Radio Communication

The Journal of the Radio Society of Great Britain

February 1991

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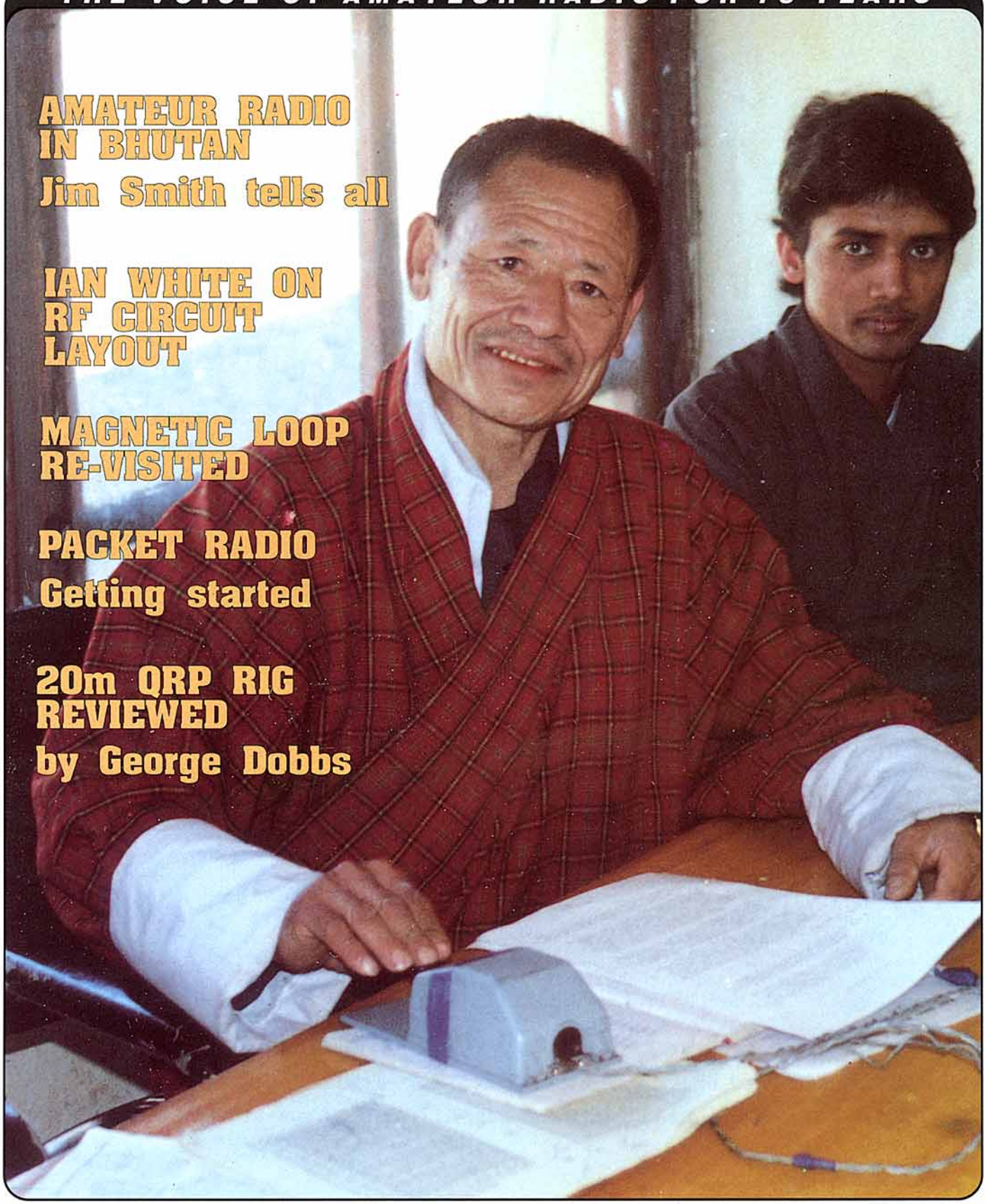
THE VOICE OF AMATEUR RADIO FOR 78 YEARS



AMATEUR RADIO IN BHUTAN
Jim Smith tells all

IAN WHITE ON RF CIRCUIT LAYOUT

MAGNETIC LOOP RE-VISITED

PACKET RADIO
Getting started

20m QRP RIG REVIEWED
by George Dobbs

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N.B. for all other RSGB telephone numbers see page four.

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Radio Communication

Aerials for small sites

Readers responding to our survey asked for articles on aerials for small and/or urban gardens. In response, we feature this month a small but very efficient LF loop aerial from I1ARZ, a compressed T-antenna translated from an article by DL1VU, a user review of a portable antenna designed to be used anywhere, and Pat Hawker on loop radiation patterns..

NEWS AND REPORTS

TECHNICAL FEATURES

COVER PICTURE:

Sherab Dorji, Bhutan P & T, at a Morse class for commercial radio operators. The full story of how famous DXer Jim Smith, VK9NS/A51JS, put Bhutan on the amateur radio map is on page 8.

Photograph: VK9NS

REGULAR ARTICLES

SUPPLEMENT

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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Correspondence to honorary officers should be passed directly to them (QTHR), not to RSGB HQ.

ANNUAL SUBCRIPTION RATES
Once-off joining fee: £1.50
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UK associate member under 18: £12.75. Family member: £11.95
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 Communication*): **£17.95** (excluding *Radio Communication*) (Subscriptions include VAT where applicable)

Membership application forms available from RSGB HQ

FROM THE PRESIDENT

The following are highlights of a speech made by John Case, GW4HWR, on the occasion of his installation as RSGB President at Cardiff Castle on 12 January 1991. A report on the event will appear next month.

AMATEUR RADIO HAS long been considered to be the testing ground for new bands and new methods of communication. Nearly 20 years ago, the first speech repeaters were put into operation. In this area we are proud of the fact that we have the first totally amateur repeater to be brought into service - GB3BC. I am delighted to have been closely associated with it for many years. Thanks are due to our friends in the BBC and IBA for allowing the use of many of their masts to support our repeater aerials.

Satellites, moonbounce, packet radio and meteor scatter, are just a few ways in which amateur radio has contributed to communication methods.

But all of this is in the past, and I hope that many of the problems of the RSGB are also in the past. We must now set our sights firmly on the future.

We must examine the spawning ground of amateur radio and take every opportunity to promote growth. At last we have a new means of encouraging that growth - the Novice Licence. Many of us have worked for the last four years in order to set this in motion. We are indebted to the Radiocommunications Agency staff for their help and guidance and are pleased to have this opportunity to say thank you. I must also say thank you to all the members of the team (both past and present) who have worked long and hard to bring this project to its present state. I must include my wife, Joan, who has given me a great deal of support and encouragement through the last four years.

It will not be long before we hear new and strange sounding callsigns. It will be most necessary to give the holders every encouragement and to ensure that our own behaviour on the air is impeccable. In this way we will consolidate the work done by a new, and we hope a more effective, method of training.

But we must not rest on our laurels, the Society can only be an effective force in the battle for bands if our membership grows ever bigger. We must find ways to increase the membership and, more importantly, ways of persuading existing members to remain. You will be able to judge the effectiveness of some of these efforts later this evening when the new recruitment video is premiered.

We must convey our thanks to all who have worked long and tirelessly to bring this project to a successful conclusion. It started a long time ago under the then President, Joan Heathershaw, who I am pleased to see is with us this evening. Also present are some of the team from Yorkshire Television who have provided money and expertise, and have contributed so much to the video's success. In thanking those members of the team who are present tonight, we also thank those who are not able to be here. The video will be made available to our members in clubs and elsewhere, throughout the country, and we are pleased to announce that we shall be presenting each main affiliated club with a free copy. This has been made possible by the kind cooperation of Icom (UK) Ltd.

All of this has given a great step into 1991 and Council will mount a marathon effort to build on these beginnings. In addition, we must continue to strive to put the Society on a firm financial footing so that the other things can be supported.

If I were vicar of a church where the roof needed repair, I would encourage my parishioners to set up a roof fund. In the last few years, the Society has been losing money - the 'roof' hasn't yet fallen in but it is in need of repair, so I have already asked every Council member to generate a money making scheme. They may call upon as much help as they require, but they must not involve the Society in any outlay. We have set a target of at least £1000 per year per Council member. Of course, the scheme does not have to be confined to Council and I would be delighted if any member or group of members would join in the fight. *The 'roof' must not be allowed to fall in because, if it does, amateur radio will fall with it.*

Finally, I am humbled by the great honour you have bestowed upon me and will do my best to justify your trust - Thank you.

Edwina Takes to the Air

PHOTO: DERBY EVENING TELEGRAPH

FORMER minister, Edwina Currie, MP, and the Mayor of Derby, Barry Chadwick, were able to experience amateur radio when GB1RLD joined up with Derby Hospital Broadcasting (Radio Link) last November. Operating on the 144MHz band, the special event station made 75 contacts and helped promote Hospital Broadcasting.

Radio Link provides a service for over 50 hours a week to the Derby City Hospital, and the Nightingale Continuing Care Unit, from their studios at Derby City Hospital.

Edwina Currie, MP, gets a taste of amateur radio.

HQ NEWS

The decision of Council to appoint Philip Smith to take charge of HQ management was reported in January RadCom. In the first of a series of articles, he reports on the tasks ahead of him.

I HAVE NOW taken on the task of General Manager, and would like to re-iterate one of the comments I made at the AGM concerning greater accountability. To give members a more up to date view of the Society's finances, I propose to publish unaudited half year accounts up to 31 December in March RadCom. They will not be good, but I believe they represent the nadir of our fortunes. It is still very early in January but there are signs that members have responded well to the substantial increase in the membership fee and have not resigned in droves. We had nearly 1,000 new members in November, and almost 500 in December compared with an average month of about 200.

The book production programme, which took some restarting after a dormant year, has so far produced *The Bright Sparks Of Wireless*, *RF Byrne's Unpublished Masterpieces* and a Novice Licence Book for Instructors. We are now poised to publish *Radio Auroras* in January, *Novice Licence Notebook for Students* in February, with *Microwave Handbook Vol 2*, *HF Antenna Compendium* and *Space Radio Handbook* to be produced in March. This will be followed by the *RSGB 1991 Call Book*.

We have a very exciting year ahead, which I want to kick off with a major lottery, to be drawn at this years NEC. The proceeds will be used specifically and exclusively to fund the Novice Licence and Project Year, objectives which will be spelt out clearly and the disbursement of those funds reported in *RadCom*.

The installation of the new President marks the start of active promotion of the Novice Licence and there is a danger that the attendant costs will exacerbate our deficit. It is of paramount importance, therefore, that these costs are met from the proceeds of the lottery, and not out of the surplus that should arise in January and February.

The lottery has been structured in an unusual way to reduce greatly the administration costs, and to give a daily cumulative total of funds received. There is a short time scale of three months and, if it is thought worthwhile and stimulating, I shall release the figures of cash received to date in a bar chart in *RadCom* each month, up to the draw. I hope you will respond enthusiastically, and apply for tickets. This is a great opportunity to tell your friends and colleagues about your hobby. The less well off can apply for a book of tickets at £5; if they cannot afford to stand the cost themselves, they can sell all tickets onwards to friends and aquaintances, while still retaining the chance of a prize for having sold the winning ticket. Please study the system, as much midnight oil has been burnt to devise a something that benefits all to the detriment of none, and the proceeds are not swallowed up in administration costs. All applicants will be logged on our computer, so that all tickets are traceable and checkable.

This is the start of a whole stream of ideas and innovative thinking, designed to raise the profile of the Society with the public. If you watched Children's BBC on Sunday, 6 January, you would have seen the HQ shack featured.

Please watch this space next month.

Philip Smith,
General Manager

Brrr-istol

Lowest ever attendance at RSGB's 1990 Annual Meeting

LAST YEAR'S AGM, in Scotland, confounded members' fears by being the warmest ever. By contrast, the weather for 1990's Annual Meeting, in Bristol, was awful!

On 8 December, heavy snow and gale-force winds paralysed road and rail communications throughout the North and Midlands. Even those from the South and East had perilous journeys down the M4. Bristol itself was bitterly cold and windy but got off relatively lightly. Some 70 members, mostly from the South-West and South Wales, made up the quorum.

The meeting itself proved uneventful, concentrating on the Society's deficit and the ways in which Council planned to turn this round.

A full report will appear in next month's *RadCom*.

News & Reports is continued on page 7

"I say patience and shuffle the cards"

Miguel Cervantes

Of all the services provided by the Radio Society of Great Britain many members consider the QSL Bureau to be second only in importance to *Radio Communication*. John Hall, G3KVA, amateur radio adviser to the RSGB HQ QSL Bureau, explains what happens to your cards.

QSL CARDS, or contact confirmation cards, derive their name from the international Q-Code meaning "I acknowledge receipt".

In the early days of amateur radio, just to contact a fellow enthusiast over the radio was an achievement worthy of confirmation. Therefore, it became the practice for amateurs to exchange personalised QSL cards which showed their callsign, together with details of the contact (date, time, frequency, type of equipment used and its power, strength of signal etc). That practice continues today.

The cards serve as a permanent record of a country contacted or heard, and are often required as proof of the contact when an amateur applies for one of the many hundreds of operating awards available.

The cards can be exchanged by regular mail, and some amateurs prefer this method for some or all of their QSL exchanges. This can prove expensive so the most popular, cost effective, way is to use a Bureau operated by the individuals' national radio society.

By forwarding QSL cards in bulk to the bureau for distribution, the amateur is spared the enormous cost of individual postings.

The Radio Society of Great Britain has operated a bureau since 1926 which now handles over 3 million cards each year. In doing so it has accumulated a wealth of knowledge in dealing with the many other national societies affiliated to the International Amateur Radio Union, and who maintain similar bureaux. Members are actively encouraged to visit RSGB Headquarters and inspect the facilities at their disposal. Suggestions for improving the service are also welcome.

This short article sets out in detail the work of the RSGB QSL Bureau in order that new members will take advantage of the service. Experienced members may also find some of the information of use to them.

The Bureau is divided into three functions. They are:

(1) Incoming QSL cards.
(2) Outgoing QSL cards.
(3) The Bureau's Sub Managers.

Incoming Cards

THE INCOMING QSLs arrive by surface and air mail at RSGB Headquarters from the overseas bureaux, and are manually sorted into four preliminary categories. These are:

(i) G Zero callsigns
(ii) G Three callsigns
(iii) G Four callsigns
(iv) All other callsigns

Experience has shown that these four categories provide fairly equal batches of cards and enable the second, and final, sort to take place.

It also facilitates the work of the person sorting the cards to the various RSGB QSL Bureau Sub Managers in that the callsign pigeonholes are grouped together numerically, and to sort initially by callsign number allows the sorter to concentrate on one set of pigeonholes at a time.

There is a small number of part time paid sorters, although much of the work is performed by enthusiastic members of the Society who give of their time freely in order to make the system work.

Once the initial sort has taken place, the cards can be sorted to the various Sub Managers for onward transmission to the individual amateur. The cards are placed into boxes and then posted to Sub Managers at regular intervals.

It is difficult to set down a pattern for these postings due to the different levels of activity among callsign groups. However, the Bureau tries to ensure that each Sub Manager receives a carton of sorted cards at intervals no greater than six weeks.

Naturally, the 'other callsigns' group tends to be the most time-consuming because it often contains cards destined for overseas destinations which have been sent mistakenly to the RSGB. These are always forwarded to the correct destination. The group also contains cards for incorrect calls, silent keys, non-existent calls and 'pirate' calls. Only when every avenue has been thoroughly explored does the Bureau reluctantly return a card to the originating bureau with an explanation as to why it cannot be delivered.

Outgoing Cards

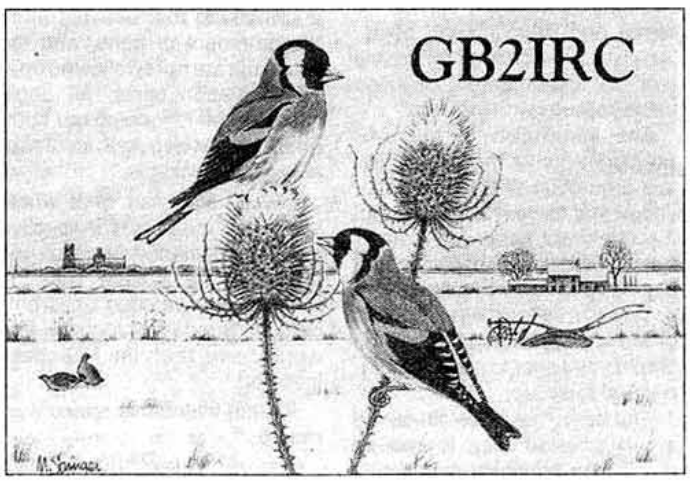
ALL CARDS FOR distribution from United Kingdom amateurs should be sent to: **QSL Bureau, RSGB Headquarters, PO Box 1773, Potters Bar, Herts EN6 3EP**. They should *not* be sent to Sub Managers who have quite enough to do with incoming cards!

The destination call should be written as clearly as possible on both sides of the card and any 'routing' information set out prominently.

'Routing' occurs when the card is to be sent to its destination via another callsign. For example, a card directed to G3OUF via G3KVA will be sent by the Bureau to G3KVA. It is *not* necessary to route GB callsign cards to one of the callsign operators or organisers. GB cards are all forwarded to the GB Sub Manager. Failure to put adequate routing instructions on the card may lead to non delivery.

Ideally, QSL cards should be of uniform size. If they are too big they are invariably damaged in transit, and small cards are difficult for the sorters to handle. The IARU recommended size for a card is 5.5in x 3.5in.

The cards should be sorted the same way up and alphabetically by prefix, with the exception of cards for the USA which should be sorted by the number in the callsign, regardless of prefix. It also helps considerably if the G



One of the more attractive QSL cards received here at RSGB HQ.

callsign cards are placed on the top of the pile in numerical order. This enables the sorters to deal with the G cards first and then turn to the ones destined for overseas.

