties. With both spacing and length perturbations, we were able to find the optimized array analytically in a systematic way - some examples having gain increases of nearly 80%. The effects of finite dipole radius and mutual coupling were included in the theoretical treatment. Yagi-Uda arrays are used extensively in practice; but manufacturers have not been pressed to offer arrays with an optimum gain, because most users have scant idea of what gain or directivity is. It is hoped that our work will eventually have an impact on the design of Yagi-Uda arrays.

"We have, in fact, more recently looked further into the problem of increasing the gain of Yagi-Uda arrays, based upon an observation by Landstorfer, that properly-shaped wire antennas (**Fig 5**) longer than a wavelength, could yield a higher directivity than straight dipoles (see *TT*, December 1982). By assuming a sinusoidal distribution that did not change with the shape or the radius of the dipole, he obtained a dipole geometry for maximum directivity by a piecewise-linear approximation. He also found by experimentation that a 3-element Yagi-Uda array of shaped wires, each 1.5λ long, could be adjusted to yield a maximum gain of 11.5dBi (**Fig 6**). We managed to put Landstorfer's results on a firm analytical basis, by applying the method for function minimisation. We found the optimum shapes (bent like bows), as well as the positions of the array elements, both of which depend on the radius of the wire dipoles. The calculated current distributions on the shaped dipoles differ markedly from sinusoids (*Electronics* Letters, September 1982 pp816-818 and *IEEE Trans Ant & Prop*, May 1983)."

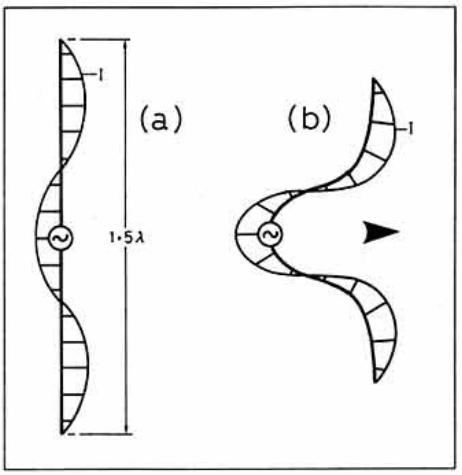


Fig 5: The current distribution on (a) a straight 1.5λ dipole where the phase reversal reduces radiation normal to the axis of the dipole; (b) A 1.5λ dipole with a gain-optimized shape producing maximum radiation in the forward direction (F M Landstorfer, 1982).

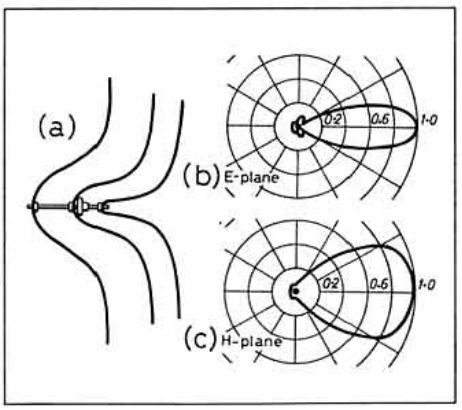


Fig 6: A Yagi array using three Landstorfer gain-optimized 1.5λ elements. A VHF array of this type provided a gain of 11.5dBi, sidelobe attenuation better than 20dB, and a front-to-back ratio of 26dB.

POSTSCRIPT ON 144MHZ D/F SYSTEMS

SOME USEFUL COMMENTS have been received on the 144MHz handheld D/F systems described in the April and July *TT*.

Dick Rolema, PA0SE, mentions that Helmut Liebich, DL1OY, has pointed out that this type of 'Doppler' direction-finder is suitable only for use with vertically polarised signals, whereas many of the popular European 144MHz 'fox hunts' specify the use of horizontal polarization in order to allow even simple dipole antennas to function as crude D/F antennas. However, this is not universal. It also does not apply, for example, where

there is a need to sort out 'repeater problems' for which the G3KMG 'whistling dipoles' were originally developed.

If you turn these antennas through 90°, as PA0SE comments, you can find the elevation of an incoming signal but not its bearing! This is not the case with the various Yagi type antennas often used in fox hunts, or for example the directional miniature twin-loop antenna that formed part of the ZS6EF 'sniffer' system (antenna *TT*, September 1990; receiver *TT*, March 1981).

The ZS6EF sniffer system was intended primarily for use quite close to the transmitter, although the antenna itself responds well to weak signals. As ZS6EF noted, a practical problem with most D/F systems is that strong local signals can be received on the average handheld receiver virtually without an antenna, making it difficult to obtain a good 'null' unless two systems are carried: one for weaker distant signals, the other for sniffing out the transmitter in the final stages of the hunt.

PA0SE has drawn my attention to a means of overcoming this problem, eliminating the need for a separate sniffer receiver, described by Anjo Eenhoorn, PA0ZR, in *Electron*, June 1991, pp309-310). His elegant solution to a very real problem consists of a compact, screened, add-on unit, attached to the handheld receiver and then brought into use when the signal is strong. It comprises a simple mixer/oscillator which converts the incoming signal to a different 144MHz channel, spaced some 500kHz from the channel used by the hidden fox transmitter: **Fig 7**. The mixer is a 1N4148 with a simple diode mixer, a BSX329 as 500kHz oscillator and an emitter-follower BC107 arranged to provide variable oscillator injection. By varying the oscillator signal applied to the mixer, by means of a slider pot, the conversion loss (attenuation) of the signal applied to the handheld receiver proper can be reduced by tens of dBs. In this way, the signal strength indicator becomes useful over a range of more than 100dB.

As PA0SE explains: "At the beginning of the hunt the antenna is connected directly to the handheld receiver and the 'fox' received on its correct frequency. When the signal becomes too strong to enable a clearly defined minimum, the antenna is transferred to the add-on unit but the receiver remains on the fox channel. The injection control slider potentiometer now drives the diode as an adjustable attenuator with a range of about 12 to 26dB. When, as one closes in, the signal becomes so strong that this amount of diode attenuation is insufficient, the hand-held is retuned to one of the two mixing products,

$$f(mix) = f(fox) \pm f(osc).$$

The oscillator frequency can be chosen more or less at will. PA0ZR uses 500kHz which means that at least one of the mixer products will be in the range 144 to 146MHz yet sufficiently removed from the fox frequency to minimise breakthrough/overload problems. With a low oscillator frequency, stability will not be a problem. The unit is powered by a single 1.5V 'button' alkaline battery and consumption is only 0.7mA at 1V. A nice feature is that, when near the transmitter, conversion loss is increased so that the output signal on the fox frequency reaching the receiver is also attenuated. Although the receiver is not tuned to the fox channel, its front-end stages could otherwise still be overloaded by the extremely strong signals when very near the fox transmitter".

H J Benjamin, Z21FB writing from Harare, Zimbabwe, questions the use of the term 'Doppler' to categorise the type of D/F system outlined by ZS6EF and G3KMG (the principles of operation of which were outlined in the April, 1991 *TT*). He writes: "My understanding of the term is that the 'Doppler Effect' occurs when a static observer receives an audio or RF signal arriving from a moving object with a frequency which changes depending on whether it is coming towards or moving away from the observer. With these electronically switched antennas neither the transmitter nor the observer is moving.

"This is not the way these direction finders operate. The oscillator switches the output of each antenna element in turn. When the elements are at different distances from the transmitter, ie not pointing at the transmitter, the radio wave will arrive at the first antenna before it arrives at the second, inducing unequal signal amplitudes due to the phase difference between them (ie because the signal is arriving at slightly different times). If the unequal outputs of these two antennas are now summed, then an output will be produced being the incoming carrier wave phase modulated at the rate of the switching oscillator. This signal will produce an audio tone of the switching oscillator in the receiver. But when both antennas are equidistant from the transmitter, the signal arrives at the antennas at the same time, producing an equal signal at the summing point thereby cancelling the output. Therefore no carrier wave is passed to the receiver, hence no audio output".

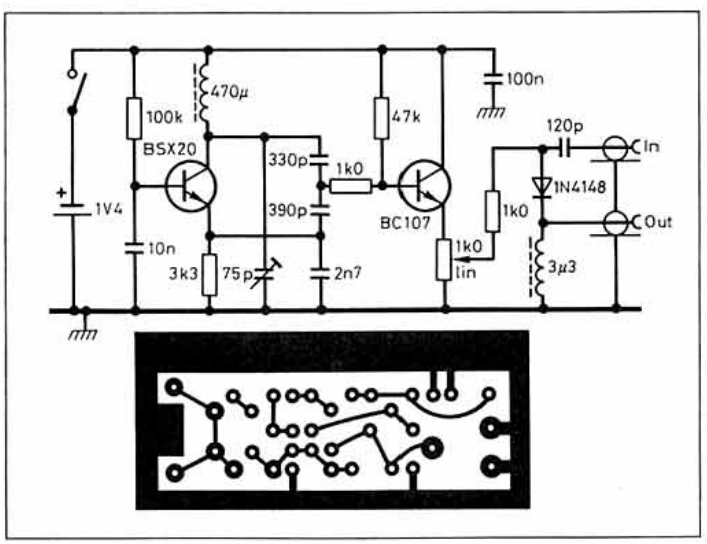


Fig 7: PA0ZR's add-on channel translator/attenuator provides an elegant solution to the problem of using a handheld receiver as a combined strong-signal 'sniffer' and weak-signal direction-finder, enabling the system to cope with a 100dB variation in signal strength.

I do not agree with this final paragraph. The electronic switch connects each antenna to the receiver in sequence, so in fact there is no summation of the outputs. There is no cancellation of the carrier wave at the receiver. However, because there is no phase difference between the signals, the receiver sees the carrier as an unmodulated carrier, and hence the audio tone disappears. Since, in effect, the antenna is moved back and forwards by the action of the electronic switch, it does produce a sort of artificial 'Doppler Effect' justifying the use of the term 'Doppler D/F', though perhaps others may disagree. In any case "a rose by any other name would smell as sweet".

However, Z21FB does raise another matter of practical significance. He writes: "I would also like to comment regarding the spacing of the two antenna elements. Neither ZS6EF nor G3KMG commented on the significance of this spacing and their spacing was different, although this would not have been important in their antennas. However, if cognisance is taken of the effect of the spacing, then by suitable adjustment, use can be made of the properties of a parasitic array to resolve the 180° ambiguity.

"Considering each antenna in turn, the dormant one (ie the one not switched through to the receiver) as a parasitic element affects the radiation pattern of the active element so that it is no longer omnidirectional. Instead it becomes that of a two-element parasitic beam pointing sideways on to the transmitter (both dipoles equidistant to the transmitter). If the spacing is now set for about 0.2λ then the resulting received pattern can be used to determine whether the transmitter is at 0° or 180° relative to the antennas.

"The audio output from the receiver is fed back into the unit and used to control a switch giving an output on a centre-zero meter. It can then, by correct phasing, be arranged to show the output from each antenna on the left or right of the meter. Because of the directional characteristics of the antennas, by simply rotating them by a small amount, the antenna most forward to the station will produce more output on that side of the meter, showing immediately if the transmitter is ahead or behind.

"If the meter is to the left, then turning left until the needle centres will show that the transmitter is ahead. Conversely, if the needle is centred and turning in either direction causes the needle to move in that direction, then the station will be behind.

"I developed and manufactured a system based on this technique in Zimbabwe (pre-1980) for use in aircraft operating on a frequency between 118-136MHz. If readers are interested in further information I will be pleased to send the circuitry". His address is H J Benjamin, Z21FB, P O Box 1215, Harare, Zimbabwe. ❑

RADCOM CONSTRUCTION FEATURE

First Steps in Home Construction

A series of articles by John Case, GW4HWR

IN LAST MONTH'S article, the Pulse Generator circuit IC1 could be used to operate a relay instead of the LED, but make sure you use a relay that does not pass more than 150mA. Also remember that coils like the one used to drive the relay contacts will generate quite high voltages when they are switched off. Unless protection is used these voltages will damage the semi-conductor output devices within the IC. Diodes to provide the necessary protection should be used as shown in **Fig 9**. The connection in 9a results in the relay being de-energised during the timing period and that in Fig 9b energised during the timing period.

The increasing need for safe, 'hands off' operation of mobile equipment has brought a few minor problems. For example, if the 'Press To Talk' (PTT) switch is replaced by an ordinary toggle switch, it is possible that the rig could be accidentally left in the transmit state. The experimental circuits described in Part 5 can be used to provide warning of this occurence. Two units are described using the same circuit: one to provide the above facility and the other as a simple domestic timer which can be used in a wide variety of applications from boiling eggs to timing the UV exposure when making printed circuit boards.

PART EIGHT – MOBILE CONTROL BOX

The conclusion of this series of articles deals with two practical uses of the '555 timer circuit dealt with in Part 7.

THE MOBILE CONTROL BOX

THE TIMER IS AUTOMATICALLY set in operation whenever the transceiver is switched to transmit. After a time (set by the operator) the warbling alarm sounds. Switching to receive mode will reset both timer and alarm. In the prototype, the timing control gives a range of 1 to 2 minutes delay before the alarm gives warning. This makes it ideal for use on two metres and especially on repeaters where it enables operators to avoid that embarassing 'time out'. It will also add interest to the other station who will probably hear your 'police-siren type' warning! Other ranges can be obtained by changing the value of the control VR1 or for shorter times, the series resistor R1.

There is no electrical connection between the mobile rig and the timer circuit. The timer which is powered by a small internal battery is switched on or off by one section of a double pole, double throw (DPDT) switch, the other section of the switch being used to replace the PTT on the 'hand-held' microphone. The microphone lead enters the box but is connected directly to a phono-socket, the lead from the boom mic being terminated in a phono-plug. **Fig 10** shows the connections to the switch. These are arranged so that the timer supply rails are shorted while the switch is in the receive position and so ensures that the starting voltage is always zero, even if the switch stays in the receive position for only a second or so. The extra contact on the switch also makes a convenient means of anchoring both wires from the battery clip.

THE BOX

THE MOBILE CONTROL BOX is intended to lie flat above the dash board so that the transmit/receive switch is close to the steering wheel. For convenience of battery changing, the lid should be uppermost so that it can be removed without disturbing the rest of the box. **Fig 11** shows the position of the PCB and the components not on the board (periph-

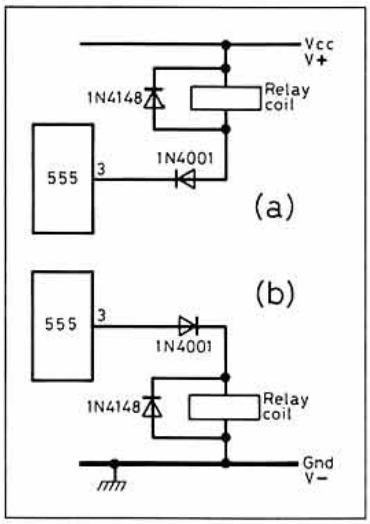


Fig 9: Replacing the LED with a relay in last month's timer circuit.

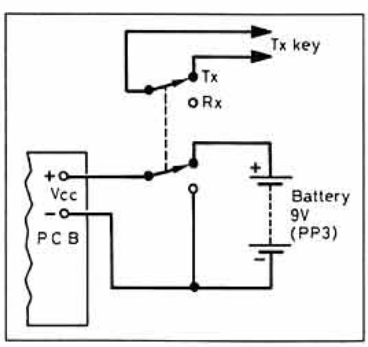


Fig 10: The switch is arranged to reset the timer on receive.

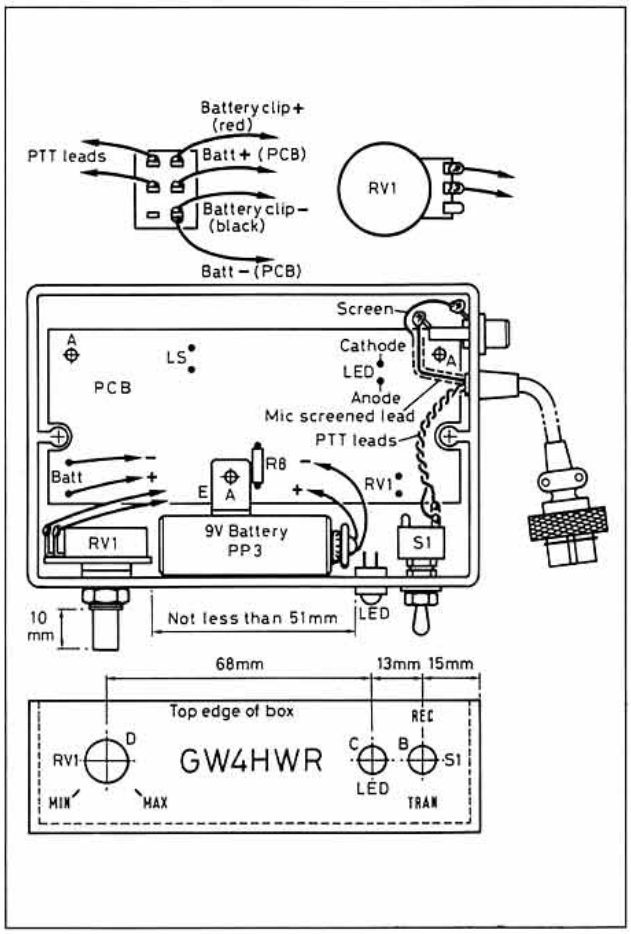


Fig 11: (Top) switch and potentiometer connections; (middle) layout of peripheral components; (bottom) dimensions of front panel.

eral components).

The box specified was chosen because of its convenient size and low price. Any other box having dimensions not less than 73mm x 111mm x 31mm could be used but the layout might have to be modified to suit. It is important to drill the three fixing holes for the PCB *before* any components are put into the board. It is surprisingly difficult to locate the holes correctly once the components have been fitted.

Put the PCB into the box with the copper side towards the bottom, the slots in the ends of the board should allow it to fit over the pillars which accept the fixing screws for the lid. Enlarge the slots slightly if the board will not sit on the bottom of the box. Note the wide space between the board and one side of the box. Mark this side of the box by means of a piece of PVC tape. The controls and so on must be fitted to this side - refer to Fig 11. Carefully drill the three PCB fixing holes with a ⅛inch or 3mm drill, using the holes in the board as a guide. It is advisable to use a hand drill with very light pressure as the plastic cuts very easily. If the hole in the centre of the side of the board is drilled first, a 6BA nut and bolt will hold the panel firm while the other two holes are drilled.

Remove the panel and countersink the holes on the outside of the bottom of the box. A countersink bit used in a hand drill is the best way of doing this but with great care; a ¼inch drill bit can be used. Repeat, great care is needed if you are to avoid a ¼inch hole in the bottom of the box. It is probably safest to use the 'bit' by hand. Remove just enough plastic to allow the head of a 6BA countersunk screw to lie level with the surface of the box. The three 6BA x 10mm (or ½inch) screws can now be fitted using three full nuts. If you do not have full nuts use two half nuts in each position to give sufficient clearance between the board and box.

Mark the position of the holes in the long edge of the box following the dimensions given in Fig 11. They are not too critical and may be varied a little to accommodate components other than those listed but be sure that the PP3 battery, together with its clip, will fit in the space between the control VR1 and the LED. When satisfied that everything will fit, drill all three holes using a small drill bit. Use the taper reamer described in Part 3 to enlarge the holes to the required size. The plastic will again cut very easily, so use only gentle pressure on the reamer. Keep checking the holes by trying the appropriate component. In the case of the LED clip, the LED must be in position as it makes the clip expand a little. **Fig 12** shows the way in which the three parts fit together.

S1, the LED and VR1 can be fitted to the box. Note - the value of VR1 in the prototype was a 100k linear control (the only value that is different to those used in Part 7) which will give a time range of just about 1 - 2 minutes. The spindle of the control should be cut before fitting. About 10 - 12mm measured from the end of the bush will suit most control knobs.

THE PCB

THE PCB IS SHOWN IN **Fig 13**. Commence by inserting the eight terminal pins from the copper side. Press in until the shoulder is up against the copper, and if double-sided pins have been used clip off as close as possible to the shoulder. Refer to Part 5 for the method of inserting the pins. Solder the heads of the pins - remember the rules of soldering. If you built the circuits on a plug board the same components can be used and they have all been pre-tested! First insert the 14 resistors. They are all mounted flat on the board and each pair of holes has 10mm spacing. This enables the wires to be bent at right angles to the body of the resistor (as close as possible to the body) and it should fit. Push the wires through the correct holes until the resistor lies flat, then bend the ends apart (on the copper side), clip off and solder. Unless you are used to soldering, it will be easier to fit, clip and solder each component in turn - it takes longer but good soldered joints are more likely.

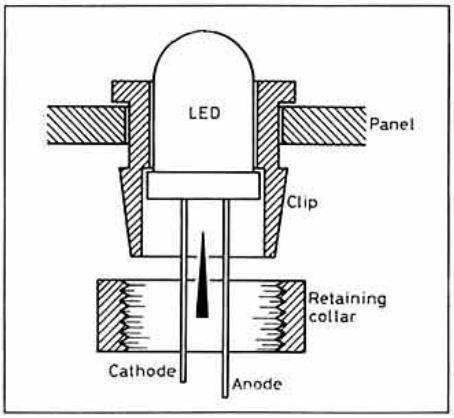


Fig 12: Fitting the LED.

Examine the IC holders. Normally there will be a notch at one end and sometimes each socket is numbered. Fit each one so that the notch (or pin 1) is at the same end as the notch shown in the IC in Fig 13. The IC could be soldered straight in but it is rather difficult to get it out again without damaging the board, and if by chance the circuit does not work correctly there will be that feeling that it is the IC which is faulty. The holders allow the IC to be changed very easily.

Now fit and solder C2, C3, C5 and C6 - they can be either way round. Follow with C1, C4 and C7 and this time make sure they are the correct way round - note the crimp at one end (which normally indicates positive) and the negative mark on the case. Finally fit the transistor - carefully follow the connections shown in the overlay diagram, Fig 13. This shows a plastic version of the BC108 - BC548 or similar. If a metal can BC108 is used, refer to the connections given by the side of the overlay diagram.

The board is now complete but it should be tested before it is fitted into the box.

TESTING

CAREFULLY CHECK THE value and position of all components and examine the copper side of the PCB for poorly soldered joints and/or short circuits caused by solder bridges. If all appears OK, fit the three ICs so that pin 1 is in the correct position, again refer to Fig 13. If the pins are not in the correct alignment - they are often splayed apart - adjust them by holding the pins against a flat surface and gently pushing the IC towards them. Solder the battery clip leads to two pins marked battery, observing the polarity. Connect an LED to the two pins - the shorter wire is the cathode and the side of the device next to this wire is flat, so that if the leads are cut the polarity can still be determined. Temporarily short the two pins marked VR1 in Fig 13 and connect a loudspeaker or telephone earpiece to those marked LS. When the PP3 battery is connected to the clip, the LED should light and after one minute go out at the same time as the alarm sounds. If anything fails, follow the fault-finding procedure described in Part 6. When all is well, disconnect the battery and remove the leads from the panel. Also remove the LED and the short circuit from the VR1 pins.

Secure the board in the box using three half nuts. Connect S1 following the circuit in Fig 10. Reconnect the LED and connect VR1 refering to Fig 11 as necessary. Temporarily fix the loudspeaker or telephone insert (this was used in the prototype) to the inside of the lid of the box using small pieces of BLU-TACK, place the lid in position and adjust the loudspeaker/sounder until clear of the other components. Remove the lid and draw round the sounder with a pencil, then remove it. Draw a second circle with a diameter of about half an inch in the centre of the first and drill four or five holes - ⅛" or 3mm around the small circle. The speaker can now be fixed

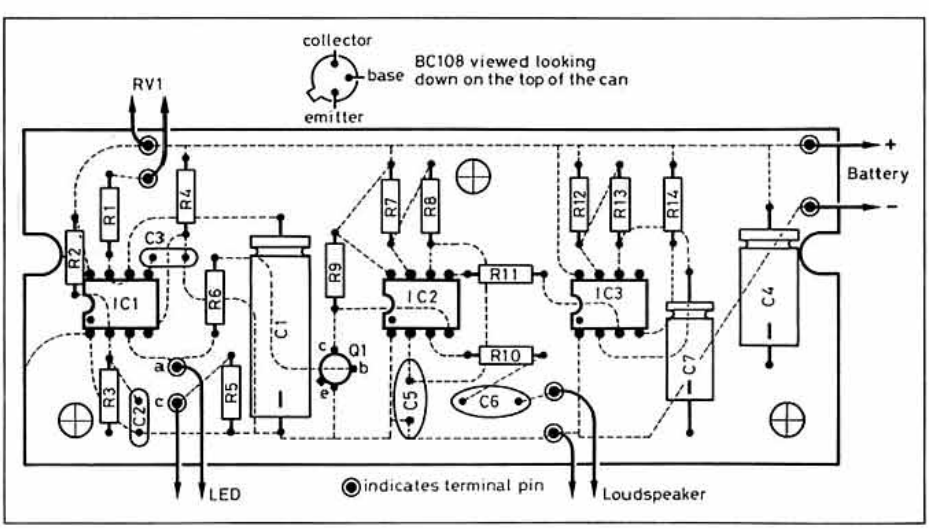


Fig 13: PCB component overlay.

using glue or, in the case of the telephone earpiece, two double-sided sticky pads.

FINISHING OFF

A BATTERY RETAINING CLIP is made from a small piece (10mm x 25mm) of aluminium sheet. Small pieces of sheet aluminium, brass or tinplate are easy to cut using tinsnips but there will be a tendency for the metal to curl as the cut is made. To minimise this, make two cuts: the first about 2mm away from the cutting line and the second along the line. Both cuts should be made with the required part of the metal resting on the left-hand blade - when the cut is made the surplus metal will curl, leaving the required piece flat.

Smooth the edges and bend to a right angle to form an 'L'. Place the PP3 battery in position in the box, hold one edge of the 'L' against the battery and mark the position of the screw holding the PCB. Drill a 3mm hole and fix under the nut as shown in Fig 11. Gently bend the clip so that the battery is held in position.

The hole for the phono socket must be drilled and reamed to suit the socket being used. Note that the socket is supplied with a soldering tag, this must be fitted under the nut on the inside of the box and the outer braid of the microphone lead must be connected to this tag. The inner of the mic lead goes to the centre connection of the socket. If you intend to leave the rig in the vehicle, the lead from the hand-held microphone can be carefully removed and connected as shown in Fig 11. It is almost impossible to give details for this part of the operation as there are so many different microphones and rigs to be considered. If you have trouble you will almost certainly get help from your local club boffins. Alternatively, a new lead can be made up by using two lengths of twin-screened cable.

As a finishing touch add your callsign, 'rec/tran' and 'min/max' as shown in Fig 11, using rub-down lettering such as Letraset. A very thin coat of clear varnish will fix the letters and prevent them being rubbed off. Finally, put some strips of double-sided tape on the underside of the box and fix it in the most convenient position over the dashboard. (Double-sided sticky pads are not recommended for this as they are rather difficult to remove).

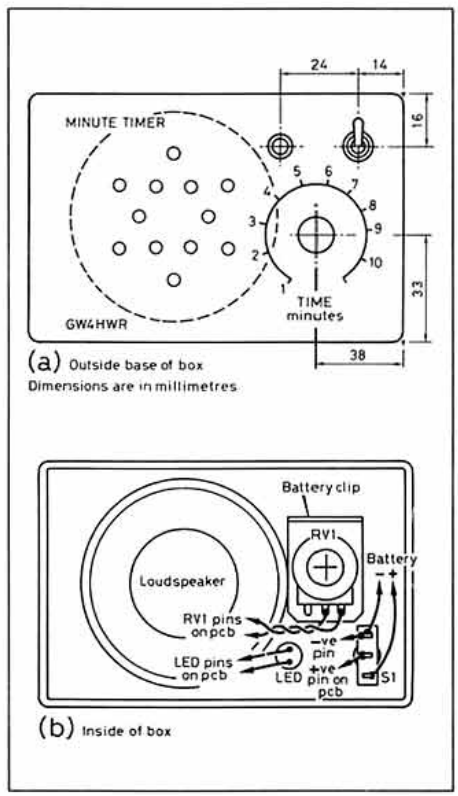


Fig 14: The front panel (a) outside and (b) inside.

screw through each of the two fixing holes so that the heads are on the outside face of the lid. The holes are very slightly too small but the screws can be started with the fingers and then taken all the way with a screwdriver. Fit a nut on each screw and do up finger-tight; align the flats of the nuts so that they are parallel to the long sides of the lid. The PCB can now be fitted with the 'cut-outs' at the ends of the board located by the 4BA nuts - the copper side must be against the lid. The three PCB fixing holes can now be marked and drilled accurately. Countersink the holes on the outside and fit three 6BA x 10mm screws using full nuts so as to give enough clearance when the completed board is fitted.

The speaker, control (VR1), switch (S1) and LED are fitted to the box in the positions show in **Fig 14**. Drill and ream the three holes referring to the instructions in the Mobile Control Box section if necessary. Place the speaker in position and draw round it with pencil. Draw a second circle of about 40mm and a third 22mm equally spaced inside the larger circle (concentric). Drill a pattern of holes around the two smaller circles to make a speaker grill. The speaker can be held in position by means of three or four spots of glue.

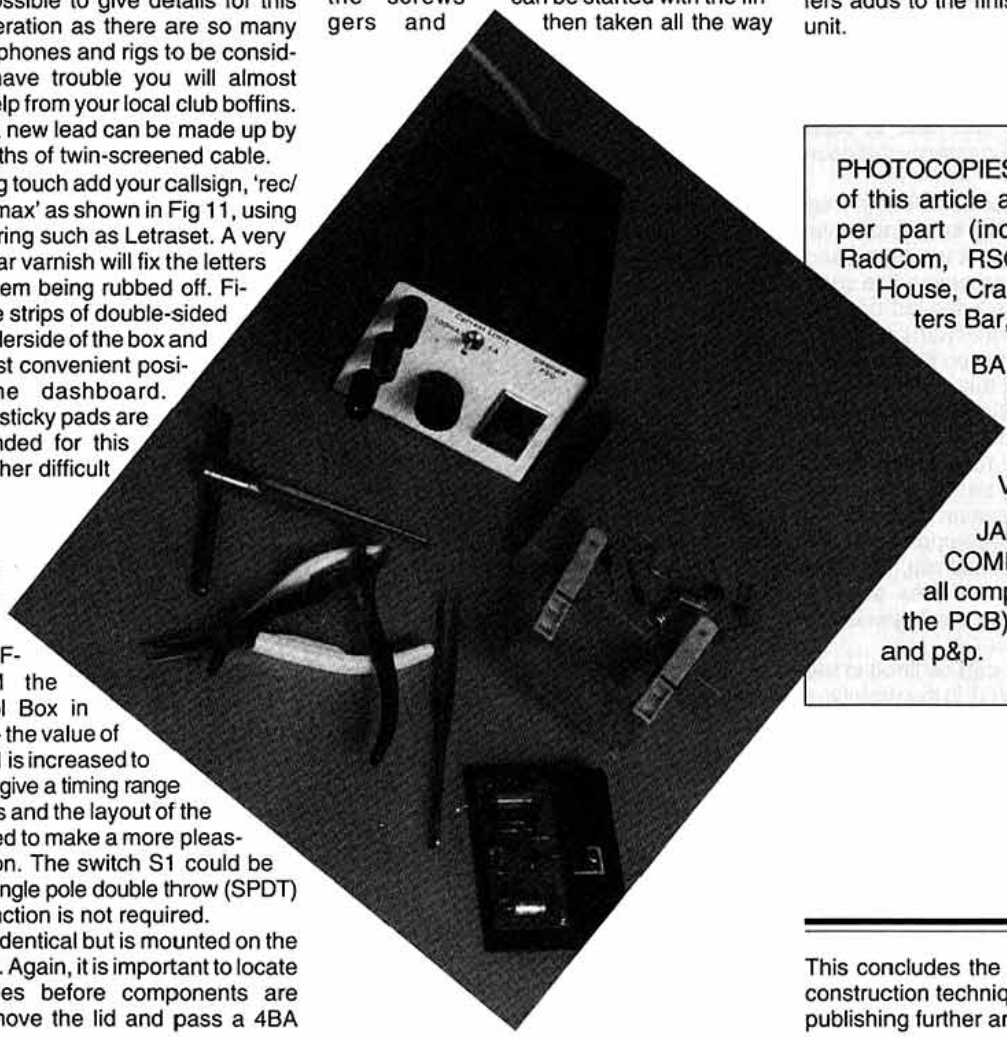
The bracket securing the battery is again an 'L'-shaped piece of aluminium but has a large hole reamed in it so that it will fit under the control as in Fig 14. If the hole is a bit too big it will allow adjustment to hold the battery in position. Refer to Fig 14 for the connections between the board and the other components.