The cards should not be separated in any way by pieces of paper or rubber bands as this only makes the work of the sorter more difficult. It is recommended that outgoing cards are sent in large, batches preferably once a month.

Once the cards have been sorted, they are despatched to the overseas bureaux by mail at Printed Paper rate. This is not the fastest service provided by the postal authorities but it is the most cost effective. The newly licensed amateur should appreciate that it will often take some months after he or she has despatched cards before incoming cards are received by the Bureau.

Naturally, mistakes will occur occasionally. The RSGB QSL Bureau is operated by ordinary people who make errors in sorting and in interpreting the destination information. However, the Bureau staff pride themselves on keeping mistakes to a minimum because of the importance of the service to so many amateurs.

Provided the above simple guidelines are observed, the amateur can be assured that his or her outgoing QSL cards will be despatched promptly to the designated call via one of the 200 overseas Bureaux the RSGB deals with.

Sub Managers

THE SUB BUREAU'S services are available to all licensed amateurs and listeners, unlike the outgoing service which is a benefit exclusively available to members. The Sub Bureaux are operated by volunteers who distribute QSL cards to the individual amateur within the callsign groups for which they are responsible.

Once the incoming cards reach the Sub Bureau manager from the central QSL Bureau, they are sorted into individual callsigns ready for mailing.

The amateur should supply his or her Sub Manager with stamped addressed envelopes, 8in x 6in, and made of strong material. Some prefer to supply just addressed envelopes and an amount of cash to enable the sub manager to stamp the envelopes when sufficient cards are to hand.

The amateur's callsign or receiving number should be printed on the top left hand corner of each envelope and the envelopes should be numbered. The words *LAST ENVELOPE* should be written on one. Envelopes are not normally returned until full weight for the postage paid has been reached, but those wishing to collect cards more frequently can mark their envelopes with the number of cards they wish to be sent to them, regardless of weight, eg *WAIT 10.*

It is important that if an amateur does not wish to collect cards then, out of courtesy, he or she should inform the Sub Manager accordingly in order to avoid unnecessary work. Sadly, about 40% of cards received from overseas amateurs are not collected from the Sub Managers. Unwanted cards are retained for three months and then destroyed.

The names and addresses of Sub Managers are published from time to time in *Radio Communication* and changes are broadcast on GB2RS. An up-to-date list can be obtained from HQ.

It is worth mentioning again that a great deal of the work in dealing with QSL cards is performed by amateurs working on a voluntary basis. Following the guidelines in this article will enable them to continue providing a service of which the RSGB can be justly proud.

Any comments or suggestions for improving that service should be addressed to the QSL Bureau Supervisor, RSGB Headquarters, PO Box 1773, Potters Bar, Herts EN6 3JE. They will always be most welcome.

STOP PRESS STOP PRESS STOP PRESS STO

As we go to press, the Gulf War has just started. US radio amateurs have been assisting in keeping moral high by linking troops in Saudi Arabia with their families at home. The US Army Military Affiliate Radio System (MARS) comprises 233 military and 3,800 civilian HF radio stations worldwide. The latter are equipped and manned by radio amateurs, though amateur frequency allocations are not used.

Thinking Day

GUIDES HAVE THEIR own radio Jamboree called Thinking Day On The Air, held this year on 23/24 Feb. A list of GB calls used during the event is on page 74 but a great number of special club calls (GX, etc.) will also be used, of course. Last year's event involved over 150 stations.

Many Guides and Brownies will be able to exchange short greetings messages under the licence enhancement available to GB and special club calls.

Owing to sterling work by the Radiocommunications Agency, the number of counries with whom greetings messages can be exchanged, *during TDOTA and JOTA only*, has increased to 36. The full list is as follows:

Algeria
Anguilla
Australia
Bahamas
Central African Republic
Denmark
El Salvador
Gambia
Gibraltar
Honduras
Hong Kong
Iceland
Israel
Jordan
Kiribati
Liberia
Malaysia
Malta
Macau
Maldives
Norway
Papua New Guinea
Portugal
Rep. of Ireland
St Helena
St Vincent and Grenadines
Surinam
Sweden
Swaziland
Tanzania
Virgin Islands

Below are those countries with which greeting messages can be exchanged at any time:

Canada
Falkland Islands
Pitcairn Island
United Kingdom
USA

QSL Bureau news

THE QSL SUB-MANAGER for the G3EAA to G3HZZ series, Mr EL Simpson, G3GRX, has moved house. His new address is "Everdene", Fell Lane, Penrith, Cumbria, CA11 8AW.

Some More RLOs

FURTHER TO THE list in January's *RadCom*, more RLOs have been appointed.

Mid and South Glamorgan: David Jones, GW1SQT, "Beridale", 41 Penrhys Road, Ystrad, Rhondda, Mid-Glamorgan, CF41 7SJ; tel 0443 435309.

Dyfed and West Glamorgan: RLO is Martin Goodall, GW8ZMU, 91 Uzmaston Road, Haverfordwest, Dyfed, SA61 1UA; tel 0437 764009.

Gwynedd: Dewi Roberts, GW0ABL, 23 Lon Hedydd, Siglan Farm Estate, Llanfairpwll, Anglesey, Gwynedd, LL61 5JY; tel 0248 713647.

Cheshire: Dave Glover, G1VJF, 216 Alder Street, Newton-le-Willows, WA12 8HS; tel 0723 859845.

Hereford and Worcester: D Gourley, G0MJY, 4 The Serpentine, Kidderminster, Worcestershire, DY11 6NX; tel 0562 746207.

Clwyd: Re-appointment of Peter Higgs, GW4IGF, "Oulton", Parkside, Rossett, Wrexham, Clwyd. His phone number is 0244 570212.

Avon: Re-appointment of Shaun O'Sullivan, G8VPG, 15 Witney Close, Saltford, Bristol, BS18 3DX; tel 0225 873098.

Central Scotland: Re-appointment of Brian Waddell, GM4XQJ, Carsemount, 3A Polmount Road, Laurieston, Falkirk, FK2 9QQ.

Appointments

COUNCIL HAS ELECTED Terry Barnes, GI3USS, as Executive Vice-President for 1991.

Julian Gannaway has stood down as Chairman of the Finance and Staff Committee as he is no longer a member of Council. Geoff Smith, G4AJJ, has been appointed Chairman.

Ian Suart, GM4AUP, has been appointed Chairman of the Membership Liaison Committee, a vacancy created by the resignation of Geoff Smith, G4AJJ.

Peter Chadwick, G3RZP, has resigned as Chairman of the Technical and Publications Advisory Committee from 1 Feb, owing to pressure of (paid) work. A successor has yet to be announced.

G4AJJ Phone

OWING TO BT number changes, the telephone number for Geoff Smith, G4AJJ, Zonal Council member for the North of England, is 0723 859845.

Amateur Radio in the Kingdom of Bhutan

Jim B Smith, VK9NS

IN THE OFFICE OF Sherab Dorji, Civil Wireless in Thimphu, I had commented on a map of Bhutan, on the wall, which showed the 'Wireless Network' used to keep the various areas of The Kingdom of Bhutan in touch with Thimphu and with each other. During a discussion on the communication system, manning, training and so on, he mentioned the 'inspection tours', used to keep the network in good shape and on its toes. It was soon obvious that my extensive travels in Papua New Guinea had been luxurious, relative to some of Sherab's tales. These tours kept staff away for weeks on end with miles of hiking, but he promised that he would show me around a few of the stations during my stay. So it was that, in addition to other reasons for being in Bhutan, I was also to be given an insight into the operation of the wireless network.

It might be a good idea to stop for a moment and give a bit of background to my visit to this remote Kingdom in the Himalayas. I stayed in Bhutan from 20 March until 11 April 1990, and only a few weeks previously had received a telex from Thimphu, advising "permission is granted to enter Bhutan as a common tourist. Permission will be granted to operate amateur radio after check of your radio equipment". An idea, started almost three and a half years earlier had finally become a reality. The phrase "common tourist" was unusual, but it was the means of permitting me to stay in Bhutan longer than the visits normally allowed. In fact, tourism is strictly controlled with only a couple of thousand tourists permitted each year, and all of the group tour variety. As a result, in town or countryside, one sees things as they really are, unmodified by tourist hype.

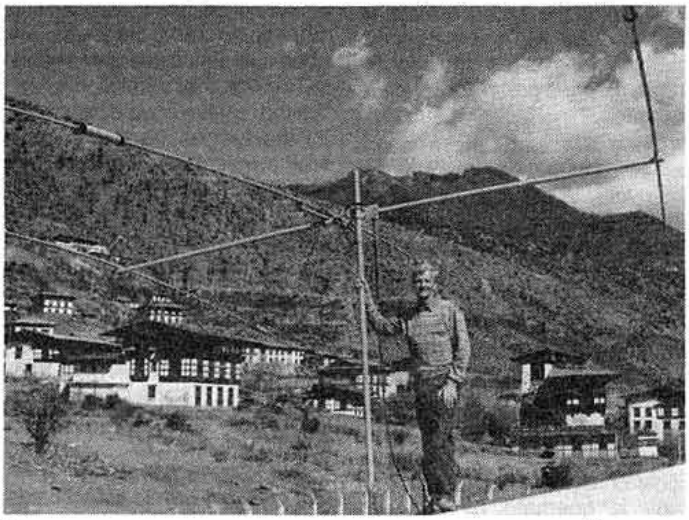
The author, holder of A51JS and many other rare DX calls.

In late 1987, I had written to the Wireless Division, Thimphu, requesting permission to visit Bhutan for amateur radio purposes. During my 42 years of being a licensed radio amateur I have been a DXer and also an honest-to-goodness G station. When I wrote initially, Bhutan had been off the air for about six years - the last time I had spoken to Pradhan, A51PN, had been shortly after my move to Norfolk Island in late 1980. Whilst I was in Papua New Guinea as P29JS, QSOs with Pradhan were commonplace, often with no apparent skip to other areas of the world. A51PN had been active on SSB and CW for several years, from Phuntsholing in the lowlands of Bhutan and during those years, was the only station active from Bhutan.

In due course, I received a very polite but non-committal reply from Thimphu. It was from this glimmer of hope that I resolved to keep going and to keep in touch with the Kingdom of Bhutan. Over the ensuing months I kept in touch with Thimphu by telex, letter and telephone. In the early days, telephone calls were a marathon relying on a radio link from India to Thimphu. Telexes also required lots of trying. I often think that the Telecom staff on Norfolk Is enjoyed the challenge of these strange requests. Later, things did improve, or maybe our operators just got better; these days a satelite link now makes things relatively easy and I can almost guarantee instantaneous transmission of telex material and a good telephone connection.

The Road to Thimphu

In progressing along the road to Thimphu, I tried to present amateur radio in a positive manner. In many ways it is hard to justify amateur radio in terms of DXCC and endless pileups. The competitive side to DXCC has resulted in much that is wrong, QRM, bad language and so on. I found myself getting back to basics, trying to express amateur radio as a real asset, a source of training, a source of raising the interest of youth in electronics and so on. The approach seemed to be on the right track as in due course, I was to write all of the amateur radio infra-structure. This was done using Region III frequencies, powers and modes. In addition, I outlined how amateur radio was driven at National Society level, not forgetting the role of the country's licensing authority. All of the initial structure was in place, albeit in draft form and there was the first hint that I might have my permission in due course. It was six months before that telex eventually arrived.



"The New Delhi circuit used an FT101 and a Cushcraft tri-bander."

I arrived at Paro Airport, early in the afternoon, after an uneventful trip from Norfolk Island. I say uneventful, but I was carrying many kg of excess bagagge in the shape of radio gear. As things happened, it became really a matter of paying excess baggage charges.

I was met at the airport by Sherab Dorji and staff so the customs formalities were quickly taken care of. A few hours later, after a stop for lunch, we travelled to the Hotel Mottithang in Thimphu (over 7000ft) which was to be my home for the next few weeks.

Once settled in, we resolved to get the station set up and with a couple of willing helpers I soon had the Butternut HF6V Vertical erected. The radial system was laid out, the antenna was made secure using nylon fishing line and 30m of coax was hooked up. There was a slight hiccup as the power socket was not the same as my plug. In fact, it was suddenly realised that the system was the old three-pin, 5A, one for lighting and the old three-pin 15A one for power. A quick fix, in the shape of stripped wire ends and a few matches *[please don't try this one at home! - Ed]*, and the problem was solved. Next day, I was able to purchase a couple of plugs locally to put the matter right.

The ICOM 751 was switched on, and we quickly ran through the frequencies, power output and modes of the rig. Sherab announced that he was satisfied, and that he would take the manual for further study at his office. In the meantime, if I wished to operate it was OK and written

Pradhan, A51PN, the only station active from Bhutan.

"The RSGB provided a large selection of books for use in the Kingdom of Bhutan."

permission would be available next day. So it was that about five hours after my arrival in Bhutan, A51JS hit the amateur bands and the long silence had been broken.

Amateur Radio Activity

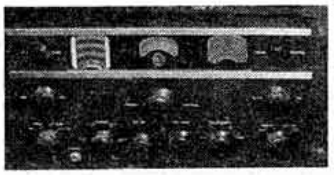
My amateur radio activity continued during my stay in Thimphu and I was to clock up almost 15,000 QSOs - more than Pradhan had made during four years operating as A51PN. There were a few frustrations to be sure, such as power cuts and it was always very cold at nights, but it was exciting and fun. On occasions Sherab came back in the evening, around my sked time with home. I think this impressed him more than my continual 599/59 approach during pile-up operating. Although, when I let him hear the pile up, following my explanation of the demand for Bhutan, he understood.

Sherab had three plans for me as the days passed. Firstly, he was determined that I should become a tourist. I could not leave Bhutan without seeing the countryside, and meeting some of the people. Next, he wanted me to go over all of the amateur radio proposal I had written. Then he wanted me to see for myself the workings of the Wireless Division.

90% of traffic in and out of Bhutan - handled by the Wireless Division - is by means of Morse. As a result, operators have to be found, trained, and finally installed at the stations within the network.

The grounds of the Thimphu wireless station were quite large. Masts carrying dipoles and multi dipoles were in abundance. Inside the main building, there were many rooms, each with one or two operating positions. Things were pretty basic, a table, chair, multi channel CW/SSB rig, key, handheld microphone and the usual pile of traffic forms. The operators were very busy and most only had time for a smile and acknowledgement.

The New Dehli circuit was interesting as it was using an FT101 and a 3-ele A4 Cushcraft fixed tri-bander. The beam probably worked reasonably well near the bottom end of twenty. According to Sherab this was a very good circuit. Judging by the traffic on hand, it was also a busy one.



"Two RCA AR88D receivers, very forlorn in the corner."

We continued the tour of the building and on passing a couple of locked rooms, Sherab mumbled something about old equipment. I prevailed upon him to let me look inside (what self-respecting radio amateur would pass a room of radio junk?). Inside was a wonderful old ex Indian Army radio transmitter which was very British looking, and I would have loved to have spent some time looking it over. A nearby table carried chassis parts of the Tx and many old valves; 807s, 6V6 etc, which certainly took me back. The prize was two RCA AR88 HF receivers, looking very forlorn in a corner. I had cut my 'HF receiver teeth' on this monster in my early RAF days in the late 40's.

Panoramic View

Our next move was to climb a very unsafe ladder to the top of the building for a panoramic view of the site. Photographs were taken of Sherab and of myself under the Tri-band beam. It all seemed an impossibility, from Norfolk Island to the roof of the Wireless station of Thimphu at about 7,000 feet.

On returning to earth, we visited the operator training room where a budding operators were copying morse being sent by their instructor. The key was a good model, but initially I sent the morse code like a rank beginner; it had been a long time since I had used a straight key in ernest. A Bencher paddle and electronic key had long ago become my norm. Anyway, with laughs all round and sheer determination on my behalf, I could feel my confidence recover. Sherab also had a go but was way ahead of me, sending fast accurate morse. I was redeemed slightly as the students saw me copy it down on one of their pads. There is tremendous potential for amateur radio in the Kingdom of Bhutan. It was easy to imagine these youngsters, at the local radio club, using their training for other purposes - making the voice of amateur radio in Bhutan a reality.

Later, we visited other outlying stations and in each case there was the same basic, no frills, set up. We never arrived at any station where the operator was not busy. At Phunaka a couple of eucalyptus trees were used as antenna masts for the dipoles. This tree is an import from Australia used to re-aforest many areas of Asia and it grows fast and straight. In only a few years - bingo a 30/40ft antenna pole! Sherab explained that many of the outlying stations were quite remote and often required several days of foot slogging travel. One of his unfulfilled wishes was that I should accompany him on one of his inspection tours of these remote areas.

On several occasions, we discussed amateur radio as a real issue; how to get the legislation in place and what standards would be required to allow a Bhutan National to become licensed. It was relatively easy to justify exclusive amateur radio frequencies, quite easy to discuss power and modes. There was great interest in RTTY and I was the first to use it from Bhutan. Sherab could see that this was a good communication system. Harder to come to grips with was the basic question "why is there still no amateur radio in the Kingdom of Bhutan?" The answer is complex and I prefer to leave the matter open-ended.

Tremendous Inroads

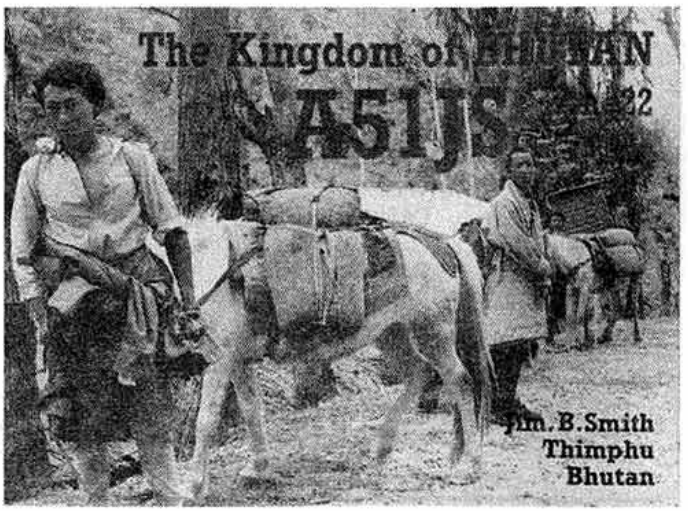
However, tremendous inroads have been made into making amateur radio a reality. In some ways, I must confess that when I received that telex - I did really expect that Pradhan would be on the air. This is now only a short step away but it has taken longer that I thought.

With the amendments and additions to the proposal in my briefcase, I eventually returned home to Norfolk Island. A few weeks later, the up-dated proposal was back in place in Thimphu. This has now reached ministerial level and hopefully things will be finalised soon.

I would like to thank the RSGB for their prompt assistance in providing a wide selection of books for use in the Kingdom of Bhutan. In fact, the response to my request was so quick that the books, all sent Air Mail arrived whilst I was in Thimphu.

I have personally thanked Sherab Dorji, of P and T and Civil Wireless. I am indebted to the BTC of Bhutan and the Director of Tourism for the visa allowing me entry 'for amateur radio purposes'. To my many friends in Bhutan, my sincere thanks for the world of consideration and kindness shown to me, this is hard to find these days.

Tashi Dalek (May your journey be a safe one).



RADCOM PCB SERVICE

G4WIM 50/70MHz TRANSCEIVER

May/June/July 1990

BOARD DESCRIPTON	CODE	PRICE
Complete set of boards	567WIM90	£66.13

G4PMK SIMPLE SPECTRUM ANALYSER

November 1989

BOARD DESCRIPTON	CODE	PRICE
RF Board	118946	£6.11
Video/sweep board	118947a	£4.88
Marker generator/PSU	118947b	£4.49
Complete set of 3 boards	1189SSA	£14.38

G3TXQ TRANSCEIVER

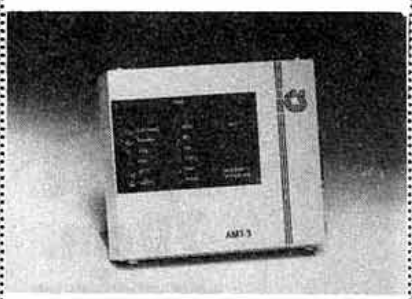
February/March 1989

BOARD DESCRIPTION	CODE	PRICE
Main IF/Audio	028945	£11.50
VFO	028946	£5.46
Driver/Preamp	028947	£6.33
Low pass filter	028948a	£7.48
Band-pass filter	028948b	£4.60
Control board	038942a	£5.18
Regulator board	038942b	£2.30
Complete set of 7 boards	0289TXQ	£27.03

All prices include postage and packing.
Please note these PCBs are not available from RSGB HQ, but direct from Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-353 9326

Leading Edge Products from ICS

Amtor



AMT-3 Amtor/RTTY Terminal Unit

Bored with simply sending packet messages via mailboxes on VHF? Itching to have a live QSO with someone on the other side of the globe again? Try Amtor. Amtor is by far the most reliable method of HF data communication, and the AMT-3 has been optimised to get the best from the mode. With internal firmware written by G3PLX (the 'father' of Amtor), the AMT-3 is a third generation product from ICS, which represents the definitive implementation of the mode.

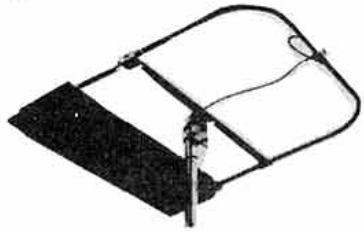
- Compact packaging
- Comprehensive status display
- Excellent tuning indicator
- High tones filters to match most HF radios
- RTTY transceive
- CW ident
- Split screen IBM-PC driver program included
- AFSK, FSK outputs
- Operates from 12 volts DC

Amtor gives virtually error free copy even with badly degraded signals. Unlike packet, it is easy to call CQ and have 'live' QSOs, and yes, there are lots of Amtor mailboxes on HF - many with links to their local VHF packet network.

AMT-3 : £199.95 inc. VAT

(£5.00 post, packing)

Antennas



IsoLoop™ HF Loop Antenna

The performance of this low profile loop antenna is not compromised by its small size. Operates from 14 - 30 MHz in areas with planning consent problems, from flats or apartments - or simply take it on holiday.

150 watts. Rated at up to 150 watts, the IsoLoop radiates with the gain of a dipole when mounted horizontally. Radiation is omni-directional, horizontally polarised and at a low angle to the horizon. Tuning is by means of an inbuilt stepper motor, driven by a small remote control box.The IsoLoop needs no ground radials, and is well insulated from its feed line.

High Q Design. One of the unique features of the IsoLoop is its inherent high Q. The IsoLoop can be considered as a very sharp tuneable filter that radiates. The narrow bandwidth suppresses transmitter harmonics. and attenuates strong out of band signals from nearby transmitters which could easily overload your receiver.

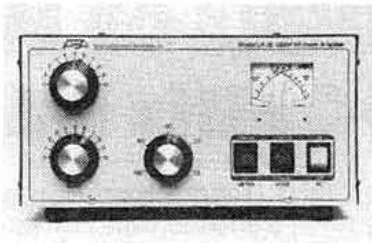
Compact. The IsoLoop is only 32 inches square, and packs down to half this size for transportation. When mounted horizontally for omnidirectional use, it needs no rotator.

Isopole. *Ask us about AEA's unique low radiation angle omnidirectional antennas for VHF and UHF.*

IsoLoop: £299.95 inc. VAT

(£5.00 post, packing)

HF Linear



LA-30 HF Linear Amplifier

Designed to provide reliable, stable, high RF output power, AEA's LA-30 class AB2 linear amplifier is rated at 1200 watts PEP input, ready to handle the UK legal limit with ease. The LA-30 is a self contained table top unit with built in power supply and pressurised plenum cooling system.

The LA-30 covers all amateur bands from 1.8 to 29.7 MHz and is capable of continuous duty in CW and SSB. A quiet squirrel cage blower cools the unit for extended tube life and reliability.

A fast heating, high performance 3-500Z triode requires no warm up time so you can get on the air as quickly as possible. Inrush filament current protection is provided.

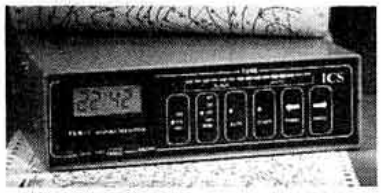
A Pi network input for each band provides a good match for all solid state transmitters. A Pi-L output network, heavy duty rotary band switch with silver plated contacts and high quality loading and plate tuning capacitors contribute to the LA-30's reliable design.

Make yourself heard, and work the DX with AEA's new high quality, economically priced HF linear.

LA-30: £799.95 inc. VAT

(£5.00 post and packing)

Wefax



FAX-1 HF Weather Facsimile Demodulator

The FAX-1 plugs into the loudspeaker output of any HF SSB receiver and provides superbly detailed images on any dot matrix printer. It also prints radio teletype and Navtex messages.

- Manual or fully automatic operation
- Built in timer
- Excellent tuning indicator
- Mounting bracket, printer cable included
- 12 volts DC operation
- **12 volt DC printers available**

Stations throughout the world transmit current and forecast weather maps. These are indispensable to the long distance offshore sailor and weather enthusiast alike.

We also sell sytems for direct reception of weather satellite images.

FAX-1: £319.95 inc. VAT
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ICS Electronics Ltd. Unit V, Rudford Industrial Estate, Ford, Arundel,
West Sussex BN18 0BD Telephone: 0903 731101 Facsimile: 0903 731105

ICOM

THE NEW IC-2SE, SIMPLE OR MULTI-FUNCTION 144 MHz FM TRANSCEIVER

Icom's tradition of building high quality, reliable handhelds continues with the IC-2SE an incredibly compact handheld designed with features that exceed larger, bulky handhelds. The IC-2SE proves that superior quality comes in all sizes.

IC-4SE 70cm. version available

Actual Size
▼

Slim and unbelievably compact.

The IC-2SE measures only 49(W) x 103.5(H) x 33(D)* mm with the BP-82 Battery Pack. Hold the IC-2SE in your hand to truly appreciate its miniature size. Weighing just 270g† with the BP-82, the IC-2SE will easily fit anywhere – on belts in shirt pockets, handbags, etc. *1.9(W) x 4(H) x 1.3(D) in. † 9.5 oz.

Simple design for operating convenience.

Even with its tremendous versatility and a wide variety of functions, the IC-2SE is easy to use. All functions are performed by a total of just six switches and three controls. The IC2SE includes both simple and multi-function modes. The result is two transceivers in one: both an easy-operation and multi-function transceiver. Simple mode ensures totally error-free operations. Multi-function mode allows you a variety of function settings depending on your operating requirements.

Other advanced features:

Reduced size doesn't have to mean reduced quality. The IC-2SE proves this with a wide variety of advanced functions.

- Tuning control on the top panel for quick QSYing.
- Monitor function that allows checking of the input frequency of a repeater.
- Function display that clearly shows all information required for operations.
- Splash resistant design and durable aluminum die-cast rear panel for dependable outdoor operations.

Options

• BA-11, Bottom Cap. Protective cap for terminals on the base of the IC-2SE.

• Battery packs and case.

BP-81	7.2V, 110mAh
BP-82	7.2V, 300mAh
BP-83	7.2V, 600mAh
BP-84	7.2V, 1000mAh
BP-85	12V, 340mAh
BP-86	Case for six R6 (AA) size batteries

• BC-72E, AC Battery Charger.
Desk top charger for the BP-81 - BP-85.

• CP-12, Cigarette lighter cable with noise filter. Allows you to use the IC-2SE through a 12V cigarette lighter socket. Also charges the BP-81 - BP-85.

• FA-140BB, 144MHz flexible antenna.
Flexible antenna for 144MHz band operation. Same type supplied with the IC-2SE.

•HM-46, Speaker/Microphone.
Combination speaker and microphone equipped with an earphone jack. Clips to your shirt or lapel.

•HS-51, Headset. Headset with VOX function that allows you hands-free operation.

• Carrying Cases.

Carrying Case	Battery Packs, Battery Case
LC-53	BP-81
LC-55	BP-81, BP-83 or BP-86
LC-56	BP-84 or BP-85

• MB-30, Mounting Bracket.
Mounts the IC-2SE in a vehicle or on a wall.

• OPC-235, Mini DC Power Cable.
For use with a 13.8 V DC power supply

Datapost: Despatch on same day whenever possible.
Visa & Mastercards: Telephone orders taken by our mail order dept. instant credit & interest free H.P.

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Count on us!

THE COMPACT HANDHELD WITH A SPLIT PERSONALITY

5 Watt Output Power.
Utilizing a specially designed ultra-small highly efficient power module, the IC-2SE delivers a full 5 W* of output power. Bring those distant repeaters into range.
* At 13.8V DC

48 Memory Channels.
The IC-2SE has 48 fully-programmable memory channels and one call channel. Each memory and call channel stores an operating frequency and other information required for repeater operations.

Convenient Repeater Functions.
The IC-2SE is equipped with programmable offset frequencies for accessing repeaters. All memory channels and a call channel store repeater information for your convenience. The IC-2SE includes a newly designed 1750 Hz tone call transmit function. A 1750 Hz tone call transmits when the PTT switch is pushed twice quickly.

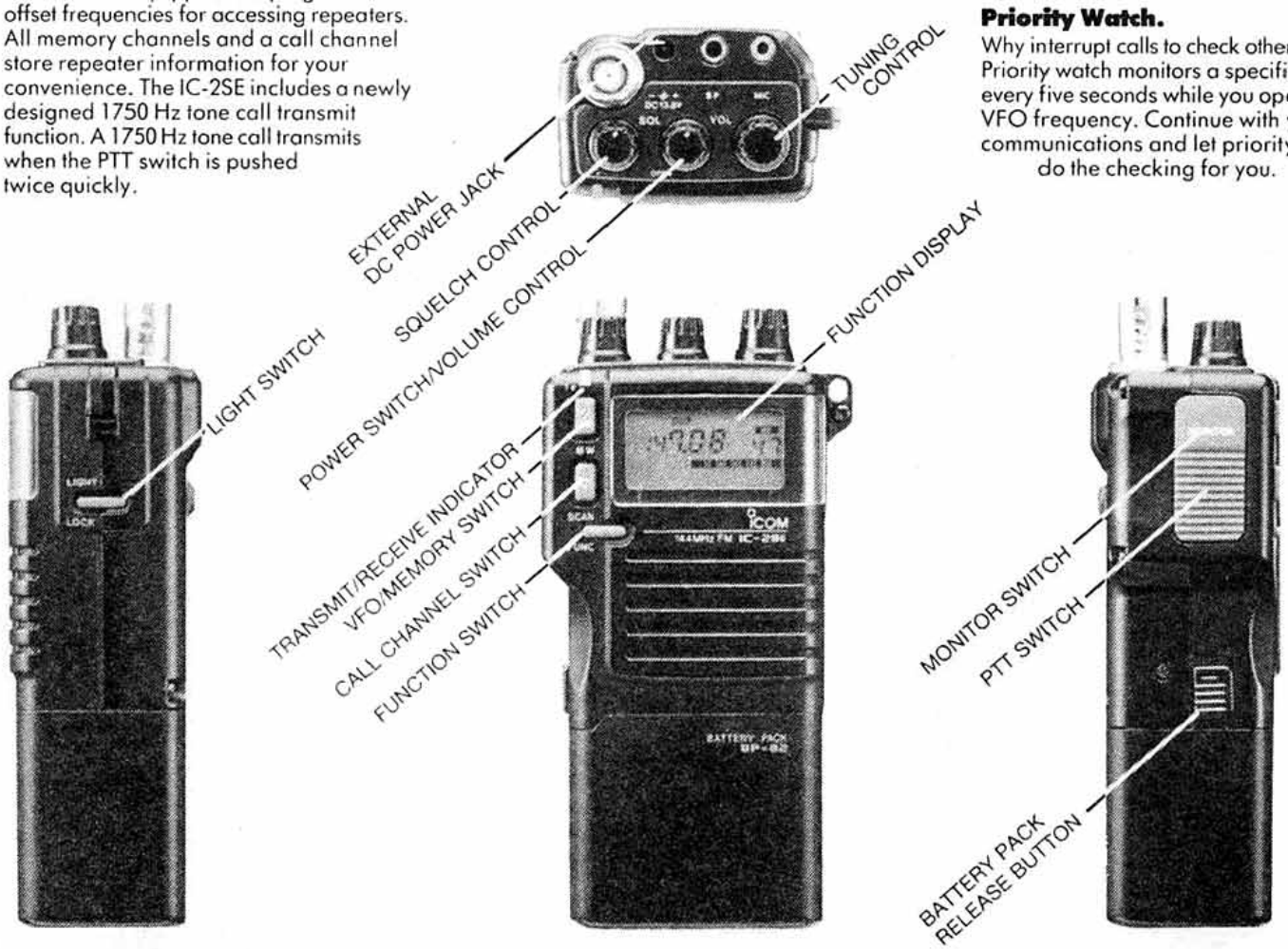
Power Saver for longer operating time.
The power saver ensures lower current flow during standby conditions. Operating times are much longer than with older, more conventional transceivers.

Built-in Clock with timer functions.
The IC-2SE is equipped with an advanced 24-hour system clock with timer function. The transceiver automatically turns on when real time matches a pre-programmed time. This is perfect for scheduling QSO's. Auto power-off timers and other settings can be made in clock mode.

Convenient Scan Functions.
The IC-2SE is equipped with VFO and memory scan.
- **VFO Scan.** VFO Scan repeatedly scans all VFO frequencies. In addition, unnecessary frequencies can be skipped.
- **Memory Scan.** Memory scan repeatedly scans memory channels.

Auto Power Off Timer Function.
If you ever forget to turn the IC-2SE off, don't worry. It will turn itself off. Power-off time can be selected or deactivated using multi-function mode. Preserve battery pack power for the times when you need it most.

Priority Watch.
Why interrupt calls to check other stations? Priority watch monitors a specified station every five seconds while you operate on a VFO frequency. Continue with your communications and let priority watch do the checking for you.



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NEW BRANCH NOW OPEN AT LONDON HEATHROW

TH-77E 2M and 70cm FM HANDHELD TRANSCEIVER

The smallest dual bander in the world — and light too!
It is incredible how many features Kenwood have included in their latest range of handhelds whilst improving ease of use, size and weight.

The TH-77E is an excellent example. You will need to send for full information to appreciate all it has to offer, but here are some of the main features:

Size:
58mm wide, 30mm deep, 141mm high (excl aerial).

Weight:
Less than 1lb!!

RF Output:
From 500mW to a powerful 5W. The battery pack supplied gives 2W output on VHF and 1.5W on UHF.

Receive:
The TH-77E can receive both VHF and UHF at the same time or dual frequencies on UHF. Dual display on the large, easy-to-read LCD displays make operation simple and efficient.

VFO's:
There are two. For added convenience they include frequency step, tone frequency and repeater information and are programmable for a range of frequency steps.

Squelch:
Independent squelch circuit for each band including the Dual Tone Squelch system for opening the squelch when DTMF tone sequences are received.

Other functions:
- Pager Function with DTMF tone groups
- Tone alert to warn of an incoming signal
- Independent volume control on each band
- Repeater Offset and Reverse switches
- 40 Multi-function Memory Channels with Lithium battery back-up

Options:
- Remote Control Speaker Microphone which controls a host of functions
- Battery packs, wall chargers, filtered 12V power cord, soft case, etc

Write or telephone for full and detailed information or, better still, visit one of our shops or approved dealers for a good look and some handy hands-on evaluation! We think you will be impressed.