Calibration of the timer must be carried out by trial and error and just requires rather a lot of patience! Again, a few labels using transfers adds to the finished appearance of the unit. ❑

GENERAL PURPOSE TIMER

THIS UNIT DIFFERS FROM the Mobile Control Box in two ways only - the value of the control VR1 is increased to 1MΩ (linear) to give a timing range of 1-10 minutes and the layout of the parts is changed to make a more pleasing presentation. The switch S1 could be changed to a single pole double throw (SPDT) as the PTT function is not required.

The PCB is identical but is mounted on the inside of the lid. Again, it is important to locate the fixing holes before components are mounted. Remove the lid and pass a 4BA



PHOTOCOPIES of the earlier parts of this article are available at £2 per part (inc postage) from RadCom, RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE

BADGER BOARDS can supply a PCB for this timer at a cost of £4.11 inc VAT and p&p.

JAB ELECTRONIC COMPONENTS supply all components (excluding the PCB) at £4.50 inc VAT and p&p.

This concludes the present series on basic construction techniques. We look forward to publishing further articles from John Case.

RADCOM CONTESTS FEATURE

VHF NFD 1991

by VHF Contests Committee member Andy Cook, G4PIQ

In terms of weather, VHF NFD for 1991 proved to be an event of contrasts, conditions, logging standards and opinions about the rules. The Hawick Station Group reported their main problem during the event as sunburn, but the Cornish RAC complained of force-seven gales and rain to match. Some rather vicious thunderstorms were also in evidence over the weekend. Radio conditions were patchy and varied according to location and band. However, in general the east coast and, for a pleasant change, Scotland, saw the best of the enhancements.

Although registrations were down this year, the number of groups who went out and braved the elements (sunburn and all) actually changed less, and it was good to see an increased entry in the new Restricted Section. Only the entry to the SWL section was really disappointing - don't forget that the Hansen Trophy is on offer to the leading set of SWL scores for VHF contests, and VHF NFD counts towards this award!

For the second year running, the VHFCC met over a weekend for a mixture of heavy adjudication and heavy curry eating, and our thanks must go to Bob, G4UJS, for his hospitality and help with the provision of facilities. Also we must say thank you to Shirley G0ESO, Tony G4APA, Pete G4CLA and Nick G4KUX for their help in turning a large cardboard box full of logs into a coherent set of results.

The results in the Low-Power and Restricted sections were quite clear from the outset, but the same could certainly not be said of the Open Section. Our astonishment had to be seen to be believed when, after keying the un-adjudicated results into the computer, only 0.07 points in around 3500 were present between the first and second places in the Open Section. After *very* careful checking, this gap was extended to 11 points, and congratulations must go the North-ern Lights who won by dint of their more accurate logging.

PHOTOGRAPH: G0LRS

Dorking and District Radio Society's 4m station, G3CZU/P. On the mic is Ian Davies, G3KZR; logging is SWL Mark Lumley.

It is good this year to see the winners and leading stations well distributed around the UK, with the various winners operating from the Isle of Man, East Anglia, and Scotland. Hopefully this situation will do something to demonstrate that it is possible to be successful from the more remote parts of the country.

The code exchange on the higher bands met with a mixed reaction as did the enforced close-down on the microwave bands. Next year's rules are not yet decided, and your input on these and any other issues is always welcome - please feel free to contact any member of the committee with your comments.

Congratulation and certificates go to the winners and runners-up in all sections, bands and countries. Special congratulations are extended to the **Northern Lights**, who retain the **Surrey Trophy** (just!); to the **Martlesham Radio Society** who retain the **Martlesham Trophy**; to the **Westmorland VHF Group**, who stormed up the table from 11th place last year to take the **Arthur Watts Trophy** *and* to retain the **Scottish Trophy;** to the S of Scotland CG who take the **Tartan Trophy** (which is awarded to the leading Scottish station in the Open Section whose operators are *resident* in Scotland); and to **David Whitaker, BRS 25429**, who wins the **SWL** section.

70MHz

FROM THE comments on the logs, it was difficult to come to a conclusion about conditions during the event because of the huge variation in opinions across the country. Overall, tropo conditions seemed flat, but with some North-South enhancement towards the end of the CW event. Activity in the CW session was, however, well down but as usual it sorted out those who could read Morse from those who would be very effective in a game of Chinese Whispers. One candidate for winning such a game lost 75% of the points in the CW section from logging errors. There were a couple of calls for changes to this band, including one to remove it from VHF NFD altogether but, under flat conditions, the geographical bias of 70MHz winners does have a levelling effect on the overall scores when the microwave bands are taken into account. A couple of stations had 10% docked from their scores for giving their QTHs as a distance greater than 25km from a town - check General Rule 13.

Finally, the appearance of some sporadic E made life somewhat more interesting, with a couple of stations working four Gibraltar stations. Also, I gather that ZB0T sends his regards to one of the leading stations, G4 . . . /P, who told him in no uncertain terms to get lost because he must be a pirate!

144MHz

THIS WAS another band suffering from schizophrenia of conditions. During the first few hours of the event, conditions from the east-coast were a little enhanced, although the DX appeared to become locked out later by the appearance of a large North Sea duct with huge signals and an associated noise level from PA and ON. These conditions extended into Scotland, with GM0CDA/P having a superb run of stations in Holland and Ger-

OVERALL RESULTS

OPEN SECTION

Pos	Group Name	Loc	70	144	432	uWave	Total
1	The Northern Lights	74PD	917	1000	782	783	3482
2	Sheppey Exiles	94WC	906	873	769	923	3471
3	Parallel Lines & Hillbillies	03BF	483	868	1000	1000	3351
4	Lodsa Money CG	01KJ	605	774	991	862	3232
5	Warrington CG	85OS	845	944	839	418	3046
6	Windmill CG	01LD	830	597	665	831	2923
7	Flight Refuelling ARS	80WP	673	433	492	458	2055
8	Crawley & Reigate	01OC	487	376	583	537	1983
9	South of Scotland CG	74NP	1000	627	178	49	1855
10	Leicester Polytechnic ARS	92NP	527	572	387	345	1831
11	Victory CG	90JO	512	681	179	343	1715
12	Splinters CG	91GI	515	312	265	526	1618
13	Surrey Radio Contact Club	91XH	513	493	220	356	1582
14	HERC & SARS CG	00HU	502	359	310	232	1402
15	South Manchester RC	93EH	379	394	258	349	1379
16	Rugby ATS & Ariel RG	92LJ	316	384	308	366	1375
17	Verulam ARC	91LT	505	466	188	166	1324
18	Clifton ARS	01DH	465	293	253	291	1302
19	Hornsea ARC	93PV	546	221	206	279	1252
20	Reading & DARC	91IH	482	243	214	248	1186
21	Thornton Cleveleys ARS	84VB	463	375	136	105	1079
22	Telford & DARS	82NN	546	215	117	160	1037
23	Farnborough & DARS	91OF	312	167	232	136	848
24	11th Hour CG	91XG	327	184	141	134	786
25	Maidenhead & DARC	91OO	355	124	0	0	479
26	Kidderminster & DARS	82SI	271	61	99	13	443
27	Grimsby ARS	93VJ	193	101	114	0	407
28	Lincoln IMPS CG	93RG	299	40	68	0	406
29	Watford CG	91PS	0	264	100	0	364
30	Yeovil ARC	80LV	0	257	75	20	351
31	SEARS CG	01EN	0	122	74	115	310
32	Hawick Station Group	85PJ	157	77	35	0	269
33	South Devon RC	80FI	4	77	95	63	238
34	Burton on Trent & District	92BV	0	57	66	0	124
35	Bredhurst Rx & Tx Soc	01HH	0	70	42	0	112

RESTRICTED SECTION

Pos	Group Name	Loc	70	144	432	uWave	Total
1	Martlesham RS	01QX	815	1000	1000	1000	3815
2	Scunthorpe VHF CG	94PH	1000	813	775	621	3210
3	Spalding & DARS & 5 Bells	92SU	515	460	615	413	2003
4	Leicester RS	92MO	594	296	186	263	1338
5	Bracknell ARC	80ST	640	270	372	0	1281
6	Shefford & District	92VB	509	145	198	207	1060
7	Lagan Valley ARS	74AI	611	230	130	2	972
8	Goole Radio & Elec Soc	93PW	234	300	297	0	831
9	Chesham & Aylsebury	91PS	471	129	0	197	798
10	West of Scotland ARS & YAGIS	75SW	322	188	204	45	758
11	Darwen ARC	83SQ	403	203	145	0	751
12	Mid Cheshire ARS	83PF	476	134	86	0	697
13	Bristol CG	81RN	385	97	107	0	590
14	Weston Super Mare ARS	81MH	405	85	94	0	584
15	North West of Ireland ARS	64LX	374	140	0	0	514
16	Melton Mowbray ARS	92MT	0	246	256	0	502
17	Bristol & Shirehampton ARC	81UL	0	145	169	173	487
18	Ellsemere Port & DARS	83JG	70	352	0	0	422
19	Mexborough & DARS	93KM	208	97	80	0	384
20	Birmingham University ARS	82TG	0	280	95	0	374
21	Banff & DARC	87SP	120	111	79	7	317
22	Cornish RAC	70GE	0	165	7	0	172
23	Leiston ARC	02SF	0	101	47	0	149

LOW POWER SECTION

Pos	Group Name	Loc	70	144	432	uWave	Total
1	Westmorland VHFG	84UR	1000	461	854	1000	3316
2	Mansfield CG	93EC	635	1000	892	248	2776
3	Sutton & Cheam RS	93AC	709	500	920	409	2537
4	Basingstoke ARC	91KG	550	444	1000	467	2460
5	South Birmingham ARS	82XJ	470	313	789	616	2187
6	Salisbury R&ES	81XA	434	329	635	591	1989
7	Salop ARS	82IP	638	367	584	298	1887
8	Nunsfield House ARG	93BA	434	175	511	574	1693
9	Guildford & DRS	91TF	506	193	451	367	1517
10	North Kent RS	01BH	468	0	526	288	1282
11	Cambridge & DARC	02AD	468	363	0	346	1176
12	Doncaster ARS	93JK	508	176	507	0	1190
13	Edgeware & DARS	91PO	483	203	281	124	1091
14	Braintree & DARS	01GU	0	254	609	0	863
15	Dorking & DARS	91UE	96	150	505	0	751
16	Wythall Radio Club	92BJ	96	223	358	37	714
17	Warwick School ARS	92GD	0	212	450	0	662
18	Nene Valley RC	92PG	0	112	222	0	334

SWL SECTION

Pos	Group Name	Loc	70	144	432	uWave	Total
1	BRS25429	93FX	0	1000	1000	0	2000

Thanks to G3BPM/P, G3RXJ/P and G1ZMS/P for their check-logs.

many, with one page of their log averaging 29 points/QSO. This situation did not appear to extend over the whole country, and stations to the West in England and Wales reported Saturday conditions as flat, flatter than flat, or totally flat - even flatter than 1990 which was flat!

Grimsby Amateur Radio Society: (l to r) G4KAL, G4HZF, G3RSD, G0IKF, G7BNZ, G0IIQ.

For those people who were still coherent and/or awake at around 5.30am, there was a small dawn lift which was not confined to the east-coast, but which extended some way inland. In general, towards the end of the contest, conditions did begin to improve over the whole country as seems to be traditional! Even with these enhancements, little really long DX was worked, and indeed, G4LIP/P was embarrassed at not to be able to better the distance worked by their 13cm station.

432MHz

70CM CONDITIONS followed a similar pattern to those on 2m. North Sea ducting made for Syledis chirping away for people on the eastern side of the country, but also enabled some contacts to be made into OZ and SM6, including some by stations located up to about 150km inland. The Warrington Contest Group, GM3CKR/P, also had an excellent run of PA and DL stations on this band late on Saturday evening, and at that time were workable from JO01 on an IC402 with its $\lambda/4$ whip. Some people also caught a very short-lived dawn lift on the Sunday, with OK, HB9 and southern DL being worked.

Microwaves

THESE BANDS seemed to be the most patchy of all as may be expected. From the east coast an excellent North Sea duct existed on the Saturday, and was just extending into Scandinavia when the 2200 close-down time occurred. Also, just after 2200, the path between GM and PA/DL opened, and on the following morning, before the 0600 start-up time, several stations were making reasonable DX QSOs on 2m and 70cm and could not transfer these onto 23 and 13 cm. This caused a good number of groups to ask for the 8-hour close-down to be withdrawn, or changed so that you can choose which hours you take off. Let us know how you feel about these proposals.

In spite of these constraints, congratulations to G4NXO/P and G4HWA/P for managing to work SM6HYG on both 23 and 13cm.

PHOTOGRAPH: G4JNT

Ian, G4DHA, operating the 1.3GHz station of the Flight Refuelling Amateur Radio Society with the 2.3GHz equipment in the foreground.

Equipment continues to improve slowly on 23cm, with three stations declaring the full 400W: one from the traditional ring of 6 x 2C39, and the other two from the TH328 triodes which now seem to be creeping their way onto the band. There was no competition for the equipment mortality prize this year - 70cm had slipped into comfortable reliability, and the microwaves steamed forward into their traditional place at the head of the queue for the equipment mortuary. Several people lost preamps, also some their PAs, both on 23 and 13 (including the open section winners - if only for part of the event) and, just like last year, G4MRS/P had a generator fail, and was running well under power for most of the event.

For full results see Contest News

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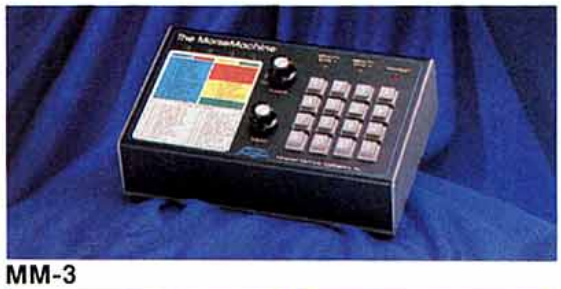

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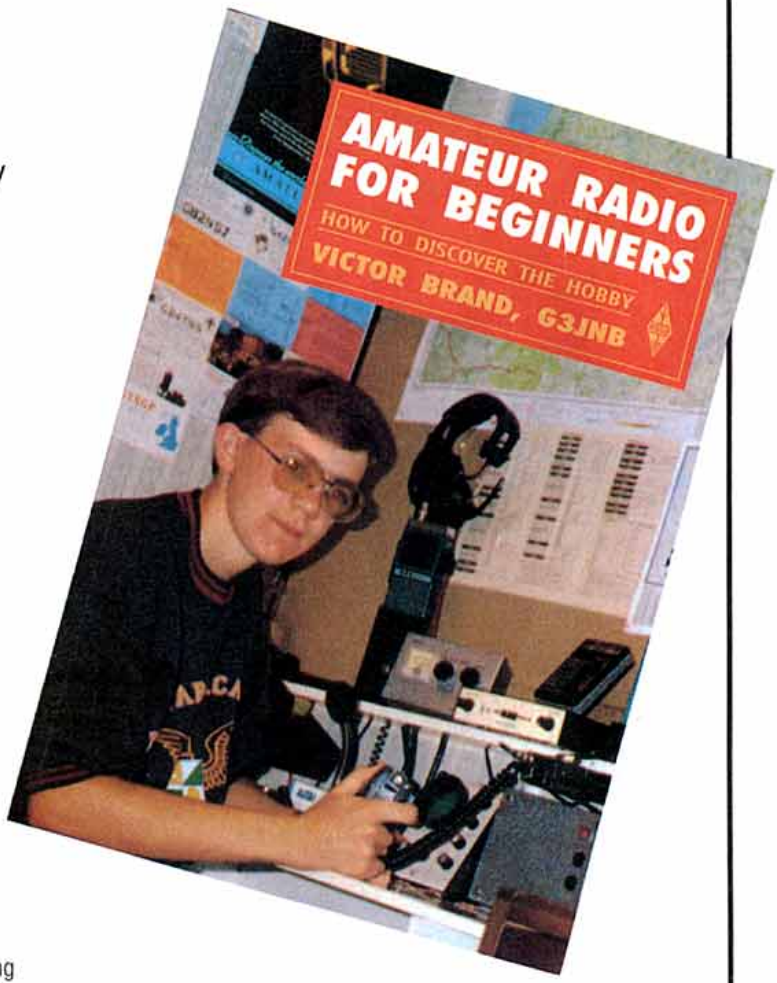

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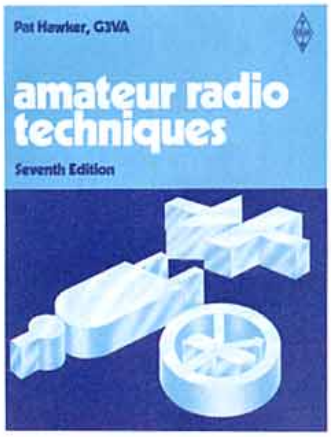
Pat Hawker, G3VA



This long-awaited reprint of the classic 7th edition brings together a very large selection of circuit ideas and devices, information on antennas and related topics, plus many construçtional and fault-finding hints, gathered during 22 years of writing the Technical Topics feature.

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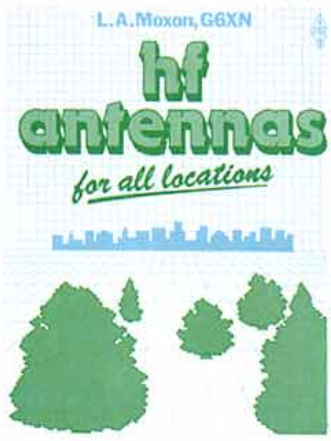
Les Moxon, G6XN



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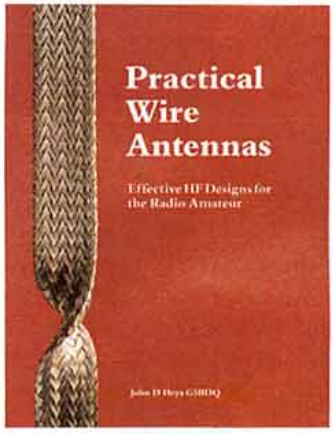
John Heys, G3BDQ



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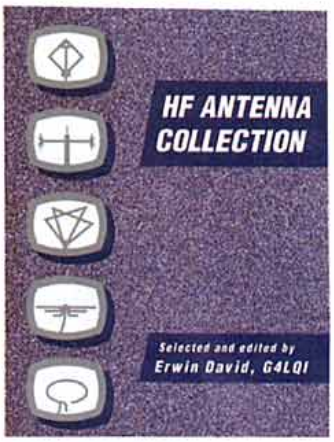
Edited by Erwin David, G4LQI



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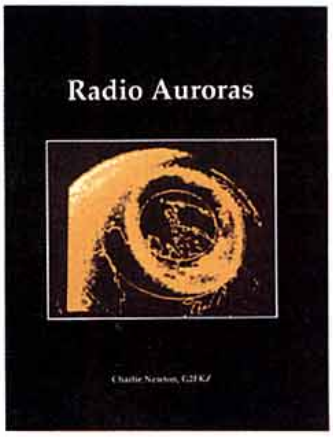
RSGB Books for Christmas

Radio auroras



Charlie Newton, G2FKZ

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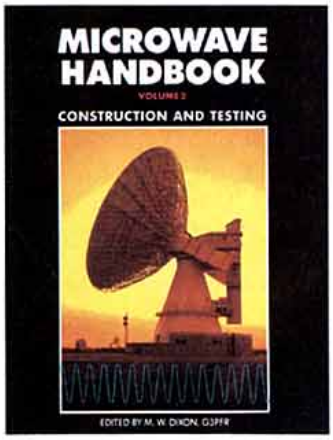

Mike Dixon, G3PFR

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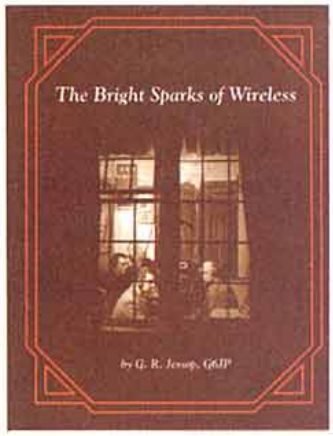
The Bright Sparks of Wireless



George Jessop, G6JP

This is the story of the real experimenters: the radio amateurs from Marconi to the 'secret listeners' of WWII, who laid down the foundations of circuits and procedures that all radio amateurs now take for granted. 90 pages hardback.

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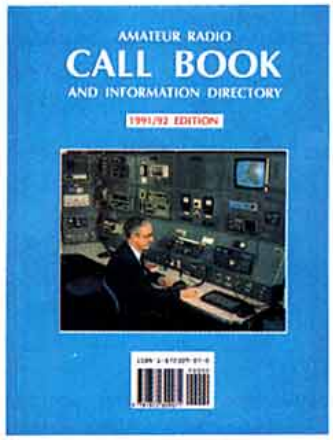
Amateur Radio Call Book 1991/92



Brett Rider, G4FLQ

As well as an up-to-date list of all UK and Republic of Ireland radio amateurs, this invaluable reference also includes a 120-page information directory. Note: valid for 1992 as well (next edition to be published October 1992). 422 pages

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RADCOM CONSTRUCTION FEATURE

CW Transmitter for the 3.5MHz Novice Band

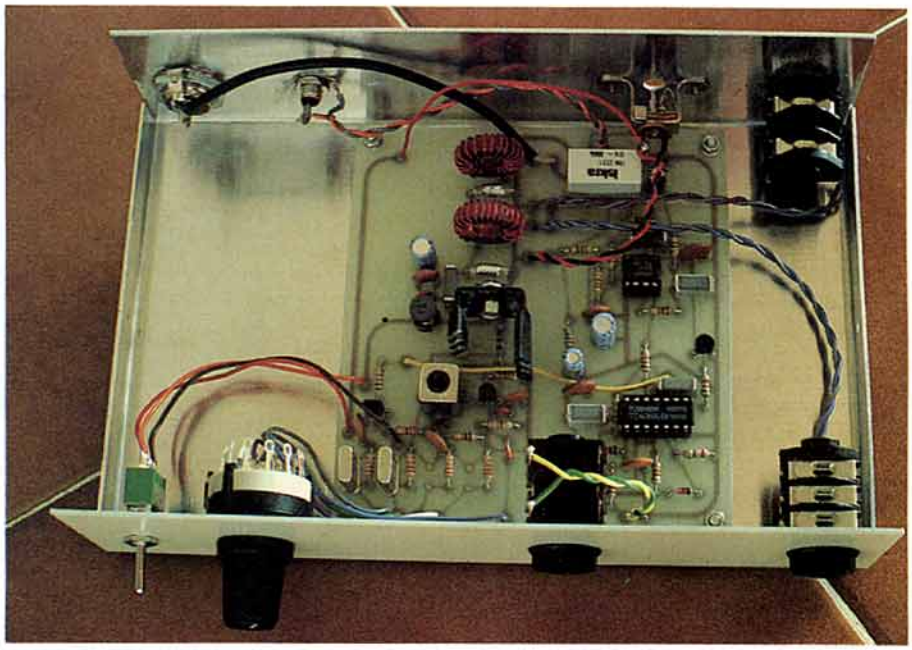
by Steve Price, G4BWE

THE INTRODUCTION OF THE UK Novice Licence last July means that is possible for Novices to operate within specified sections of some popular HF (High Frequency) bands providing, of course, that the licensees have also passed the new 5 Words Per Minute Morse test.

Having obtained a class A licence, the Novice will probably wish to set about improving his or her skills as a Morse operator. By far the most enjoyable way of doing this will be to practice over the air during real CW contacts with other amateurs. The 3.5MHz band is certainly a good place to start and so to make things a bit easier, here is a design for a CW transmitter that operates on 3.5MHz and complies with all relevant conditions of the Novice Licence. It can of course be built and used by any Class A licensee, Novice or not.

The Novice CW transmitter is intended to complement the RC14 beginners HF receiver [1] and its matching 3.5MHz converter [2], both of which are already available in kit form from Cirkit Distribution Ltd. However, the transmitter has been designed in such a way that it will easily interface with any receiver that covers 3.5MHz and can also resolve CW signals - in practice this means either a simple direct convertion receiver or a superhet with a product detector or BFO (the appropriate control may be marked 'SSB').

The 3.5MHz CW Novice segment is 20kHz (kilohertz) wide and extends upwards from 3.565MHz. In order to ensure a high level of frequency stability and also to prevent the possibility of the Novice transmitter accidentally being operated on a frequency outside of the allotted segment, crystal control is employed. This involves the use of a separate quartz crystal (abbreviated xtal) for each frequency to be used. Up to four frequencies may be chosen and the appropriate xtal is then selected using a rotary switch mounted on the transmitter's front panel.



The four recommended frequencies are:- XTAL1 - 3.567MHz; XTAL2 - 3.572MHz; XTAL3 - 3.577MHz; XTAL4 - 3.582MHz.

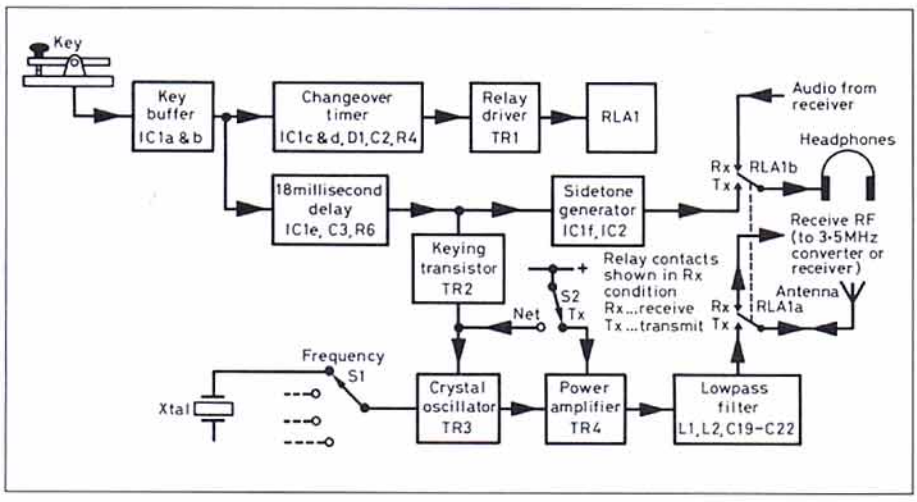


Fig 1: Block diagram of the Novice transmitter

A complete kit of parts, which includes the high quality PCB, all components, all connectors, hardware, solder, wire, and punched and painted custom-built case, is available from Cirkit Distribution Limited, Park Lane, Broxbourne, Hertfordshire, EN10 7NQ. Also supplied with the kit are two crystals - XTAL1 and XTAL2. The price of the kit (including P&P and VAT) is £55.60; XTAL3 and/or XTAL4 may be ordered separately at a cost of £7.85 each.

For the benefit of the more experienced constructors who may wish to build this project from scratch, rather than buy a kit, full constructional details are included in this article.

USING CW

CW (CONTINUOUS WAVE) TRANSMISSON is simplicity itself! All we need to do is build a generator of radio frequency (RF) energy - an oscillator - and arrange for it to be turned on and off using a Morse key. Each time the key is depressed the generator emits a continuous stream of oscillations at the chosen frequency (the carrier wave). The distant receiver then turns these oscillations into an audible tone so that the dots and dashes of Morse code are rendered as bursts of sound in much the same way as they would be if we were using a Morse code practice oscillator.

For practical use we may wish to increase

the oscillator's power by feeding its output into an amplifier. A transmitting antenna is also necessary and it will obviously be convenient to use the same antenna for receive. This means that a switch of some kind must be incorporated so that the antenna can be connected to the transmitter when sending, and to the receiver when listening.

It is also a good idea to provide a means of monitoring the Morse while it is being sent. One way of doing this is to use the station receiver. However, the results are likely to be unsatisfactory - mainly because the receiver will be grossly overloaded by a transmitter operating so close to it. The problem can be solved by building into the transmitter a tone generator controlled by the key - just like a practice oscillator. This technique is known as sidetone, and by adding further switching we can arrange for the tone to be fed to the receiver headphones during transmit.

Finally, the antenna and sidetone switching can be made automatic and activated by the Morse key. The Novice transmitter offers all these features by incorporating logic control and a transmit/receive changeover relay. The design is therefore slightly more complex then absolutely necessary, but it is assumed that the Novice will wish to concentrate on the Morse itself, rather than have to worry about switch settings!

HOW IT WORKS

FIG 1 SHOWS A BLOCK diagram of the Novice transmitter and the full circuit appears in **Fig 2.** Transistor TR3 forms the heart of the crystal controlled oscillator and S1 selects the appropriate quartz crystal (XTAL1 - XTAL4). TR2, the keying transistor, simply switches the oscillator on and off under the control of IC1 (more about IC1 later).

The main winding of T1 and C14 form a tuned circuit which is resonated at 3.5MHz. When TR3 is oscillating, its output is fed via the coupling winding of T1 to the base of the RF power transistor, TR4. R23 is a damping resistor which prevents excessive voltage appearing at the base of TR4 and also helps ensure that the power amplifier remains stable - we do not want TR4 to start oscillating as well! Following amplification by TR4 the transmitter output is fed through a lowpass filter consisting of L1, L2 and C19-22.

The lowpass filter attenuates all frequencies above 3.5MHz. It is necessary to do this because the output from TR4 contains not just the 3.5MHz signal that we wish to transmit (known as the fundamental) but also the harmonics, or multiples, of this frequency. Omitting the lowpass filter would therefore cause the transmitter to radiate additional signals at 7MHz, 10.5MHz, 14MHz and so on; a situation we must clearly strive to avoid!

RFC1, a radio frequency choke, feeds power from the DC supply to TR4 but prevents RF currents travelling back in the opposite direction. The decoupling capacitors C23-25 help prevent instability by absorbing any RF energy that RFC1 fails to suppress.

IC1 contains six inverting gates labelled (a) to (f). Each gate is a simple circuit made up of a few MOS transistors (MOS stands for Metal Oxide Semiconductor - but don't worry if you have not come across this expression before). An inverter is a logic device which provides an output voltage that is the opposite of its input. However, logic circuits can only operate by differentiating between two distinct levels - logic 0 and logic 1 (in a computer system these levels are used to represent the noughts and ones of binary numbers). Conveniently, logic 0 is defined as zero Volts and logic 1 is equal to the supply voltage - say 12 Volts. So, if we connect the input of an inverter to the 12V supply rail, its output will immediately drop to 0V. Looking at the circuit symbol, the output is at the point of the triangle (the small circle here indicates that the gate is an inverting type).

Gates (a) and (b) of IC1 have their inputs connected ('tied' in logic circuit parlance) to the supply rail via R2 and R9. Pins 2 and 4 will therefore be at 0V. As capacitor C2 is fully charged, pin 5 is also at 0V which means that pins 6 and 9 are at 12V. Pin 8, of course, gives an output of 0V and this ensures that TR1, the relay driver transistor, is turned off.

Now, if the Morse key is depressed, pins 1 and 3 are grounded via R1 (the value of R1 is so small compared to R2 that the gates react as if they were connected directly to 0V). Pins 2 and 4 immediately go high (another way of saying that the gate outputs rise to the supply voltage) and C2 discharges because both ends of this capacitor are now connected to 12V, albeit via R3 and D1. The states of IC1 (c) and (d) are also reversed and so TR1 switches on because pin 8 is now at 12V. This energises the coil of RLA1 - the transmit/receive changeover relay - and its contacts, RLA1a and RLA1b, move into the transmit position (NB in Figs. 1 and 2 the relay contacts are shown in the receive position).