TH-77E £389

TH27E (VHF)/ TH-47E (UHF)

ULTRA-COMPACT FM TRANSCEIVER

Size and styling unbeatable for comfort!

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There is a branch near you

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The high impact moulded case is designed with a five degree incline. This simple idea coupled with compact dimensions makes these models the most comfortable handhelds on the amateur market today.

Size:
50mm wide, 38mm deep, 125mm high (excl. aerial).

Weight:
Less than 13oz (360g).

RF Output:
From an Economy Low Power of 20mW to high power of 5W, the output power is determined by a combination of the battery pack chosen and a 4-position power switch.

Battery Power:
The new 7.2VDC/700mAH NiCad battery gives extended operating time.

Scanning:
Both models offer a fully flexible scanning system, including carrier or time operated resume and busy channel scan stop. Every operational scanning need is fulfilled by the comprehensive functions.

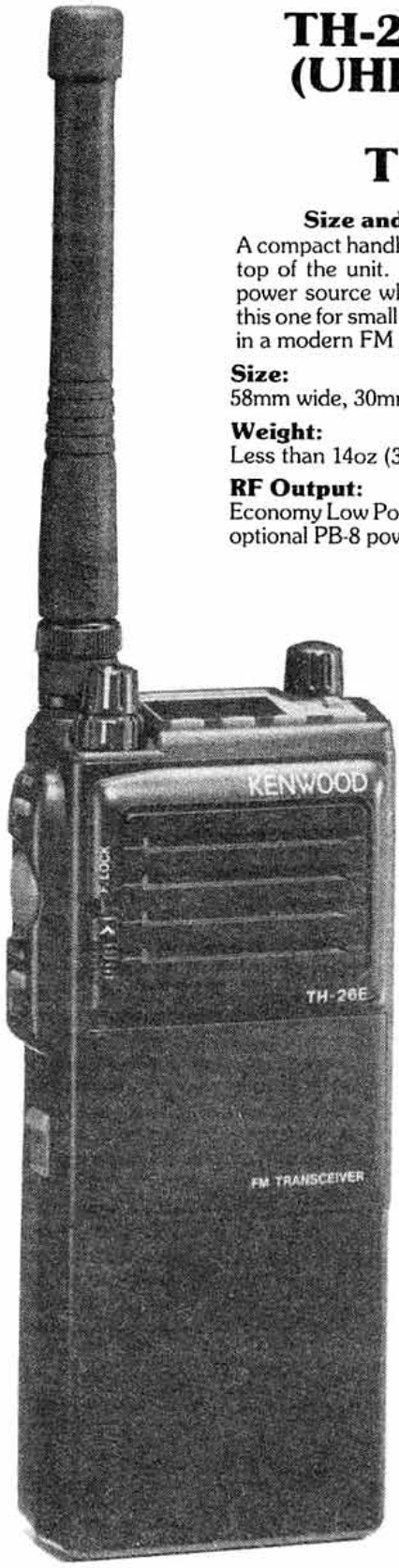
Squelch:
The built-in Dual Tone Squelch System (DTSS) provides selective reception using DTMF tones.

Other features:
- Pager function with DTMF Tone Groups
- 40 multi-function split frequency memory channels
- Auto battery saver
- Repeater offset and reverse offset
- DC Input Jack for external power and recharging the internal NiCads
- Programmable VFO.

Options:
- Remote control speaker microphone which operates a whole range of transceiver functions
- Sub-audible tone unit
- External DC power cord
- Battery packs, wall charger, soft case, etc.

The detailed information sheet does these little handhelds more justice, so write, phone or FAX for one and it will be sent immediately. Better still, seeing is believing, so why not drop in on one of our shops or approved dealers and get a feel for what we are talking about!

TH-27E £249
TH-47E £269



TH-26E (VHF)/TH-46E (UHF) COMPACT FM HANDHELD TRANSCEIVER

Size and design ideal for portable/mobile!
A compact handheld transceiver with controls and readout on the top of the unit. Remove the battery pack and use an external power source when mobile and no other transceiver will match this one for small size and all the state-of-the-art features expected in a modern FM transceiver.

Size:
58mm wide, 30mm deep, 136mm high (excl aerial).

Weight:
Less than 14oz (380g).

RF Output:
Economy Low Power of 20mW up to a high power of 5W using the optional PB-8 power pack. The power pack supplied gives 2.5W.

Scanning: 20 Multi-function Memory Channels with Lithium battery back-up record tone status, frequency step, repeater offset and REV(erse) status, DTSS code and status.

Squelch:
Includes the Tone Alert System; when a signal is received, distinct 'beeper' tones sound.

Other features:
- Auto-battery Saving Circuit
- Auto Power Off function
- Repeater Offset Switch and Reverse Switch
- Easy Check Monitor Switch
- Lamp Lock Key for continual illumination of the LCD display when mobile.

Options:
- Remote Control Speaker Microphone controls the most useful functions required by the mobile operator
- Headset with VOX/PTT
- Filtered cigar lighter cord
- Water resistant bag
- Battery packs, chargers, soft case, etc.

A full colour specification sheet is available upon request and both models are in the showrooms of our shops and approved dealers. When you see the transceiver as a handheld, you will find it small. When you see its profile in your car without the battery pack, we think you will be pleasantly surprised at the very small amount of space required to house a fully functional FM VHF/UHF transceiver with all the modern necessities.

TH-26E £249
TH-46E £269

Telephone 0629 580800 (4 lines) Fax 580020 Telex 377482 All branches are closed all day Monday.
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The *TOKYO HX240* HF Transverter when coupled to an all-mode 2m rig will give you 50 watts on 80 to 10m. RAYCOM have put together this unique unit with the new YAESU FT290RII inc. DC and COAX leads!!!

FT290R II	£429.00
TOKYO HX240	£249.00
1/2 Size G5RV	£ 14.95
12 Amp PSU	£ 59.95
Nicads & Wall Charger	£ 31.30
Total regular price	*£784.20*

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73s TOM G6PZZ, John G8VIQ & Ray G4KZH

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TS711E	£898	IC3220E	£499	FT736	£1,195
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73 DE RAY G4KZH, TOM G6PZZ
COLIN and JOHN on the landline.

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

STEVE WATT, G8KDL, (21 Cauldwell Avenue, Ipswich IP4 4EB) advises that he has a good supply of IRCs for sale at 40p each in minimum quantities of 10. An SAE with your order would be appreciated. Money can be sent as sterling cheques, Eurocheques, drafts, or postal orders in pounds or US dollars.

Stamp collectors will like to know that the Norfolk Islands Post Office will issue a set of three stamps on 9 April which feature amateur radio. The mint set costs $2.63 and a first day cover $2.83 - Australian dollars of course. Payment can be made by Visa/Mastercard to Philatelic Bureau, Norfolk Is, S.Pacific 2899.

Harry Popov, LZ1BB, (PO Box 87, Sofia 1618, Bulgaria) offers his services as QSL manager to any DX station or to anyone planning a DXpedition.

K8SWZ has been receiving QSLs intended for CN8DX, mostly for contacts made on CW and for a period of about two years. He is *not* CN8DX's QSL manager . . . .

IRIS & LLOYD COLVIN

DURING MY RECENT visit to southern Africa, I had the opportunity of transmitting a short interview on the SARL Sunday morning news bulletin. I shared this distinction with Iris and Lloyd Colvin who had just left for ZS9 and had left a recorded interview which I found most interesting. Lloyd said that the Foundation was formed in 1955 and *Yasme* the name of the yacht being sailed around the world by a lone sailor from England called Danny Weil. Danny met KV4AA who suggested that amateur radio would be useful to him during his long journey.

Danny became enthusiastic about this and passed his examination and took his morse test in a matter of thirty days. He became VP2VB and sailed for nine years visiting a large number of rare radio locations. He used five different boats - all called *Yasme* - and all of which finished at the bottom of the sea. When Danny finished, Iris and Lloyd asked if they could take over. They did, and their ambition was to visit every country in the world - so far their total is 212 !

Lloyd does most of the CW operating and Iris the SSB as Lloyd tends to lose his voice, but in contests they operate equally on the appropriate mode. Their equipment consists of an ICOM 751A transceiver and an Ameritron 80 amplifier which they usually manage to stow under their aircraft seats! Antennas are a 3-ele Cushcraft and collapsible 33ft pole, and a rotator. Together the couple have been licensed for 108 years and have worked DXCC from well over 100 countries. Their QSL cards - all 650,000 of them - are all filed alphabetically in metal cabinets. Iris said that she has had no problems even in countries where women are sometimes not very welcome. Lloyd mentioned places where they nearly got arrested but in each case all ended well. Their future plans are to continue visiting new countries (although each is more than 75 years old) for as long as possible. A truly remarkable duo . . . .

DX NEWS

THE ARRL HAS announced that the Peoples' Democratic Republic of Yemen (7O) and the Yemen Arab Republic (4W) are deleted from the DXCC list from 22 May 1990. After that date, QSOs with either area will count for the new Republic of Yemen and both recent DXpeditions will count for this. QSLs may be submitted for credit beginning 1 March 1991. The German Democratic Republic was, of course, deleted as from 3 October 1990. A special effort is being made by ARRL staff to process the very large backlog of DXCC applications which have resulted from the good propagation during the recent past and also the addition of a number of new countries to the list. ARRL business manager Barry Shelley has been put in charge of the operation which involves a special task force in addition to W3AZD and his regular staff.

Amateurs in Belgium will be heard using the OT prefix until 21 July of this year. This marks the 60th anniversary of HM The King of Belgium.

The Lynx DX Group will hold its 1991 Convention in Porto (Portugal) on 2, 3, and 4 May. More information later.

Lorraine, ZD9CO, is on **Tristan da Cunha** and uses 21.335MHz during her evening time. G4ZVJ is back on **Ascension Is**, and will be using his ZD8VJ callsign mostly on CW but also on RTTY, packet, and AMTOR. VP8GAV is GM0GAV who will be stationed at **Faraday Base, Antarctica**, for two years. G1SWW was due to be at Haley 5 Base by now and using his VP8CES callsign. The Italian expedition IA0PS finishes operations from Terra Nova Bay on 15 February. VP8COJ, in **S.Georgia** meets QSL manager GM4KLO on Mondays and Thursdays at 1830 on 21.215MHz and is also often in the vicinity of 14.255MHz after 2200. VK0CH, who used to be at Mawson Base, is now on **Macquarie Is**. 4K1ADQ begins a year's stay at Bellinghausen Base in **S.Shetland Is** this month. According to *DX News Sheet*, 4K2OIL is located in **Franz Josef Land** and to be found on 10.101 or 18.072 from 2300 - at midnight he goes to 14.020 - 14.030MHz. FD1PRL will be on **Crozet Is** for a year and will use the callsign FT4WC, he has been on 14.035MHz at 1200. FT4YD is now on from **French Antarctica**.

A lot of islands are mentioned above - why not work towards the Society's IOTA Award ? There is an IOTA net on Saturdays/Sundays at 1300 on 14.280MHz which gives the latest information.

Alec Korda, G4FDC, operated from Slovakia as OK8ALU on a few occasions in 1990, and hopes for an action replay this year. Cards go to the address in *QTH Corner*. SV2AVH/A, SV2BFA/A, SV2BFD/A, and SV2BBH/A, are all monks who have passed their examinations and are preparing to transmit from **Mt.Athos**.

Robin Seal, 3DA0AJ, at his operating position in Swaziland. He manges to keep in touch with the other 20 or so amateurs in the country via a 144MHz repeater.

DXPEDITIONS

DJ4OI, DJ1UJ, AND DK7UY/N2IOE, have given notice of a journey to SE Asia which they will be making. The timetable goes as follows: 8 to 15 Feb - **E.Malaysia** (9M8RH); 15 to 20 Feb - **Brunei**; 21 to 26 Feb **Christmas Is** (VK9XA, VK9XC, VK9XE); 27 Feb to 5 Mar **Cocos Keeling Is** (VK9YB, VK9YD, VK9YE); and 6 and 7 Mar **Christmas Is** again. The callsigns are subject to confirmation on arrival. They will have TS440s, and an ICOM IC735 with a Butternut HF9VX vertical, a GPA30, and dipoles. In E Malaysia they hope to operate from 9M8PV's station which has a TH6DXX beam and other antennas. They will be on all bands 1.8 to 28MHz CW and SSB. On 1.8MHz they will use 1.825MHz and on other bands one to five kHz above lower CW band edges. SSB frequencies will be mostly .195 and .495kHz. QSLs go - via the bureaux *only* please - to the respective German home callsigns.

Jim Smith. VK9NS, of Heard Island DX Association fame, is considering organising another expedition to **Heard Is**, probably in 1992. He is sounding out DXers to decide if such a trip is needed and the level of support he would be given. Please write to him at PO Box 90, Norfolk Is, Australia 2899, or drop a line to *DX News Sheet*. (HIDXA should enrol its 1000th member soon - why not ask about membership when you write ?) Other plans are for a visit to **Bangladesh** and a return to **Bhutan**, this time with a linear and beam. HIDXA often takes part in the DX net on 14.222MHz. *[See page 8 for Jim Smith's account of his efforts promoting amateur radio in Bhutan].*

DX'press says that there will be another operation from **Malyj**

Vysotskij in March, and that this time there will be activity on 1.8MHz as well as round the clock RTTY.

G4UOL would like to thank all those who helped to make his GD4UOL stint such a success. He made 8002 QSOs - (2199 of which were in the all-band section of the CQWWDX contest) in a total of 88 zones and 309 countries. A repeat performance is on the cards for 1991.

AWARDS

FIRST OF ALL, an apology to the sponsors of the **British Postcodes Award** which was mentioned in the January column. Please note that the starting date for eligible QSOs is 6 May **1990** and **not** 1991.

WORKED EU CW AWARD

Issued to commemorate the 200th anniversary of the birth of Samuel Morse which is on 27 April 1991. Requirements for the standard award are confirmed CW contacts on or after that date with 100 different stations who are members of EU CW clubs over three different bands, with a minimum of 20 on each. The 100 must also include at least three members of six different EUCW clubs. Up to 40 stations worked on 27 April 1991 can be counted for double points. There is a QRP award for which the applicant must have used not more than 5W output power, and a SWL award for 100 stations heard. The fee is DM10.00, US$8, or 12 IRCs and applications go to Gunther Nierbauer, DJ2XP, Illinger Str.74, D-6682 Ottweiler/Saar, Germany. EUCW clubs are AGCW-DL, BQRP, BTC, FISTS, FOC, G-QRP, HCC, HSC, INORC, SCAG, SHSC, UFT, and VHSC.

THE KENYA AWARD

Requirements are ten points gained by working members of the Radio Society of Kenya. Each QSO counts two points and with special club station 5Z4RS four. Any modes or bands may be used and contacts must have been made after 31 December 1977. Submit log details - certified by a responsible club official - plus US$8 or 15 IRCs - to The Kenya Award, Radio Society of Kenya, PO Box 45681, Nairobi, Kenya.

JUBILEE HELVETIA AWARD

To celebrate the 700th anniversary of the Swiss Confederation. For confirmed QSOs during 1991 with at least one station in each of the 26 cantons using the special HE7 prefix. Endorsements for phone/CW/mixed/RTTY and SSTV. Send a list giving full details of QSOs (including the canton of each station) with return postage to Kurt Bindschedler, HB9MX, Strahleggweg 28, 8400 Winterthur, Switzerland. (If similar to the regular H26 Award this one will be well worth having).

WMBAS AWARD

For confirmed contacts/reports with 10 stations in Bruges (zip codes 8000 - 9000). Send log extract certified by two other amateurs plus six IRCs or US $4 to Danneels Luc, De Klerckstraat 49, Knokke Heist, 8300 Belgium.

CONTESTS

RESULTS OF THE **1990 CQ 160M Contest** (CW section) show **G3BBD** with 31,140 points, and G3TXF 26,559. **GM3IGW** was the only UK entrant in the multi-operator section with 188,510 points, and in the phone section G3NAS scored 27,880 points.

HERE AND THERE

GWYN MORGAN CLOSED down from T5GM on 25 March 1990, and still has some QSLs for those who apply with return postage (see under 5H3GM in *QTH Corner*). He goes on 28.530MHz on Thursdays from 1200 but otherwise operates mostly around 14.320MHz. Gwyn says that there are only two other licensed amateurs in the country - one a national and the other Norwegian.

I received a letter from the newly formed Nepal Amateur Radio League which says that following the recent change of Government, regulations would be passed in January by the Council of Ministers which would legalise amateur radio. By now there should also be provision for taking a radio amateur examination. The letter says that Father Moran, 9N1MM, has been the only fully authorised amateur in the country - and that is by special permission of the Royal Ordinance.

DEADLINES

THANK YOU TO THE *Ex-G Radio Club Bulletin* (WA8GTA), the *Lynx DX Group Bulletin* (EA2KL), *DX'press* (PA3CXC), *DX'press* (DL3RK), the *Long Island DX Bulletin* (W2IYX), and the *RSGB DX News Sheet* (G4DYO).

Please let me have all items for the **April** issue by **26 February**.

QTH CORNER

C53GH	PO Box 92, Banjul
FP/VE1KM	PO Box 383, F-97500 St Pierre et Miquelon.
JU1DX	Box 676, Ulan Bator, Mongolia.
OK8ALU	A Korda, 5 Windmill Ct, North St, Tunbridge Wells, TN2 4SU.
T33R/T33T	OH3GZ, Varuskunta 47 as 11, SF-11310 Riihimaki 31, Finland.
VR6BX	Brian Young, PO Box 21, Pitcairn Is.
ZS9Z/ZS1	OH2BH, Nuottaniement 10 D 20, SF-02230 Espoo 23, Finland.
3C1EA	EA4CJA, General Saliquet 103 3, 28044 Madrid, Spain.
3C1SG	ON6BV, Freest 4, B-1590 Bever, BT, Belgium.
3W4DK/3W4VL	UA3DK, PO Box 70, Dubna 141980, USSR.
5H3GM	G Morgan, PO Box 9212, Dar es Salaam, Tanzania.
9M8AX	(see 9M8BZ).
9M8BZ	9M2AX, E.Tanaka, F 7 Menara Impian, Taman Tar, 6800 Ampang, Kuala Lumpur, Malaysia.

28MHz COUNTRIES TABLE (1990)

G4MUW	205	(SSB)	G0MXU	115	
G4VVP	202	(SSB)	G2AKK	113	(CW)
G0JZA	196		G4SJG	104	
G4DXW	192		G0CKP	79	
G4ZYQ	162		GM4CHX	75	
G4NXG/M	147		G0DUS/M	74	
G0KDS	139		GM4ZIL	63	
GM4OBK	131				

BAND REPORTS

Thanks to the following who managed to beat the Christmas mail rush:- G2s AKK, HKU, GM3CSM, G3's GVV, KSH, LPS, G4DXW, GW4KGR, G4's MUW, NXG/M, VVP, G0KDS, and the UK Packet Cluster Network. Stations listed in italics were using CW:

3.5MHz

0000	*3W4DK*
0200	*EA9EU, J6DX, ZD8Z*
0300	*PJ9A, RQ9W, TF3EJ*
0700	TU2UI, *V73AS*
2100	HL1IUA, 3W4DK
2300	*8Q7AJ*

7MHz

0400	*FM5BH, KL7EM, NN7L, ZF2IZ*
0600	*J8/K3IP, ZP0Y*
0800	*AH6EE*, HC2HVE, *JA8DLQ, VE7ZZZ, 6Y5IK*
1500	*BY5RCS, N7DF/KH2, JAs*
1600	*FR5DX, ZL3GO*
2000	*C56/G4ODV, JA1UTS, XW3UB, Y90ANT, ZD8Z*
2200	HL1IUA, *JW0GB, 4S7WP*
2300	*D44BC, KL7WI, RV3E/JT1BY,*

14MHz

0800	FO0IGS, KL7's, VR6ID,*3C1EA, 4K4POL*
1400	*BV2TA, XU0AA, 9M8ZR*
1500	BV2WC, KL7GU, V63AO, 9M2HB
1600	BY1QH, [sa]T33T[sx], VK6NG, 3B8CF
1700	A22BW, XW8KPL, 7Q7LA
1800	KH0/JG1OUT
1900	FY0EK, [sa]KD7P/NH7[sx], T33R, ZS9/W6KG
2000	G0BAU/C6A, HF0POL, V51SW, VQ9CQ
2200	A92FL, SU1HN, 4U1UN
2300	*KH6IJ, LU1XY, XU0AA*

21MHz

0800	AH9AC, BY4, BY5, HL, JA, VK, *3W4DL*,9N1RN
0900	BV5VZ, DU9PA, SV2ASP?A, ZL
1000	P29AS, VK9NS
1100	J6LRU, SV2RE/A
1200	3W4VL
1600	*FS/W2QH, N7MSU*(Mont), ZD9CS
1700	*H7IA, V51Z*, ZD9BV, ZL2AAG
1900	KH6IDU, VQ9HW, ZD7VC, 7Q7RM

24MHz

0800	JA, VK, ZL
1000	*ZS9Z*
1300	A61AD, OY2H, *3A2LF*,3XISG
1400	CN8JP, HH2MC, J6LRX, VK6PM
1500	C53GH, V29A, VQ9FM, *W7HLC*
1600	A45ZA, FP/VE1KM, 9J2WG
1700	4U1UN, 7Q7JA
1800	*KL7U*
1900	KH6SB

28MHz

0800	BY5QW, VQ9HW, XU0AA, 3V/DJ8LN
0900	BV2FA, WM4L/HS1, JH1MAO/JD (MTorishima), *3W4DK*
1000	BZ4RBC, J5CVF, KH6JJH, VS6WO, 9Q5XO
1100	AP2SAR, JU1DX, KB6QE/KH0, S01A, *XU0AA*, ZS9Z
1200	A71CD, BV2QC, P43WLP, VP5JM, ZS9Z/ZS1,*3W4DK*
1300	JX9DFA, TZ6VV, VP2ML
1500	D68JA, TI2CC, XQ0X
1600	A22AA, *V2/KD6WW*, W6, W7
1700	*HC5Z*, W6, W7, 4U1UN, 7Q7RM
1900	V2/K2QM, W7, XE

Propagation NEWS

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

THE PROPAGATION studies Committee draws the attention of members to a useful service provided by the GEC-Marconi Research Centre in Great Baddow, Essex.

A short term ionospheric forecasting service has been provided by the Centre for twenty years. During the past two years many improvements have been made in the availability of the service to the HF community. In particular, the message distribution is now made via Telecom Gold electronic mail, telex, and fax services. In addition, the daily forcast is recorded on an answerphone and can be obtained by dialling (0245) 73331 and asking for extension 3152. This service is available 24 hours per day.

HF

THE G8KG REPORT THIS month goes as follows: "The rise in solar activity which began in November was still in progress at the time of writing (20 December) by which time the 27-day average solar flux was just about to top the 200 sfu mark. At the same time, the average over the past 60 days of Boulder's geomagnetic A index was only a little over 8 with only five days topping the 15 level. Taken together, these trends led to generally good and stable conditions on the HF bands and it seems likely, though by no means certain, that these will continue throughout the early months of 1991.

50MHz

IN HIS NOVEMBER report, Ray Cracknell, G2AHU, wrote: "On 50MHz conditions during November 1990 did not rise to expectations occasioned by the higher than predicted sunspot numbers and solar flux during October. Nevertheless, there was a period of good transatlantic openings just one solar rotation after the October maxima and solar flux was around 200 from 6/7th to 20th, with best DX conditions centred on the 11th. Large solar flares tended to inhibit propagation on 6, 15, 18 and 23rd, and a magnetic disturbance associated with a fine aurora on the 27th."

The report includes a summary of results from Britain, which are recorded in last and this month's *VHF/UHF News* columns, and contributions from observers in JA, PA, SV, Z2 and ZS6. The Dutch reporter, PA2HJS, commented: "November 1990 was very disappointing compared to November 1989. We did not have the widespread openings to many areas and some regions were not heard at all."

The 8th report of The 50MHz Reporting Club covers the period 1 March to 31 August and comprises 12 A5 pages. The graph of predicted and observed sunspot numbers indicates the latter 17% to 37% down between the beginning of March and mid-June, as predicted by the end of July, and peaking to 22% above by mid-August before declining.

Compiler G2AHU commented: "There seems to be considerable similarity between solar activity in the period March-August 1989 and March-August 1990. The average of the monthly means of sunspot numbers for these periods was 148 in 1989 and 144 in 1990, with similar peaks and lows."So why were the results so different? Ray states: "If sunspot numbers and geomagnetic storms are not to blame then it stands to reason that solar flares, X-ray radiation and other factors leading to ionospheric absorption are the most likely cause. This would be an interesting field of research."

HF F-LAYER PROPAGATION PREDICTIONS FOR FEBRUARY 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	....69996...	....899981..	...1999994..	...3988897..	1..777778931	752654446887	986422123688	+53......3++
MALTA	....798872..	....899994..	....9999981.	...19888993.	22.677678984	884754456899	998521124789	+++2.....4++
GIBRALTAR	....277662..	....499885..	....7999981.	....9988994.	11..87778983	673575556898	998842223689	+++52....3++
ICELAND	.....26651..	.....48872..	.....79995..	....1899981.	68788961	451.76557896	887553234688	+++52....35+
** ASIA								
OSAKA	....54......	....76......	...1881.....	...2873.....	...2643234.2	1...41114754	....1...1572	.........24.
HONGKONG	...18972....	...18984....	...278762...	...1576652..	1....24346631	2....1.14775	1........1576	243
BANGKOK	...28++96...	...379998...	...2587892..	....276785..	1....4346833	4....1.14788	2........1577	245
SINGAPORE	...278887...	...378898...	...3487893..	...1266786..	1....4346833	3....1.14787	1........1576	243
NEW DELHI	...3++981...	...478982...	...446785...	...224677...	2....1346333	73.....14788	62......1578	4.........245
TEHERAN	...4++++7...	...6878981..	...7557894..	...63366861.	4114...346854	8641....14788	862.....1577	53........244
COLOMBO	...3++++7...	...4688992..	...3357895..	...11366871.	31....346864	72.....14788	61......1578	3.........245
BAHRAIN	...4++++71..	...6778983..	...64478961.	1..521568831	6222..236976	973....14798	861.....1577	53........244
CYPRUS	...2++++93..	...4999995..	...78889982.	1..877789952	642754567997	996521235899	8852...12688	++2......355
ADEN	...4++++94..	...67679961.	1..633589841	3..411368974	7422...36898	984....13788	861.....1576	54........243
** OCEANIA								
SUVA/S	.....2562...	.....5774...	....177862..	....376775..	....6534671.	...2421134..	...11...12..	.....
SUVA/L	1....532..163	21..75411374	22..87543663	111286545851	..156322672.	...34...34..	...11...11..	.....
WELLINGTON/S	....16643....	....38865....	....687871..	....776783..	...27534661.	...2421144..	....1....12..	.....
WELLINGTON/L	....1.....1	11..31....12	22..631..133	111.74211342	..126322363.	...241..34..	....1....1..	.....
SYDNEY/S	...187675...	...298787...	...4987881..	...4876784..	...16434782.	....31.1474.	....1...151.	.........2..
SYDNEY/L	....12....11	....231....22	....5631.154	76432374	64224662	....31..363.	....1....31.	.....
PERTH	...388765...	...4888772..	...3687885..	...13666871.	2...13346863	1....1.14785	1573	.........24.
HONOLULU	.........1..	.........3..	.........61.	.........172.	.11.3221461.	..44421133..	..252...11..	...2........
** AFRICA								
SEYCHELLES	...4567744..	...55678761.	1..423678941	31.2.1368974	841....136898	962.....3788	84......1567	5.........234
MAURITIUS	...37889951.	...46689972.	1..433579962	41.2.1368985	851....36899	951.....3799	72......1578	4.........245
NAIROBI	...28788862.	...466789841	21.633479974	53.511168997	9732...36899	984.....3798	872.....1476	54........244
HARARE	...167788841	1..266689963	42.533369996	74.511138999	9833...16899	985.....3799	872.....1578	54........245
CAPETOWN	67889962	2..176679985	53.353348998	8614211279999	9944....4899	9861....1589	873.....378	54........4+
LAGOS	1...9++++963	21..97679985	64.174347998	871362116999	99673...3899	8995.....689	6773.....378	345.......45
ASCENSION Is	1...88767753	21..97667875	54..85334898	873.83112799	99746....589	98973....279	7775......58	4452......2+
DAKAR	....6++++962	11..88768985	431.96435998	763.85213899	998372...689	88974....379	76851.....58	4352......2+
LAS PALMAS	....6++9+83.	89999961	11..99889984	331.98778997	8863865568999	999763223689	888731..1378	+5+4......4+
** S. AMERICA								
Sth SHETLAND	14778862	11..36888875	431.67766677	663.76543467	787374211135	466541.....2	23431.....	.....
FALKLAND Is	....2688+862	1....48877774	331.78754577	663.87521357	8972742...26	688741.....3	46651.....1	.342.....
R DE JANEIRO	7756762	18755784	321.48533587	653.6721.278	998274....58	999641....26	87851.....4	5552.....
BUENOS AIRES	25877861	47866773	221.78643466	543.87521157	8871742...26	899641.....3	67861.....1	3553.....
LIMA	......++85.	876662	21753344	222.42631126	6771643....5	799541.....2	47762.....	.553.....
BOGOTA	......++85.	876662	753354	222..2521.36	666.232....6	798541.....3	57662.....	2543.....
** N. AMERICA								
BARBADOS	.....4+++85.	6876772	7743475	222..7611267	7761243...38	998541.....5	87662.....3	+533.....
JAMAICA	......8++85.	886661	763354	111..2641136	666.3431...6	798542.....3	57662.....1	2543.....
BERMUDA	.....19++85.	3987871	5764574	111..6642376	666.2531..48	898542....16	77762.....3	4543.....
NEW YORK	......69+84.	898861	1776673	111..3664476	665.24331147	888442....15	67762.....2	3543.....
MEXICO	.......9473.	88641	175332	111.1.363113	465.4233...2	488442.....	16762.....	.353.....
MONTREAL	......69983.	......79885.	1776773	11...3665575	664.15332257	888442....25	67762.....3	3543.....
DENVER	.......1761.	.......3873.	68651	11.....66443	454.3..43114	478441.11..1	26852.....	.352.....
LOS ANGELES	.........661.	.........872.	18631	11.....27422	353.21.351.1	268442.12....	.4752.....	..42.....
VANCOUVER	.........4..	.........261.	.........573.	11.....7752	352.2..26433	367441.13111	13652...1...	...32.....
FAIRBANKS	.....	.....	.........131.	.1..11113531	341.43235753	345442113533	12452...121.	...2.....

The provisional mean sunspot number for December 1990 issued by the Sunspot Data Centre, Brussels was 128.5. The maximum daily sunspot number was 186 on 4 December and the minimum was 88 on 15 December. The predicted smoothed sunspot numbers for, February, March and April, were respectively: (classical method) 127, 125, 123; (SIDC adjusted values) 114, 112, 110.

RSGB NATIONAL VHF CONVENTION

Sandown Exhibition Centre, Esher, Surrey

SUNDAY 24 MARCH 1991

- One Day Exhibition and Lecture Programme
- Specialist Groups
- Full Lecture Programme on VHF, UHF and Microwave Subjects
- Equipment Test Facility
- Morse Tests (by prior booking)
- Presentation of Trophies
- Comprehensive Trade Exhibition

PROGRAMME

1030 **Convention opens.** Enter through main entrance.
Refreshments. Snack bar in the hall will be open from 1100 to 1800 and the licensed bar will be open throughout the convention.

1130 **AGM** 6m Group.

1330 **Convention address and presentation of trophies** by RSGB President John Case GW4HWR

LECTURE PROGRAMME

Detailed Arrangement for Lectures will be Notified on Arrival

	A	B	C
1415	'EME – Past, present and future' *Peter Blair, G3LTF*	'Repeater linking voice and TV' *Dave McQue, G4NJU*	'Amateur Radio Observation Service' *Geoff Griffiths, G3STG*
1515	'VHF/UHF DX' *Dr Ian White, G3SEK*	'High gain aerials for 23cm' *Derek Atter, G3GRO*	Remote Imaging Group AGM *Henry Neale, G3REH*
1615	VHF Committee Forum	'Modern generation of 10GHz equipment' *Dr Charles Suckling, G3WDG*	Morse Test Forum *Robert McEwan Reid, G4GTO*

1715 Lecture Sessions Ends

1800 Trade exhibition closes. Convention ends

ADMISSION

To simplify management and to reduce costs, it has been decided, as last year, not to issue admission tickets for this convention, either in advance or at the gate.
Admission will be by payment on entry as follows:

Convention and exhibition	£2.00
,, ,, ,, (OAPs)	£1.50
,, ,, ,, (under 18)	£1.00
,, ,, ,, (under 14)	Free

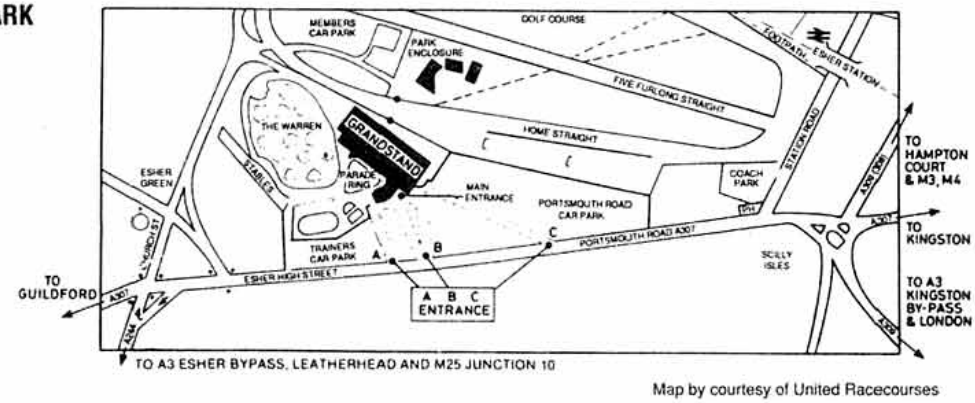
ACCESS MAP TO SANDOWN PARK

RAIL TRAVEL:
British Rail
WATERLOO TO ESHER

TALK-IN STATION:
GB2VHF:
Channels S22 SU22

STAND BOOKINGS:
Les Hawkyard G5HD
Tel: 040-928342

DETAILS:
Geoff Stone G3FZL
Tel: 081-699 6940



Map by courtesy of United Racecourses

VHF/UHF NEWS

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

THIS WAS EDITED at the year end when much of Britain was being battered by gales, rain and snow, as huge low pressure systems raced across the Atlantic. Even so, some readers worked DX by aurora and tropo on the VHFs, while 50MHz saw periods of trans-atlantic propagation and some late E-layer contacts into Europe.

VALE THE BMS

THE BRITISH METEOR Society was very much a one-man band operation and the Director, Robert Mackenzie, decided to close it down on 31 December 1990 "... due to pressure of work." This seems to have been a rather sudden decision as he sent out renewal notices only a few weeks earlier.