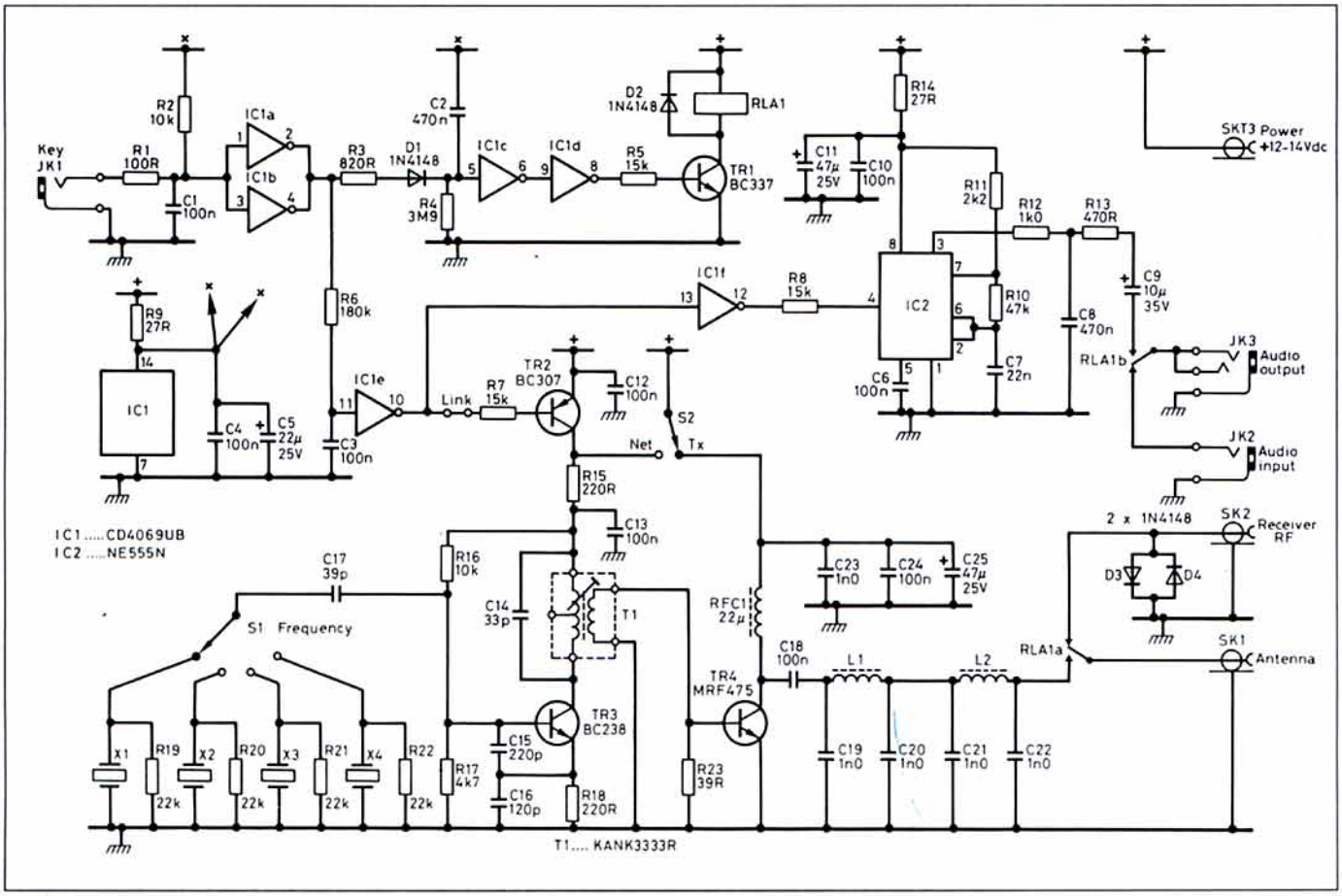


Fig 2: The complete circuit of the transmitter

The purpose of RLA1a is to connect the antenna to the output of the lowpass filter on transmit, but allow the receiver to be connected to the antenna when listening. This is achieved by phono socket SK2 using a patch lead which enables the antenna socket of the receiver (or the 3.5MHz converter) to be coupled to SK2.

When the Morse key is released, pins 1 and 3 of IC1 go high (+12V) and pins 2 and 4 return to 0V. However, as C2 has been discharged, the input of IC1(c) (pin 5) initially remains high and so TR1 stays switched on. C2 now begins slowly to charge through R4 (the outputs of gates (a) and (b) play no part at this point because they are isolated by D1 which is reversed biased and therefore cannot conduct). After about 2 seconds, C2 is charged sufficiently to take the input of IC1 (c) low (ie close to 0V) and so TR1 finally switches off and the relay contacts return to the receive position. Of course, if the Morse key is pressed again at any time before the input of IC1(c) goes low the process is halted and C2 must begin charging all over again.

The net result of all this is that once we have started to send Morse, RLA1 stays in the transmit position until there is a pause of approximately 2 seconds. This prevents RLA1 attempting to follow every depression of the key and ensures that the receiver remains disconnected from the antenna during the whole period of transmission.

The Morse itself is routed via R6 and IC1(e) to the keying transistor TR2. R6 and C3 delay the dots and dashes by a period of 18 milliseconds (1 millisecond equals one thousandth of a second). This small delay is introduced so as to ensure that RLA1 has time to connect the output of the power amplifier (TR4) to the antenna before the oscillator (TR3) has been activated by TR2.

The output of IC1(e) is inverted by IC1(f) in order to key the sidetone generator built around the NE555 oscillator/timer chip, IC2. The NE555 produces an audio tone in similar fashion to a Morse practice oscillator - indeed, you may already have seen designs for practice oscillators which utilize this popular IC. The frequency, or pitch, of the tone is determined by R10, R11 and C7 and is set at approximately 700Hz. IC2's output is taken from pin 3 and filtered to make it sound more pleasant by R12 and C8. R13 attenuates the tone so that it is not too loud in the headphones.

Instead of plugging the headphones into the receiver as normal, a jack socket (JK3) is provided for the 'phones on the front panel of the transmitter. A patch lead couples the receiver's headphone socket to JK2 and this enables us to listen to the receiver when RLA1b is in the receive position. However, as soon as the key is depressed at the beginning of a transmission, RLA1b connects the headphones to the sidetone generator so that we can hear the Morse being sent.

Finally, S2 (the 'net switch') enables us to turn on the crystal oscillator without having to depress the key. This means that RLA1 will stay in the receive position and we can listen to the oscillator using the receiver as a monitor. This enables us to tune the receiver to our transmit frequency (very important). Note that when 'netting' (the name given to the process whereby the receiver and transmitter are tuned to the same frequency), TR4 is disconnected from the power supply as there is no need for the oscillator signal to be amplified.

The completed transmitter will provide an output power of just over 1 Watt if operated from a 12V power supply (slightly more using 13.8 Volts). This is comfortably within the 3W power limit specified by the Novice Licence regulations.

COMPONENTS LIST

RESISTORS

R1	100
R2, 16	10k
R3	820
R4	3.9M
R5, 7, 8	15k
R6	180k
R9, 14	27
R10	47k
R11	2.2k
R12	1k
R13	470
R15, 18	220
R17	4.7k
R19, 20, 21, 22	22k
R23	39

All resistors are 0.25W, 5% carbon film.

CAPACITORS

* = 10mm lead spacing

C1, 4, 6, 10, 12, 13, 24	100n	Disc ceramic
C2, 8	470n	Siemens style polyester*
C3, 18	100n	Siemens style polyester*
C5	22u	25V radial electrolytic
C7	22n	Siemens style polyester*
C9	10u	35V radial electrolytic
C11, 25	47u	25V radial electrolytic
C14	33p	Sub-miniature ceramic plate
C15	220p	Sub-miniature ceramic plate
C16	120p	Sub-miniature ceramic plate
C17	39p	Sub-miniature ceramic plate
C19, 20, 21, 22	1n	Polystyrene
C23	1n	Disc ceramic

INDUCTORS

L1, 2	See text	
RFC1	22uH	Toko 8RBSH (Part No. 262LYF-0084K)
T1		Toko 10K type KANK3333R

SEMICONDUCTORS

D1, 2, 3, 4	1N4148
TR1	BC337
TR2	BC307
TR3	BC238
TR4	MRF475
IC1	CD4069UB
IC2	NE555N

GENERAL

RLA1	Iskra TRK2221 (12V, 270 ohm coil)
S1	3 pole, 4 way rotary - type CK1026
S2	SPDT miniature toggle
SK1	SO239 (Single hole fixing type)
SK2	Phono (single hole fixing type)
SK3	2.5mm DC power socket
JK1, 2	6.3mm mono jack socket
JK3	6.3mm stereo jack socket

8 pin DIL IC socket
14 pin DIL IC socket
2.5mm coaxial DC power plug
PL259 plug with solderless reducer for RG58U cable
Phono plugs (2 required), all metal
2 x 6.3mm mono jack plugs
6.3mm stereo jack plug
1.2m of RG174A/U miniature coaxial cable
Length of multicore solder
Lengths of PVC covered, stranded cable for flying leads and PCB link
1m of 24SWG enamelled copper wire
PCB and case with lid (see text)
Heatsink for TR4 (type TV-5)
Small quantity of heat transfer compound
Trimmer tool for T1 (Cirkit part No 35-00002)
4 x 6BA nuts, bolts (15mm overall length) and 6.3mm spacers to mount PCB
1 x 4BA nut and bolt (short) plus shake-proof washer to fix heatsink
2 x self tapping screws (small) to fix lid.
4 x stick-on feet
2 x T68-2 powdered iron toroids (for L1, 2)
6.3mm push-on knob plus cap with index line (for S1)
XTAL1-4 - See text.

REFERENCES

1 'The RC14 Beginners Receiver', *Radio Communication*, June 1987, pp397-399.

2 'A 3.5MHz Converter for the RC14', *RadCom*, April 1989, pp 39-42.

. . . to be concluded

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And there were in the same country *shepherds abiding in the field, keeping watch over their flock by night.*
And lo, the angel of the Lord came upon them, and the glory of the Lord shone round about them; and they were sore afraid.
And the angel said unto them, Fear not: for, behold, I bring you good tidings of great joy, which shall be to all people.
For unto you is born this day in the city of David a Saviour, which is Christ the Lord.
And this shall be a sign unto you: Ye shall find the babe wrapped in swaddling clothes, lying in a manger.
And suddenly there was with the angel a multitude of the heavenly host praising God, and saying,
Glory to God in the highest, and on earth peace, good will toward men.

Luke 2, v.8-14

Lowe Electronics wish all licenced Radio Amateurs and Short Wave Listeners the Season's Greetings and best wishes for the New Year.

With special thanks and appreciation to our thousands of customers who have supported us in 1991.

LOWE ELECTRONICS LTD

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The Peter Hart Review

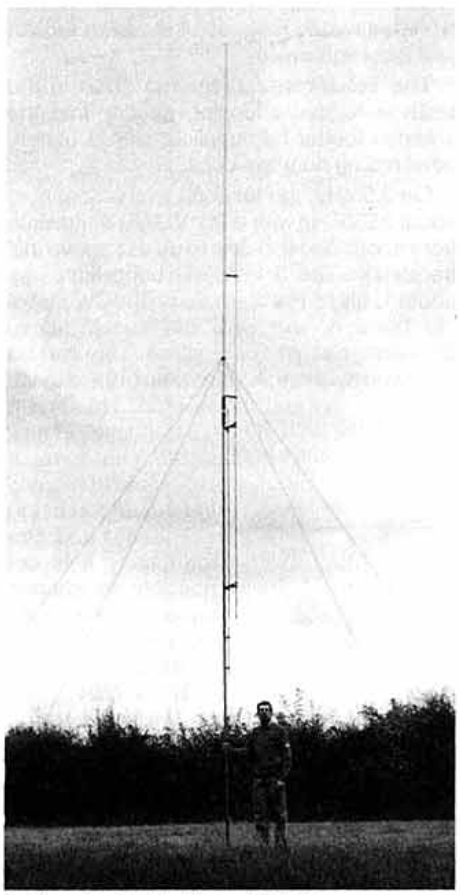
Challenger DX-VI

A Multiband vertical from GAP Antenna Products

I FIRST HEARD OF the GAP Antenna Products Challenger DX-VI last March when a mailshot from Bredhurst Electronics addressed to my local club landed on the door mat. I gave it little thought at the time, but later on in the Summer, I received two separate enquiries asking for my opinion of the Challenger antenna. As I still use the Butternut HF6V-X reviewed in the March 1991 *RadCom*, I had the means to perform an interesting comparison of these two similarly specified antennas.

The Challenger DX-VI covers six of the HF bands - 3.5, 7, 14, 21, 24, 28MHz and, as a bonus, it is claimed to function on 50 and 144MHz as well! It uses no traps, coils or transformers and provides a match to 50Ω cable without the need for any switching.

Traps are notoriously lossy, particularly when the antenna has been exposed to the weather for a number of years, and there are more and more antennas appearing on the market now which avoid the use of traps. With the Challenger, its whole length is active on all bands, a major advantage over most trapped antennas. The total height is about 31.5ft (9.6m), about 5ft longer than the Butternut, and has a power rating of 1500W. The total weight is quoted as 16lbs (7.2kg). The antenna comes packed in a relatively large box, 267 x 25 x 7cm (105 x 10 x 3inches), but the antenna lengths are broken down into fairly long sections.



Author with the Challenger DX-VI Antena.

DESCRIPTION

THE CHALLENGER DX-VI is an interesting design and achieves multiband performance without the use of traps or coils. These two items usually suffer most from the rigours of the weather, in particular the British climate. The antenna may be described as a grounded elevated feed monopole and is illustrated in **Fig 1**. Elevated feeds can provide certain advantages compared with base feeding. A better match to 50Ω coax is often achievable and noise pickup can be lower in noisy locations due to better symmetry and reduced ground currents. The antenna is less critical on the provision of radials and ground losses are lower. The tubing is split about halfway up to give a 16ft top section electrically insulated from the lower section which is grounded at the bottom. The 50Ω coax feed passes through a hole at the base and then up the inside of the lower section. The outer of the coax is connected to the top of the lower section and the inner passes through a series stub to the bottom of the upper section. The arrangement of the coax is shown in **Fig 2**. Hence the feed is connected across the gap (which gives rise to the name of the company). The feeder and the stub are formed from a single length of ¼in diameter thick-braided coax with the braiding suitably cut at the gap feed point. The stub is electrically one quarter wavelength long on 3.5MHz and is terminated at the far end in a capacitor. The value of the capacitor on the review antenna was measured as 2440pF. The stub is contained within the upper section by 'zig-zagging' inside the tubing. The antenna is supplied with 5ft of feeder emerging from the base.

The other notable feature of the antenna is that there are tuning rods protruding both upwards and downwards from the gap. These are spaced away from the antenna elements on insulated supports and are connected in antiphase to the adjacent antenna element section. On the low frequency bands, these tuning rods act as capacity loading. On the higher frequency bands, the length of the tuning rods becomes significant in terms of wavelength and these must be considered as transmission lines with the main antenna element. The two lower tuning rods each comprise transmission lines with higher impedance sections connecting to lower impedance sections. The result is three shunt stubs across the gap which gives a multi-resonance, and matches the antenna across the different bands. However, the situation is probably more complex than this, and the tuning rods almost certainly radiate on the higher bands particularly where they are a resonant length.

The precise details of how the antenna functions on all the bands is not clear to me. However some general observations can be made:

On 3.5MHz, the antenna is less than λ/8 long and the series stub is λ/4 long. The 2440pf capacitor across the end of the stub is transformed to an inductive reactance in series with the upper antenna section. This is equivalent to a series loading coil at this point and brings the antenna into resonance together with the additional shunt capacity provided by the tuning rods.

On 7MHz, the antenna is a little under λ/4 long and the series stub is λ/2 long. The capacitor across the stub is quite a low impedance and this is transformed to an equal low impedance in series with the top section. The capacity of the tuning rods resonates the antenna.

On 14, 21 and 28MHz, the stub is a multiple of λ/2 in length and the capacitor can be regarded as a short circuit. Hence the stub is a short circuit at the feed and the feeder is effectively connected across the gap. On 14MHz the antenna is a centre fed λ/2, on 21MHz ⅜λ and on 28MHz a full wavelength. The tuning rods provide a stub matching system on these bands but also contribute to the radiation. On 24MHz, the stub presents a fairly high impedance which matches to the relatively high feed impedance of the antenna in conjunction with the tuning rods.

I will not hazard a guess at how the antenna matches or radiates on 50 or 144MHz!

The DX-VI will function without radials on the higher bands but for operation on 3.5 and 7MHz three 25ft radials are specified, connected at the base. With an elevated feed of this type, there will be plenty of RF on the outer of the coax. However, by running the coax down inside the lower section to ground level, this should be considerably reduced. As a further measure, GAP recommends feeding the antenna with at least 65ft of additional coax and coiling this if necessary at the base to eliminate RF getting back to the transceiver on the outer of the cable.

The main radiator comprises thick walled aluminium tubing 1⅜in diameter at the bot-

tom and middle reducing to 1⅛in at the top. The base section is double-walled for added strength. With very little taper, the structure is quite stiff, heavy and very rugged. The tubing is not capped, rain is free to flow through but will not collect inside, and the coax joints and capacitor are all sealed against the weather. The tuner rods are constructed from ½in aluminium tubing and the capacitor is housed in a potted plug-in cap fitted with spade terminals.

The antenna is provided with an 18-page manual, assembly diagram and other literature which gives clear numbered instructions on assembly, installation, functioning, site considerations, test etc.

ASSEMBLY AND INSTALLATION

THE TOTAL ASSEMBLY time took about two hours but this included checking off all the parts and following the instructions very closely. The manual claims 30 minutes which seems very optimistic. Assembly is very straightforward, the only problem was a missing hole in one of the tuner rods. The main radiator comprises four sections which are pre-assembled with the stand-off insulators for the tuner rods in their correct locations. These just require final positioning and tightening. Stainless steel clamps and hardware are used throughout and there are a few spare screws and washers included. A nut driver is even provided with the parts. The tubing joins are very strong. All the joins are sleeved and accurately drilled and avoid the use of slits and hose clamps.

The antenna is suitable both for ground mounting and for roof mounting in an elevated position. For ground mounting, a 3ft-long mounting post is provided and this should be set into the ground. Care should be taken to ensure that the mounting post is accurately vertical. As for the Butternut, I used a longer steel pole of about the same diameter as the mounting post, knocked into the ground to make a tracer hole, constantly twisting and removing to clear the hole. This was frequently checked with a spirit level to ensure verticality as, once off the vertical, it is impossible to make corrections. When siting the antenna, note that the lower tuning rods can easily be touched, and on certain bands very high RF voltages exist on them.

For roof mounting, guys are essential. For ground mounting, guys are desirable but can be dispensed with in the more sheltered locations. The antenna is rated at 60MPH wind survival. Non-conductive guys should be mounted above the gap, preferably about two-thirds of the way up. They should not be attached too high as this can bow the antenna.

It can often be a time consuming operation to tune a multiband vertical as the tuning adjustments tend to interact. The Challenger DX-VI is pretuned and requires no adjustment as this is inherent in its design. This is a particular advantage where the antenna is roof mounted.

PRACTICAL RESULTS

THE CHALLENGER DX-VI was used ground-mounted and located in the clear on level ground well away from trees and other antennas. Comparisons were made with a Butternut HF6V-X similarly mounted and a DX33 3-element triband beam at a height of 30ft. The DX-VI was located about 300ft away from the Butternut and about 450ft away from the beam to avoid any possible interactions. A coax relay arrangement was used to switch between the DX-VI and the Butternut and care was taken to ensure that the feeder losses to these two antennas were similar (and both rather high considering the cable lengths involved). The Butternut is mounted in an ideal situation and fitted with twelve radials between 17 and 34ft in length (the original complement of 16 radials having been depleted by the ravages of the lawn mower and local squirrels!)

The VSWR measurements given in the table were made looking directly into the antenna feeder as supplied, with a battery powered rig near the base.

On 3.5MHz, the antenna was resonant at about 3630kHz with a 2:1 VSWR bandwidth from about 70kHz below to 60kHz above this frequency. The 3:1 VSWR bandwidth was about 190kHz. For operation in the CW part of the band or the SSB DX sector above 3750kHz, retuning is required. This can be achieved by changing the value of the capacitor at the top end of the stub. This has a minimal effect on the other bands. GAP now provide five different capacitor units to resonate from the CW end of the band through to the upper part of the US phone band. Unfortunately it is not possible to change capacitor units without taking down the antenna.

The VSWR figures on 7MHz apply to the band 7.0 - 7.1MHz. The VSWR rises above 7.1MHz but is still below 2:1 even at the top of the US phone band. On 28MHz, the VSWR was lowest at around 29MHz, rising to 2:1 at the extremities of the band.

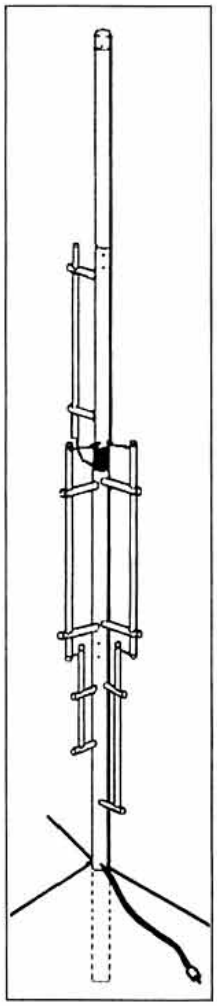


Fig 1: Challenger DX-VI physical layout

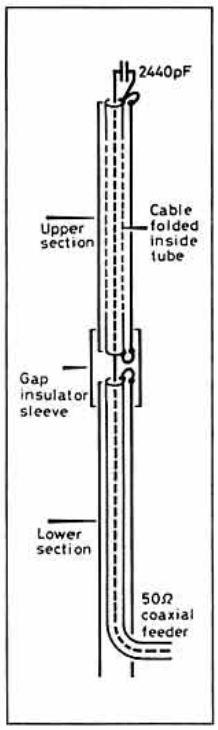
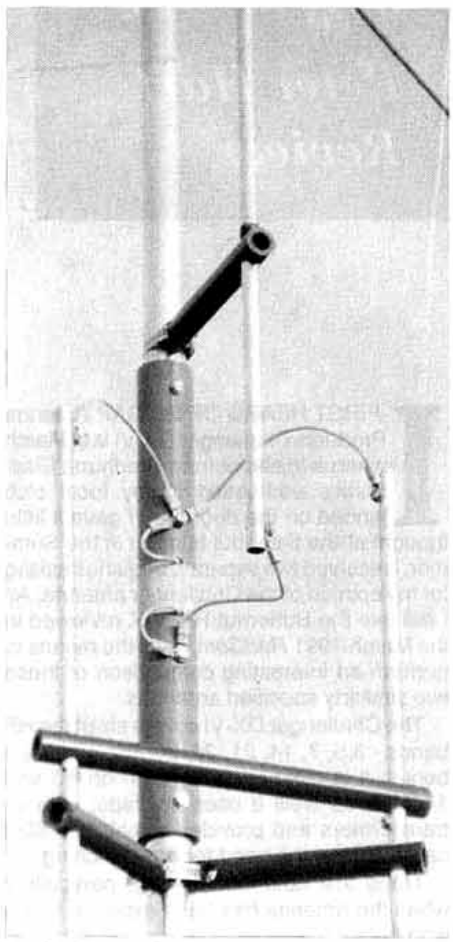


Fig 2: Arrangement of the coax.



Detail of the gap feed.

On 14MHz, the VSWR measurement was rather prone to hand-capacity effects around the feeder and power meter. This indicates conducted RF on the outer of coax and is the reason why GAP recommends a minimum of 65ft of extra feeder. The VSWR measurement in the shack on 14MHz was a big improvement over that measured at the base of the antenna.

Different radial configurations were tried ranging from no radials up to ten radials. The effect on VSWR was relatively minor on most bands with the exception of 7MHz. This band appears to be most critical on radials. With no radials, resonance disappeared and the VSWR was a constant 4:1 over the band. Surprisingly, the resonant frequency and VSWR on 3.5MHz was not particularly dependent on the radials, even with none at all.

Some tests were also made with the antenna standing on ground level instead of recessed into the mounting base to give some idea of how the performance may differ in an elevated roof mounted environment. Again, the only band which showed any significant difference was 7MHz. In this case, resonance shifted down below 6.9MHz although the VSWR across the band was still well below 2:1.

Comparative tests with the Butternut vertical proved most interesting. On 3.5MHz, the Butternut was first tuned to the same resonant frequency as the Challenger. At this frequency, the Challenger was about 1 to

1½ S-points down on the Butternut. This reduced to ½ to ¾ S-point at 50kHz away from resonance and at 100kHz and beyond the antennas gave identical performance. The Butternut has a bandwidth of 32kHz between the 2:1 VSWR points compared with 130kHz for the Challenger. This wider bandwidth of the Challenger is most likely due to the lower Q inductive loading provided by the stub and capacitor arrangement and this gives higher losses at resonance.

On 7, 14 and 24MHz there was no perceptible difference between the antennas. On 21MHz, the Challenger was 1 to 2 S-points down and on 28MHz generally similar but up to ½ S-point down on some signals.

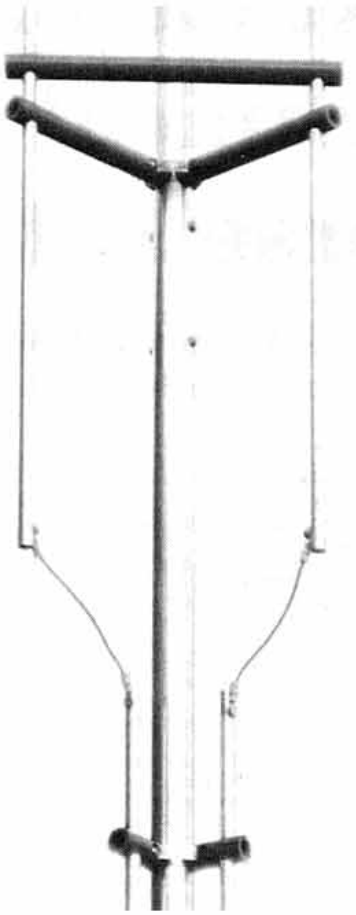
These results were remarkably consistent and independent of direction or whether the signals were local or DX.

Comparing with the HF beam, the Challenger was about 1 S-point down on 14MHz and 1 to 2 S-points down on 21 and 28MHz. No comparisons or performance assessments were made on 50 or 144MHz.

CONCLUSIONS

THE CHALLENGER DX-VI is an interesting six-band HF vertical antenna with the added bonus of functioning on 50 and 144MHz as well. It is very ruggedly built and should survive the wildest of weather conditions and give many years of reliable service. The radial requirements are minimal and the elevated feed can help in noisy locations and reduce RFI. With the possible exception of 21MHz, the performance on all bands compares well with other vertical antennas although the wider bandwidth on 3.5MHz has been achieved at the expense of reduced 'on the nose' performance. The review antenna was supplied with the standard capacitor to give resonance around the centre of the 3.5MHz band. Alternative capacitor units are available to suit the CW and upper SSB sections. These can be supplied at time of order or are available separately at a cost of about £12.

The current price of the antenna is £229.95 inc VAT.



Detail of the lower tuner rods.

Band	Min VSWR	Max VSWR or Bandwidth 2:1 VSWR
3.5MHz	1.0	130kHz
7MHz	1.05	1.09
14MHz	2.0	2.2
21MHz	1.25	2.1
24MHz	1.7	2.0
28MHz	1.02	2.0
50MHz	1.5	2.0

Note that for values of VSWR below about 1.5, inaccuracies in the measurement equipment probably gives an over-optimistic result.

ACKNOWLEDGEMENTS

I WOULD LIKE TO THANK Bredhurst Electronics Ltd of Handcross, West Sussex for the loan of the antenna and Peter Swallow, G8EZE, for his advice on the functioning of the antenna.

RADCOM TECHNICAL FEATURE

Textloader for Technical Software Morse Tutor

James Hossack, GM3DKW, describes a useful add-on program to enhance this popular Spectrum software

ONE OF THE MOST inexpensive Morse tutors on the market at the present time is that sold by Technical Software for the Commodore, Acorn and Spectrum computers. The Spectrum was one of the most popular home computers of the eighties, although perhaps now overtaken in the amateur radio field by the BBC, particularly in the 'Master' version. However, there are undoubtedly many of the earlier 48K machines still around, while the 128+2 and 128+3 models are also available new, together with quite a wide choice of software. All these computers are tape-loading, while the 128+3 has an additional built-in disc drive.

PLAIN LANGUAGE

THE TECHNICAL Software program for the Spectrum, available on tape, has as one of its options a series of plain-language texts on a separate tape cassette. This is included with the Morse program at no extra charge. Many aspiring Morse students will find the 40 texts on this tape more than sufficient for plain-language practice. However, those who have difficulty reading plain-language, perhaps with a tendency to 'anticipate' letters (fatal during the test!) may find only 40 passages a trifle limiting. There is a further option with the Technical Software program - Send Entered Text - enabling a 40 or 50-word passage to be typed in and converted to Morse at any desired speed for on-the-spot copying, but this is lost as soon as the computer is switched off.

```
  10 REM Textloader for Morse;
GM3DKW
  20 POKE 23658,8
  30 LET a=29696
  40 CLS : PRINT AT 4,9;"TYPE IN
 TEXT";AT 6,7;"(8 LINES MAXIMUM)
";AT 8,10;"__________";AT 12,5;"
Check text carefully,";AT 14,7;"
then press ENTER"
  50 INPUT ;a$: LET b=256: Let c
=LEN a$: IF c<b THEN CLS : PRINT
 a$: GO TO 90
  60 REM If text inadvertently
exceeds 8 lines, lines 70 & 80 r
emove the extra words
  70 LET b=b-1: IF a$(b)<>" " TH
EN GO TO 70
  80 LET a$=a$( TO b-1): LET c=L
EN a$: CLS: PRINT a$
  90 PRINT : PRINT "To save text
 so that Morse is   sent BACKWAR
DS press B;other-   wise press a
ny other key.          Then
WAIT for SAVE sign"
 100 IF INKEY$="" THEN GO TO 100
 110 IF INKEY$="B" then go to 14
0
 120 FOR b=1 TO c: POKE a+b,CODE
a$(b): NEXT b: POKE a,c
 130 SAVE "fwd_text"CODE 29696,c
+1: STOP
 140 FOR b=1 TO c: POKE a-b+c+1,
CODE a$(b): NEXT b: POKE a,c
 150 SAVE "rev_text"CODE 29696,c
+1: STOP
```

Listing one: The Spectrum Textloader.

THE PROGRAM

WITH THE AID of the short auxiliary program described below, texts can be typed, entered and saved on tape for later recall in a precisely analogous manner to the 40-text practice tape supplied. Such texts can be chosen by the student to be closely related to the Morse test requirements, to include words or letter combinations which are causing special difficulty; or if preferred, to be based on CW abbreviations, numbers and on-air chit-chat, in preparation for real QSOs once the test has been safely negotiated.

Saving a number of texts at once for later use also helps to ensure that the earlier ones will be satisfactorily forgotten when you come to practice them again. An additional feature which may appeal to some is the ability to enter a text with its letters in reverse order. Thus the passage takes on the character of 'random letter groups' but with the advantage that the plain-language letter frequency is preserved. No translation key is required simply read the passage backwards!

The text loader program is quite independent of the original Morse tutor or the practice tape; *no attempt should be made to save the program to either tape because of the danger of accidental erasure of valuable material.* The texts themselves have to be limited to 255 characters each (including spaces between words). This is about the same length as the practice texts, and represents approximately 3½-4 minutes' practice at 12WPM.

IN USE

ENTER THE PROGRAM exactly as listed, paying special attention to punctuation. When you run the program, you should see the instruction given in Line 30 appearing in the centre of the screen, with a flashing cursor in the lower half, Type in your chosen text (which will be in capitals) as accurately as possible, using the delete key where necessary. Be careful not to remove the inverted commas at the end of the text, or hit the break or enter keys accidently. After entering the text and choosing the option in line 90, the legend "Press Rec and Play then any key" will appear on the screen in its usual way. When the text has been saved, remember to "Verify" that all is well (refer to the Spectrum handbook if you have forgotten how!). If in a surfeit of enthusiasm you inadvertently exceed the limit of 255 characters for the text, don't worry, as the program will automatically remove the extra words (to the nearest complete word).

Once the program is working correctly, it should itself be saved, using any convenient title, such as "textloader". The program occupies no more than about 15 seconds of tape and each text about 8s, so that up to sixty can be accommodated on a small computer tape. Re-loading into the Spectrum is carried out exactly as for the Technical Software practice texts, using option 8 of the main program. For operation with the Specrum+3, the machine should first be switched to the 48K mode; this would in any case be the normal mode for tape loading. Details of an alternative program making use of the disk drive to store texts, can be obtained by sending an SASE to the author (QTHR).

My thanks to Richard Wilmot of Technical Software for reviewing the draft of this article.

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

The G4LQI Multiband Quad-Plane with a Bonus, described in the Dutch magazine *Electron* of March 1989, demonstrates how one can take features from several proven designs and integrate them into something new.

THE UPPER HALF of a quad loop, of which the lower half has been replaced by radials or other counterpoises, makes an excellent space and height saving, mostly vertically-polarized DX antenna. DK9FN's *'Quad-Plane'* [1] and G8PO's *'Jaws'* [2] are prime examples. Applying DJ4VM's symmetrical feed method [3] to such an antenna yields the following useful features:

- Shack-tuneable 3.5-30MHz with vertically polarized broadside radiation on all bands;
- Two horizontally polarized 'bonus modes', created by judicial arrangement of feeders;
- No outdoor pruning, tuning or weather proofing;

THE DESIGN

THE G4LQI ANTENNA is pictured in **Fig 1**. **Figs 2a, b & c** detail the three modes. **Fig 3** shows the mode selection switch.

Mode **a** is the basic quad plane, vertically polarized and good for broadside ground wave and DX on all bands 7 - 30MHz. Like all vertical HF antennas, it works best in areas with earth of good conductivity. The 9m leg length was the largest that could be conveniently accommodated at this QTH, but no dimension is critical. This configuration readily tunes to 3.5MHz but the legs are too short and the wire too thin for efficient operation on that band.

Mode **b** is a horizontally polarized delta loop consisting of the two upper quad-plane legs and one side of each feeder. I found this mode useful for European contacts on 14 and 21MHz and occasionally for DX reception in heavy local QRN.

Mode **c** is a low U-shaped dipole consisting of the other side of each feeder, end loaded by the lower legs of the quad-plane. When first erected, the two lower legs were one 18m U-shaped wire with, on all bands, a current null at its midpoint. Cutting the wire at that point and straightening the two legs to run parallel to each other made no difference to mode **a** operation and produced a low 30-metre-long centre-fed wire which is effective for short skip on the 3.5 and 7MHz bands. Note: By folding the lower legs, eg in 'sardine tin opener' [6] shape, unwanted radiation from those legs in mode **a** could have been minimized, but obstructions at my site ruled this out

THE MECHANICS

THE G4LQI ANTENNA uses one 13m mast. The lower points are tied to the house, a tree and fence posts, using fishing line. The antenna proper is made of 1.5mm² PVC-covered copper wire. The feeders are 450Ω slotted twinlead, now also sold in the UK. All mechanical stress on soldered connections was avoided. On the down run of the two twinleads, 10cm-long perspex bars were used as spreaders, 1m apart. The runs were kept away from brick-work and gutters by several spreader lengths. These are resonant feeders with, on several bands, high RF voltages where they enter the building. A brick in the shack wall was replaced with a wooden block. Through it two 38mm holes were drilled into which I inserted PVC pipes, capped at each end. Slots for the twinleads were made in the caps. With the twinleads fed through, all outside openings were sealed with silicone compound. Four spark gaps and their earth lead are attached to and stood off from the outside of the wooden brick for lightning protection [4].

The mode switch has two 38mm ceramic wafers which withstood 400W PEP on all bands; mine is mounted just inside the feeder entrance.

TUNING UNIT

AN ASTU FOR BALANCED feeders with a high SWR is required. My modified Z-Match [5] provides a low SWR on all bands. Note that most single-ended ATUs with a ferrite balun fall short because the latter cannot handle the high impedance levels of tuned feeders.

REFERENCES:

[1] DK9FN, quoted by G3VA, 'Technical Topics', *Radio Communication* Oct 83, p891

[2] G8PO, 'The G8PO Jaws antenna', *HF Antenna Collection* (RSGB), p67

[3] DJ4VM, quoted by G6XN, *HF Antennas for all Locations* (RSGB), p155, Fig 11.9

[4] G3MYA, 'Lightning', *HF Antenna Collection* (RSGB), p196

[5] G5RV, 'An improved Z-match ASTU', *HF Antenna Collection* (RSGB), p116

[6] DL1VU, 'Eurotek', *Radio Communication*, Feb & Mar 91

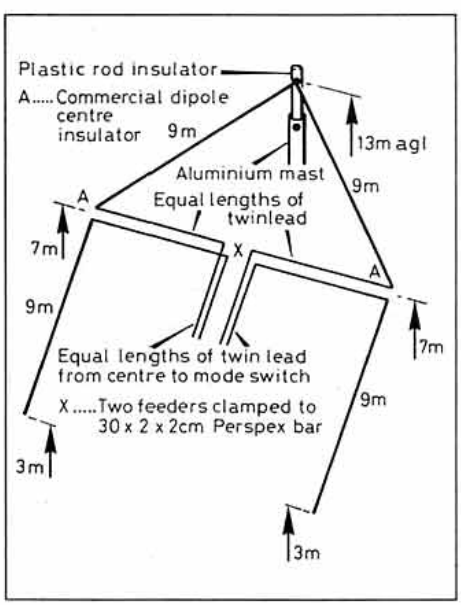


Fig 1: The G4LQI 'Quad-Plane with a Bonus'

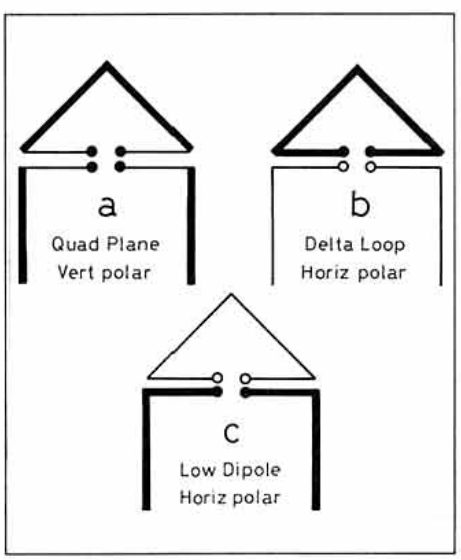


Fig 2: The three modes in schematic form. Active antenna elements in bold lines. Active downleads as solid dots

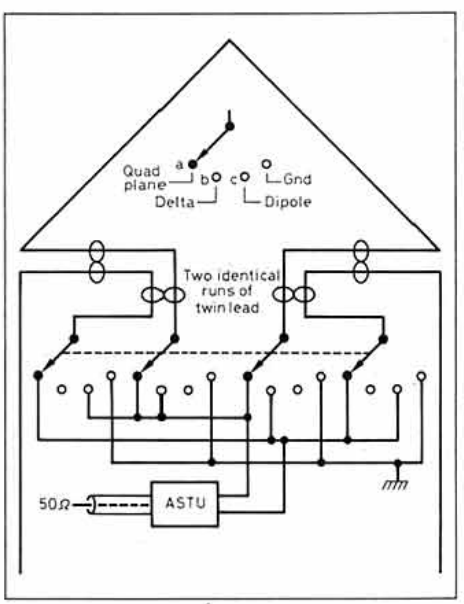


Fig 3: Mode switching

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.

"AT LAST!" writes Gordon Crowhurst, G4ZPY, "our new Miniature Iambic Keyer is ready . . . . and the design is even better than we first contemplated."

Housed in a screened low-profile black vinyl-coated steel cabinet measuring 3.25 x 3.25 x 0.75in the Keyer has controls for side-tone and speed (8 - 60WPM). Sockets are provided for connection to the key itself, for the battery/PSU and for connection to the rig; matching plugs are supplied. In addition, auto inter-character spacing can be switched in and out. The Keyer was introduced in July at £53 inc P&P and insurance.

G4ZPY Paddle Keys International: 41 Mill Dam Lane, Burscough, Ormkirk, Lancs, L40 7TG. Tel 0704 894299.

NEW FROM Ferromagnetics is a range of Choke Baluns. One is for use on any type of dipole or inverted vee antenna from 1.7 to 30MHz, another is designed to mount on HF beams with 1.5" or 2" booms, and another is especially for VHF use from 30 to 250MHz. The HF models can handle 4kW whilst the VHF one copes with up to 200W. Prices are around £29 (HF) and £17 (VHF).

Ferromagnetics: PO Box 577, Mold, Clwyd, CH7 1AH.

THE MANY thousands of amateurs world-wide who have remained true to their now ageing Drake-Line equipment, will be delighted by the news that the oft rumoured return of that outstanding mark has at last come about.

The famous Miamisburg company, founded in 1943, has at last returned the attention of their craftsmen to the amateur market and have announced their first new model in ten years - a high specification communications receiver, the R8E.

Launched as a complete surprise at Leicester by the newly appointed sole UK Distributors, Nevada Communications, the receiver was the star of the show. It looks every inch a Drake and offers full multi-mode coverage from 100kHz to 30MHz and a wealth of sensible, practical facilities. The price is £965.

Mike Deveraux, Managing Director of Nevada, explained that as a confirmed Drake man himself, he and his Portsmouth team were delighted to win this coveted distributorship. "Competition to be the new UK Drake supplier was fierce" he said. "Now that the decision has been made, we have received many congratulatory messages from the other contenders and leading trade figures. Orders are already rolling in and the R8E could be set to take the top spot in communication receiver sales for 1992".

Nevada themselves have an enviable reputation for their service and support, built up over the past 22 years. They intend to provide a high degree of back-up on the R8E for the newly emerging Drake enthusiasts of the nineties!

Nevada Communications: 189 London Road, North End, Portsmouth, Hants, PO2 9AE.

LOWE ELECTRONICS LTD has stolen a march on those manufacturers endeavouring to come up with a reasonable, general coverage communications receiver below the £300 price barrier. Pre-production prototypes were displayed at Leicester of the HF-150 for the amateur and SWL markets. Possibly an ideal rig for the Novice, this tiny receiver measures only 185 x 80 x 160mm (just half the size of this page) but comes with an excellent specification for the price and is very solidly built.

Covering 30kHz to 30MHz with SSB, AM and synchronous AM, it features digital readout, selectable 2.5kHz and 7kHz IFs, and a bank of 60 memories. Operation is by internal batteries or an external 12V DC source and there is an optional mute facility for use with a transmitter. An optional desk-top keypad gives direct frequency entry. Price is expected to be £299.

Lowe Electronics Ltd: Chesterfield Road, Matlock, Derbyshire, DE4 5LE. Tel 0629 580800; Fax 0629 580020.

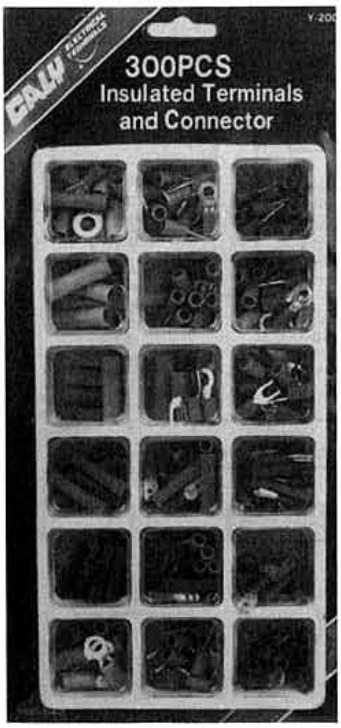
AS PREDICTED, Icom's IC-R7100 communications receiver was undoubtedly a principal attraction at the Leicester Show. Following a great deal of publicity by the trade, visitors were eager to 'see, feel and touch' before passing on to a retailer's stand to part with their hard earned yen. Denis Goodwin reports booming demand and is very happy to see this very neat receiver finding such favour with both the licensed and SWL fraternities.

ICOM (UK) Ltd: Sea Street, Herne Bay, Kent, CT6 8LD. Tel 0227 741741; Fax 0227 360155; Telex 965179.

RN ELECTRONICS has announced a completely new design of 23cm transverter giving exceptional sensitivity. It is designed to professional standards, incorporating microstrip bandpass filters, a very low noise Avantek GaAs FET front end and stable MMIC devices to ensure a spurious free output.

Transmit output power is 2W from 0.5 - 3W drive. As an optional extra (available soon) the output power can be increased to 15W by incorporating a power amplifier PCB and heatsink into the unit. The standard Transverter operates on 1296 - 1298MHz. For a small additional cost, models are available to include a second crystal for either satellite working or repeater shift. The standard model, the RN23/2/2 is priced at £279. The repeater version, the RN23/2/2R is £297 as is their satellite transverter the RN23/2/2S.

RN Electronics: 1 Arnolds Court, Arnolds Farm Lane, Mountnessing, Essex, CM13 1UT. Tel 0277 352219; Fax 0277 352968.



HAVE YOU ever tried re-connecting a crimped connector using the old connector and a pair of pliers? Not very good is it! Maplin has come to the rescue with three inexpensive kits; one containing 100 and one 300 assorted insulated crimp terminals and connectors. The third kit contains 50 units and a crimping tool which also cuts bolts, strips wires and cuts wires. The 100-piece kit costs £3.52, the 300-piece kit is £9.13 and the tool set is £4.03. Postage is extra.

Maplin Electronics: PO Box 3, Rayleigh, Essex, SS6 8LR. Tel 0702 554161; Fax 0702 553935; Telex 995695.

CUSHCRAFT Corporation has appointed **Specialist Antenna Systems Ltd** as their UK distributor. In addition to this high quality range of antenna products, SAS will promote a large range of commercial products previously not seen in the UK.

The Cushcraft R7 is a half-wave no-radial vertical which now caters for all bands 10 - 40 metres. Standing only 22ft 6in high and weighing only 12.3lb, the R7 is ideal for portable or roof-mounted operation.

The 13B2 Two Metre Boomer from Cushcraft is a light-weight, low profile 13-element beam on a 4.57m (15ft) boom giving a claimed gain of 15.8dBd and "the cleanest pattern available".

Specialist Antenna Systems Ltd: Radfords Field, Maesbury Road, Oswestry, Shropshire, SY10 8EZ. Tel 0691 670440.

SMC CALLED a special press and trade conference at Leicester to present the very latest offering from Yaesu Musen - the FT-890. Graham Taylor, Sales Manager of SMC, explained that a demonstration model - serial number 0008 - had been flown in especially for the Show.

The FT-890 is essentially a very neat little base-mobile HF transceiver multi-mode intended to replace the popular FT-757. At a probable price of around £1100, excluding PSU, the specification offers 100W output, a built-in servo-tuned ATU with its own memory, 30 memories, twin VFOs and repeater shift for 10m FM operation. The very smooth 'glitch free' tuning of the general coverage receiver is a joy to use. Weighing in at around 5kg and measuring 283 x 93 x 238mm, this rig looks a most attractive proposition for the busy operator who is determined to stay on the air at home and away.

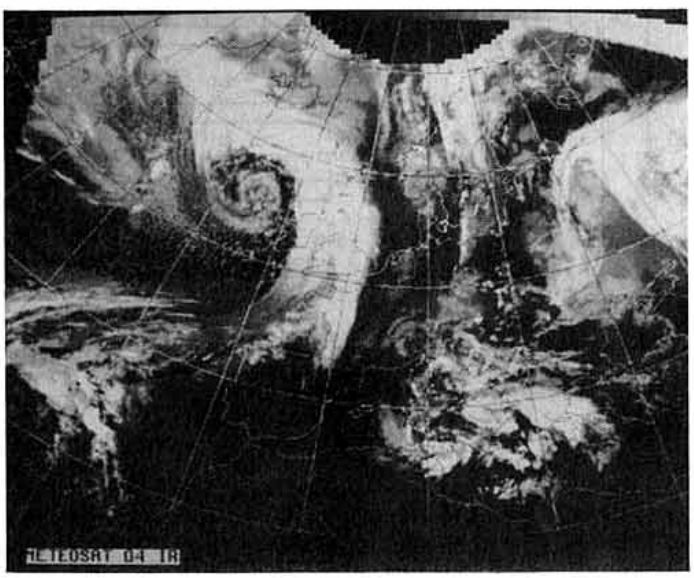
South Midlands Communications: SM House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hants, S05 3BY. Tel 0703 255111.

A FULL three-year warranty is an important feature of the Nabishi equipment sold by M J Components. The 140-series 2.5W 144MHz hand-held transceiver is priced at a fraction under £150 and includes the cost of the mains charger, 'rubber-duck' antenna, soft carrying case and belt clip. Described as "a basic - no frills" product, the rig uses thumbwheels to tune in 5kHz steps.

M J Components: 6 Deercroft Crescent, Salendine Nook, Huddersfield, HD3 3SG. Tel 0484 652149.

ALINCO HAVE announced their first scanning receiver. The DJ-X1 is very compact at 110 x 53 x 30mm and covers 500kHz to 1300MHz without gaps. Importers Waters and Stanton claim the scanner has the widest number of programming steps ever to be made available: 5, 9, 10, 12.5, 20, 25, 30, 50 and 100kHz. Modes include AM, NBFM and WBFM and sensitivity is claimed to be "unsurpassed".

Waters and Stanton Electronics: 22 Main Road, Hockley, Essex, SS5 4QS. Tel: 0702 206835; Fax 0702 205843.



WEATHERFAX V5 from PC Maritime is software which displays high resolution weather fax pictures on a PC screen or printer. Images can be zoomed, rotated and coloured, and sequential charts can be animated to see weather systems developing. At just under £200, the software approach is far cheaper than using a dedicated system, provided of course you have a PC.

Included in the price is an interface cable linking the PC's serial port with the receiver's audio socket, a manual including worldwide weatherfax schedules, and a tutorial cassette tape explaining how to recognize and tune fax signals. A similar package, NAVTEX, receives weather in in text format; it costs around £100.

PC Maritime Ltd: The Computer Complex, Somerset Place, Stoke, Plymouth, Devon, PL3 4BB.

PRICED AT £2, Greenweld's latest catalogue lacks some of the production values of those from RS or Farnell but its 132 pages are packed with equipment and components at competitive prices. Section headings include: Audio, Batteries, Books, Breadboards, Cable, Calculators, Capacitors, Car Amps etc, Computer, Connectors, Craft Goods, Disco, Enclosures, Fuses, Hardware, Instrumentation, Lighting, Opto, Packs and Kits, PSUs, Radios, Resistors, Security, Semiconductors, Service Aids, Soldering Equipment, Switches, Telephone Accessories, Tools and Video.

Supplied with the catalogue, or available if you send a 41p SASE, is a 48-page Bargain List which includes all manner of new-but-surplus items and bumper packs, at 'amateur' prices.

Greenweld Electronic Components: 27 Park Road, Southampton, SO1 3TB. Tel 0703 236363; Fax 0703 236307.

AERIAL SPECIALISTS **Jaybeam Ltd** of Northampton have been acquired by a French company with the very un-French name of Davey Bickford Smith (DBS). Based in Rouen, they describe themselves as an antenna and explosives group (yes, we had to read it twice, too).

Allen Worsfold has been appointed Managing Director of Jaybeam.

DBS went into the antenna business in the 60s and have progressively expanded ever since. It is expected that the addition of Jaybeam's range will provide a broad-based operation with world-wide outlets.

Jaybeam Ltd: Kettering Road North, Northampton, NN3 1EZ. Tel 0604 646611; Telex 311101.

EMC

MEGAN SMITH, G0MEG
EMC Committee Secretary

FLASHER UNITS FOR CAR direction indicators used to be simple units with a bi-metallic strip which did not respond to RF! Many modern cars use an electronic flasher unit with a chip driving a relay. This incorporates load-sensing so that if one bulb fails, the unit flashes much faster than normal to alert the driver to the blown bulb. This load-sensing circuit may be susceptible to RF however, causing the flasher to flash faster than the legal rate when all bulbs are working but a transmitter is being operated in the vehicle. EMC Committee member G1OSC had this problem with a 10W 144MHz transceiver installed in a Metro, but only when indicating left! The flasher unit is a Lucas 19FL type, 42/98W and has no decoupling capacitors to prevent any RF picked up in the car's wiring from getting inside the unit. The problem was solved by soldering two 100nF ceramic disc capacitors across the pins of the flasher unit externally: **Fig 1**.

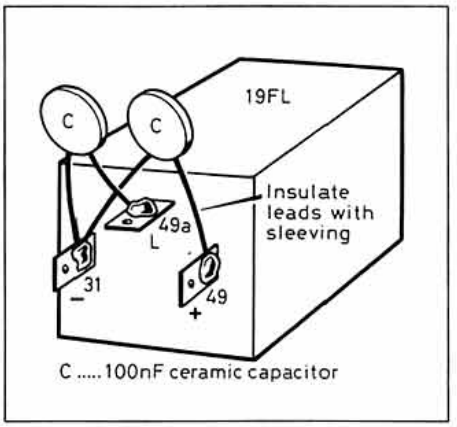


Fig 1: RF proofing a car's flasher unit.

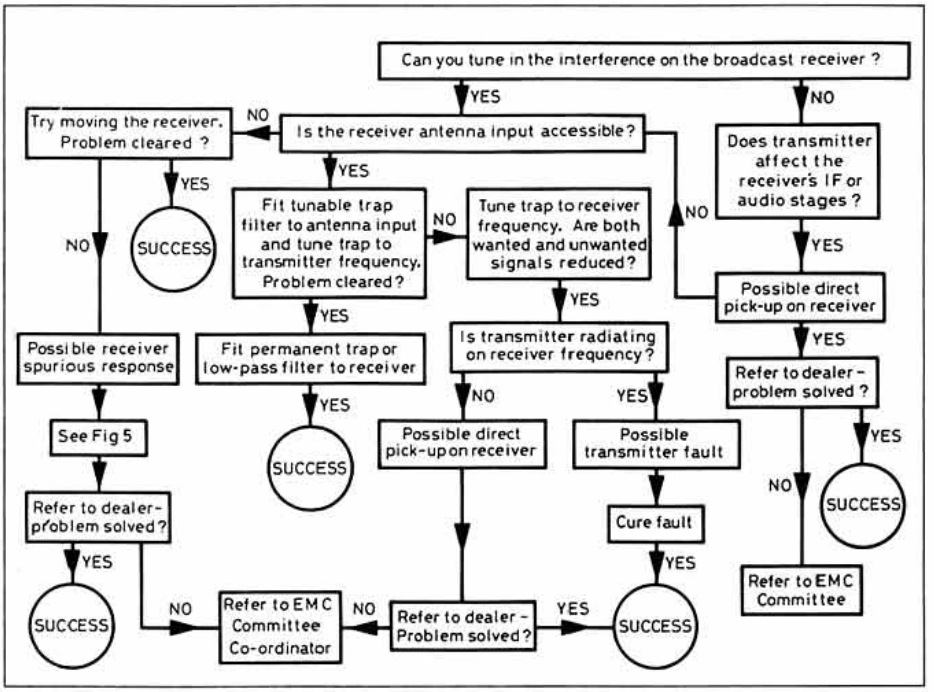


Fig 2: Flow-chart for AM broadcast radios

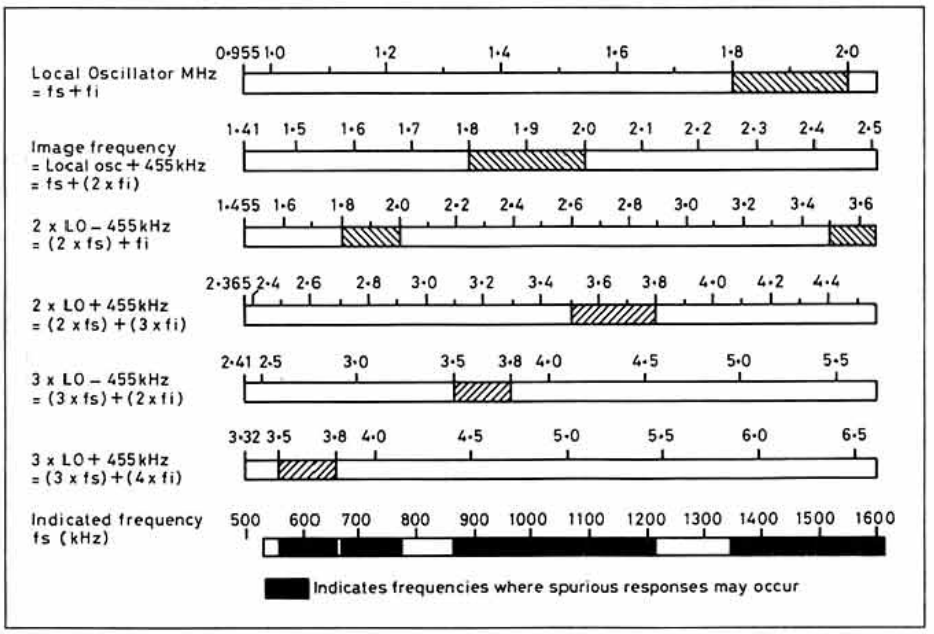


Fig 3: Some possible spurious responses of a superhet receiver with 465kHz IF tuning the medium wave band.

YET ANOTHER FLOW-CHART

THIS IS THE LAST in the mini-series of flow-charts showing how to go about diagnosing and curing EMC problems on TV and audio equipment (**Fig 2**). This one is for AM radio receivers. Most of these are the battery-powered portable type with an integral antenna and are not readily amenable to fitting chokes etc. However you do have the alternative strategy of being able to move the set about easily and it may be that changing its position removes the problem.

Normally it is unlikely that amateur transmitters will produce any harmonics which can be received by these sets as the lowest amateur frequency is above the long and medium wave bands. The main problems are that the equipment is often not designed to operate where there are local signals stronger than the desired broadcast station. This is done to reduce cost and obviously a compromise has to be drawn between cost and performance.

As almost all these receivers are the superheterodyne type, a nearby amateur transmission could be close to, or a harmonic of, the receiver's local oscillator frequency. This could cause harmonic beats or intermodulation. **Fig 3** shows some possible spurious responses of a medium wave superhet receiver with a 455kHz intermediate frequency. This is a common IF for receivers from the Far East, although other IFs are sometimes used, such as 465kHz or 468kHz. The main spurious response of most broadcast receivers is the image frequency, which is spaced from the wanted frequency by twice the IF. For example, a MW receiver tuned to 990kHz could suffer breakthrough from an amateur transmission on its image frequency which is 1.900MHz (assuming 455kHz IF).

Other spurious responses exist, for example an amateur signal on 3.600MHz could break through on a broadcast receiver at 593.3kHz, 896.7kHz or 1117.5kHz.

If a battery/mains receiver suffers breakthrough when operating on mains, try disconnecting the mains cable from the back of the set and operating it on batteries. If the

NEW NUMBER

Please note that the telephone number of EMC Co-ordinator J E T Lawrence, GW3JGA, of Prestatyn is now:

0745-853255

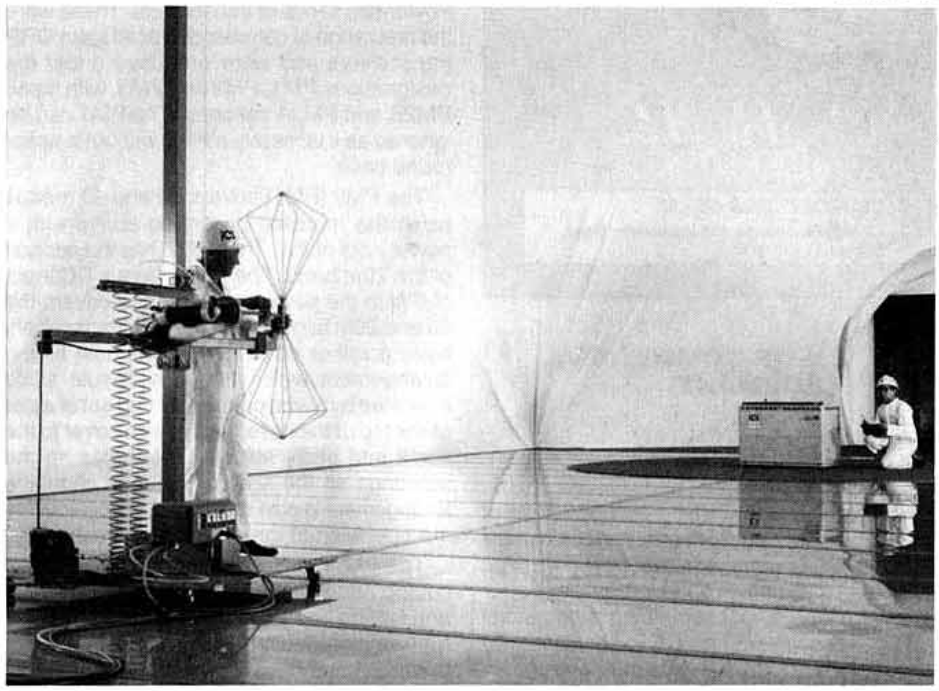
breakthrough disappears without the mains cable, try winding the mains cable through ferrite rings close to the set before re-connecting it.

EMC DOWN THE SALT MINES

NO, NOT A REFERENCE TO the Committee being banished, or even what some neighbours would like to do with amateurs, but ICL's new £1 million EMC test centre. The photographs (this month's front cover and right) show the large air-conditioned tent, 35 by 16 metres, which has been installed 200m below ground in a worked-out part of a salt mine in Winsford in Cheshire. The tent houses a 25m by 10m stainless steel ground-plane with a turntable capable of taking a 5 tonnes load. The centre includes a mobile aerial system (shown in the second photograph) linked to the test instrumentation and control equipment which is installed in a bunker built into the salt rock beneath the ground plane.

The choice of the salt mine means that much higher signal levels can be generated to test ICL's computer products for immunity without causing interference with normal telecommunications, and also the absorption of the salt walls will prevent RF from unwanted sources interfering with the testing of emissions. ICL is expecting to be one of the first European electronics companies to conform to the new EC standards for EMC in 1992.

PHOTOGRAPH: ICL PRESS OFFICE



The interior of ICL's large air-conditioned EMC testing tent, located in a Cheshire salt mine. A mobile aerial system detects emissions from the computer system under test.

PHOTOGRAPH: G3JNB

Not down a salt mine, but behind bars: EMC Committee member Dave Lauder, G1OSC, at the Leicester Show.

Did you over-hear . . . . the one about the 50MHz listener who discovered he could hear his neighbour's arguments via their 49MHz baby alarm? After much deliberation, he eventually plucked up the courage to mention it to them and was greeted with the reply "Oh, we'd better use the other channel then . . . .".

Seasons Greetings and good DX in the New Year from the EMC Committee to all our readers.

Q R P

GEORGE DOBBS G3RJV
St. Aidan's Vicarage, 498 Manchester Road, Rochdale OL11 3HE

SURVEY OF COMMERCIAL QRP EQUIPMENT

PART 1: EARLY TEN TEC EQUIPMENT

THE DEMISE OF THE Heathkit range of QRP transceivers has left only one commercial low power transceiver, the new Ten Tec Argonaut II. Shortly, I hope to be able to offer a review of this last remaining commercial QRP Transceiver. The QRP operator who wishes to buy a ready-made transceiver may now have to turn to the second-hand market. Over the next few *QRP* columns, I hope to describe the range of equipment that might be found in this rather limited field.