In the Meteor Scatter section of *VHF/UHF News* I have frequently referred to the BMS's *Radiant Catalogue* which is probably the most authentic source of information on meteor streams. I will continue to quote relevant data from it but there are no significant showers until the April Lyrids.

NOCTILUCENT CLOUDS

THE AUTUMN ISSUE of the BMS's journal *Meteoros* included an interesting article on noctilucent clouds by A A Mardon. It has been queried whether these clouds, at 80-90km altitude, could sustain VHF signal propagation, *VHF/UHF* on page 20 in the October 1990 *RadCom*.

The usual theory, proposed by Apostolow in 1926, is that they are formed by ice crystals with a meteoric nucleus that has entered the atmosphere. But Mardon states they weren't observed until 1885, a period when the European and North American atmospheres were first subjected to fossil carbon and associated pollutants.

He mentions ozone depletion, volcanic dust - Krakatoa in 1883 - atomic weapons testing in the atmosphere, release of modern pollutants and global warming as alternative and/or additional causes of noctilucent cloud formation. One conclusion is; "... that rather than being a hazard, noctilucent clouds might assist in the equilibration of atmospheric movements and global rainfall patterns."

MOONBOUNCE

SOME READERS HAVE been experimenting with EME mode for years, using their maximum licensed power and large antenna arrays, while others with much more modest equipment have managed to work a few of the bigger stations.

144MHZ

The following information has been compiled from individual reports and the November and December issues of Mark Turner's, G4PCS, *2M DIRECT* publication. VS6BI is QRV, and should be workable by four-Yagi stations in favourable conditions. KG6UH/DU1 has been on with a marginal system, hopefully to be improved soon, and K9RX/4 is a big signal from the hitherto rare state of South Carolina.

Peter Blair, G3LTF (SXW), runs a pair of 4CX250Bs, four 15-element home made DL6WU-type Yagis and an MGF1402 preamp. He has worked around 30 stations. In the second leg of the ARRL Contest on 3/4 November, he completed with 13 stations on the 4th between 0049 and 0630. These were HB9CRQ, N5BLZ, EA2LU, W4ZD, SM2CEW, KB8RQ, K9RX/4, K2GAL, SM5FRH, AF9Y, DL8DAT, VE7BQH and W5UN, giving 10 multipliers.

John Regnault, G4SWX (JO02PB), was QRV on 3/4 November and completed with 18 stations including W7IUV, K7CA, KL7X and UA9SL. Note that KL7, Alaska, is a separate DXCC country as well as a state. Next weekend he worked VE3BQN, W7VXW, W4ZD, K0IFL, KB8RQ and VE7BQH.

Andy Cook, G4PIQ (JO01MU), worked W5UN and SM5FRH around 0630 on 3 November, then his PA blew up. Martin Platt, G4XUM (IO82SX), runs a pair of 8874 triodes and four 15-element Yagis. On 2 December he completed with N5BLZ, K9RX, W4ZD, AF9Y, KA5AIH, W7HAH, W0HP, VE5RF, G8MBI and DL8DAT between 0033 and 0411. Mark Holloway, G4YRY (DOR), runs a modest 80W and a couple of 14-element Yagis with masthead preamp. At moonset on 3 November he worked W5UN, then N5BLZ got part of his call shortly afterwards. W5UN and KB8RQ were heard the following morning and at 0854, W4ZD came back with a 'QRZ?' but worked a WA6 instead.

On 3/4 November Graham Daubney, G8MBI (JO02ID), worked WB5LBT, WB0QMN, HG1W, GM4YXI, RB5EC, K7CA, ES2XM, W4IY, WD5AGO and best of all W2RS who was using 150W and a single 18-element Yagi; all were new.

Keith Kerr, GM4YXI (IO87WI), was quite active that weekend and completed with KL7X, G8MBI, SM4GVF, SM2CEW, SM7BAE, RA6AAB, EA3ADW, YU3WV and OE5JFL. On 29 November, he worked K0IFL and VE1VBL and next day KA5AIH, W4ZD and N1BUG. In December he worked K2GAL and DL8DAT on the 1st, AF9Y on the 2nd and Y22ME on the 3rd. Keith runs a 4CX350A PA and four 9-element Yagis.

Ralph Taylor, GW2HCJ (GDD), built a potent Tx, using 4X500A valves, and PSU intended for the mode, but never got around to using them. He wants to dispose of this gear so anyone interested can contact him to haggle; he is QTHR.

432MHZ

Ian White, G3SEK (OFE), appreciates the inclusion of EME news in this feature and wrote: "But there's no point in trying marginal EME unless you know how to operate, and the standard operating procedure for 432MHz was becoming outdated and quite hard to find."

Procedures were thoroughly reviewed last August at the International 432MHz and Above EME Conference held in Trenton, New Jersey, USA. The agreed protocols are very detailed and I have no space to publish them here, so anyone contemplating 432MHz EME should write to the VHF Manager, David Butler, G4ASR, enclosing an SASE for a copy of these procedures; he is QTHR.

G3SEK is QRT for the winter and is replacing the entire antenna system from the hole in the ground, up. The new one will comprise; "... 16 shortish Yagis, rear mounted and rotatable in polarization to overcome the cross-polarization problems that arise from Faraday rotation and inter-continental longitude differences."

G3LTF is quite active on the band with a pair of 4CX250Bs, a 20ft dish and ATF1013S preamp. Peter has worked over 230 stations and in the second leg of the ARRL Contest he completed with 48 stations and gained 33 multipliers. His DX included UA1ZCL, VE4MA, UA9FAD, ZS6AXT, RA3YCR, RB5LGX, JR4AEP, LX1DB and a dozen Ws.

Dave Dibley, G4RGK (IO91ON), operated in the 3/4 November contest weekend and completed with K4QIF, SM0ERR, UA1ZCL, WA3FFC, K4PKV, K9UIF, PA3CSG, DJ6MB, GW3XYW and G3LTF on the 3rd. On the 4th, HB9SV, RA3YCR, JA4BLC and SM6EUP between 2050 and 2318 when echoes were strong.

Stuart Jones, GW3XYW (GNW), has been an active EME-er since March 1979 and started on this band. All his antennas have been dishes but he suggests that if space is limited, a properly engineered combination of stacked and bayed Yagis should give a compact, gainy system. Dishes have the advantage of being usable on several bands and feed polarization can be changed easily.

His station comprises an FT-736 transceiver, N7ART amplifier, 22ft dish and a DL9KR-type two-stage MGF1302/CF300 preamp. The centre of the dish is only 12ft AGL; it is AZ/EL controlled by a BBC computer with real-time tracking and there is separate polarization control on receive and transmit.

In November, Stuart contacted YO2IS, PA0AVS, SM6EUP and YU1IQ on the 2nd, and in the contest on the 3rd, JA4BLC, F1ELL, G3LTF, DJ9BV, G4RGK, Y22ME, DF3RU, SM3AKW, EA3PL, DL9KR and FF1OLW. I have listed lots of calls to give an idea of the amount of activity on this band.

MICROWAVES

The advantage of the microwave bands for EME communication is that high gain antennas need not necessarily be a blot on the landscape, or require too much real estate. The disadvantages are a greater path loss and the problem of generating large amounts of RF economically.

G3LTF uses 400W from six 3CX100A5 valves on 1.3GHz, a 20ft dish, which should produce a gain of about 35dBi, and an ATF1013S preamp. In the two legs of the ARRL Contest he completed with 23 stations gaining 19 multipliers. They were; DL9EBL, PA3DZL, ZS6AXT, EA3UM, SM4DHN, I4JED, HB9BM, OE5JFL, IN3HER, JR4BRS, SM2CEW, GW3XYW, K2UYH, SM0ERR, G4CCH, WD5AGO, F2TU, VE4MA,

LOCATOR SQUARES TABLE
Starting date: 1-1-1979

Callsign	50MHz	144MHz	430MHz	1.3GHz	Total
G3IMV	319	446	125	51	941
G0CUZ	-	350	73	-	423
G4SWX	-	347	-	-	347
GM4YXI	-	340	-	-	340
G4IJE	366	338	5	2	711
G4DHF	-	331	-	-	331
G4RGK	121	311	145	52	629
G4XEN	66	301	115	6	488
G4PIQ	-	278	105	-	383
G4YTL	-	269	-	-	269
GJ4ICD	433	264	119	59	875
G4SSO	-	261	98	-	359
G4DEZ	116	249	62	54	481
G3FPK	-	244	-	-	244
GW4VEQ	-	241	-	-	241
G6HCV	309	233	-	-	542
GW4FRX	-	232	-	-	232
G6HKM	269	224	112	48	653
G4DOL	-	219	-	-	219
G0EVT	142	213	57	-	412
G4TIF	222	204	111	-	537
GM4CXP	50	201	32	-	283
G8LHT	113	185	93	14	405
G1KDF	309	184	104	39	636
G1LSB	73	176	144	-	393
G4XBF	-	172	-	-	172
G1GEY	-	170	92	22	284
G1SWH	197	166	60	9	432
G4MUT	142	155	94	34	425
G0OFE	264	152	-	-	416
GJ6TMM	109	151	52	-	312
G8ATK	74	144	94	52	364
GW6VZW	238	143	6	-	387
G8XTJ	101	121	-	-	222
G8PYP	200	120	34	-	354
G1WPF	20	114	37	-	171
G1SMD	115	106	-	-	221
G7CLY	-	100	2	-	102
G6MXL	52	97	48	20	217
G1TCH	99	95	6	-	200
G1UGH	111	94	-	-	205
GM0GDL	-	88	23	-	111
GM0CLN	-	81	-	-	81
G0NFH	113	78	18	9	218
G1CEI	11	77	18	-	106
G0HVQ	176	71	-	-	247
GU7DHI	151	68	-	-	219
G6MEN	67	54	27	3	151
G0JHC	332	48	-	-	380
GM1ZVJ	35	48	-	-	83
G6ODT	-	29	47	-	76
GM1BVT	92	23	-	-	115
GW7EVG	-	22	-	-	22
GM0GEI	193	-	-	-	193
GM1XOG	145	-	-	-	145

No satellite, repeater or packet radio QSOs.
"Band of the month" 144MHz.

W7GBI, W0KJY, OK1KIR, WB5LUA/N5QGH and SM3AKW. That will give you an idea of who is QRV on this band. Incidentally, *all* Peter's equipment is home-built for the 144, 432 and 1296MHz bands.

GW3XYW is also QRV on 1.3GHz and Stuart is now getting going on 2.3GHz; he uses his 22ft dish and circular polarization. Having given 432MHz a lot of attention recently, he should probably have changed feed to be on 1.3GHz by now. He reported steadily increasing activity on this band.

There are EME nets every Saturday and Sunday afternoon on 14.345MHz starting with the 432MHz-and-above net, handing over later to the 144MHz operators. If you listen in, you will be able to note down skeds being made by the big stations. You can then monitor at the appropriate time to test your receive capability.

50MHZ

THIS BAND CONTINUES to both delight and disappoint its devotees. The following data has been compiled from the monthly notes from Ted Collins, G4UPS (DVN), and letters from Darrel Moody, G0HVQ (GLR), Neil Carr, G0JHC (LNH), Jim Smith, G0OFE (ex-G1DWQ in DOR), Terry Chaplin, G1UGH (SFK), Ela Martyr, G6HKM (ESX), Geoff Brown, GJ4ICD, and Al Harvey, GU7DHI (GUR).

INFORMATION

K1ME should be QRV from the Bahamas until March, probably signing C6A/K1ME, using 65W and a 4-element Yagi. Tarik Skiredj, CN8ST, is active from Rabat using the TS680S and dipole left by CN2JP. Up to 21 December he had worked 11 countries. His QTH is 81 Avenue Okbah, Apt 1, Rabat-Agdal, Morocco.

VP8CEO has been active from the Falklands Islands. VO1NE and VO1WA are both in Marystown, Newfoundland, Canada A0E 2M0; 'NE at PO Box 1055 and 'WA at PO Box 652. None of these three is in the *Call Book*.

The UK Six Metre Group now has about 400 members and has promoted the 6X6 Award for members only, based on locator fields, countries and UK counties. There are six grades and the starting date is 1/1/89. Applications are processed by Richard Lax, G4AHN, who is QTHR; send him an SASE for the complete rules.

ACTIVITY

The 27 November aurora was quite good and DL, OH, ON, OZ, PA and SM stations were worked until about 1940. On 1-3 December TU and 6W stations worked into the UK till lunchtime; at 1110 on the 2 Dec GM3WOJ contacted 6W1QC. HC and TI stations were available in the afternoon of the 4th and the FY7 beacon was copied, with the W1 and W4 call areas worked.

From 1240 on the 5th, VE1, HC, W1, W3 and W4 till 1430. On the 6th, 1247-1700, a good opening to VO, VE1, VE2, W1-4 and W8. On the 7th, 1200-1600, VO1MUN beacon, VE1, W1-3. On the 8th, 9L1US was S5 for over an hour from 1050 at G4UPS (DVN) and 6W1QC was very loud for an hour up to noon; 1240-1700, VO, VE1-3, W1-5. From 1200 on the 9th, VO, VE1-3, W1, W2, W4 and W8 until about 1620.

On the 13 Dec, the Geminids shower brought many bursts from DL, OZ, etc. G4UPS made QSOs with DL, I4, LA, LX, OZ and SM7 stations, 2218-2318. On the 15, Es to DL, F, I1-5, OZ and SM6-7, 0850-1115; CN8TS was worked by Gs, 1200-1400. 16, VO1MUN at 1315 with VE1 and W1 worked. After that, activity tailed off with very poor conditions by the 21/22.

144MHZ

THE 27 NOVEMBER aurora produced strong reflections but activity was low. From 1754, G4YRY worked GM0FET (IO87), DL8EBW (JO31), PA3FJY (JO32), DL0WAE (JO42) and F1FHI (IN97) on CW and GM0EWX (IO67) on SSB at QTEs 10-60°; Mark's last QSO was at 1923. G0OFE worked GM3NHQ (IO97) at 1707.

There was a tropo lift on 30 November in which Ian Carter, G0GRI (WLT), worked GI4GVS, GM1SZF, GM0LIR and GM8XOC from 1812. He uses a TR-751E, 4CX350A amplifier and Halbar CQDX antenna at his 325ft ASL QTH. G4YRY contacted GMs 0LIR, 1SZF, 1TBW, 4CXM, 4JEJ, 0GMD, 0NXP and 8XOC between 1645 and 2220. G1UGH found LX/DC6DY/P (JO30) at 2104 on 24 November.

Dave Dell, G3PQF (HPH), enjoyed the CW Cumulatives working 21 different stations, only three of whom were fellow G3s. He wonders if they have got 'rusty fists' like him? He finds the band very quiet compared to 1976/7 and suggests it's because ". . . the B licensees rushed off to 6m to work DX . . ."

Conditions in the Fixed Station Contest on 2 December were better than average. G4PIQ's successes included EA1BCB (IN63), DK1FG and DL4NCA (JN59), DG8LG (JO44) and DF2QD (JO54). Gary Nicholas, GW7EVG (CWD), got four new 1990 counties from this event - GLR, NOT, LEC and SRY.

A tropo lift to the south was reported by G4YRY on 22 December. From 1700 to 2023, Mark worked EA1EBJ/P (IN53), EA1DKV (IN73) and many Fs along the Atlantic coast as far down as La Rochelle. At 1717 on the 23 he worked F/G8MBI (JN04) on CW.

Returning to Stan Brown's, G4LU (SPE), propagation poser - *VHF/UHF News*, December - he says they never experience aircraft flutter, and concludes that transient propagation between him and G3AHX (CNL) must be due to other means. He mentioned reflection from aircraft vapour trails, a phenomenon discussed by Ian Cowan, VK1BG, in the March 1989 issue of the WIA journal *Amateur Radio*.

Two months later, Gordon McDonald, VK2ZAB, discounted much of Ian's article. These authors included calculations covering reflections from aircraft, atmospheric heating from jet engines, bistatic radar measurements, etc. All very fascinating but inconclusive; clearly a subject for further study.

DEADLINES

NO 70MHz OR 432MHz TROPO news to report, but perhaps the 70MHz Cumulatives, which started on 27 January, might result in some input? The deadlines for April are 21 February and for May, 28 March, just before Easter.

Novice NEWS

Correspondence c/o the Editor, Novice News at RSGB HQ.

CITY AND GUILDS have announced that the first Novice Licence examination will be held on 3 June. Other exams are 16 Sep and 9 Dec, and in 1992, there will be four exams, the first being in March. A list of exam centres should be available from RSGB HQ by the time you read this. Please remember to enclose a stamped self addressed envelope.

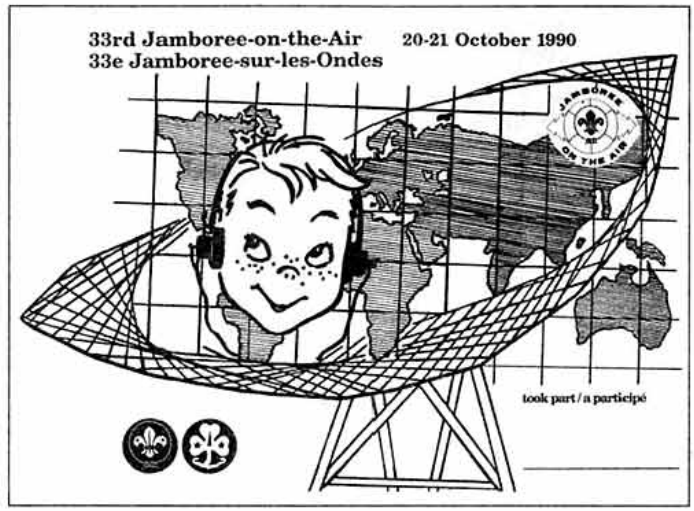
Unlike the present Radio Amateurs' Exam, the Novice Exam cannot be taken without previous practical training. A pass slip from an RSGB Training Course must be gained *before* the written exam can be taken. To find out where your local course is, telephone the Senior Novice Licence Instructor in your county, or an adjacent county, (see list below) and he/she will tell you what courses are being held locally, or may be able to get a course set up near you.

Anyone wishing to start up a Novice training course should send an A5 envelope with 27 pence in stamps to Mrs Hilary Claytonsmith, G4JKS. whose address is on page 54, requesting a Novice Instructors booklet.

THE VIDEO

THE SOCIETY'S AMATEUR radio recruitment video was given its first public showing at the installation of the Society's President, John Case, GW4HWR, on 12 January. Copies of the video are being sent to all main radio clubs who are affiliated to the RSGB.

Contact your local club Secretary to find out when and where you can see it. Why not take along with you some potential Novice Licensees?



A QSL card used for last year's JOTA, designed by Roberto Bordignon (Scouts of Ecuador) and published by the World Organisation of the Scout Movement.

SENIOR NOVICE LICENCE INSTRUCTORS

County	Name	Callsign	Home Tel.No
Co. Antrim	Mr JH Branagh	GI3YRL	09603 67208
Bedfordshire	Mr MR Green	G0BMG	0234 212565
Berkshire	Mr RJ Redding	G3VMR	
Buckinghamshire	Mr W Fitzgerald	G3DCA	0908 372498
Cheshire	Mr SE Black	G3VSY	061 485 1871
Central	Mr GL Collier	GM0LOD	0259 42126
Cumbria	Mr JB Baker	G0MTQ	0900 814405
Clwyd	Mr H McCook	GW7FTG	0492 532669
Cleveland	Mr D Jones	G0IBW	0287 633816
Derbyshire	Mr R Oakton	G0IWF	0332 761943
County Down	Mr JM Skillen	GI4TSK	0247 872707
Dorset	Mr PW Mayer	G0KKL	0202 742453
E.Sussex	Mr R Cornall	G7DME	0424 444466
Essex	Mr RE Morfett	G1UER	0255 430825
Gloucester	Mr D Griffen	G0HUX	0594 824109
Gwynedd	Mr DE Roberts	GW0ABL	0248 713647
Greater London	Mr SJ Beazley	G7BIM	081 524 1582
Greater Manchester	Mr F Delaney	G4GKT	
Grampian	Mr S Sutherland	GM4BKV	0224 691716
Gwent	Mr FR Clare	GW3NWS	0633 880146
Hampshire	Mr JM Gale	G3JMG	0705 466450
Highland	Rev J Lincoln	GM0JOL	0641 208
Hertfordshire	Mr JH Maclagan-Webberburn	G4JOV	0582 712134
Humberside	Mr R Sugden	G0GLZ	0405 769968
Hereford & Worcester	Mr DJ Gourley	G0MJY	0562 746207
Isle of Wight	Mr A Ash	G3PZB	0983 298731
Kent	Mr KL Smith	G3JIX	0304 812723
Lancashire	Mr S Williamson	G3WGU	0253 53126
Leicestershire	Mr DG Harries	G4WYN	0530 412307
Lincolnshire	Mr I Buffham	G3TMA	0775 87464
Lothian	Mr GR Winchester	GM4CUX	031 339 5092
Merseyside	Mr JDS Malits	G0KCT	051 722 5252
Mid Glamorgan	Mr CN Trotman	GW4YKL	0443 226198
Norfolk	Mr DJ Buddery	G3OEP	
Nottinghamshire	Mr KC Simmonds	G1BNBL	0602 810785
Northamptonshire	Mr IG Rivett	G8WPU	0604 715628
North Yorkshire	Mr GA Vallely	G4YRS	0748 850430
Oxfordshire	Mr RW Bygrave	G0KNJ	0235 816144
Salop	Mr D Whalley	G4EIX	0952 588878
Strathclyde	Mr BJ Beggs	GM3YEH	0563 820215
Suffolk	Mr CS Muddimer	G1GPD	0781 77004
Staffordshire	Mr C Elliott	G4UJW	0283 791213
Surrey	Mr RP Horton	G4AOJ	081 668 7003
South Yorkshire	Mr JW Denniss	G0NMJ	0302 531011
Tayside	Mr DW Duff	GM4UGF	0826 23634
Tyne & Wear	Dr MNS Hill	G0BEV	091 281 0999
Warwickshire	Mr GN Frykman	G0GNF	0926 613669
Wiltshire	Mr AJ Anderson	G0BFM	0380 812528
West Midlands	Mr MR Annetts	G7ANL	021 421 5638
West Yorkshire	Mr G Edinburgh	G3SDY	0484 602905

CALLING ALL SCHOOLS

HILARY CLAYTONSMITH, G4JKS, has compiled a list of schools interested in amateur radio. Send her a stamped self-addressed envelope for a copy.

RSGB NATIONAL EXHIBITION 1991

THE THEME OF THIS YEAR'S RSGB show at the National Exhibition Centre (see page 28) is Project YEAR and the Novice Licence. There will be a great deal of information for budding Novices, young and not so young, and the recruitment video will be shown. This is a great opportunity to bring a friend and show him or her how much fun can be got from our hobby.

To encourage whole families to attend, there is no admission charge for children under 12 years, accompanied by an adult. *[My children, aged 7 and 9, had a super time at last year's show, and keep asking to go again - Ed].* There are special cheap tickets for parties of 25 or more coming to the NEC.

THINKING DAY ON THE AIR

GUIDES HAVE THEIR OWN version of Jamboree On the Air, associated with Thinking Day. This year's event is on 23/24 February and many Guide and Brownie stations will be active. This is a wonderful oportunity for youngsters and their leaders to experience the joys of amateur radio, especially by using the greetings message facility negotiated by the Society some years ago. See also this month's News and Reports, and Events Diary.

SWL NEWS

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

IN ALL THE YEARS that I have been writing for the SWL in this magazine, the item I ran in November last year about sending SWL reports in respect of signals copied by telereaders certainly caused much comment.

Most of the letters I received thought I had been unkind, but my aim has always been to lay out some ground rules so that the transmitting fraternity start receiving reports which are of some use. I receive enough letters from amateurs offering yet further examples of worthless SWL reports.

In my view, any report from a British SWL to a British amateur on 7MHz - whether on SSB, CW, RTTY - in daylight conditions is a waste of time. Everyone knows that the band is good for local working during daylight hours and any report would only confirm what an amateur would already know - that he was a good signal around the UK. I do acknowledge that telereaders can be a help with learning and understanding morse, but I remain of the view that it is not 'best practice' to send a report to a station working locally on 7MHz during daylight hours - regardless of who sends the report.

MARCH CHALLENGE

REGULARS WILL KNOW that I normally run a 'January Challenge', but for various reasons I have decided to hold it in March this year. The main ones being that everyone knows by now that the LF bands can be exceptional in January and, with the White Rose Contest reappearing this year, it would provide an extra event for the listener later in the year.

In order that the Challenger will appeal to everyone, it will be on 14MHz. Everyone knows what a good band 14MHz is, but how many listeners note how many countries have been heard in any particular month. Therefore, the idea of the Challenge will be to see how many countries can be heard on 14MHz between 1 and 31 March. Only one station from each country may be claimed for points, but the interest will be in the fact that stations in Europe will NOT count. Points will be available as follows: stations in Oceania count 10 points; in Africa 8 points; in Asia 6 points; in South America 4 points; in North America 2 points. As the Challenge will run for the whole of March, listeners will have a great deal of choice as to when they listen. Logs to me at the usual address. I hope this idea attracts a few newer listeners, much as I hope the established ones will take part too. If there is sufficient interest, I will donate a prize to the best log coming from a listener who has joined the Society since 1 January 1990.

INTERBOOKS

THE INTERBOOKS 1991 catalogue is now available. It has a wide range of publications which will interest the listener. For your copy, write to Interbooks at 8 Abbot Street, Perth, PH2 0EB, Scotland.

DXTV

ONCE AGAIN, GM1DSK has provided a great deal of insight into his DXTV activities. However, now that I have less space, I have to limit the details. Of course, Sporadic E is not providing the openings right now, but by early May, pictures from all over Europe will start coming through again.

Aerial Techniques have noted the interest shown through this column for DXTV and have asked me to point out that they have been supplying equipment for TV DXing, including Band 1 antennas, for over 12 years. They have a catalogue, price 75p, which is available from 11 Kent Road, Parkstone, Poole, Dorset, BH12 2EH. They also have a customer advisory service.

HF SUMMARY

ASANTHA COORAY IS the only listener in Sri Lanka at present and he wrote with news of activity from 4S7. He was not an RSGB member, but was made aware of the Society by G3VHE, who was visiting 4S7. Asantha has heard 202 countries, but would very much like British listeners to write to him with information about the hobby. Apart from asking amateurs in 4S7, Asantha has no way of receiving DX news or news of awards (he is particularly interested in IOTA, HAB) etc. He finds out about DXpeditions after they have happened and could certainly benefit from some Western ideas. *[Sounds like a customer for the DX News Sheet - Ed]* You can write to Asantha at 53 Foster Lane, Colombo-10, Sri Lanka.

Turning to our summary of conditions, the bands have been good, with a few DXpeditions to increase the activity. Notable trips included those to Banaba Is (T33T), Penguin Is (ZS9Z/ZS1), and the YASME expedition to ZS9. Let us start this month on 1.8MHz where the CQWW CW Contest increased DX activity. Several useful countries were heard - CN5N, FG5R, JA4LXY (Brad Bradbury's first JA on the band), OY9JD and 4X4NJ. On 3.5MHz, the contest again helped, and readers mentioned J6DX, P4OGD, RI7A, RL0L, TA5KA and V47KP. On SSB, Albert Tideswell, BRS48462, logged F05FO for country number 295, and Robert Small, BRS8841, mentioned hearing EK0RR/AM (who was 3W3RR and 1S1RR) in a hot-air balloon over Moscow! 7MHz again did not disappoint with K4SXT/DU3, FP5DX, KH0AM, KL7IKF, TU2QQ, 8Q7AJ and 9Q5TE probably the pick of a long list. 14MHz, by comparison, had not fared too well.

The lists did not show too much DX, but the best on offer appeared to be A43ND/20 (reported by first-timer Daniel Peake, BRS93034), various BV's, CE0ZZZ (Juan Fernandez Is), HSOE, SV2UA/A (Mount Athos), ZS9Z/ZS1, ZS9S and 5W1RA. 21MHz produced several weird Mexican callsigns over the period in question. 4BIPAZ was aired from Ballena Is and 6FXBCS was on from Santa Margarita Is. Other DX included J82A, J8/K3IPK, P29AS, V29W, V31TI, 3C1EA and 9L1US. That leaves us with 28MHz. Conditions had been very good, but there were periods when the band seemed very poor. Some of the more choice DX mentioned included BY7KQ, FR0P, FT4XD, KB6QE/KH0, W2JDK/VS6, ZS9/W6KG and 9L/OH7XM.

The WARC bands had been just as good, too, with 10MHz CW providing HH2Z, XE1GRR and ZP6XDW for Robert Small.

To put an unfortunate typo right, AA4NP/AH9 mentioned in the December column as Brad Bradbury's 37 country on 21MHz was in fact his 307 country all time!

VHF SUMMARY

THERE IS ONCE AGAIN little to report. The most disappointing feature has been - at the time of writing - the poor F2 propagation witnessed on 50MHz. There was a stateside opening on 11 November in which I logged two VO's, five VE's and nine W's in one hour. Some OE's and I's during the UK 6m Contest livened up an otherwise dull event, and HC5K and HC2FG were copied on 19 November.

I would be obliged to know who G6HKM and G4GPW worked at 1357 and 1359 respectively on 21 November. The DX station on .110 was quite weak here before he faded out. After that 6W/JA8RWU was fair copy on both CW and SSB at around 1420. 6W1QC was heard on 3 December and VO1WA was a good signal at 1240 on 9 December. It can only be hoped that somewhat better conditions will prevail soon.

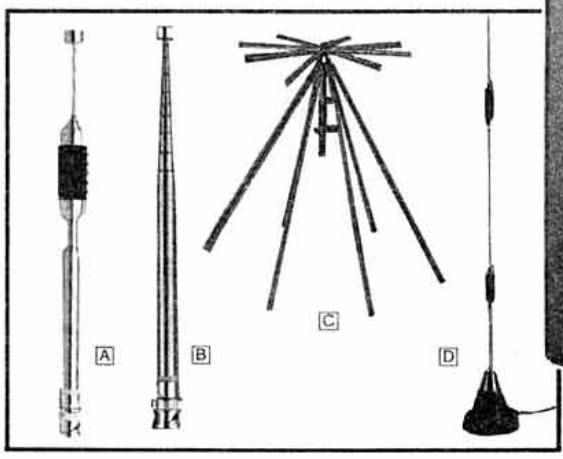
FINALE

COPY FOR THE APRIL issue should be with me no later than 8 February. Please continue to keep the postman busy!

Monique, ON6BY, and Paul, F6EXV, at the 1990 RSGB HF Convention.

REALISTIC®

SCAN THE BANDS



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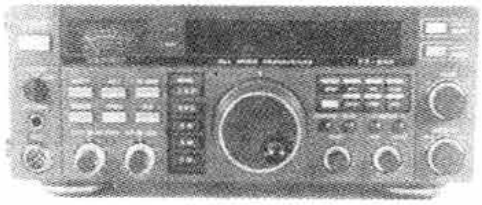

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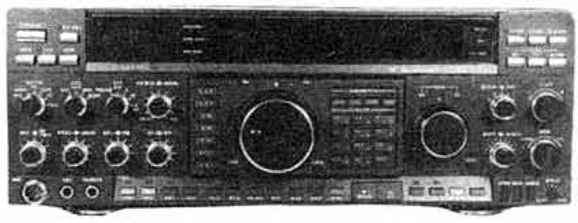
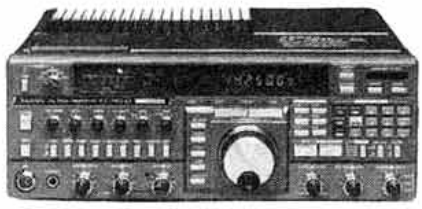
The Yaesu HF transceiver fleet



FT1000



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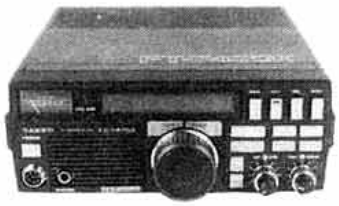
BPF-1	Sub VFO Filter Unit	£69.00	**144/767**	2m module FT767GX	£179.00
D3000568	FM Unit for FT747GX	£39.99	**430/767**	70cms module FT767GX	£225.00
FC757AT	Automatic Antenna Tuner	£349.00	**SP767**	External Speaker	£69.95
FC1000	Automatic Antenna Tuner (Single Wire o/p)	£534.75	**MD1B8**	Desk Microphone	£79.00
FP700	Power Supply 20A (50% duty cycle)	£219.00	**MH1B8**	Hand Microphone	£21.00

FT757GX2



FT747GX

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RSGB 1991

National Convention

and

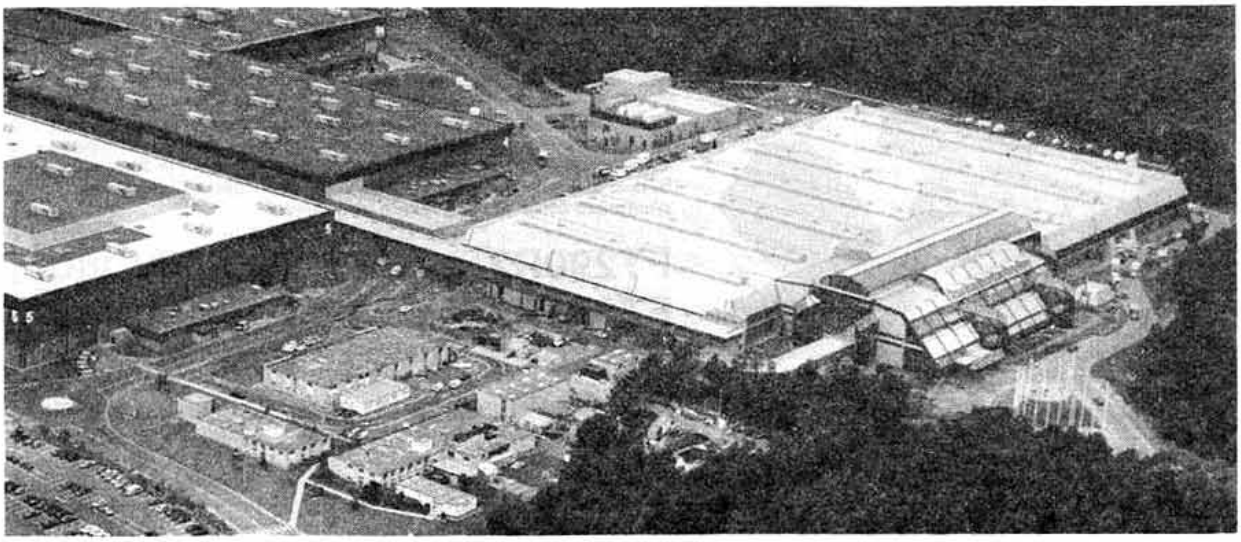
Amateur Radio Exhibition

at the

NEC

Saturday 27 April - Sunday 28 April

HALL 7, NATIONAL EXHIBITION CENTRE, BIRMINGHAM



RSGB 1991 LOTTERY PRIZE DRAW!

- **Launch of Novice Licence**
- **RSGB Committee Representation**
- **Lecture Programme (Saturday only)**
- **Large Component Stand Area**
- **Large Trade Exhibition**
- **Morse Tests** (Saturday only, by appointment with RSGB)

Opening times:

Saturday 27 April, 10 until 6
Sunday 28 April, 10 until 5

Talk-in on 2 metres, S22

Entrance fee: £3. OAP's, disabled and children: £1.50, (includes free parking and shuttle service to Hall 7).
Children under 12 years of age accompanied by an adult are free of charge.
Concessionary rates for groups of 25 or more.