Twenty years ago, Ten Tec of Sevierville, Tennessee, pioneered the idea of offering a low power transceiver on the commercial market. Not only did they popularise the idea of using low power on the HF bands, but they also introduced many radio amateurs to the idea of using the direct conversion technique as a method of obtaining a simple receiver or transceiver. There is little in the amateur radio literature prior to that time about direct conversion; the odd mention of the 'synchrodyne' receiver and very few practical circuits. My first introduction to the practical aspects of this technique came from Pat Hawker's *Technical Topics* when he described the Ten Tec PM2 in 1970.

Ten Tec began as a small company operating out of a mobile home offering a range of printed circuit board modules and simple transceivers designed for the US Novice market. The company was surprised by the take-up of these products, the sales to Novices were exceeded by the sales to established radio amateurs who were looking for simple portable equipment or just low powered equipment to enjoy on the bands.

The heart of these early QRP transceivers was a unit called the TX1, a crystal oscillator and power amplifier board which gave about 2W on a range of amateur bands. Ten Tec sold a small range of 'wired and tested modules' which could form the basis of a simple transceiver.

In addition to the TX1, was the VO1 (a variable frequency oscillator/buffer for 80 or 40 metres) the MX1, (a direct conversion mixer-detector using a dual gate MOSFET) the AA1, (a 100dB audio amplifier). Additional modules included the AC1, (hardware and switching kit for the four modules above) the AC2 (a keying sidetone monitor) the AC6 (a 20 metre converter and sidetone) and the AC7 (a semi-automatic change-over board).

These modules were sold as individual units and they also formed the boards for the Powermite series of transceivers. These were the first range of commercial, solid state QRP transceivers and were produced under the designations PM1, PM2 and PM3, with some PM2B and PM3A versions. The PM1 can be ignored as it is merely a PM2 without a wrap-round case.

The PM2 (PM1) covers 80 and 40 metres using the modules described above with a power input of 2W. The PM2B has the addition of the 20m band. The PM3 offers a DC input of 5W to the power amplifier and covers the 40 and 20m bands. All of the PM Transceivers have a rather odd dial and flywheel tuning arrangement which has a slide-rule scale indicated by a wire pointer coming out of a slot at the top of the case. There is no cover to the scale and badly adjusted examples rip the markings off the scale. The band changing arrangement is also somewhat novel requiring the operation of three slide switches.

The PM transceivers are certainly on the cutting edge of technology but they do work and can be bought, when they can be found, for bargain prices. I have examples of all of them. Even my best PM3A only cost me £20 and I have a PM2 which I bought for £10, although perhaps £25-£40 is more like the usual asking price.

The receiver is very basic and struggles under European conditions on 40 metres in the evenings. The VFO is stable enough for normal use, although its coverage is too large: The 40m band covers the US allocation of 7.0 - 7.3MHz. Most PM owners seem to change the variable capacitor from the huge 500pF to a value around 100pF and re-calibrate the scale. Many of the standard modifications for the Heath HW7 transceiver can be performed on a PM transceiver to improve its receiver performance.

Look out for the PM range of transceivers, they are not very common, but can usually be had for bargain prices and make a useful standby or portable station. A lot of them come with previous owner modifications, which may be effective or require undoing or re-doing. Even in their basic form they are viable transceivers. I once worked 23 countries in a week on a PM3 portable in Wales using a 60ft wire to a tree and an L Match Tuner.

THE AGCW - DL WINTER QRP CONTEST

THIS POPULAR TWICE a year contest, arranged by the German 'Activity Group Telegraphy' is on 4/5 January 1992.

Times: 1500UTC Saturday to 1500UTC Sunday. 9 hours minimum rest time, in one or two blocks, is obligatory.

Operation: Single Op in CW on 3.5, 7, 14, 21, 28MHz. Call 'CQ QRP TEST'. Only one transmitter and receiver, or transceiver, may be operated at the same time. QSOs with stations outside the contest are valid. Reception of RST is sufficient from non-contest stations. Contest stations exchange RST + Serial Number / Category.

Categories:

VLP: Very Low Power - up to 1W out (or 2W input)

QRP: Classic QRP - up to 5W out (or 10W input)

MP: Moderate Power - up to 25W out (50W input)

QRO: Above 25W out (or 50W input)

(QSOs between QRO stations do not score)

Points: The Contest Manager will calculate 4 points for QSOs with VLP, QRP or MP stations having submitted a log. Other QSOs count 1 point (own Continent) and 2 points (DX).

Multipliers: The Contest Manager will calculate 2 multiplier points for each DXCC country worked in QSO with VLP, QRP or multiplier stations having submitted a log. Otherwise each DXCC country counts 1 Multiplier point per band.

Final Score: Total QSO points multiplied by total multiplier points. All point calculations will be performed by the Contest Manager.

Logs: Please list QSOs separately for each band and mark the claimed multipliers, the obligatory rest time(s) and the input or output of all transmitters or transceivers used. Other station details are appreciated. Do not forget your full address and an IRC for the result lists. Other stations can only claim points if you send a log, so please send any kind of log including check logs - even 3 QSOs on a postcard will help. Logs to be submitted to : Dr Hartmut Weber, DJ7ST, Schlesierweg 13, W-3320 SALZGITTER 1, Germany, by 1 March 1992.

RELAX WITH QRP AFTER CHRISTMAS

NOT EVERYONE ENJOYS Contest working, but there is one event which can be enjoyed by both contesters and casual operators - the G QRP Club Annual Winter Sports. This takes the form of a QSO Party inviting operators to come on the bands using low power, up to 5W RF output or 10W DC Input, and enjoy making two way QRP contacts.

The event takes place between 26 December and 1 January, inclusive, and attracts QRP operators worldwide. A lot of exciting international and intercontinental two-way QRP contacts take place each year. The usual format is to call 'CQ QRP' on the International QRP calling frequencies (3560, 7030, 10106, 14060, 21060 and 28060kHz). There are no contest exchanges required as this is not a contest.

Part of the value of this event is the correlation of the results. Those taking part are invited to submit logs, log extracts and notes to Gus Taylor, G8PG, the G QRP Club Communications Manager, at 37 Pickerill Road, Greasby, Merseyside, L49 3ND. An award, the G4DQP Trophy is presented each year to the operator who, in the opinion of G8PG, has contributed most to the event. So get out your QRP equipment or turn down the power on your conventional transceiver and join in the fun.

QRP AND THE NOVICE

AT THE TIME OF WRITING over 20 novice licence holders have joined the G QRP Club. The club now has a Novice Manager who writes a regular Novice News column in the magazine SPRAT and is happy to correspond with any Novice. He is David Gosling, G0NEZ, 31 Semphill, Hemel Hempstead, Herts, HP3 9PF.

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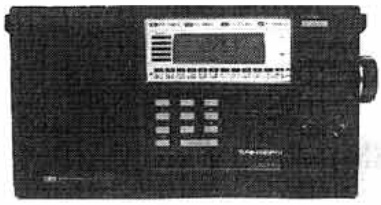

DIMENSIONS: 29.2cm x 16.0cm (11.5in x 6.3in x 2.36in)
OUTPUT: 1200mW (10% THD) WEIGHT: 1.7kg (3.75lbs) Without batteries. Wide/Narrow Filter Switch.

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★ Attenuator ★ Audio filter
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★ 80 & 160m rigs still available

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★ 25 milliwatts to 20 watts ★ 50 ohm ★ 10KHz-150MHz
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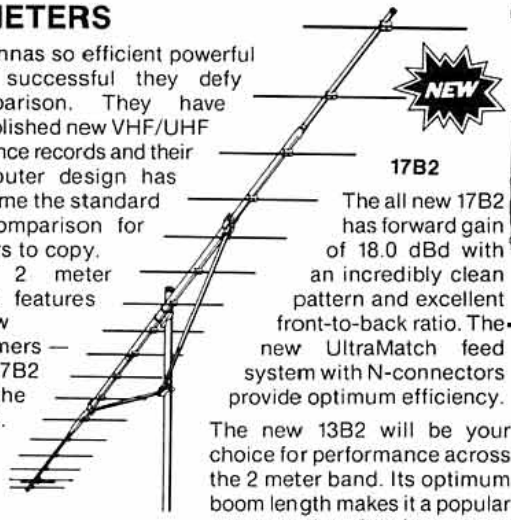
BROADBAND MATCHING
MOUNT ANYWHERE
NO MOVING PARTS

Also R5 HF Vertical 10-20m

2 METERS

Antennas so efficient powerful and successful they defy comparison. They have established new VHF/UHF distance records and their computer design has become the standard of comparison for others to copy. The 2 meter band features 2 new Boomers — the 17B2 and the 13B2.

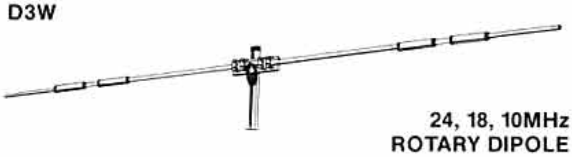


17B2

The all new 17B2 has forward gain of 18.0 dBd with an incredibly clean pattern and excellent front-to-back ratio. The new UltraMatch feed system with N-connectors provide optimum efficiency.

The new 13B2 will be your choice for performance across the 2 meter band. Its optimum boom length makes it a popular antenna that fits just about anywhere for Sideband, Packet or FM mode.

D3W



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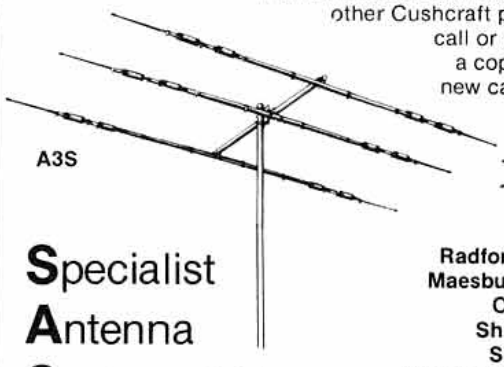
ROTARY DIPOLE

For more details of these and all other Cushcraft products call or write for a copy of the new catalogue



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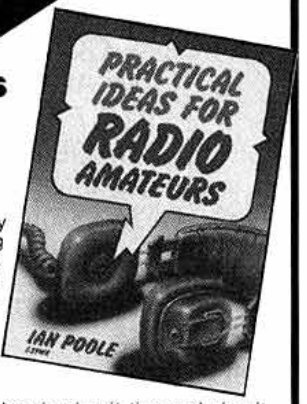

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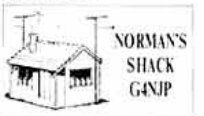

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CONTEST NEWS

All rules should be read in conjunction with the General Rules published in December 1990 (VHF/UHF/Microwave) and January 1991 (HF)

HF RULES

FIRST 1.8MHZ CONTEST 1992 RULES

1. The General Rules for RSGB HF Contests (as published in January 1992 *RadCom*) will apply.

2. When: 2100GMT Saturday 8 February to 0100GMT Sunday 9 November 1992.

3. Sections: Single-operator entries only.

(a) British Isles.

(b) Overseas including EI.

British Isles entrants for the transmitting contest are invited to submit a log for the **BINGO TABLE** which will be run in conjunction with this event (the rules for which are published this month).

4. Frequency and Mode: 1820-1870kHz, CW only.

5. Exchange: RST plus Serial Number starting at 001. British Isles stations must also send their County Code.

6. Scoring: Overseas stations work only British Isles stations for points.

Section (a) Three points per QSO plus a bonus of five points for (i) the first QSO with each British Isles County worked and (ii) the first QSO with each Country (outside the British Isles) worked.

Section (b) Three points per QSO plus a bonus of five points for the first QSO with each British Isles County worked.

7. Address and closing date for logs: RSGB HF Contests Committee, c/o S V Knowles G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, England. Send within 15 days from end of contest.

8. Awards:

(a) The Somerset Trophy will be awarded to the leading station in the British Isles. Certificates of Merit will be awarded to the second- and third-placed entrants.

The Maitland Trophy will be awarded to the Scottish entrant with the highest aggregate number of points in this contest combined with the Second 1.8MHz Contest 1991.

(b) Certificates of Merit will be awarded to the leading three entrants in the Overseas section.

(c) Certificates of Merit will be awarded to the Leader and Runner-up in the BINGO TABLE.

RECEIVING CONTEST

The General Rules for RSGB Receiving Contests will apply, as will the special rules for the Transmitting Section except as modified below.

Eligible entrants:

(a) British Isles - RSGB members only
(b) Overseas - all SWLs

Holders of transmitting licences for frequencies ONLY ABOVE 30MHz may enter the receiving section. *Holders of UK Class B licences are particularly encouraged to enter.*

Logs: Columns to be headed: time GMT; callsign of station heard; report/serial number/County Code sent by that station; callsign of station being worked; bonus; points claimed. NOTE- In the column headed 'station being worked' the same callsign may only appear once in every three contacts unless the station heard is a new bonus.

Awards: Certificates of merit will be awarded to the leading entrants in each section. Additional certificates may be awarded at the discretion of the HF Contests Committee dependant upon the number of entries.

HF CONTESTS CALENDAR - 1991/92.

Dec 6/7/8	*ARRL 160m DX (CW) (p15, Dec 91)*
Dec 14/15	*ARRL 28MHz (CW/SSB) (p15, Dec 91)*
Dec 29	LF Cums 7MHz (Nov 91)
Jan 4	LF Cums 7MHz
Jan 4/5	*ARRL RTTY Roundup*
Jan 5	LF Cums 3.5MHz
Jan 6	LF Cums 1.8MHz (Nov 91)
Jan 11	LF Cums 3.5MHz (Nov 91)
Jan 12	AFS (CW) (Nov 91)
Jan 14	LF Cums 1.8MHz
Jan 18	LF Cums 7MHz
Jan 18	AFS (SSB) - NEW EVENT
Jan 18/19	*HA DX CW*
Jan 19	LF Cums 3.5MHz
Jan 22	LF Cums 1.8MHz
Jan 25	LF Cums 3.5MHz
Jan 25/26	*CQ 160m DX*
Jan 25/26	*UBA CW*
Jan 25/26	*REF CW*
Jan 26	LF Cums 7MHz
Jan 30	LF Cums 1.8MHz
Feb 1	LF Cums 7MHz
Feb 1/2	LF SSB
Feb 1/2	*YU DX CW*
Feb 2	LF Cums 3.5MHz
Feb 7	LF Cums 1.8MHz
Feb 8/9	1st 1.8MHz CW and BINGO (Dec 91)
Feb 15/16	*ARRL DX CW*

NEW EVENT — BINGO TABLE

The HF Contests Committee is pleased to introduce an innovation in RSGB contests, based upon an idea by G3JJG . . . . the **BINGO TABLE.** The intention is to provide an award which can be contested by the greatest or least of stations on more-or-less equal terms. The inaugural BINGO TABLE will be run during the 1st 1.8MHz Contest 1992, and further such events may be run throughout the year, depending upon the level of support. The Rules for BINGO TABLES follow:

1. The General Rules for RSGB Contests will apply.

2. Object: Entrants must note the Last Letter of Callsign (LLC) of stations with whom a completed contact is made during the primary contest. Suffixes and other qualifiers are ignored when determining the last letter, so LLC of G6LX/M is 'X'; of F/W2AZW is 'W'; of JY1 is 'Y' etc. **To qualify to enter the BINGO TABLE, entrants must contact a minimum of 26 stations, one with each possible LLC (A - Z).**

3. Entries. BINGO TABLES are open only to UK entrants for the primary contest. In addition to their normal entry for the contest, stations wishing to be considered for the BINGO TABLE must include a separate list of the log entries for the 26 callsigns concerned, in order of making contact. The entrant completing all 26 contacts in the shortest time will be adjudged the winner. In the event of a dead heat in respect of the timing of the last QSO, the time recorded by the station worked will be regarded as definitive and the HFCC reserves the right to seek this information from the station concerned if not an entrant in the primary event. If the result is still tied, the station having the highest score in the primary contest will be adjudged the leader. **NB . . . . only ONE station may be nominated for each position in the BINGO TABLE.** If the entrant makes an error in receiving the callsign of any of the stations for which credit is claimed, the entire entry fails!

4. Awards. In general, certificates of merit will be awarded to the leading stations in the Tables . . . . for details see the individual rules for the primary contest. The number of awards may be varied by the Committee, depending upon support.

Remember . . . . the last letter of **YOUR** callsign may be in demand so at the end of each QSO, even if it's not 'your frequency', **LISTEN** for a call.

HF RESULTS

ROPOCO-2 CONTEST 1991 - RESULTS

The RoPoCos appear to be the most popular of the short CW events, with 47 logs and 2 checklogs being received for this year's second contest . . . . only slightly down on RoPoCo-1, despite being held on a Bank Holiday weekend. Logs were noticeably better, with no unmarked duplicates detected, although some of the Postcodes exchanged would have caused nightmares in any sorting office.

G3KHZ entered the highest-scoring perfect log, but as he has won the award for this in recent years the G3XTJ Memorial Trophy goes to Ed Taylor G3SQX who submitted the next-highest, albeit some way down the listings. The absence of some of the usual high-scoring stations from RoPoCo-1 meant that G5LP had an easy passage to the G5MY Trophy for the highest aggregate score for both contests.

Band conditions were reported as noisy . . . . nothing unusual for 80m in August! Stations from Scotland and the North complained that it was impossible to maintain a reasonable scoring rate (although the same is nearly true for stations in the extreme South and South-West) and the HFCC will consider all points raised before the 1992 events.

G4IQM

Posn	Callsign	Points
1	G5LP*+	640
2	G4BWP*	630
3	G3KHZ*	600
4	G3KAF	568
5	G4ARI	566
6 =	G3OXC	564
6 =	G3GLL	564
8	G4OGB	528
9	G3JJG	524
10	G3OLU	522
11	GW3WWN	518
12	G3YMC	494
13 =	G3JYP	486
13 =	G3JJZ	486
13 =	G3RSD	486
16	G3SQX#	470
17 =	G3JSR	468
17 =	G4EBK	468
19	G0LZL	452
20	G4BLI	448
21	G2HLU	440
22	G3IGU	438
23	G3DPX	408
24 =	G3HJF	398
24 =	G5MY	398
26 =	G4BUO	390
26 =	G3NKS	390
28	G3BPM	386
29	GM3YOR	378
30 =	G0CGB	370
30 =	GW3SB	370
32	G3CQR	366
33	G3MA	350
34 =	G3TUX	330
34 =	G0GAG	330
36 =	G4RLS	318
36 =	G4PTE	318
38	G3GMS	308
39	G3GMM	306
40	G0OGN	296
41	G4ZME	280
42	GW4KVJ	270
43	GM4WLN	250
44	G3AWR	248
45	GM4SID	226
46	GM3CFS	216
47	GM3UM	200

Checklogs received with thanks from G4CZB and GM3WOJ
* Certificate Winner
+ G5MY Trophy
# G3XTJ Memorial Trophy

VHF RESULTS

VHF NFD 1991 *continued from page 36*

70MHZ OPEN SECTION

Pos	Callsign /P	Loc	CW Pts	SSB Pts	Total	CW QSOs	SSB QSOs	Pwr	Ant	Best DX	km
1	GM3WOJ	74NP	953	1265	2218	74	105	30	6Y	G3KAU/P	567
2	GD4UJS	74PD	838	1195	2033	80	114	150	2x8Y	G3KAU/P	522
3	G4BVY	94WC	662	1347	2009	68	108	160	2x7Y	ZB0W	2033
4	GM4WDL	85OS	591	1283	1874	39	99	100	8Y	G3YYF/P	591
5	G3GRS	01LD	723	1118	1841	70	92	160	2x6Y	ZB0W	1738
6	G3PFM	80WP	569	923	1492	63	105	160	2x12Y	GI4ONL/P	583
7	G0ETU	01KJ	347	994	1341	52	99	40	6Y	ZB0W	1762
8	G4IGY	93PV	598	614	1212	66	77	70	10Y	EI7M/P	483
9	G3UKV	82NN	539	671	1210	71	100	100	8Y	GM0IRB/P	565
10	G3ORY	92NP	536	632	1168	78	97	160	2x3Y	GI4ONL/P	480
11	G4CIZ	91GI	436	707	1143	62	99	160	2x5Y	GM0IRB/P	702
12	G4FUU	91XH	481	657	1138	62	86	25	2x4Y	GI4ONL/P	619
13	G0ERS	90JO	389	747	1136	49	84	100	11Y	GM4WDL/P	584
14	G3JKS	91LT	411	710	1121	65	94	50	8Y	ZB0W	1773
15	G3YYF	00HU	544	570	1114	58	61	100	6Q	GM4WDL/P	585
16	G3KAU	01OC	494	586	1080	50	58	100	9Y	ZB0W	1739
17	G4THB	03BF	308	763	1071	43	100	160	3x5Y	EI7M/P	522
18	G3WGV	91IH	488	580	1068	63	86	100	8Y	ZB0W	1713
19	G3JKY	01DH	467	564	1031	54	75	160	5Y	GM4AGG/P	602
20	G4NVF	84VB	513	514	1027	55	62	15	4Y	G3YYF/P	405
21	G3FVA	93EH	378	462	840	56	70	20	5Y	GM4AGG/P	344
22	G3TWG	91OO	302	485	787	49	71	40	4Y	ZB0W	1753
23	G3NAT	91XG	275	451	726	35	63	160	2x5Y	GM4WDL/P	531
24	G4APD	92LJ	226	474	700	60	99	160	2x8Y	GI4ONL/P	440
25	G1FRS	91OF	286	407	693	40	59		4Y	GM4WDL/P	522
26	G4HVC	93RG	0	663	663	0	98	40	4Y	GI4SJB/P	377
27	G4CTU	82SI	331	269	600	51	68	20	4ZL	GM4WDL/P	380
28	G4KAL	93VJ	155	272	427	23	38	10	4Y	GM3WOJ/P	335
29	GM6UAQ	85PJ	0	348	348	0	28	25	5Y	G0ERS/P	542
30	G7FDC	80FI	0	8	8	0	4	8	6Y	G0NKC	92

70MHZ RESTRICTED SECTION

Pos	Callsign /P	Loc	CW Pts	SSB Pts	Total	CW QSOs	SSB QSOs	Pwr	Ant	Best DX	km
1	G3VIP	94PH	806	948	1754	70	106	150	6Y	ZB0W	2047
2	G4MRS	01QX	643	786	1429	62	82	160	8Y	ZB0W	1834
3	G4DDN	80ST	512	610	1122	58	73	160	6Y	GM4WDL/P	552
4	GI4SJB	74AI	283	789	1072	23	57	25	3Y	G3YYF/P	590
5	G3HYH	92MO	389	652	1041	61	98	150	9Y	GM0IRB/P	568
6	G4DSP	92SU	426	477	903	60	72	120	8Y	GI4ONL/P	491
7	G3WRJ	92VB	360	533	893	54	75	25	6Y	GM4WDL/P	446
8	G4CAX	83PF	305	530	835	40	75	50	4Y	G3KAU/P	356
9	G3MDG	91PS	295	532	827	47	80	40	5Y	GM0IRB	663
10	G4WSM	81MH	362	348	710	44	42	65	4Y	GM4WDL/P	440
11	G4JS	83SQ	337	370	707	44	56	30	3Y	G3KAU/P	379
12	G4WAW	81RN	301	375	676	43	52	100	4Y	GM4WDL/P	468
13	GI4ONL	64LX	257	399	656	18	25	85	10Y	G3GRS/P	683
14	GM4AGG	75SW	245	319	564	21	25	30	10Y	G3PFM/P	608
15	G0FRX	93PW	37	374	411	14	54	8	12Y	G3PFM/P	379
16	G4ANP	93KM	47	317	364	16	50	40	4Y	G3PFM/P	327
17	GM0IRB	87SP	21	190	211	7	10	100	5Y	G4CIZ/P	702
18	GW4WSE	83JG	122	0	122	22		10	6Y	G3GRS/P	369

70MHZ LOW POWER SECTION

Pos	Callsign /P	Loc	CW Pts	SSB Pts	Total	CW QSOs	SSB QSOs	Pwr	Ant	Best DX	km
1	G3FDW	84UR	705	960	1665	60	96	25	7LY	G3YYF/P	474
2	G4ADM	93AC	481	699	1180	73	106	25	5Y	GI4ONL/P	392
3	GW4AZV	82IP	513	550	1063	63	78	25	5Y	GI4ONL/P	357
4	G4FOH	93EC	391	667	1058	57	103	25	5Y	GI4ONL/P	409
5	G3ZOI	91KG	367	548	915	56	77	25	6Y	GM4WDL/P	512
6	G1XTN	93JK	325	520	845	46	70	10	4Y	GI4ONL/P	416
7	G3PJX	91TF	381	461	842	51	67	25	8Y	GM4WDL/P	529
8	G4IUZ	91PQ	393	412	805	57	64	25	5Q	EI7M/P	474
9	G4EYD	82XJ	272	510	782	46	86	25	6Y	GM4AGG/P	424
10	G4CW	01BH	383	396	779	54	54	20	6Y	GM4WDL/P	531
11	G2XV	02AD	235	347	779	39	53	25	5Y	GM4WDL/P	443
12	G4POF	81XA	300	422	722	42	54	20	5Y	GI4SJB/P	461
13	G3EEO	93BA	401	321	722	55	55	10	4Y	ZB0W	1892
14	G3CZU	91UE	327	397	160	50	62	25	5Y	GM4WDL/P	535
15	G4WAC	92BJ	0	160	160	0	28	10	HB9CV	GM4WDL/P	380

144MHZ OPEN SECTION

Pos	Callsign /P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	GD4APA	74PD	10969	899	400	8x17Y	FC1CNE/P	877
2	GM0CDA	85OS	10355	652	400	60el	DF9QT	847
3	G4ZAP	94WC	9574	689	400	4x17Y+4x9Y	FC1ADT/P	968
4	G4LIP	03BF	9518	760	400	2x2x17Y	FC1ADT/P	869
5	G8SJP	01KJ	8488	703	400	2x17Y+4x9Y	F9OE	903
6	G8LNC	90JO	7468	624	400	4x19Y	DL0CG	853
7	GM0OCG	74NP	6878	577	200	4x19Y	DF0CG/P	930
8	G0FBB	01LD	6549	576	400	36el	Y23SB/P	780
9	G3SDC	92NP	6275	623	400	4x17Y+2x14Y	F2EE/P	903
10	G6LX	91XH	5412	582	400	2x18Y	FC1OVZ/P	937
11	G3VER	91LT	5109	597	400	2x17Y+2x16Y	GM3POI	800
12	G4RFR	80WP	4747	465	400	2x19Y	DL0ZUE	845
13	G8SMR	93EH	4318	496	150	2x17Y	DJ5JK	838
14	G3BXF	92LJ	4216	501	400	2x17Y+16Y	DL8PC/A	737
15	G3WSC	01OC	4128	353	400	18Y	FC1DVZ/P	798
16	G4ATH	84VB	4114	462	275	2x9Y	DL2DBY	744
17	G6HH	00HU	3936	381	200	17Y	FF6KKH/P	837
18	G3WOI	91GI	3418	424	400	2x17Y	DF9QT	699
19	G4RFC	01DH	3211	385	400	2x18Y	DL6NAA	816
20	G0KEG	91PS	2899	379	400	2x9Y	FC1FYN/P	750
21	G3CMH	80LV	2820	323	250	2x13Y	DL8PC/A	857
22	G4CCC	91IH	2665	346	250	2x9Y+17Y	DL0SX/P	808
23	G4EKT	93PV	2419	324	250	2x19Y	F6HPP/P	584
24	G3ZME	82NN	2354	386	200	2x13Y	FC1ADT/P	844
25	G6CTU	91XG	2018	295	400	2x17Y	GM4AFF	708
26	G0FRS	91OF	1833	261	200	9Y	DL3DCC/P	603
27	G3WKX	91OO	1357	218	150	15Y	DL0EE	682
28	G4RSE	01EN	1337	183	25	19Y	F2EE/P	776
29	G3CNX	93VJ	1106	152	100	8 Slot	DK7ZH/P	538
30	G4SSD	80FI	842	118	160	2x12Y	PA3BLS	636
31	GM1JKJ	85PJ	840	96	80	18Y	F/PA3EJC	662

32	G0BRC	01HH	765	121	100	14Y	EI7M/P	574
33	G4GXP	82SI	670	121	15	9Y	F6HPP/P	529
34	G3NFC	92BV	630	105	10	8Y	F6HPP/P	540
35	G5FZ	93RG	435	80	20	2x19Y	F/PA3EJC	394

144MHZ RESTRICTED SECTION

Pos	Callsign /P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G4MRS	01QX	7138	571	400	18Y	DL0NN	872
2	G4ERG	94PH	5805	499	400	17Y	DL8PC/A	793
3	G1DSP	92SU	3286	344	400	16Y	DL0OU/P	692
4	GW3CSA	83JG	2513	365	150	17Y	GM4IPK	801
5	G0OLE	93PW	2139	265	45		DK0DB/P	661
6	G8FCQ	92MO	2110	322	100	18Y	FC1ADT/P	824
7	GW8IUB	82TG	1997	277	60	16Y	DF0RW/P	680
8	G6BRA	80ST	1927	251	200	17Y	DK0JK/P	738
9	G4FOX	92MT	1757	271	180	16Y	DF0RW/P	540
10	GI4GTY	74AI	1639	135	200	17Y	ON1BLY/P	755
11	G1ECC	83SQ	1449	264	50	15Y	GU1HTY	472
12	GM0MVZ	75SW	1344	142	150	8 Slot	PA3FMZ	813
13	G4CRC	70GE	1181	120	400	15Y	GM0CDA/P	645
14	G3FJE	92VB	1037	150	400	17Y	DF0GVT	621
15	G7AHG	81UL	1035	145	80	17Y	PA3BZD	535
16	GI3CFH	64LX	1002	86	100	17Y	G8SJP/P	660
17	G3ZTT	83PF	958	170	300	17Y	PA3BLS	520
18	G1MDG	91PS	923	170	100	13Y	DF0CG	476
19	GM8SVB	87SP	792	82	350	17Y	G4RFC/P	725
20	G1YRF	02SF	721	80	15	10Y	EI3GE/P	523
21	G4GCT	81RN	693	103	100	17Y	PA0FHG	501
22	G4BTS	93KM	693	119	100	19Y	ON6HT/P	592
23	G8WSM	81MH	606	86	90	10Y	GM0CDA/P	496

144MHZ LOW-POWER SECTION

Pos	Callsign /P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G0MCG	93EC	3884	484	25	17Y	FC1LVY/P	811
2	G4FKA	93AC	1941	329	25	15Y	DB8WK	627
3	G0ANT	84UR	1792	153	25	6 Slot	DL0WU	725
4	G3TCR	91KG	1725	236	25	17Y	F2EE/P	783
5	GW3NSY	82IP	1424	200	25	17Y	DF0CG	656
6	G8EVY	02AD	1409	168	25	19Y	DF0OL/P	596
7	G3FKF	81XA	1279	189	25	14Y	DF0CG	582
8	G1OHM	82XJ	1216	212	13	17Y	ON6HT	598
9	G6BRH	01GU	985	122	25	13Y	DF0GVT	564
10	G1WAC	92BJ	865	145	25	17Y	ON4BS/P	508
11	G4WKS	92GD	824	156	25	8 Slot	EI4GRC/P	500
12	G3ASR	91PQ	788	120	25	13Y	FF6KSL/P	568
13	G5RS	91TF	750	154	25	17Y	GM0CDA/P	529
14	G0ITW	93JK	683	102	25	13Y	PA3FMZ	528
15	G3ZBI	93BA	678	132	10	18Y	F6HPP/P	549
16	G1GUB	91UE	582	112	25	13Y	GM0OCG/P	480
17	G4NWZ	92PG	436	48	25	14P	F6HPP/P	479

144MHZ SWL SECTION

Pos	Callsign /P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	BRS 25429	93FX	700	89		8Y	F6HPP/P	620

432MHZ OPEN SECTION

Pos	Callsign /P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G4CLA	03BF	4093	349	400	2x4x21Y	SM6HYG	902
2	G8KQW	01KJ	4057	343	400	8x19Y	OZ7TOM/P	792
3	GM3CKR	85OS	3435	209	400	168el	SM6HYG	904
4	GD4GCM	74PD	3202	279	400	16x21Y	DB8WK	806
5	G8TFI	94WC	3147	228	400	8x16Y	SM6HYG	851
6	G4FAM	01LD	2720	250	400	2x21Y	OK2GR	727
7	G5LK	01OC	2385	213	250	4x21Y	OZ7TOM/P	807
8	G0FRR	80WP	2013	205	400	2x20QLY	HE7FX/P	795
9	G7AYI	92NP	1586	207	200	9x17Y	DL1BKK	672
10	G1KAR	00HU	1267	130	100	4x23Y	DJ9BV	693
11	G2LO	92LJ	1262	183	250	4x18Y	SM6HYG	1023
12	G4UHF	91GI	1086	156	400	2x48Y	PE1LMX	555
13	G3UHF	93EH	1057	149	150	8x23Y	PA3FMZ	644
14	G0HUZ	01DH	1037	153	180	2x18Y	DJ5JK	623
15	G6FRS	91OF	951	127	120	4x21Y	GM0GAS/P	577
16	G3ZPB	91XH	900	131	150	4x15Y	DF3BU/P	516
17	G0CCC	91IH	874	132	100	2x19Y	F1EAA	698
18	G4YTV	93PV	844	95	300	4x21Y	OZ7TOM/P	673
19	G4VER	91LT	768	118	80	2x19Y	GM0GAS/P	510
20	G0LNC	90JO	731	103	150	4x17Y	GM3CKR/P	584
21	GM4OGI	74NP	730	67	15	21Y	PA0EZ	719
22	G8MNY	91XG	579	101	400	27QLY	GM3CKR/P	531
23	G6GMW	84VB	558	64	60	2x48Y	PA0EZ	535
24	G6ZME	82NN	480	86	400	4x17Y	PE0MAR/P	480
25	G3RSD	93VJ	465	63	100	2x18Y	OZ7TOM/P	680
26	G0KVA	91PS	410	84	300	2x23Y	FC1MKG	376
27	G0KRC/P	82SI	405	65	20	19Y	OZ7TOM/P	870
28	G0CDB	80FI	387	45	120	2x14Y	GM3CKR/P	604
29	G7AIC	80LV	305	41	130	2x21Y	GM3CKR/P	541
30	G6RSE	01EN	302	62	80	2x21Y	DL2KAD	457
31	G6COL	93RG	277	47	50	48Y	F/PA3EJC	394
32	G7BQT	92BV	271	54	10	Slot	PE0MAR/P	419
33	G7BRC	01HH	171	36	50	2x15Y	GD4GCM/P	478
34	GM1AQV	85PJ	144	18	25	29Y	G4FAM/P	532

432MHZ RESTRICTED SECTION

Pos	Callsign /P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G4MRS	01QX	3011	253	250	21Y	OK2KKW/P	817
2	G0JRB	94PH	2335	182	400	21Y	DL0TH/P	717
3	G8ZHP	92SU	1851	185	400	21Y	DL0OU/P	692
4	G4BRA	80ST	1119	131	400	2Y	HE7FX/P	825
5	G8HSG	93PW	894	99	100	48Y	DL2CI	749
6	G7FOX	92MT	771	57	25	21Y	ON7WR/A	438
7	GM0GAS	75SW	613	45	105	19Y	F/PA3EJC	763
8	G4LOO	92VB	596	86	200	17Y	DC5BT	729
9	G3LRS	92MO	559	104	220	21Y	ON7WR/A	427
10	G3TAD	81UL	510	82	50	19Y	GM3CKR/P	478
11	G2AKK	83SQ	436	64	100	10Y	PE0MAR/P	436
12	GI4KSO	74AI	390	34	25	21Y	F/PA3EJC	679
13	G6PNB	81RN	323	51	50	21Y	GM3CKR/P	468
14	GW8IUB	82TG	285	51	10	44Y	G4MRS/P	315
15	G1KHX	81MH	283	40	12	13Y	GM3CKR/P	496
16	G8ZTT	83PF	260	51	50	36Y	PE0MAR/P	482
17	G0KSK	93KM	240	41	10	46Y	ON1BLY/A	441
18	GM3DZB	87SP	237	24	100	19Y	OZ7TOM/P	694
19	G1YRF	02SF	143	20	15	22Y	ON7WR/A	263
20	G4CRC	70GE	20	6	25	24Y	G0FRR/P	241

432MHZ LOW POWER SECTION

Pos	Callsign /P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G0JSR	91KG	734	107	25	21Y	DK9VD/A	607
2	G0BWV	93AC	675	130	25	21Y	PE0MAR/P	430
3	G4GNC	93EC	655	129	25	18P	PA0EZ	471
4	G4RCD	84UR	627	55	25	21Y	PE1NHZ/P	689
5	G8OHM	82XJ	579	105	25	21Y	ON7WR/A	484
6	G4LDR	81XA	466	66	25	17Y	ON7WR/A	451
7	G4JXG	01GU	447	61	25		DK0VS	505
8	GW3SRT	82IP	429	67	12	27Y	GM0GAS/P	373
9	G8TNK	01BH	386	66	25	17Y	GM3CKR/P	531
10	G0NHR	93BA	375	64	10	88Y	ON7WR/A	502
11	G8JJR	93JK	372	54	25	21Y	PA3FPS	413
12	G7DOR	91UE	371	69	25	23Y	GM3CKR/P	535
13	G6GS	91TF	331	63	25	21Y	GM3CKR/P	529
14	G0GNF	92GD	330	68	10	9Y	PE0MAR/P	382
15	G0EYO	92BJ	263	51	25	21Y	ON7WR/A	474
16	G4RMD	91PQ	206	36	10	21Y	GM3CKR/P	473
17	G6GWZ	92PG	163	32	10	88Y	PE0MAR/P	425

432MHZ SWL SECTION

Pos	Callsign /P	Loc	Score	QSO	*	Pwr	Ant	Best DX	km
1	BRS 25249	93FX	93	19			8Y (2m)	PE0MAR/P	440

1.3/2.3GHZ OPEN SECTION

Pos	Callsign /P	Loc	1.3 Pts	2.3 Pts	Total	1.3 QSO	2.3 QSO	1.3 Pwr	1.3 Ant	2.3 Pwr	2.3 Ant
1	G4HWA	03BF	1094	222	1316	110	23	400	16x23Y	40	1.8m
2	G4NXO	94WC	898	317	1215	76	27	150	2x55Y	40	1.2m
3	G4IEV	01KJ	886	249	1135	99	29	400	1.8m+2x23Y	25	1.8m
4	G8XIR	01LD	934	160	1094	109	22	200	1.4m	12	1.4m
5	GD4XUM	74PD	940	91	1031	82	12	250	16x23Y	25	2m
6	G3GRO	01OC	551	156	707	69	18	100	4x15 Slot	20	45QLY
7	G3UAX	91GI	536	156	692	80	22	150	2m	12	1.2m
8	G3YGF	80WP	539	64	603	67	10	200	4x39Y	35	2x50Y
9	GM6PHJ	85OS	527	23	550	39	3	120	2x23Y	70	66QLY
10	G3YKI	92LJ	406	76	482	72	13	400	2.5m Square	15	1.2m
11	G8TB	91XH	398	70	468	81	14	60	2m	6	2m
12	G3ZDM	93EH	419	40	459	61	8	70	8x23Y	4	1.2m
13	G4OQR	92NP	374	80	454	62	14	40	2m	1	1.2m
14	G8VOI	90JO	381	71	452	55	13	30	4x26QLY	3	1.3m
15	G3BSN	01DH	312	71	383	54	11	100	4x23Y	25	1.5m
16	G3PWN	93PV	367	0	367	46		20	48QLY		
17	G3ULT	91IH	273	54	327	49	11	150	23Y	50	25Y
18	G7ERC	00HU	305	0	305	57		10	23Y		
19	G8VER	91LT	218	0	218	44		10	2x15QLY		
20	G4NKC	82NN	210	0	210	38		30	1.6m		
21	G4FRS	91OF	179	0	179	45		100	4x23Y		
22	G4TAW	91XG	125	51	176	35	11	30	55Y	2	66QLY
23	G0LTS	01EN	151	0	151	35		10	23Y		
24	G8KBH	84VB	138	0	138	15		2	2x23Y		
25	G6YTZ	80FI	83	0	83	11		30	23Y		
26	GM0ONB	74NP	65	0	65	7		10	16 Slot		
27	G4JBH	80LV	26	0	26	6		2	4x23Y		
28	G6KRC	82SI	17	0	17	6		1	48QLY		

1.3GHZ RESTRICTED SECTION

Pos	Callsign /P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G4MRS	01QX	1408	137	200	55Y	DL0UL/P	700
2	G4CCH	94PH	875	75	150	47QLY	DC6GB	658
3	G4SIV	92SU	581	73	150	2m	PA0WMX	435
4	G4JDI	92MO	370	66	100	2m	ON7WR/A	427
5	G4TXG	92VB	292	52	25			
6	G3MEH	91PS	278	58	100	15 Slot	GD4XUM/P	376
7	G0CFM	81UL	243	37	60	55Y	G4NXO/P	359
8	GM6FPX	75SW	63	9	12	55Y	G3YKI/P	452
9	GM3DPK	87SP	10	2	7	55Y	GM8MJV	176
10	GI4XLB	74AI	3	1	15	30Y	GD4XUM/P	84

1.3GHZ LOW POWER SECTION

Pos	Callsign /P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G3JYP	84UR	645	49	20	2m	OT7YK	598
2	G3OHM	82XJ	397	69	18	55Y	PE0MAR/P	422
3	G8OPR	81XA	381	57	25	2m	PE0MAR/P	440
4	G8KGC	93BA	370	64	15	55Y	PE0MAR/P	421
5	G8FMH	91KG	301	54	25	55Y	DF0HS/P	501
6	G0GZQ	93AC	264	45	10	55Y	PE0MAR/P	430
7	G4YPC	91TF	237	52	25	55Y	GD4XUM/P	436
8	G6KWA	02AD	223	42	2	55Y	GM6PHJ/P	443
9	GW4LU	82IP	192	31	10	QLY	GM6PHJ/P	349
10	G8BHD	01BH	186	40	10	55Y	GD4XUM/P	453
11	G0GAG	93EC	160	35	1	55Y	GM6PHJ/P	305
12	G3SJE	91PQ	80	21	10	55Y	G4NXO/P	272
13	G0ICJ	92BJ	24	8	1	55Y	G3ZDM/P	103

VHF NFD: VHFCC COMMENTS

Thanks to those who have written to me over the past few weeks, replies (if needed) have been sent out. Your comments and suggestions will be taken up/discussed at next VHFCC meeting.

VHF Field Day was very close this year (see G4PIQ's report), however there are one or two things that I must comment on:

The two top stations (before adjudication), based on their normalised claimed scores showed a difference of only 0.07 of a point! After adjudication in which *all* their contacts were checked against multitudes of others, these two stations were only 11 points apart, the Northern Lights increased their lead, but only because of poor logging on behalf of other groups. Yes, the Northern Lights were there at the adjudication but they were not allowed to check their own logs and any points lost by any group were checked not only by committee members but also by volunteers from another group (Hill Billies), and my wife Shirley G0ESO, whose aim was to ensure total fairness in all adjudication.

During site inspections, we found a few curious facts. The standard British metre is four feet long! Some of those 10m masts did look a bit tall, I put it down to the new British Standard, or maybe soil shrinkage ("honest guv the earth was up to here when we put it up!").

Somebody also thought they would have an advantage by using a 50W amplifier on the low power section. They could have been disqualified if they had been using decent feeder cable, but as they weren't, they weren't! Bet they only had 5W at the antenna!

The magic numbers proved one thing to me, many operators cannot take down a simple character number sequence, many many points were lost because of poor logging skills, and that's what contests should be all about, skill not brute force and repetition. How about a Field Day that really needs good operating, up to 50W, no linears, single antennas, choice of up to four bands of say 6m, 4m, 2m, 70cm, 23cm, 13cm . . . . Your comments would be appreciated.

Bryn Llewellyn, G4DEZ,
Chairman VHFCC

VHF CONTESTS CALENDAR 1991/92

1 Dec	144MHz AFS/Fixed/SWL (Mar 91)
3 Dec	432MHz Cumulative (Mar 91)
10 Dec	1.3GHz and 2.3GHz Cumulatives (Mar 91)
2/3 Jan	*DARC Winter Contest (DL), 144MHz - Microwave, 1900-2200*
4 Jan	*DARC Winter Contest (DL), 144MHz - Microwave, 1500-2200*
19 Jan	144MHz CW (Dec 91)
26 Jan	70MHz Cumulative (Dec 91)
1 Feb	*Winter Field-Day (DL), 1296MHz, 0900-1100*
1 Feb	*Winter Field-Day (DL), 2320MHz - 47GHz, 1100-1300*
2 Feb	*Winter Field-Day (DL), 432MHz, 0900-1300*
2 Feb	*Winter Field-Day (DL), 144MHz, 1100-1300*
2 Feb	432MHz Fixed/AFS
9 Feb	70MHz Cumulative
23 Feb	70MHz Cumulative
1 Mar	70MHz Cumulative
7/8 Mar	144/432MHz
15 Mar	70MHz Cumulative
29 Mar	70MHz Fixed/SWL
5 Apr	50MHz Trophy
12 Apr	1296MHz Fixed

For details of rules for European contests, contact G4PIQ, QTHR.

VHF RULES

RSGB VHF/UHF/ SHF CONTESTS

144MHZ CW SINGLE OP FIXED /ALL OTHER

19 Jan: 1000 - 1600GMT

General Rules (published Jan 92) apply, plus rule 14.

Sections: F Fixed station single operator; O Open (all others); L Listeners.

Adjudicator: B.Llewellyn, G4DEZ, 110 South Avenue, Southend, Essex SS2 4HU

70MHZ CUMULATIVES

26 Jan, 9 Feb, 23 Feb, 1 Mar, 15 Mar

0900 - 1100GMT

General Rules (published Jan 92) apply, plus rule 10.

Please include a single 4422 summary sheet to show scores for each day and single 427.

Exchange: Locator and location (QTH) must be exchanged.

Sections: F Fixed station single operator; O Open (all others); L Listeners.

Best three logs of a possible five. Please send all logs for checking purposes.

Adjudicator: J Pilags, G8HHI, 43 Bartons Drive, Dungells Lane, Yateley, Camberley, Surrey, GU17 7DW

G4CGM was one of the Northern Lights operators responsible for winning the Mitchell Milling Trophy presented at this year's VHF Convention.

practical Wireless

LOOK OUT FOR OUR NEW FRONT COVER LOGO STARTING NEXT ISSUE

It's appropriate that as *Practical Wireless* enters its 60th anniversary year, that we're making sure that we do so in style. We're all very proud of the magazine's heritage, and there's a new logo starting with the next issue.

Along with the new logo, one of the biggest improvements will be a change to a higher quality glossy paper. There will be full colour and two colours available throughout the magazine. There will also be much higher quality photographic reproduction, with advantages to be had for everyone.

The new printing system will enable our art editor Steve Hunt to use his artistic expertise and the second colour to full effect. As a result technical articles with circuit diagrams, p.c.b. designs and appropriate overlays will be more attractively designed, providing a much easier read.

Rob Mackie, our photographer and technical artist, in conjunction with Steve, will be able to use many more of the production and presentation aids to produce an even better magazine for our readers.

So, we'll be entering the new year in style. There are some interesting projects under way, and I hope to be letting you have news of one or two of them very soon. In the meantime, everyone on the *Practical Wireless* team is looking forward to sharing the enjoyment of a wonderful hobby with the support of our new technology and most importantly, you the reader.

73 DE Rob Mannion G3XFD

- ✔ Practical Wireless 60th Anniversary Year
- ✔ Look out for our new logo starting from the next issue
- ✔ Higher quality glossy paper
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S M C (Northern), Nowell Lane Industrial Estate, Leeds. Tel: 0532 350606

S M C (Midlands), 102 High Street, New Whittington, Chesterfield. Tel: 0246 453340.

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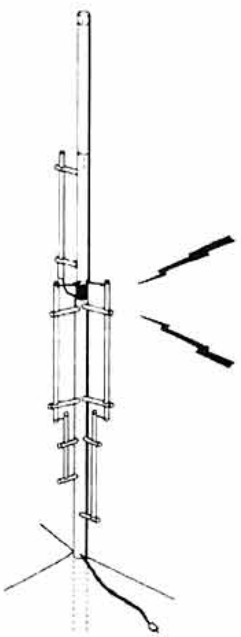

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ICOM 740 tcvr with Icom PS15 PSU: £400, Icom SM5 desk mic: £10, Icom SP3 ext spkr: £5, KW1000 linear amp: £100, two new valves for KW1000: £25, Commodore 64 computer: £30, Commodore 803 printer: £50, Wordcraft word processor cassette: £10, AEA CP1 computer/Tx interface for RTTY-AMTOR: £30, all as new. Real bargains. Buyer to collect. (Cardiff) 0222 755190.

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JRC NRD525 communications RX 90kHz-30MHz as new, boxed: £625 plus carriage. LS for above: £30. G8WYT. (Haywards Heath) 0444 450265.

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LOWE HF-225 30kHz-30MHz Rx incl. amsynch/FM, active whip antenna, nicads, PSU, leather case, man, box, etc: £400. SSB electronics/piper comms straight, German built, 432MHz linear amplifier, 10W in 100W out: £200. Ned G8GZZ QTHR. (Woking) 0483 723506.

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YAESU FRG 7700 Rx with man, ex cond. property of silent key: £250ono. (Blackwood) 0495 225825.

RACAL RA17L Rx, ex cond: £200. Commodore 64 computer + Datasette two programs locator + logbook: £100. 10in main/batt Matsui colour TV, new only used as monitor: £130. Star-Masterkey MKII and bencher key: £80. G0KOG QTHR. (Northampton) 0604 751928.

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YAESU FL2100Z linear amp. Hardly used: £475ono. Dressler D200 amp: £500. VGC. Buyer collects. G0HXP QTHR. (Wickford) 0268 560734.

YAESU FT902DM HF all mode tcvr, built in pwr supply, Curtis keyer, CW filter, new valves, YD-844A, base mic, man, bxd, mint cond: £600. Yaesu FT726R base station 2m and 6m, all modes, built-in pwr supply, manual, mint cond: £630ono. (Brighton) 0273 462696.

COMPLETE system 4 mobile equipment inc aerial, VGC, also pair 5 chan dymar, 169MHz walkie talkies, cases, bttry chrgr. OFFERS. (Frinton on Sea) 0255 672884 eves.

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AR240 144-148MHz, FM H/H, soft case, mains chrgr, no nicads, flexible AE, diagram manual: £70. Post paid. (Redcar) 0642 486155.

AUTO-TXFR, 2KW, 2x120v output. WW2 TX, STC, Fleet Air Arm, 1.5-9.0MHz, VFD, XTAL, sidetone, 2/807 PA, battery/mains powerpack, fully metered. KW 'Vanguard' TX kit, 1.8-30MHz Geloso VFO, 807/6146 PA, lettered panel, cabinet, nice club project. 415-0-415v 300m/a powerpack, numerous HT/LT TXFRS, 19" panels, chassis. Thermo hotwire and 19 set meters Jones plugs, etc. Offers. Mense (London) 081 852 4759.

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BBC Master. 40/80 technomatic disc drives. 6502 2nd processor. Microvitec colour monitor. Morley teletext adaptor. HCR Eprom programmer: £250ono (Bromley) 081 462 7051.

BBC-B computer with monitor, drives, printer modem, books and amateur s/ware. Too much for here. (Southend on Sea) 0702 464689.

BBC-B D/D drive, 12in monitor, joystick, ICS Eprom printer/RTTY, cassette: £150ono. Dragon ZAK cassette: £20ono. G3JXR QTHR. (Bletchley) 0908 642398.

BNOS LPM144 10-100 linear: £130, Jaybeam 14el PBM 2m: £60. Both as new. G0EIR QTHR. (Alsager) 0270 876149.

BROTHER W-P1 word processor, fully portable, unwanted toy, used 6 times, cost £516.35 with receipt, accept: £300ono after 6pm. (Chesterfield) 0246 452169.

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COMPLETE base stn FT767GX, 2m/70cm/6m modules inc. Yaesu SP-767 spkr, Kantronics allmode kam, Yaesu MD1 desk mic, FIF-232C cat system plus cables and software, HI-Mound manipulator paddle key and compact switch, ex. cond. £1800. Harry G0LKB. (Chesterfield) 0246 451960.

COMPLETE station. FT101ZD, CW filter, fan, FM, bxd. FL902, ATU, man, spare valves, key, mic, new wavemeter: £495. Tony G0KUL. (Bognor Regis) 865468.

CREED 444 teleprinter and valradio 240v AC freq changer: £20. Wanted, disc drive attachment for ITT 3000 (Cheetah 85/87) teleprinter. (Swansea) 0792 884895.

CRYSTAL filters, Yaesu type XF90B and XF90C or equiv. also FV201 ext. VFO. G4BZI QTHR. (Chester) 0244 351357.

DAIWA DR7500A 500KG/CM Torque antenna rotator. CW DC7055 round controller and instruction man as new: £100 + carr. TRIO 9130 tcvr cw mobile mount, instruction man and workshop man: £250 + carr. (Redcar) 0860 816139 or 0642 487381.

DATONG FL1 filter. Tunable manual peak/notch 140-5000Hz or auto notch for tuner uppers!: £50. (Tamworth) 0827 86298.

DATONG FL3 multi filter: £80ono, Ken KP12A speech processor: £50, as new, FT980 spkr, unused: £45. (Southampton) 0703 462878.(After 10/12/91).

DATONG FL3: £90 or near as new surplus to requirements. Buyer collects. (Nr Surbiton) 081 398 5696.

DIAMOND CPS vertical antenna with trapped radials in nearly new cond, stored in garage. Collect only, Bargain: £95. (Colchester) 0206 383363.

DRAKE TR-4C + PSU: £200, RV-4C VFO: £75, MS4: £25, The lot: £275. Buyer inspects and collects. G3GGK QTHR. (Cambridge) 0954 210374.

ERA micro reader Mk2 in mint cond incorporates RTTY and Morse readers plus Morse tutor: £100 plus postage. G3HNP QTHR. (Great Yarmouth) 0493 393560.

FT 727R Yaesu dual band h/held 5W 12v nicad, chrgr, carry case: £200. Chris G0CNG. (Shropshire) 0952 825004.

FT101 and FV101B with WARC bands fitted, also G3LU double balanced mixer fitted. Mic and fan, gd cond. FV101B external VFO, pristine cond, both in full wking order with mans: £335 ono the pair. Phone Dave after 6pm. (Chigwell) 081 504 8187.

FT101E HF tcvr: £300. Heathkit audio scope: £15. FT101B: £150. FT101 500Hz CW filter: £30. Daisywheel printer: £50. G4IFB QTHR. (Swindon) 0249 821427.

FT101E with FV101 VFO, CW filter, VGC: £250. G3RWF QTHR. (Canterbury) 0227 721791.

FT101Z with new filter and fan: £350ono, Ham M/mode converted to 28-29.2 SSB/AM/FM

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FT101Z, SP901 spkr and FC901 tuner. Narrow filter: £450ono. Buyer Collects. G3YLA QTHR. (Norwich) 0603 880288.

FT101ZD, complete with FM board, CW filter, fan, FV101 VFO, 70848 desk mic, external Yaesu spkr: £400. No offers, carr extra. Bxd and ready for despatch/collection. (Caerphilly) 0443 862127.

FT102 AM/FM recent overhaul inc. output valves: £550, Lowe HF125 keypad PSU portable option: £275. G0OEW. (Nantwich) 0270 668111.

FT290R 2m all mode: £220, MML 144/100LS linear + pre-amp: £60, WELZ SWR pwr mtr 1.8-500MHz, 3 sensors: £25, Farnell 30amp continuous PSU stabilised: £40, HiMound key: £10, Mag mount 7/8: £15, 30m UR 67, new: £10. All equipment superb cond. (Teddington) 081 977 3546.

FT290R Mutek board, chrgr, case, strap plus DRAE wave meter. Both bxd. Gd cond: £225. G0MHM (Herne Bay) 0227 362527.

FT707 with narrow C/W filter NH-1B8 mic matching FP707 PSU with spkr. As new, boxed: £450ono. G4UOS. (Somerset) 0278 783941.

FT767 GX plus 2m module Nov '89: £1050. If asking price paid a Jaybeam trap dipole, 18mths old FREE. (Bolton) 0204 50264.

FT767 GX with 2m module, SP767 chrome bencher paddle key Shure, 526T desk mic, MH1B8 scanning mic. All less than 1yr old. Also TB 3-ele tribander, 2-ele 12 and 17m beam. Lightweight aluminium tower crank-up tilt-over with head unit top bearing. 40ft 2xKR400RC rotators 2x13-ele elites for 2m with phasing harness 48-ele 70cm beam: £1850. (Bristol) 0272 642867.

HEATHKIT HW100 tcvr, mic, H B PP, positive SM drive, fan, GWO manual: £100. Spare set valves negotiable. Buyer collects. G3ELF QTHR. (Stroud) 0453 765119.

HF LINEAR amp KW 1000 all bands, Inc WARC: £350ono. Pye Olympic 70cm fitted RB10 tone burst: £45. Pye M296 fitted RD6, RD14 tone burst: £55ono. Motorola MX330 fitted RB10 tone burst chrgr, spare batt: £55ono. Micron QRP, CW, TX, RX very nice example: £110ono. Buyers pay carr. Contact G0HZE QTHR (Peterborough) 0733 342439 (eves).

HF LINEAR Icom 2KL fully auto with own pwr supply. Unused, new: £995. (Herne Bay) 0227 742061.

HIGH voltage capacitors 400 to 8KV, working, suitable D-I-Y valve TX's or traps. Also hundreds of resistors incl. wire wound. (Atherstone) 0827 712438.

ICOM 0ZE FM 2m h/h: £150, AOR 900 scanner: £130, Both perfect and bxd. (Worcester) 0905 355381.

ICOM 2 SE FM 2m H/H bttry pack and chrgr: £195, ICOM 726 as new: £750, CW narrow filter for ICOM 725, 726: £30, power SWR meter 50-150MHz: £25, Trio 811E 70cms m/mode plus 70cm valve linear 100W: £800. Will split, Yaesu FT 757: £450, 2SE bttry pack and chrgr: £40. G0PUR 0784 259149 or G0DOE 081 391 0514.

ICOM 202E SSB portable tcvr, fully xtal'd inc case: £120. G6PRL QTHR. (Huntingdon) 0480 457167 after 6pm.

ICOM 575. 26MHz to 56MHz tcvr. 10W CW filter. Mains PSU built-in or 12v. Perfect cond. Orig packing: £650. (Farnham) 025 125 3093.

ICOM 735. 9 band tcvr. 100W, 100KHz to 30MHz RX. CW filter. Perfect cond. Orig box acc's and mans: £750. (Farnham) 025 125 3093.

ICOM IC-R7000 scanning rx, Icom serviced, man, mint: £800. 16in high-grade chassis monitor and 1024+768 co-processor graphics card: £699. (Guildford) 0483 62586.

ICOM IC24ET 2m/70cm H/H CTCSS encoder fitted: £230, Bearcat 200XLT H/H scanner, 66-69MHz, 200 memories: £125. As new, G4IOF QTHR. (London) 071 722 7040.

ICOM IC32 dual band h/h. 5W on VHF and UHF. CTCSS, DTFM, Spare bttry, spkr mic, Icom headset, carry case, extended receive, good cond.: £275. Access/VISA possible. Phil G6DLJ. (Southampton) 0703 207155.

ICOM IC740 HF tcvr: £450. IC735: £700. AT150 auto-ATU: £150. Yaesu FT480R 2m all-mode: £240. Tokyo HT140 40m SSB/CW: £180. HC400L ATU: £95. SEM Transmatch ATU + ez-tune: £65. Microwave Modules MML144/100-S: £90. MML70/100: £75. Grundig sat 600 Rx: £90. BNOS 12/25a PSU: £70. 2 ZETAGI B300P HF linears: £60 each. Reasonable offers considered, buyer arranges collection from Falmouth. (Macclesfield) 0625 431880.

JUNIKERS marine Morse key: £30 R/Sigs H/book of line comms vol 1 1947: £5, Micropatch leads software CW/RTTY/Amtor: £55. G4CJY QTHR. (High Wycombe) 0494 530018.

KANTRONICS KAM all mode tnc. Absolutely mint, bxd with 4 mans and Wefax software: £210. G2FZU QTHR. (Southwell) 0636 813847.

KDK 2m tcvr 3/25W 25/12.5 spacing. Has socket at rear for packet controller: £80ono. Simon (Southampton) 0489 579494.

KENWOOD TR 2300 nicads chrgr, shoulder case, bxd: £95. FDK700E 2m FM 25W: £85. Both ex cond., handbooks. Buyer collects. G3XPX QTHR. (Tunbridge Wells) 0892 548575.

KENWOOD Trio TS430 with FM, new lithium cell: £590. (St Austell) 0726 843487.

KENWOOD TS 520 + VFO 520 EWO: £275. ZETAGI 80-10m s/state linear variable to 400W: £90. Ray G4OOK. (Thetford) 0842 2748.

KENWOOD TS140S HF tcvr and gen coverage rcvr. Boxed and in mint cond: £580ono. G0DZU QTHR (Romsey) 0794 884286.

KENWOOD TS140S HF tcvr, vgc: £625. TRIO 9130 all mode 2m tcvr: £300. G3KJP QTHR. Buyer collects or pays carr. (Honiton) 0404 43006.

KENWOOD TS140S, Good cond, mostly used for general listening: £600ono. Also Yaesu FP107 pwr sup with spkr: £80ono, and Trio TR7200G 2m mobile well xtalled: £75ono. Prepared to haggle on all. Steve G4YGA. (Norwich) 0603 406234.

KENWOOD TS670 all mode 6m VHF plus 10m,15m,40m bands GC RX dual VFOs 10W PEP 80 memories: £325ono. 50W linears 6m and 10m also available 5ele 6m tonna TS530SP with 1.8kHz and 500kHz filters: £545. All VGC. G3GHB QTHR. (Worcester) 0386 792582.

KENWOOD TS820HF TCVR, boxed, operating man: £375ono. Standard C78 70cm portable/mobile, incl case chrgr mobile carrier: £140ono. G4OZD QTHR (Leicester) 0533 680888.

KENWOOD TS830S new O/P valves h/book, man, spkr. DFC230 digital frequency controller h/book, ex-cond. Both items £725. (Cheltenham) 0242 673834.

LARGE stock of valves, some vintage, many new. All proceeds to Royal Free Hospital. SAE for list. G3ASV QTHR. (Golders Green) 081 455 2437.

MICROWAVE Modules 144MHz to 27/28MHz tvtr man and circuit diag. as new: £45. G1YCR (Essex) 0702 464877.

MICROWAVE Modules, 23cm tvtr 144/1296: £90, MM 4m tvtr 144/70: £45, MM 384MHz signal source: £12, MM 435/600 cvtr with PSU: £12. GU2FRO QTHR. (Sark C.I.) 0481 832210.

MORSE KEYS, very rare and collectable, Marconi International marine 365A and 365EZ, Admirality key approx 11in long, High class professional keys. Very old brass key on wooden plinth from the Marconi Wireless Telegraph Co, Ltd, London with serial No. 1915, GPO type double current key with glass top, a dream to use and beautifully made. Serious offers only. G4JJC QTHR. (Bradford) 0274 674462.

MURPHY B40D. All plugs and mount. Works well: £85. Eddystone 358X PSU, orig coil box, working: £55. 52 Bramble Lane, Mansfield, Notts.

MUTEK TVHF 230C tvtr from 2m to HF, 9 bands. Ideal for FT290R or similar. Low output, ex performance: £175ono. G4UDT. (Wembley) 081 902 5995.

MUTEK TVVF 144a 2m TVTR with 10m IF. As new cond: £190 or exchange for 430MHz linear 100W. G0OUS (Reading) 0734 700655.

NDI HC140D 2mFM tcvr: £75. 9ele tonna with rotator mast and wall brackets: £80. Icom IC201 2m m/mode base station: £120. (Worcester) 0905 20002.

OFFERS over £70. Marconi marine key TYP3658. G3AUZ QTHR (Notts).

P30 MIDI Tower and tilt-over: £300ono, P60 tower and tilt- over: £500ono, cold galvanized only. (Alford) 0507 463561.

PANASONIC NV-MS1B full size S-VHS camcorder with 10X zoom, extra bttry, caption generator in orig case, full instructions: £800ono. (Brentwood) 0277 821198.

PK232 mint. Manual. ICS DATA terminal and PC fax s/ware: £260. Paloma PF-300 audio filter: £95. Yaesu FT707 + mobile tray: £235. F-whip 10,15,20,80 coils: £20. HB/HF linear amp 400W: £95. Kenwood TR2200 + chrgr: £45. Advance storage scope: £50. EMI HF/FS meter: £30. (Nr Worthing) 0903 770804.

QRP station, complete: £50. Comprises 2 Howes TXs for 80 and 20m with VFOs, ATU, Dummy load, SWR, codar 45, TRF RX, pwr supply and all connections. No split, buyer collects. G4COY. (Liverpool) 051 546 3235.

QUAD II audio amp, with Quad 22 control unit. Both in gd cond. Needs EF86 valve to be complete. Sensible offers. G0LCC. (Didcot) 0235 813160.

QY4-400 valves, used, good emission: £25 eq. Homebrew linear c/w QY4-400 valve, 4000v variac PSU, capacitors etc, working: £200ono. Homebrew 50ohm load with lower, >1/2kw,: £30. National R106 (HRO-MX) c/w PSU, man, good cond.: £45. Tektronix 585+1A1 plug in HF dual time base delay oscilloscope, wkng cond.: £150. Misc RF pwr components, vintage radio and pwr valves, RadCom 1980 onwards. G4FXU QTHR. (N Cheshire) 0925 756545.

RACAL RA17L 0-30MHz rcvr, mint cond. checked and aligned 1.7.91: £200. PX ICR7000, FRG8800, FRG9600, possible PX any rcvr. (Derby) 0332 372696.

RACAL RA17L RX, 500kHz to 20 MHz. 6 filters: £170. G3RDG. (London) 081 455 8831.

RADCOM h/book 4th edition, hardback also Practical Wireless 1950-1990, some complete years. G3JSP QTHR. (Nottingham) 0602 604563.

RADCOMS. Jan-89 to Oct-91: £10. Valves, mostly unused 6D6, 6B7, CV138, CV131,6SL7, 3 each. VT69, 6K8, CV585, PY32, 1 each: £10. 4.5in b/w tv digital clock radio: £35. 200ft aerial 16swg, copper wire, hardened, new: £10. Buyer Collects. (Bath) 0225 463232.

ROTATOR 400RC, control box with 360 degrees illuminated dial. Control cable good cond: £85. Buyer collects. G0IRK QTHR. (Surbiton) 081 390 2650.

RTTY/CW tcvr, complete: £100, comprises Spectrum+2, Phillips portable colour TV. G1FTU, JEP s/ware, ear, filter, Morse keyer PSU, serial printer, all connections and instructions, Rx4 included, NO split. Buyer collects. (Liverpool) 051 546 3235.

SILENT KEY sale (G4PUL). YAESU FT101ZD: £400, TD148 desk mic: £20, Yeta mic: £12, Daiwa ATU CNW419: £130, Yaesu FT290R with chrgr: £200, Tokyo HL30 2m linear: £30, Yaesu YH1 h/set/SB2PTT: £15, Raycom 12A p/s: £25, AVO(D) m/meter: £30, Electro design EL bug: £20, Low pass filter: £5. Contact G3IMP QTHR. (Newport) 0952 812134.

SILENT KEY SALE (G8NY). Icom 735 T/r: £725, ATU 150: £200, PS 55 PSU: £125, AH 2B whip aerial and mobile ATU: £430, R71 R/x fitted FM, speech readout and remote comtrol: £750, Icom R7000 R/x with speech readout and remote control: £750, IC 2E h/h with L/case: £115, Icom 24SE H/Held with L/Case: £215. Yaesu mobile 2m FT230R: £180. All bxd and little used complete with instr. Many other items. Sony 2001D portable HF Radio. As new, unwanted gift. Complete in box etc: £230. Tono 7000E R/X, T/X RTTY, CW, ASCI. Little use: £150ono. G4IHT 0533 700827.

SOLARTRON 1170 freq response analyser, complete operating documents, sensible offer please. NSC 440A mini-ubiquitous and spectrum analyser, sensible offer please. Wayne Kerr universal bridge type CT492: £15. Bell and Howell oscillograph 5-137: £25. Marconi digital synchroniser type TF2170B: £50. (Bicester) 0869 244166.

ST 5C terminal: £35. G4IDE I/face for Spectrum: £8. 2 DACOL terminals, 1 trend printer: £35ono. G4SAF. (Rochdale) 0706 342701.

TELEQUIPMENT D61 dual chan oscilloscope: £75, Moving coil meters 50-0-50 micro amp: £3, One milli amp: £5. Not QTHR. (Saintfield) 0238 511392.

TEN TECH Argosy 2 with matching PSU and mic. 250Hz crystal filter fitted: £450. G3COO. (Havant) 0705 483676.

TEN-TEC Argosy 2 500Hz filter, ex for AMTOR: £455. Amstrad PCW8512 computer with RS232 interface: £275. Tiny 2 TNC latest 1.1.6D4 ROM: £120. Fibreglass GEM 2el-quad 20/15/10m: £110. Kent twin paddles: £25. Hy-Gain 12AVQ vertical 20/15/10m: £55. ST5C RTTY TU, BARTG PCB 170/425/850Hz shifts: £48. Yaesu MH1B8 hand-mic: £10. Datong RF clipper: £25. All carr at cost or buyer collects. G4EVS QTHR (Guisborough) 0287 636464.

TEN-TEC narrow SSB filter 1.8kHz (Argosy) type 218,: £30. Kenwood SSB filter 2.4kHz (TS4405 etc), type YK-885: £20. (Larkhall) 0698 887176.

TEN-TEC Paragon with matching power unit and mic, full wking order with mans: £1200ono (Sussex) 082 574310 (eves only).

TEST equipment, Farnell AMM-B auto modulation meter 1.5MHz 2GHz, Farnell FM600 digital freq. meter, (very accurate xtal oven etc.) Farnell TM10 thru-line RF pwr meter 25MHz-1GHz 100W, Farnell 2085 AF pwr meter .15mW-50W in 12 ranges, 1.2ohms-1kohms in 36 ranges, all above with calibration cert, Tektronix scope 545B with 4 trace plug in Marconi TF995 sig gen, Marconi TF801 sig gen Altai TE20D sig gen: £450. No split. (Leamington Spa) 0926 497330.

TOWER, Heavy duty telescopic fold over hand winched. Galvanised lattice sections, base, top unit. Extends approx 55ft: £350. (Lincoln) 0400 72717.

TRIO 830S CW filter mic 35S checked to spec by LAR VFO 240, mans: £750. G3YAA QTHR. (Beverley) 0482 866865.

TRIO R2000 rcvr in-built VC10 VHF cvtr 118-174MHz. Bxd hardly used: £400, Eddystone 77OU UHF Rx needs attention: £30, various items of Army radio equipment especially Larkspur ancilliaries/manuals, phone for details. RadComs mid-70s to date, cheap to clear. Rob Thornton G4JCY QTHR. (Hassocks) 0273 842585.

TRIO TR2300 tcvr, mint cond. orig packing: £80, Liner 2m SSB rig, VGC: £65, Pye PF1R WKG.FB RB6R: £10. Carr extra. (Runcorn) 0928 714843.

TRIO TR851E, mint cond, mobile 70cm (never used) TS930S + ATU + AM filter; offers. (Ipswich) 0473 311665 (after 7.30pm).

TRIO TS120v with CW filter plus TL120 amp plus P530 PSU: £425. Sommerkamp 144MHz FM tcvr, 10W 40ch: £80. Paccomm tiny 2 TNC as new: £100. G4HYY QTHR. (Todmorden) 0706 815342.

TRIO TS4405 with auto ATU, SSB and CW filters, matching SP430 speaker: £825. (Steyning) 0903 814516.

TRIO V-UHF TS780 m/mode, VGC: £650. SONY ICF200LD HF SSB/CW AM/FM airbands memories, VGC: £200. Trevor G0HOA. (Wimborne) 0202 889352.

TS120V HF TX: £295, Matching TL120 linear: £100, Matching VFO 120 EX VFO: £60, All interconnecting leads. Weltz RS655 pwr supply, metered output, 7 amp: £30, VR3 10,15,20 vertical: £30, Dictaphone, Sanyo TRC 7050A hand recorder and base cutone, foot pedal, latest model: £80. G4SLG. (Lincoln) 0522 751920.

TS430 as new complete with mic(MC50) and manuals: £659. CAPCO 3000 ATU: £120. HF mini beam, 3 ele: £220. G 400RC rotator and controls all as new: £120. Electronic keyer and paddle: £50. Never used. G1GSM. (Stockport) 061 483 7228, phone after 6pm.

TS4405 18 mths old, excellent and unmarked: £800. Scanner Realistic PRO 2005 400 ch: £200. Hokushin WARC vertical, almost new: £40. G4OBB. (Oxford) 0865 61866.

US ARMY R/19/TRC-1 RX 110v, R206 L/F adaptor: £20 each. VARIAC 240v 8A: offers, Larkspur 'O' box, Radio adaptor box:- Larkspur to Clansman: £5 each, Daiwa NS660P SWR and PWR meter,: £70. DL1000 1KW dummy load: £40. CV1252/4212E valve, (very large triode): offers. R1125B: offers. G0JNT. (Grimsby) 0472 752794.

WELLER TCP soldering iron with PU2 pwr sup, temp controlled 45W: £30. TCP iron only: £12. Yaesu YM34 and YD148 desk mics: £20 each. Storno BU4001 nicad packs almost new: £2.50 each. Pye PF8 8 way chrgr: £15. Contact Les G8PWT. (Maidstone) 0622 687275.

YAESU 1012 new bottles fan cw filter, unmod, manuals, bxd. Yaesu YE7A mic. Adds M4010 dumb mon. and keybd. surplus to requirements. The lot for: £350ono. Buyer collects. Peter G0KMM. (Merseyside) 051 678 1811.

YAESU 101Z WARK mic, one owner, new trans, serviced by pro, spare valves. Immac cond: £400. (Grimsby) 0472 822542.

YAESU FL2100Z, gwo, WARC, 400W out: £475. WANTED handbook YO-100 monitor scope. G4TKH QTHR. (Potters Bar) 0707 43879 eves/wkends.

YAESU FRG7700 RX, FRT7700 ATU, FRV7700 VHF Convector, manual. VGC: £350. Eddystone 940 overhauled by radio sack. Ex performance: £130. (Southall) 081 571 5759.

YAESU FT dx 40/tcvr with ext VFO FV401, mic, manual, most spare valves, odd spkr. Could deliver Suffolk, better buyer inspects, tests collects: £200. Sorry no split. G0BYY QTHR. (Bury St Edmunds) 0284 702281.

YAESU FT dx 401: £225ono. Modified 10m FM with service man: £15. 2m 5/8 whip: £10. 2m 2el ZL special: £10. Jointing sleeve for 2in poles: £10. Buyer to collect. G3WMO QTHR. (Enfield) 081 363 5814.

YAESU FT101: £200, Yaesu FT101: £225, FV101B VFO: £40, Speaker: £15, Digital display unit YC601: £45, FV101DM digital VFO: £100, Photographic colour enlarger with lenses: £225. G3RCO QTHR. (Devon) 0297 21016.

YAESU FT102 tcvr: £350. Oscilloscope Hung-Chang OS620 20MHz dual beam: £110. AMT 1 with BBC ROM chip CWRX option fitted: £15. Silent key sale G4PJM. (Poole) 0202 695873.

YAESU FT102 with AM/FM plus FC102 FV102 SP102: £800, no splits. DAIWA DK210 keyer: £30. New matched triple 6146B plus 2 12B77A drivers: £60 the lot. Les G0JFV. (Gloucester) 0452 862773.

MEMBERS' ADVERTISEMENTS

YAESU FT290 RII, CW, FL2025 25W clip-on linear, FBA8 nicad case chrgr, nicads, soft case, whip, antenna, hand mic, all bxd, mint cond: £400ono G0NCV (Northumberland) 0434 632837.

YAESU FT290R, nicads, 1/4 wave case, spkr mic, gutter mount 1/4 wave, 25W linear: £250. G0PEW. (Sheffield) 0742 443797.

YAESU FT726 2m, 6m, 70cm satellite boards, mic, ex cond, bxd: £750. Yaesu 965 scanner, HF to 960, bxd: £280. (Uttoxeter) 0889 562713.

YAESU FT757 6x HF tcvr, FP757Gx PSU, FC757 AT. Auto ATU YM35 scanning mic, manuals and boxes: £675. G4ZRP QTHR (Bournemouth) 0202 432610.

YAESU FT757 GXII, little used, mint cond: £540. Ron G0KLS. (West Midlands) 0746 780451.

YAESU FT757 MK 1 inc FP757HD PSU SWR meter: £650, also spare FP757HD: £120, FP700: £80. All FB cond. G3TWE QTHR. (Gt Yarmouth) 0493 664497.

YAESU FT767GX with matching FP757GX PSU and MFJ 941D ATU. Gd cond: £600ono. Also Icom IC25E H/Held tcvr with 3 bttry packs, spkr/mic, cigar socket, adaptor case etc Ex cond: £195. G4VKE QTHR. (Barrow-in-Furness) 0229 65359.

Z88 COMPUTER, mains adaptor, 128K eprom, 32K eprom, eraser, Amstrad printer, various books, cost new £450 accept: £220ono. Alinco DJ560E, 2m-70cms, extended receive, with mic, bxd as new: £250. Kevin G7JDD. (Glossop) 0457 868535.

WANTED

AP1086 issue one 1938/1952 (RAF radio stores ref Nos). Also air publications relating to radio radar equip. Excellent prices offered. Would purchase post-war to current magnetrons, klystrons, T/R cells, TWTs, photomultipliers, microwave and special CV types. Required unmodified GEE r/x type R1355. Mr M Gee (London) 071 790 2846 or 071 511 4786.

SSB tcvrs, KW2000CAT or PYE125SSB, PYE130SSB plus PSUs. no mods please. Spare PYE125SSB PSU required also. Brian (Kent) 0474 872743.

WANTED Ten Tec Century 22. offer to: Otto A Wiesner, DJ5QK, Feudenheimer Street 12, Heidelberg, Germany, D/W-6900.

YAESU FT757 or FT747 with filters fitted, must have instruction man. G1YOL QTHR (Fareham) 0329 664269.

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19 SETS, 19 set high power amp, variometer, control boxes, PSUs - all types, etc. WHY. 22 set and PSU indicator for APN-4. T1154 R1155 loop antenna. ATU for A13 radio. ZC1. RA17 L/F converter. Always interested in WW2 radio and radar items. Will buy or exchange above equipment. G0JNT QTHR. (Grimsby) 0472 752794.

BIRD power meter elements:- 250H, 2500H plus 2.5KW or 5KW dummy load. G4ZOW. (Harpenden) 0582 461952, if out please leave message.

CIRCUIT diag and/or Mods for KW200OA. All expenses paid. Stan G3XHE QTHR. (Dartmouth) 0803 833621.

CIRCUITS and mans for RX set R206 (0.55/30W) and Phillips GM2877/02 Wobbulator. Loan or photocopy. Expenses will be reimbursed. GW0OSB. (Caerphilly) 0222 868601.

COIL winding machine, conventional or wave winder also codar ATS tuning dial and Yaesu NC7 or NC8 charger. John G0OAF. (Nottingham) 0602 606552.

COLLINS TCS-12 Tx/Rx for spares. Also accessories, info on homebrew PSU design, 1950/60s articles to copy. Pye Silent marine DF/Rx circuit and/or tech man. to copy. Contact Ian Wye (London) 071 385 1244 ext 2485 (office hours only)

COMPONENTS parts taken out of DF section R1155. Expenses paid. G3MBW QTHR. (Yorks) 0943 874794.

DRAKE RR1 DSR2 R4245 any cond. Scrap s/state Drakes wanted. Also SPR4 wanted. Will import WHY? Also Sherwood bits. (Shrewsbury) 0743 884858.

FT102DM secondary VFO for Yaesu FT102. Gd price paid and will collect or pay postage. Andrew G6YFY. (Reading) 0734 418468.

FT767 module (B) (430-440MHz) also remote control feeder switch for FT102 tuner. G3LRM QTHR. (Cheltemham) 0242 674027.

HEATH SB220/or 230 HF linear amp. Cond not important. Also TS130S or FT747. G3TCO QTHR. (Bristol) 0272 681068.

HELP needed to locate Marconi MF/HF communications Rx, type AD94 or AD118 pref. in wking order or repairable. G0GPE QTHR. (Crowborough) 0892 653154.

ICOM SM5 desk mic in GWO. GM0BPY QTHR. (Eyemouth) 08907 50492.

IS THERE someone in Southampton who can get me through the Morse without too much pain? Tel 0703 438815.

LOUDENBOOMER linear or other lightweight HF linear, also valves QY3-259 QY4-400. G3MGW QTHR. (Brightlingsea) 0206 302382.

LOW LOSS coax cable, 50m length eg LDF4-50, LDF5-50, FSJ4-50, RG177, RG218 or WHY? Gd cond. cable only. G3WZT evenings (Horsham) 0403 864222.

MARCONI CR100/B28 Rx, working or not, or incomplete. Can collect. (Knutsford) 0565 651442.

MICROWAVE Modules RTTY cnvtr MM4000. (Oldham) 061 633 3895.

MMS-1 Microwave Modules Morse talker also transistorised GDO by Heathkit 1.8-230MHz, Both with mans. G3UZB QTHR. (Redcar) 0642 470623.

REQUIRED: Bell & Howell standard 8 sportster cine camera, 605 series. Good price paid, or good alternatives for exchange if necessary. G4IMT QTHR. (Chippenham) 0225 891254.

TEN TEC remote VFO for Corsair II, model 263. G4RWL. (Carlisle) 0228 513227.

TRIO TS811E 70cm m/mode base stn. Phone after 5.30PM (Didcot) 0235 816947.

VIBROPLEX 'Blue Racer' mechanical bug key. Wanted by a user not a collector. G4KJD. (Taunton) 0823 480074.

VT 160 valve tester also valve data manuals, grid volts pot for VT 160 part No 14558-1. (Wolverhampton) 0902 781726.

WANTED HV variable capacitor. Split stator. About 150+150pf, also PU with variable output 0-10v. Norman G4RYS. (Leeds) 663846.

WANTED, YAESU 10W linear, model FL7010, also Yaesu 10W linear, model FL2010. Patrick G0JXD QTHR. (Westwood Ho!) 0237 474755.

WIRELESS BOOKS, mags, cats for Nat W'less Museum. Lissen valves, pilot radio, Phillips video tapes, 8 track stereo tapes. G3KPO. (Ryde, IOW) 0983 67665.

WOULD the next person selling a Yaesu FLDX400 in daily use condition (see Sept RadCom) please contact me first. Also wanted, CW filter for Yaesu FT77 or else customer not concerned about CW for FT77 FM fitted: £325. G0PDH. (Stockport) 061 427 6003.

YAESU FC902 ATU. Ken G3ICG QTHR. (Norfolk) 0379 852116. Please phone late evening.

ZENITH trans-oceanic Rx, pref model Royal 8000. Other models considered. (New Milton) 0425 619884.

EXCHANGE

STAR LC-10, 9 pin dotmatrix colour printer, bxd plus spare mono ribbons for SPC 3000 ATU also realistic PRO 34 H/H scanner, 200 memories AM/FM/NFM, 68-88MHz 380-512MHz 806-960MHz, eleven nicad batteries, leather carry case, spare telescopic antenna (BNC fitting) man & scanner book for Uniden 2830 or 50MHz mobile or portable or WHY in antennas or Ham Radio gear. G4XPP QTHR (County Durham) 0388 745787.

ALR-22E 2m-FM-25W, 138-172MHz mobile alinco tcvrs, MA-200 (& MB-100A) 144MHz half-wave 2.15dB:-50W diamond antenna: £170. ST-9F-DX AM/FM-5W USB-LSB-12W 26.9-27.9MHz mobile, 2x antenna: £130. (Romford) 04023 72919.

EXCHANGE F2 Comet windsurfer and Tushingham 5.2MRR sail, mistral mast plus gutterless roof rack, wet suit, harness and lots of other extras exchange for 2m base station. Anything considered. Howard G0LCC. (Didcot) 0235 813160.

FT290 Mk1 case nicads chrgr box, swap for similar standard C58. Reason gone pedestrian. G1WIW. (Hinkley) 0455 845019.

VHF/UHF NEWS

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horizon. The Japanese recorded this burst at around 1600GMT which is about 0100-0200 local time and so ideal for visual observation. In one all-sky photograph of 50min duration 26 trails were recorded. As only trails of brightness of the star Sirius, magnitude -1.43, would show up, there were bound to have been many more detectable by radio. Either side of this outburst, the ZHRs were normal - about 60-70 observed.

The American continent was in daylight at this time. Reporting on radio reflections, one observer was quoted as saying it was the best event since the great Leonid storm of 1966, referred to in the November *VHF/UHF News*.

The parent body of the Perseids stream is comet Swift-Tuttle which was expected back in 1980-81. But it was not found even though the ZHRs for the Perseids were about three times the then average value of 60-70.

This surprise burst on 12 August has led to speculation that the comet may return to perihelion - ie perigee in satellite terminology - next November. If so, the 1992 Perseids shower could be quite spectacular. However, don't get too excited yet as there have been no reports of any sighting of Swift-Tuttle.

1992 is a leap year. If this burst is repeated the likely time would be around 2200GMT on 11 August. The radiant point would be about 33° azimuth and 33° elevation at this hour. Although the Moon will be approaching full phase it will be fairly low in the south, so if the sky is clear, any fireworks to the northeast should not suffer from moonlight QRM.

This episode is an excellent illustration of the value of reporting an unexpected or unusual event. G0CUZ's observation has resulted in a most interesting contribution from Alastair McBeath of the IMO. For details of IMO membership please write to Ina Rendtel, IMO Treasurer, Gontardstrasse 11, D-O-1570 Potsdam, Germany. An IRC would be appreciated.

NEWSLETTER

IN JANUARY'S VHF/UHF News, I featured the 144MHz EME experiments being conducted by Graham Daubney, G8MBI (HFD), and Mark Turner, G4PCS (BFD), from a site in Suffolk. Their 224-element colinear array is also used to explore other propagation modes, such as troposcatter, ionoscatter and field aligned irregularity.

I think it is important that the more esoteric side of VHF amateur radio be reported in this column in order to encourage others to experiment. In the limited space available, I cannot devote as much copy as I would like to this fascinating research, and this is where the specialist publications, like the quarterly *DUBUS Magazine*, come into their own. A typical issue of *DUBUS* runs to over 100 pages, but there is scope for more modest newsletters.

One of these is *2M Direct* produced by G4PCS. To quote Mark: "This is an attempt to obtain reports and observations from stations that are normally too busy to put pen to paper, by doing most of the work for them. It is quite probable that, unless something is done to improve activity reports, a large amount of extremely valuable data will be lost."

Those wishing to cooperate receive a simple form, probably on a monthly basis, on which they can record their 'interesting contacts of the month', with comments. These are then collated into the newsletter, a free copy of which is sent to all contributors and to myself. This is an excellent idea and should enable me to include reports from some members who rarely, if ever, send them to *VHF/UHF News*.

An early issue of *2M Direct* runs to sixteen A4 pages and is superbly produced. The editorial matter is in two column, fully justified format. The data are presented in mode form - aurora, Es, tropo, and so on - each in chronological order. There is a brief section called Station Profiles, referring to the Five Bells Group's operations in Iceland and the Faroes, and the Northern Lights Group's activities on the Isle of Man.

I sincerely hope that readers will support Mark's efforts which are intended to complement existing 144MHz columns, rather than compete with them. His QTH is: 15 Witley Green, LUTON, LU2 8TR, or QTHR.

DEADLINES

NO 430MHz news was received this time, so it just remains for me to wish everyone a Very Happy Christmas. The **February** deadline is **Thursday, 19 December** and for **March** it's **Thursday, 23 January**.

CLUB NEWS

DEADLINE - Items for inclusion in the February 1992 issue must be sent to HQ marked "Club News - DIARY", to be received by 13 December 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

SOUTH BRISTOL ARC - 4, exhibition of Calligraphy; 18, Christmas party. For details ring Whitchurch 832222 on a Wednesday evening.

BEDFORDSHIRE

DUNSTABLE DOWNS RC - 13, TV show. Details 0582 451057.

SHEFFORD & DARS - 5, talk 'VHF Contests Through the Ages' by G4LOO; 19, chairman's mince pie night; Jan 16, AGM. Details 0908 274473.

BERKSHIRE

BRACKNELL ARC - 11, Christmas dinner; Jan 8, AGM.

BURNHAM BEECHES RC - ***NEW VENUE*** (starting 6 Jan 92) The Farnham Common Village Hall, Farnham Common, Bucks.- 2, club Christmas 'do' skittles & buffet at Greyhound Eton; 16, club video; Jan 6, welcome to Farnham Common Hall. Details 0628 25952

READING & DARC - 12, annual general meeting followed by cheese and wine. Details 0734 476873.

BUCKINGHAMSHIRE

CHILTERN ARC - 4, Christmas party. Details from Dale, G0ACL, 0494 524819.

MILTON KEYNES & DARS - 9, talk 'Liquid Petroleum Gas' by W Backhouse, G4HZI. Details 0908 501310 or 0908 315435.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 6, Christmas party; 13, quiz evening with visitors from Shefford Club; 20, talk 'Surface Mount Devices and Their Repair' by Simon, G6RWT. Details 0763 243570.

CHESHIRE

CHESTER & DARS - 3, radio ideas and discussion; 10, construction contest; 17, Christmas meeting. Details 051-608 3229.

NORTH CHESHIRE RC - 14, Christmas BBQ at the QTH of G4SUB. Please contact G4SUB before December 7 on 0565 777288 for tickets. Old and new members will be welcome. Details from G7HKQ (club secretary).

WIDNES 7 RUNCORN ARC - ***NEW SECRETARY*** P H Wilson, G7EOK, 28 Dudley Avenue, Runcorn, Cheshire WA7 5NL.

CLWYD

DELYN RC - 4, talk and demonstration on 'Amateur TV'; 18, mince pie night; Jan 15, talk about the work of the British Legion by Rose Massey. Details 0745 336939.

RHYL & DARC - 2, homebrew night (GDO project) - introduction and explanation by Dave, GW4DMR; 16, junk sale; Jan 6, talk/demo 'Satellite TV' by Roy, GW8XLL. Details 0745 338276.

WREXHAM ARS - 3, demonstration of Jandek Kits by G3ZOM; 17, buffet supper. Contact 0978 266887.

DERBYSHIRE

BUXTON ARS - *Contact is Kevin Jones, G4FPY, tel: 0332 669157, and not as in the 1991 Callbook*.

DERBY & DARS - *Contact Richard Buckby, G3VGW, tel: 0773 852475, and not as in the 1991 Callbook* - 4, junk sale; 11, constructors' contest; 18, Christmas party; Jan 8, talk 'The Work of the RSGB' by John Allen, G3DOT.

DORSET

PLESSEY CHRISTCHURCH ARS - 12, Christmas party. Details 0202 519708 (eves) 404658 (days).

SOUTH DORSET RS - 3, WX Sat Reception - Chris, G4RAK; Jan 7, further jottings from Ed - Ed G3VPF Details 0305 781164.

ESSEX

BRAINTREE & DARS - 2, talk 'Simply Wire Aerials' by Dave, G3PEN; 16, cheese & wine - club members and families. Details 0376 27431.

CHELMSFORD ARS - 3, talk 'The Marconi History of Radar' by Stan Woods. Details 0245 260831.

LOUGHTON & DARS - 13, Christmas meal at The Spotted Dog, Ivy Chimneys, Epping (provisional); 27, Christmas drink at the Victoria Tavern. Details 081 504 4581.

FIFE

DUNFERMLINE RS - 12, quiz night v Lothians RS; 19, operating evening with festive mince pies. Details 031 331 4340.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK ARC - 18, talk 'Problems in Setting Up an HF Station' by G0JRY. Details 071-938 2561.

BROMLEY & DARS - 17, Christmas party. Details 081-462 2689.

CLIFTON ARS - Details 081-691 2341.

CRAY VALLEY - 5, talk 'Greenland and the Caribbean' by G3DCC. 19, Christmas social. Details 081-699 6940.

CRYSTAL PALACE & DARC - 21, Christmas social. Details G3FZL.

EDGWARE & DARS - 12, junk sale; Jan 9, AGM. Details 081 205 1023.

GRAFTON RS - 13, talk 'Post Office Telephones'; 20, Christmas social and constructors contest. Visitors particularly welcome. Details 081-368 8154.

HAVERING & DARC - 11, talk 'Construction' by John Lemay, G4ZTR; 18, Christmas dinner; Jan 8, AGM. Details 04022 23310.

KINGSTON & DARS - 18, Christmas special. Details 081 398 1128.

SOUTHGATE ARC - 12, annual general meeting. Details 081-360 2453.

SUTTON & CHEAM RS - 19, Christmas get-together. Details 081 644 9945 (eves).

WIMBLEDON & DARS - 13, Christmas social. Details 081 397 0427.

GREATER MANCHESTER

ECCLES & DARS - 3, demonstration 'Digital Speech Generation' by G8DTF.

SOUTH MANCHESTER RC - 6, surprise lecture night; 13, talk 'Contest Preparation' by G3SVM; 20, Christmas party. Details 061-969 1964.

GWYNEDD

DRAGON ARC - 2, Mr Ron Watson-Jones with some more amazing films; 16, Christmas party. Details 0248 600963.

HAMPSHIRE

BASINGSTOKE ARC - ***NEW SECRETARY*** John Randall, G3OAZ, 243 Paddock Road, Basingstoke, Hants RG22 6QP, tel: 0256 465126 (H) 0256 706341 (W).

FAREHAM & DARC - 4, talk 'Reliability' by Ron, **G3XPH**; 18, Christmas quiz. Details 0705 321411/2 (daytime).

HORNDEAN & DARC - ***NEW SECRETARY*** Stuart Swain, G0FYX, tel: 0705 472846 - 5, talk 'Liquid Crystals' by Merck Ltd; Jan 2, talk 'British North Greenland Expedition 1952-54' by Brett-Knowles, G3AAT.

THREE COUNTIES ARC - 4, quiz night; 13, Christmas dinner. Details 0420 83091.

WINCHESTER ARC - 20, Christmas party. Details 0962 89550.

HEREFORD & WORCESTER

BROMSGROVE ARS - 10, social evening.

BROMSGROVE & DARC - 13, Christmas social.

HEREFORD ARS - 1, talk 'PCBs Then and Now Including Surface Mounting Techniques' by Bill Wells, G3HVX; 6, talk 'Contesting from Bermuda' by Stuart Jesson, G4CNY. Details 0432 355297.

HERTFORDSHIRE

CHESHUNT & DARC - 8, Verulam Rally at Hatfield Poly; 11, talk 'Packet VK' by Gerard, G0ODA; 18, Christmas social evening. Details 0992 464795.

STEVENAGE & DARS - 3, practical feedline testing; 10, construction projects evening; 17, Dutch Party and quiz; 31, practical computer assembly and modification; Jan 8, talk '2M D/F Aerial' by Alf, G7KPV. Details Stevenage 724991.

VERULAM ARC - 8, Verulam Rally at Hatfield Polytechnic, doors open 11am, 17, Annual General Meeting. Details 0727 59318.

HIGHLAND

INVERNESS ARC - 18, Christmas party and Part II of 'My Travels Abroad While an RO' by Alistair Rose, GM3WED. Details 0349 61783.

HUMBERSIDE

GRIMSBY ARS - 5, talk 'Moonbounce & DXpeditions' by G4DHF; 12, Christmas party. Details 0472 825899.

NORTH FERRIBY UNITED ARS - 6, The Way Ahead meeting; 13, talk 'LF Band DX' by Vic, G4BYG; 20 Christmas quiz with Malcolm, G4XWA. Details 0482 650410.

ISLE OF WIGHT

BINSTEAD ARS - 2, surplus equipment sale. Details from G0ISB QTHR.

KENT

DARENTH VALLEY RS - 11, Christmas dinner (provisional) Details 0689 876733.

MAIDSTONE YMCA ARS - 6, Christmas social. Details from Colin L Roberts, 16 Derby Road, Maidstone, Kent.

SEVENOAKS & DARS - 2, Annual General Meeting.Details from Council Offices, Argyle Road, Sevenoaks, Kent.

WEST KENT ARS - 20, Christmas party. Details from G3OHV.

LANCASHIRE

FYLDE ARS - 13, supper and social evening. Details 0772 635464.

PRESTON ARS - 12, Christmas buffet; all members & wives welcome; Jan 9, talk 'Lancashire's Colour and Charm' by Mr Shaw.

ST HELENS & DARC - ***NEW SECRETARY*** R T Bennett, G4DIY, 17 Truro Close, Carr Mill, St Helens WA11 9EL.

THORNTON CLEVELEYS ARS - 9, LUARS quiz; 14, Christmas dinner - Brabyn's Hotel; 16, radio video night; 23, Christmas party (families & friends welcome). Details from G4BFH, QTHR.

LEICESTERSHIRE

LEICESTER RS - 2, HF & VHF slides and video; 16, talk 'Packet Racket' by Laurence, G7AYI; 23, mince pie social evening. Details Leicester 762241.

LOUGHBOROUGH & DARC - 3, Christmas dinner - Black Swan, Shepshed; 10, construction; 17, Christmas drink. Details 0509 218259.

LINCOLNSHIRE

SPALDING & DARS - 12, Christmas social. Details from G4DHF.

MERSEYSIDE

LIVERPOOL & DARS - 3, talk by Albert, G0MSO; 10, open night; 17, Christmas social. Details from Gordon, G4VYR.

WIRRAL ARS - 4, talk 'SSB QRP' by Rev George Dobbs, G3RJV; 18, Christmas party. Details 051-644 6094.

WIRRAL & DARC - 11, chairman's night - the chairman bows out; 18, Christmas special - a social evening; Jan 8, AGM. Details from Andy, G7HUD, tel: 051-677 4448

NORFOLK

NORFOLK ARC - 4, 'Licence Conditions', Q&A; 11, Christmas party. Details 0603 747992.

YARMOUTH RC - 5, debate 'Amateur Radio is Going to the Dogs'; 19, Christmas party; Jan 16, contest plans for 1992. Details Yh 721173.

NORTHAMPTONSHIRE

KETTERING ARS - 10, Christmas buffet and social evening for members and guests; Jan 14, slide show of Old Kettering by Terry Green, G7AJS. Details 02993 79229.

NORTH YORKSHIRE

HAMBLETON ARS - 9, talk 'Fault Finding Techniques' by Tony Nicholson. Details 0609 776608.

SCARBOROUGH ARS - 2, surplus equipment sale. Details 0723 514767.

NOTTINGHAMSHIRE

MANSFIELD ARS - 5, Christmas social evening. Families and friends welcome. Details from Mary, G0NZA on 0623 755288.

SOUTH NOTTS ARC - 13, construction evening (Fairham College); 20, Club Christmas dinner. Details 0509 672734.

OXFORDSHIRE

OXFORD & DARS - 13, Christmas mince pie party. Details 0865 58785.

SHROPSHIRE

SALOP ARS - 5, talk by G3IDY Bob Robson and the BBC; 19, beer and butties. Details 0743 790457.

TELFORD & DARS - 11, video night; 12, Rally Group AGM Salop HQ; 18, club dinner - Malthouse, Ironbrighe. Details Bridgnorth 761203.

SOUTH GLAMORGAN

CARDIFF RSGBG - 9, annual Christmas dinner - Pantmawr Hotel. Details 0446 773212.

SOUTH YORKSHIRE

BARNSLEY & DARC - 2, junk sale; 9, talk by G3ZOM on Jandek Kits and other technical topics; 23, construction competition plus Christmas Raffle. Details 0226 716339.

STAFFORDSHIRE

STAFFORD & DARS - 10, talk 'Introduction to Astronomy' by G3EHM; 17, construction evening. Details from Bernard, tel: 0785 662350.

STRATHCLYDE

WEST OF SCOTLAND ARS - 4, visit to BBC/IBA Blackhill - max of 10 persons; 6, talk 'EME on a Shoestring' by Ray, GM4CXM; 13, club night - Kilmarnock Club - Bright Sparks Trophy; 20, talk 'Equipment Specification Checking' by Adrian, GM1FML. Details from GM4COX, QTHR.

SUFFOLK

ISPWICH RC - 5, Morse test at Ipswich; 11, quiz - Ipswich RC vs Stowmarket RC. Details Mrs. S.M. Elden, G8HYE QTHR, tel: 0473 742072.

SURREY

DORKING & DARS - 6, Christmas dinner - venue TBA. Details 0306 77 236.

ECHELFORD ARS - 9, Christmas party and entertainment. Details 0344 843472.

REIGATE ATS - 17, construction contest/cheese & wine. Details 0293 775278.

TAYSIDE

DUNDEE ARC - 3, construction night; 10, talk and demonstration 'Test Equipment Night' by James Gentles, GM4WZP - bring your rig for a MOT - homebrew welcome. Details GM4FSB.

STRATHMORE ARC - *NEW SECRETARY* Wolf Rossmann, GM0BTK, Burnbrae, Bridgend of Lintrathen, by Kirriemuir, Angus DD8 5JH.

WARWICKSHIRE

MID WARWICKSHIRE ARS - 10, Christmas pies and wine. Details 0926 513073.

STRATFORD-UPON-AVON RS - 9, discussion evening with the chairman. Details 060 882 495.

WEST GLAMORGAN

PORT TALBOT ARC - 12, annual dinner. Club meets Thursday nights at 7.30 at BSC Sports & Soc Club. Details GW0KTE, 0639 895250.

SWANSEA ARS - 5, Annual General Meeting followed by buffet - College House at 7.30pm; 19, Christmas quiz. Details 0639 815748 (daytime).

WEST MIDLANDS

MIDLAND ARS - 3, Christmas party. Details 021-742 8712.

SOLIHULL ARS - 19, Christmas social evening. Details 021-783 2996.

WEST SUSSEX

HORSHAM ARC - 5, Annual General Meeting. Details 073784 2150.

MID SUSSEX ARS - 13, Christmas social at the Sergison Arms. Details G0OIO.

WEST YORKSHIRE.

DENBY DALE ARS - 7, Ceilidh (barn dance) at the Pie Hall, Denby Dale at 8pm. For tickets contact Brenda, G4OTE, tel: 0484 424776. Details 0484 532371.

HALIFAX & DARS - 15, Christmas social at the' Running Man'. Details Halifax 202306.

KEIGHLEY ARS - 19, Christmas buffet. Details from Kathy, tel: 0274 496222.

NORTHERN HEIGHTS AR&ES - 4, alignment evening - G3TQA; 18, social evening. Details 0274 673116.

SPEN VALLEY ARS - 5, talk 'Band 3 Radio Systems' by John Abbot; 19, Christmas event. Details 0484 716453.

TODMORDEN & DARS - 2, Christmas lecture by Rev George Dobbs; 16, social evening. Details Halifax 882038.

WAKEFIELD & DRS - 3, talk 'Earth's Magnetic Field' by G2FKZ; 10, members' VHF Contest night; 17, Christmas social evening. Details Wakefield 260048.

WHITE ROSE ARS - 4, junk sale; 18, Christmas quiz. Details from J E Hart, G3ZGA.

WILTSHIRE

DEVIZES & DARC - 20, Christmas dinner. Details 0380 724533.

TROWBRIDGE & DARC - 4, Christmas party and cup presentation; 18, planning for 1992. All welcome. Details 0380 830383.

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'.

1 DECEMBER

BISHOP AUCKLAND Radio & Computer Fair - Sunnydale Leisure Centre, Shildon, Co Durham. Easy access from A1(M). Doors open 11am (10.30 for disabled visitors). Usual traders stands, bring & buy, ample car parking, bar & refreshments. Details from Ernie, G4TYF, 64 Gurney Valley, Bishop Auckland DL14 8RW, tel: 0388 607500.

8 DECEMBER

LEEDS & DARS Christmas Rally - Pudsey Civic Centre, Dawsons Corner, Pudsey (at junct of the Leeds Ring Road with Bradford Road DO NOT follow signs for Pudsey). Doors open at 10.45am, all usual facilities. Details from Geff Stubbs, 0532 585801

VERULAM Christmas Rally - Hatfield Polytechnic. 11.00 to 5.30. Trade stands, bring & buy, free parking, catering, raffle. Talk-in on 2m. Ring 0923 249456 (Trade) 0727 59318 (Club).

15 DECEMBER

CENTRE OF ENGLAND Christmas Radio & Electronics Rally - National Motorcycle Museum, Bickenhill, nr the NEC jct 6 M42. Doors open 11am (disabled visitors 10.30), admission £1 (concession for RAIBC members and senior citizens). Over 60 traders in 3 large halls; Free parking, bring & buy, talk-in on S22, bar & restaurant facilities. Christmas Special: "Spot the Cracker" on many of the trade stands to win a free prize. Details from Frank Martin, G4UMF, 0952 598173.

EVENTS DIARY

19 JANUARY 1992

OLDHAM ARC Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Doors open 11am. Free parking. Catering & bar facilities. Morse test available. Details from Mrs K. Catlow, 137 Haven Lane, Moorside, Oldham OL4 2QQ, tel: 061-624-7354 (daytime) 061-652 8617 (evening), fax: 061-633 0550.

26 JANUARY 1992

2ND LANCASTRIAN Rally - University of Lancaster. Doors open 11am (10.30 for disabled visitors). Details from Sue, G1OHH on 0524 64239 or QTHR.

2 FEBRUARY 1992

SOUTH ESSEX ARS Radio Rally - Paddocks Long Rd (A130), Canvey Island, Essex. Doors open 10am. Trade stands, bring & buy, RSGB book stall, home-made refreshments, free parking plus parking outside the main door for disabled visitors. 2m talk-in on S22 (G4RSE). The Paddocks is at the end of the A130. Details from Dave Speechley, G4UVJ, tel: 0268 697978.

9 FEBRUARY 1992

CAMBRIDGE & DARC Mobile Rally and Boot Sale. Details from John, G6UGI, 0763/243570.

23 FEBRUARY 1992

KIDDERMINSTER & DARS Rally - Harry Cheshire School, Habberley Road, Kidderminster. Doors open 10am. Normal trade stands, bring & buy, car boot sale, refreshments available, free admission and car parking. Talk-in on S22 GB3KR, GB3OS. Details from G4HFP, 16 Marlborough Drive, Stourport-on-Severn, Worcs. DY13 0JH, tel 02993 3818. (Please note corrected date).

5TH TAW & TORRIDGE RALLY - BAAC Halls, Bideford. Doors open 10.30 am (10am for disabled visitors). Trade stands, bring & buy, refreshment room, licensed bar. Talk-in on S22. Details from John, G0GFK, 0237 476402.

EAST COAST AR & Computer Rally - Clacton Leisure Centre, Vista Road, Clacton-on-Sea. Details from Terry, G7DNS, tel: 0255 222207 or Tony, G0MBA, tel: 0255 422843.

WAKEFIELD & DARS Northern Cross Rally - Rodillia School between Leeds and Wakefield (at junction M1/M62). Open 11am (10.30am for disabled visitors). Parking for 1000+ cars. Dealers, Groups and Craft stands, bring & buy, Morse test, RSGB Propagation Studies Stand, Car crime prevention demo, Wakefield & DRS stand, bar and refreshments. Talk-in on S22. Entry 50p (programme draw prizes). Details from G0FLX, tel: 0532 827883.

29 FEBRUARY 1992

BREDHURST R&TS Rainham Radio Rally - Parkwood Community Centre, Parkwood Green, Gillingham, Kent.(Exit 4 on M2 Motorway).Bring & buy, traders, cafe and bar, free parking. Talk-in on 2m. Details from G0LKE, tel: 0634 362154.

TYNESIDE ARS - Temple Park Leisure Centre, South Shields. Details from Jack, G0DZG, 091 265 1718. (This Rally was previously scheduled for 7 March 92).

1 MARCH 1992

TRAFFORD Rally. Details from Graham Oldfield, G1IJK, tel: 061-748 9804.

14 MARCH 1992

VHF CONVENTION - Sandown Park Exhibition Centre. Stand booking to Les Hawkyard, G5HD, tel: 040-928 342. Details from Geoff Stone, G3FZL, tel: 081-699 6940. Please note this is on a Saturday this year.

15 MARCH 1992

NORBRECK ARE&C Exhibition. Details from Peter Denton, G6CGF, tel: 051-630 5790.

WYTHALL RC Rally - Wythall Park, Silver St, Wythall. Details from G0EYO, 021-430 7267.

22 MARCH 1992

MAGNUM Radio Computer Rally (Cunningham & DARC). Details from Peter, GM0FCI, 0294 72253.

PONTEFRACT & DARS 12th Annual Components Fair. Details from Colin Mills, G0AAD, 0977 643101.

5 APRIL 1992

LAUNCESTON 6th AR Rally - Launceston College. Details from Maggie 040921-219 or Rodney & Joy, 0566-775167.

25TH WHITE ROSE Rally. Details from Tony, G4DXA, PO Box 73, Leeds LS1 5AR.

19 APRIL 1992

CENTRE OF ENGLAND Easter Radio & Electronics Rally. Details from F Martin, G4UMF, 0952 598173.

26 APRIL 1992

BURY RS Hamfeast - Castle Leisure Centre, Bolton St, Bury. Details from L H Jones, G4KLT, 061-762 9308.

SWANSEA ARS Rally - Swansea Leisure Centre. Details from Roger Williams, GW4HSH, 0792 404422.

3 MAY 1992

9TH ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Details from Bruce, GM4UIB, QTHR.

Shaun O'Sullivan, G8VPG, (right) has been awarded the RSGB's Certificate of Merit for his services to the Society. He is, among other things, RLO for Avon, a local EMC Co-ordinator, and Chairman of the Longleat Rally Organising Committee. The presentation was made by RSGB President John Case, GW4HWR, at a meeting of the Bristol RSGB Group where Shaun is a member.

4 MAY 1992

MID CHESHIRE ARS Rally - Civic Hall, Winsford. Details from David G4XUV, 0606-77787.

10 MAY 1992

MARS/DRAYTON MANOR Radio Rally. Details from Peter, G6DRN, tel: 021-443 1189. Trade stand bookings - Norman, tel: 021-422 9787.

30/31 MAY 1992

RSGB NATIONAL CONVENTION - NEC Birmingham. Details from N Miller, G3MVV, QTHR.

14 JUNE 1992

ELVASTON CASTLE Mobile Rally. Details from John, G4PZY, tel: 0332 767994; trade enquiries Peter, G3WFU, tel: 0332 700265 (evenings).

RNARS Annual Mobile Rally. Details from Cliff Harper, G4UJR, 0703 557469.

21 JUNE 1992

DENBY DALE & DARS Annual Mobile Rally. Details from Philip, G4FSQ, 0484 644827.

NEWBURY & DARS Annual Car Boot Sale. Details from N Jaques, G0HFU, 0635 63310.

28 JUNE 1992

LONGLEAT AR Rally. Details from Shaun, G8VPG, QTHR, tel: 0225 873 098.

12 JULY 1992

SUSSEX AR & Computer Fair. Details from Ron Bray, G8VE, QTHR, 0903 763978.

25/26 JULY 1992

NORFOLK ARC & Hewett School Rally - Hewett School, Norwich. Details from M J Cooke, 4 Geddes Way, Mattishall, Norfolk NR20 3RE

2 AUGUST 1992

RSGB NATIONAL MOBILE RALLY - Woburn Abbey. Details N Miller, G3MVV, QTHR.

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 25 December. It was taken from the HQ computer on 31 October. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 DECEMBER
GB2LUN Lunna House - Shetland

3 DECEMBER
GB8RRP Red Rose Platinum

6 DECEMBER
GB0GTV Granada Television

7 DECEMBER
GB6AQ Tops CW Club

14 DECEMBER
GB2MS Multiple Sclerosis
GB4DX "DX"
GB4RN Royal Navy

15 DECEMBER
GB0COE Centre of England

19 DECEMBER
GB2OLD Old Year

20 DECEMBER
GB0TCF Tewit Charitable Fund

22 DECEMBER
GB6CIN Children in Need

25 DECEMBER
GB0QRP QRP 'Low Power'

PHOTOGRAPH: G0CTM

Manchester's Trafford Radio Club handed over a £50 cheque to Bill Buxton from Sale who became Pupil of the Year in the RAE course at North Trafford College. Seen in the College's radio shack are: (l to r) Bill who is now G7KNH, Club Chairman Graham Oldfield, G1IJK, Secretary Malcolm Collis, G7AGC, and course tutor John Beaumont.

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

G0AAQ	Mr KA Blatchford	
G0FFO	Mr F Price	27.09.91
G0JPB	Mr AE Collins	
G0KEF	Mr R Dodman	Aug 91
G0KHE	Mr G Johnson	20.04.91
G0KZL	Mr P Hillman	25.07.91
G0LJO	Mr DEM Penny	25.08.91
G1HLI	Mr D Norris	April 91
G1USR	Mr D Appleton	Aug 91
G2BXJ	Mr AF Thompson	14.07.91
G2DZ	Mr ABG Hall	April 91
G2HN	Mr E Howell	20.03.91
G2YS	Mr J W Swinnnerton	July 91
G3AUZ	Mr MW Parry	
G3CZA	Mr WB Marsters	03.08.91
G3EHD	Mr FL Ingleby	27.08.91
G3FPV	Mr EH Baerselman	20.06.91
G3GIM	Mr F Jackson	Aug 91
G3HSC	Mr S Bennett (not as printed in September 1991 RadCom)	
G3HTM	Mr W Ellis	22.09.91
G3IGT	Mr WG Borley	Aug 89
G3II	Mr SJ Mayhead	31.07.91
G3JDB	Mr FR Burnham	17.09.91
G3KZ	Mr RD Holland	30.07.91
G3LKJ	Mr BE Symons	05.10.91
G3NPV	Mr AW Green	19.06.91
G3PKT	Mr A Walker	07.09.91
G3PWZ	Mr JF Waldegrave	09.07.91
G3RUN	Mr TW Kupicha	Feb 91
G3SRW	Mr G McGimpsey	10.09.91
G3TOG	Miss F Martindale	24.08.91
G3VJQ	Mr D Leary	27.07.91
G3WFZ	Mr FG Lloyd	18.05.91
G4AWS	Mr AJ Foster	
G4CJA	Mr SF Caddy	03.04.91
G4CVJ	Mr HWA Zeller	Feb 91
G4EBR	Mr N Beharrell	29.08.91
G4EEA	Mr SG Warren	23.08.91
G4FOF	Mr XC Richards	
G4GHG	Mr L Barratt	
G4PEZ	Mr EH Smith	June 91
G4SIM	Mr T Short	19.09.91
G4XNM	Mr FW Johnson	02.06.91
G4ZKL	Mr PJ Ferrao	09.10.91
G5NY	Mr J Nayler	
G6MZD	Mr D Dugdale	25.07.91
G6QN	Mr R Baker	Sept 91
G6YHH	Mr F Mitchell	
G7HHH	Mr D Harding	13.06.91
G8APH	Mr GAA Gale	09.04.91
G8HY	Mr LC Carden	
G8KLU	Mr R Morris	05.04.91
G8QS	Mr R Lever	17.10.91
G8ZRY	Mr JM Stevenson	11.10.91
G8ZZA	Mr CW Kaberry	21.08.91
GD4BGK	Mr S Keyes	17.09.91
GI0FAM	Mr DMO Macdonald	12.06.91
GI0JLG	Mr JL Gallagher	09.10.91
GI3CSV	Mr J Millar	08.09.91
GM3BDA	Rev WM Ferrier	12.10.91
GM4ZLE	Mr JGL Walker	
GM5KF	Mr JR Adams	
GW1VAU	Mr DJ Broad	July 91
GW1ZTR	Mr J Chambers	18.08.91
GW3VKZ	Mr IG Rees	10.10.91
GW4NCG	Mr CR Woodward	
GW4PVK	Mr G Boote	15.09.91
GW4UWH	Mr L Davies	02.10.91
GW7EVM	Mr JT Morgan	Dec 90
RS1066	Mr Bradbury	
RS2567	Mr ADM Dunn	May 91
RS10663	Mr F Parkhurst	18.09.91
RS42590	Mr DC Smith	
RS44122	Mr LJ Gooch	02.09.91
RS45051	Mr FG Freeman	April 91
RS45890	Mr HJ Coe	June 91
RS49190	Mr T English	20.08.91
RS6116	Mr RC White	
RS88428	Mr KF Rogers	
RS93501	Mr ME Howell	
VE4QL ex G5QL	Mr L Herrington	12.06.91
VK4DEP	Dr E Pawson	27.09.91

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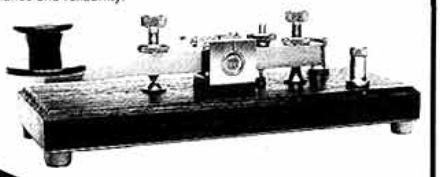

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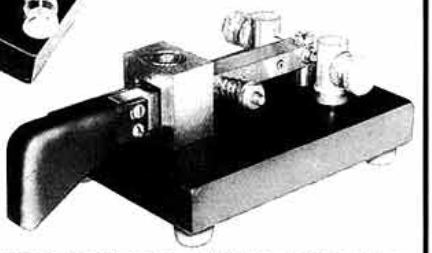

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The Last Word

GLIDE PATH

Amongst a lot of interests, amateur radio and gliding figure pretty largely in my semi-retired life. I make sure at my club that every club glider has a good working radio and so does the clubhouse; a good thing to do as we are in the Black Mountains in Wales and very close also to the Brecon Beacons. We get incredible heights there because of the interaction of the mountains and the winds, 12,000ft is quite commonplace.

It is quite easy to get lost above cloud when the hole through which one went closes up, this could bring tears to one's eyes if, in diving down through the cloud, one met a bit of mountain.

There are expensive pieces of gear around which tell a pilot where he is but most of us don't live in that kind of world. My fellow members want me to make a simple and robust piece of DF gear to be operated from the clubhouse to give a worried glider pilot above the clouds a bearing on the airfield. So far I've just thought of altering a gliding frequency set, probably a Pye Westminster, I've got lots of those, to have a good big clear signal strength meter and to hook it into a vertically polarised three or four element Yagi fitted with a compass card for a bearing. The compass card would be so marked as to enable anyone to read the bearing of the pilot to the airfield without having to give a reciprocal. The frequencies we use in the gliding world are all clustered around 130MHz to 144MHz. 2m Yagis very easily translate to 130 with a calculator.

However, there are a lot more clever radio amateurs out there and I would be most obliged if you could print my letter. I've never been in the DFing game and I'm sure that someone will have a better idea. Fortunately I've always loved making gear and light engineering with my lathe and other tools.

If you could see your way to print my request I will be most grateful to you and I am sure that some distracted pilot in Wales who makes it home and doesn't have to be pulled out of a field north of Birmingham will be delighted.

David Foster G3KQR

GB2RS ONE THOUSAND

On 3 November 1991 my second *GB2RS News* bulletin of the day was number 1000 since I started reading the news twelve years ago on 7 October 1979. In spite of several breaks due to weekend work and trips abroad it has finally happened. However the next thousand should not take as long; early retirement taken last April giving me more free time.

Some weeks I have been horrified by the length of the scripts, marvelled at the spelling or puzzled over the pronunciation. Some of the club activities listed under local news have caused a lot of hilarity, others have just baffled me. Now that due to the length of the scripts we have to edit our non-local local news, I have managed to avoid the worst tongue-twister in your repertoire - Colchester Institute of Technology. I used to shudder when I could see that lurking down the page waiting for me. One television reporter of my acquaintance used to have a fit of coughing if he saw a phrase which gave him problems - then continue after it leaving the viewer to sort out the missing bit. I never did resort to that, but it came close sometimes!

Thanking you in the office for all the scripts over the years, please keep them coming and we will try and keep up the work. Just remember it is only a 30-minute slot and the going rate for most readers is three words a second.

Cliff Goddard G4LAA

100% QSLERS (I WONDER)

Since becoming an amateur more than five years ago, I wonder what has happened to the so called 100% QSLers? Checking through my log books I find that I have to date (29.8.91) sent out either through the Bureau or direct 1323 QSL cards and have only received 587, which means that I am 736 cards outstanding.

OK, some of the amateurs may not be members of the Bureau, but why don't they say so? Do you just say you will QSL 100% (but just for collection only). It's not the cost or trouble that annoys me its the few that just cannot be bothered to return cards. Think also of the people at the Bureau who sort out the cards; also the sub-managers.

So come on lads, when I (and all the other amateurs) send a card out, we would appreciate one in return. Lets all do as we say "QSL 100%", not forgetting of course the SWL. Mine to date 634 sent 110 received 524 outstanding. I would like to hear what other amateurs' QSLing figures are compared to mine?

Mr TG Chaplin G1UGH

A CONVERT

When the Novice Licence was first mooted I was absolutely against it as I considered that it debased the amateur licence, feeling that if a person was genuinely interested in becoming an amateur the effort would be put in to pass the RAE.

However, once it was established, I felt that the least I could do was support it and give it a chance. I therefore registered as an instructor and our first class completed the course and took the September exam. Results just to hand show a 100% pass rate, with two credits.

I was very impressed with the practical aspect of the training and now submit that the Novice Course material be encompassed by the RAE. One could pass the RAE without handling a soldering iron, build equipment, use meters etc at present. Does anyone agree with this prospect?

Norman Bedford G4NJP

GOT IT TAPED

I am not given much to writing to magazines, but the November *RadCom* has prompted me out of my lethargy and sloth! I enjoy *RadCom* enormously, and think that the RSGB subscription is well worth it, just for the magazine alone.

I read Roger Daniel's, G4RVW, letter with great interest. I ordered the Russian cassette too, and found out later that it was used in conjunction with the Conversation Guide, which I also ordered and received. (Incidentally, the girl I spoke to at HQ when I phoned, was a delight to speak to in helpfulness, but she never took up my offer of dinner!)

The cassette prompted me, too, to study Russian, of which I now have a decent knowledge (enough for a good QSO). I have had pile-ups for me, a humble 'G', on 10m when calling CQ in Russian! The English have never been too good at learning foreign languages; we seem to have acted in the past on the assumption that the louder you shout, the better you will be understood! I have had delightful QSOs with Soviet stations in my halting Russian, and meet several on the air for English and Russian by Radio!

I am sorry the cassette has been discontinued. Anyone really wanting one would do well to write to UA1CIL, OH1BRD or OH2BAD, all of whom have been most helpful when I have spoken to them on the air. (They are all involved with the publication of the book and the cassettes).

I speak French, German and Italian, and would be pleased to provide any station who requests it a recording of the set phrases in the *Radio Amateurs' Conversation Guide*, in any of those languages (sadly my Russian is not good enough). I only ask to be provided with a cassette. There will be no charge.

So there it is, come and learn another language, or at least enough for a short QSO, or greeting!

Tony Carruthers G4XLA

[Details of a manual helping amateurs to use Russian on the air is available by sending two IRCs to RFH, PO Box 130, 394000, Voronezh, USSR. - Ed]

Please note that the views expressed in 'Last Word' are not necessarily those of the RSGB.

We reserve the right to edit letters and regret that we can no longer acknowledge them individually but will pass them on to the relevant department.

VIVA HAM RADIO

The spirit of amateur radio is alive and well and living in Valencia! I have recently moved here and yesterday found myself alone at home with a radio and an indoor 10m dipole to keep me entertained. My CQ calls went unheard until a local station, EA5GKV gave me a call. Enrique listened patiently to my broken Spanish and spoke clearly and slowly so that I could understand him. He was concerned about my indoor antenna, and when I explained that I was looking for a Cushcraft R5 vertical, he gave me the number of a local shop run by his friend Fernando. Fernando did not have the antenna, but gave me Cushcraft's number in America so I could find out the Spanish distributor. Again, the woman at Cushcraft was very helpful and gave me numbers of various distributors in Spain, UK and USA

Enrique invited me to dinner at his house so we could pursue the matter and find an antenna for me nearer home. When I protested, his XYL, who is also licensed, took the microphone and told me she would be offended if I didn't come! They even came to my house to pick me up! I spent a most enjoyable evening with Enrique and his family, having dinner and attempting to find an antenna. At the time of writing I have located a new one in Alicante and a second-hand one in Valencia. Enrique has even offered to come round to my house with a few local amateurs to help erect the antenna once purchased.

It is wonderful that a local ham should show such friendship to a complete stranger (and a foreigner to boot), and I think this kind of experience helps set many of the letters of complaint I see in *RadCom* in some kind of context. Although there are very many different aspects to ham radio, it appears that the common denominator is generally 'nice people'. I would say my faith has been restored, but I never really lost it in the first place!

D Lindsay EA5/GM0OBX

THANKS

I feel I must put pen to paper, to express my gratitude to two of your members, G0NMB and G0NIP at Clacton Radio Club, who gave me their undivided attention and training to give me a pass mark for my Morse Test. Now they are assisting me to pass the RAE next May.

Your *RAE Manual* is the best book on the market; without it I would not have the knowledge I have today. I am aged 55 and am new to all these matters. Now Clacton Radio Club is teaching some six of us for the RAE.

Tom Hughes

As we have only a very few British companies producing amateur radio equipment during these hard economic times, it is good to be able to report excellent after-sales service.

I have been using a Navico AMR1000 for the last two years, but it recently developed a thermal problem brought on by the warm weather. A call to their service department confirmed that the equipment should be returned to them for repair.

The transceiver was sent back to me with a computer print-out detailing the fault and the parts replaced. Despite being well outside the guarantee period no charge was made. I feel this sort of customer after-care should be reported, and I am certainly glad that I bought from a British company.

R A Joyce G3WLM

Firstly I would like to thank you for printing the information about the Oscar Victory Activity Group. We had a very successful weekend and with all the activities, eg raffle, tombola, auction etc, we raised £100 which will be donated by OVAG to RNLI.

We will be doing the same next year (August Bank Holiday) and hope to make it bigger and better than 1991. We hope to see the regulars again and, hopefully, a few new faces. We would like, through *RadCom* to thank all the people who donated prizes and also the people who turned up from as far afield as GM and Hampshire.

If anyone who activated OV00 this year or last year would like an 'Activated' certificate, they are now available upon receipt of a large SASE. Also QSL cards for GB1OV and GB4OV are available, again upon receipt of a SASE.

P Austin G7BXA

On a recent trip from Anglesey to Sussex, my vehicle broke down. Due to the help of Steve, G1PDF, and Tony, G3NPF, messages were passed to relatives via 2m to stop them worrying. Through *The Last Word* I would like to say a big "thank you", to both for their help.

Dave Keely GW0OGI

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The display advertisement copy date for our February 1992 issue will be **9th December 1991.**
New advertisers should contact **Victor Brand, G3JNB** on **0953 788473** for assistance and information.

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