Organised by the RSGB Exhibition Rally Committee.

Trade Stand enquiries welcome to ERC Chairman, Norman Miller, G3MVV, 178 Warley Hill, Brentwood, Essex, CM14 5HF (tel: 0277 225563).

TOPICS

PAT HAWKER G3VA

THOSE LOOP RADIATION PATTERNS

THE SEPTEMBER *TT* ITEM 'Horizontal loop antennas (real and with MININEC)' included as Fig 3 elevation and azimuth-plane radiation patterns of a multiband 1.9MHz (4 x 132ft) horizontal square loop antenna at a height of 50ft. These patterns were generated by W4ZCB using an IBM computer with MININEC-variant software and used by Doug DeMaw, W1FB, in 'A closer look at horizontal loop antennas' (*QST*, May 1990). Unfortunately, they show how easy it is to use valid computer-software to come up with incorrect results.

James W Healy, NJ2L (a staff member of ARRL), in *QST*, September 1990, with the assistance of KI6WX, VE2CV and W7EL shows that the patterns and gains in the May article were wrong. This was due to an axis-of-symmetry discrepancy. It is apparent that the patterns reproduced in the September *TT* were based on an incorrect axis, brought about by the fact that the MININEC variant used by W4ZCB assumes an axis shown by the line CD in **Fig 1**, whereas the axis of the corner-fed antenna described by W1FB is in fact A-B.

Fig 2 shows KI6WX's NEC3-generated patterns which differ substantially from those shown in September. NJ2L writes:

"The elevation angles at which the azimuth-plane patterns in the May *QST* (September *TT*) were plotted (30° at and below 7MHz, 15° at the higher frequencies) were probably chosen because those were the signal-arrival angles of most interest to the author. The patterns of Fig 2 are shown at the same elevation angles, not at the elevation-plane gain peaks.

"The gains shown in Fig 2 are in decibels relative to an isotropic source (dBi) in free space whereas the earlier patterns show gains relative to a half-wave dipole in free space. Comparing antennas to that of a dipole in free space can be misleading.

MININEC says that the gain of a half-wave dipole in free space is 2.14dBi (OdBd) but at 50 feet above average ground, NEC3 shows that the gain of that same dipole is 6.26dBi (4.12dBd). How can a dipole have 4.12dB gain over a dipole? Easy - the reference antenna is in free space, but the dipole over ground is subject to ground reflections that increase its gain (in this case) by 4.12dB. The same 1.9MHz dipole antenna 50ft above average ground has a whopping 10.4dBi gain at 28MHz - only 4dB less than the 1.9MHz loop's gain at 28MHz. In general, it's less potentially confusing to compare antenna gains to that of an isotropic source in free space".

It may be recalled that in the July *TT*, G3SEK drew attention to what he felt to be a potentially misleading use of ground reflection gain in MININEC diagrams/leaflets associated with a recently introduced compact HF beam with 11dBd claimed gain. It seems only fair to mention that I subsequently received (indignant) letters from the designers of that antenna who pointed out, *inter alia*, that the promotional literature made it clear that the gain was stated to be over real ground and was not a promotional gimmick (or words to that effect). True enough, but it does show the need for amateurs to be aware of the differences between an isotropic reference, a dipole reference, free space and above real ground. As G3SEK made clear in his letter, no criticism of the actual antenna was intended but he was surely right to draw attention to this important distinction in the way antennas may be described.

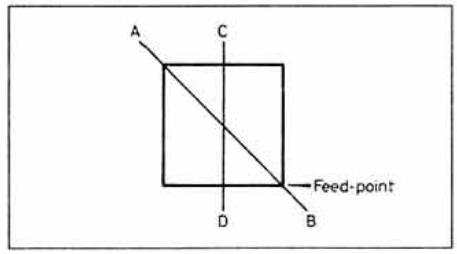


Fig 1: Top view of the horizontal loop described in QST, May and *TT*, September. Line AB represents the true axis of symmetry. CD is the axis that was incorrectly used in calculating the patterns published at the time.

Ground gain has been well understood for many years by professional antenna engineers but this is not necessarily the case for many amateurs. It can be substantial. To quote data from the *HF Communications Data Book* published by Rockwell International (Collins Radio), the maximum gains of theoretical lossless elementary antennas, together with the direction of maximum gain, are as follows:

- Short dipole in free space: 1.76dBi in plane perpendicular to axis.
- Half-wave dipole in free space: 2.15dBi in plane perpendicular to axis.
- Vertical short monopole over perfect ground: 4.76dBi on horizon.
- Vertical quarter-wave monopole over perfect ground: 5.15dBi on horizon.
- Horizontal half-wave dipoles:

(a) Infinitesimal height above perfect ground: 9.1dBi straight up.
(b) Quarter-wave above perfect ground: 7.4dBi straight up.
(c) Half-wave above perfect ground: 8.2dBi in plane perpendicular to axis 30 deg above horizontal.
(d) Sixth-tenths-wave above perfect ground: 9.2dBi in plane perpendicular to axis 24.6 deg above horizontal.

- Vertical half-wave dipole, half-wave (to centre of antenna) above perfect ground: 8.2dBi on horizon.

In practice, unfortunately, no antennas are lossless (particularly monopoles) nor, except at sea, will the ground be even nearly perfect!

Reverting to the question of the performance of horizontal loop antennas, after the September *TT*, I received letters from Gus Taylor, G8PG, and Roy Hill, GM0IJF, both of whom have for some time been very pleased with the results achieved with multiband horizontal loops at very modest heights.

G8PG has used a rectangular loop (**Fig 3**), about 20ft high, for about six years, feeding it with only about 3 watts of RF with which, on CW, he has worked more than 100 countries, including to his surprise spanning the Atlantic on 3.5MHz and all continents except Oceania on 7MHz. His loop is non-resonant, lower and smaller than those usually recommended. He writes: "I believe that to get the best out of these loops one should make it as big (and as high) as local conditions allow, and feed it via

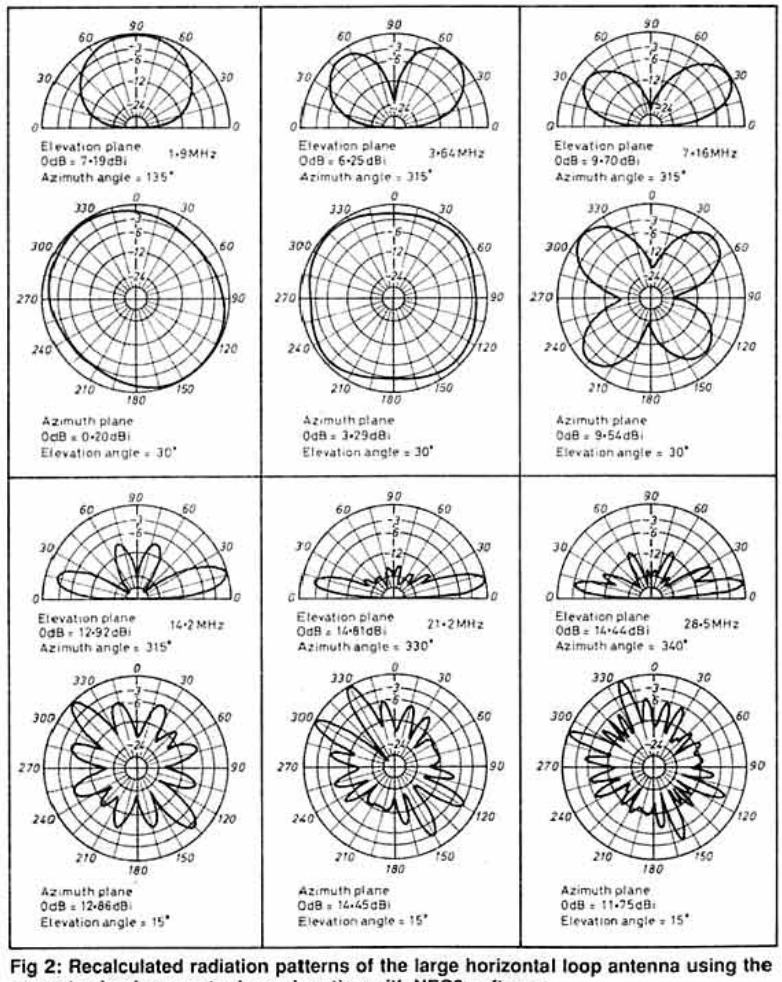


Fig 2: Recalculated radiation patterns of the large horizontal loop antenna using the correct axis of symmetry in conjunction with NEC3 software.

tuned, open-wire line by means of a suitable coupler such as the Z-match with balanced output shown in Fig 12.77 of the fifth edition of the *Radio Communication Handbook*. He wrote up his antenna in *Short-Wave Magazine* (February 1985) and mentions that other QRP enthusiasts have been very satisfied with the results achieved using various horizontal and (smaller) vertical loops. Recently he has been testing an indoor 8ft-square version about 17ft high, with good results on all bands from 10.1MHz upwards and short-skip contacts on 7MHz. He hopes to enlarge on this indoor version in *Sprat*.

GM0IJF has been similarly pleasantly surprised with the DX performance of large loops only 4, 6 or 8m high, one of which was around the eaves of his bungalow. He feeds the loop with 300Ω slotted ribbon feeder with a Z-match coupler. Unlike the majority of such loops, he feeds in the middle of one span rather than at the corner.

POOR MAN'S VARIAC

I RECALL WAY BACK IN the late 1940s, when there were occasional voltage reductions on the electricity supply mains, that somebody published in the *RSGB Bulletin* a simple dodge for increasing or decreasing the line voltage for the station equipment. This used a spare heater transformer with its secondary in series with the load to buck or boost the voltage, depending on the sense of connection. A rather more elaborate form of this idea appears in *Electronics Australia* (September 1990, p109) by someone who uses the pseudonym 'Dr Henry Choke'. He writes:

"When testing electronic equipment, it is sometimes necessary to observe the effects of high or low mains voltage. The arrangement shown in **Fig 4** allows the mains to be increased or reduced by 30V in steps of about 8V. The secondary of the transformer is inserted in series with the load to buck or boost the voltage, depending on polarity. It uses the popular ARLEC 6672 (Australian trade part number) transformer which has a multi-tapped 30V/1A secondary; this means that the load should be limited to about 250W.

"It could also be used with a soldering iron, to give a 'standby' mode when not in use and a 'high power' mode for heavy jobs. It is better to have a clockwise rotation of the switch to increase the output voltage, but if you find the switch works backwards, just reverse the connections to the primary. Finding a suitable switch is the only problem. Light wafer switches are not good enough for the voltages and currents involved, and the switch should be non-shorting.

"The same principle can be used for lots of power control applications as a poor man's Variac, and there will be none of the RFI problems associated with phase control circuits. The voltage boost and depression, and number of steps, depend on the transformer used (ie number of tappings or separate secondary windings). Two such circuits could be cascaded to provide coarse and fine control."

SIMPLE LOGIC PROBE

A SIMPLE LOGIC PROBE, operating from a 6V AC source (eg an old valve heater transformer) has been described by Glen Harris in the 'Circuit & Design Ideas' feature of *Electronics Australia* (October 1990, p107) **Fig 5**. It is designed to cope with logic circuits working between 3V and 6V and to display Hi(1), Lo(0) and pulse states of the circuit under investigation with the complete unit conveniently fitting into one of the fatter ball-point pen bodies.

Glen Harris writes: "When the probe is brought Hi, D2 conducts, turning the BC548 transistor on and lighting the red side of the tricolour LED. A Lo lets D1 conduct and turns the BC558 light on, lighting the LED. A pulse turns on each LED alternately, at the frequency of the input signal. This makes the LED appear orange at about 10Hz or more.

"Supply voltage is derived from a full-wave rectifier so there is no need to worry about which lead is positive or which is negative. The only bias needed on the transistors is a 47K resistor on the base of the BC558 . . . . When power is connected the LED will glow slightly orange from leakage current, brightening significantly above about 6V. The Hi, Lo and pulse indications, however, are significantly brighter than this slight glow."

VARIABLE CERAMIC-RESONATOR OSCILLATORS

LC OSCILLATORS, NO matter which circuit arrangement is adopted, require most careful design, construction and choice of high-quality components to achieve stable (drift-free) operation and pure T9X output waveform. Crystal oscillators, on the other hand, can virtually be thrown together yet still give entirely satisfactory results over a reasonable temperature range. The variable crystal oscillator (VXO) represents a useful compromise between a fixed-frequency crystal oscillator and a fully-tunable LC oscillator. Unfortunately most crystals can be 'pulled' over only a very small frequency range, usually not more than one part in a thousand even with inductive as well as capacitative loading, ie not more than 7kHz at 7MHz and often considerably less, before significant degradation of the crystal stability and tone begins to appear. A bank of spaced crystals can overcome this problem, but this has never been a low-cost solution and in practice has been

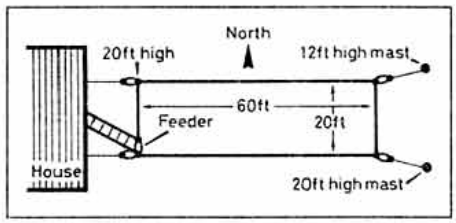


Fig 3: G8PG's horizontal loop antenna as described in *Short-Wave Magazine*, February 1985.

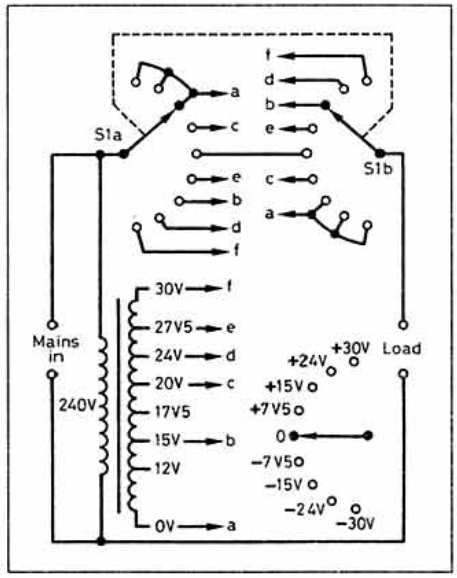


Fig 4: The poor man's Variac using a multi-tap low-voltage transformer to buck or boost the mains supply voltage.

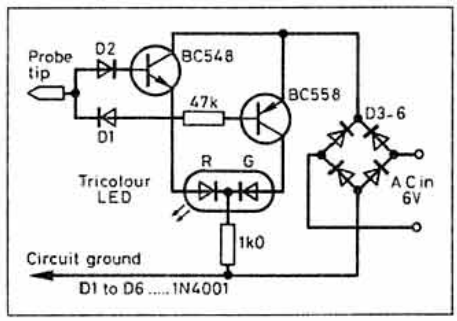


Fig 5: Simple logic probe.

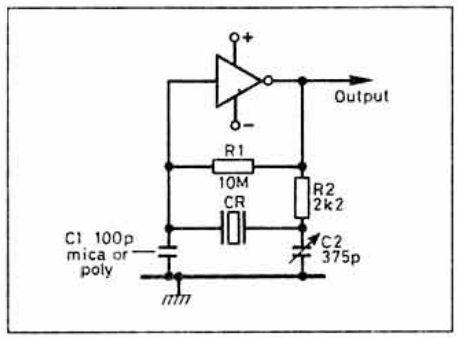


Fig 6: G3BBD finds that up to 70kHz shift by the use of variable capacitance can be obtained from a 3.58MHz ceramic resonator oscillator using resonators costing less than 60p. This gives good frequency stability provided that the temperature remains reasonably constant.

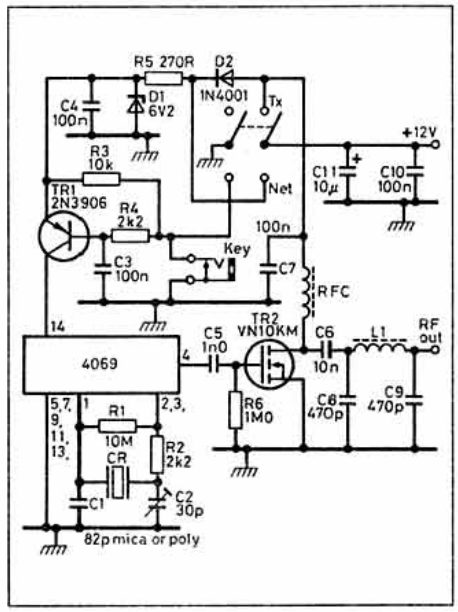


Fig 7: Ceramic resonator controlled 1W QRP transmitter/driver covering about 3.52 to 3.59MHz with single 3.58MHz resonator.

AN EFFECTIVE SUPER-GAINER

WHEN TONY LANGTON, GM4HTU, decided to build a 7MHz receiver, he opted to give the 'super-gainer' technique (superhet mixer in front of high-gain regenerative direct-conversion receiver) a try - and found this a most effective approach. He based the DC section of the receiver on the 'blooper' circuit adopted by Des Vance, GI3XZM, (*TT* October 1987, pp748-9) which used an FET as an infinite impedance detector in conjunction with a bipolar Q-Multiplier.

GM4HTU writes: "The GI3XZM design seemed well thought out and inspired confidence. I used a Denco coil as a fixed tuned 1700kHz 'IF' and preceded it with a simple 40673 dual-gate mixer with a band-pass front end for 7MHz and a VFO tuning 8.7 to 8.8MHz. The audio amplifier provides about 50dB gain and rolls off at about 3kHz.

"Results are very impressive: there is only a slight warm-up drift and SSB is easily copied. An eight-pole Butterworth filter (not shown in **Fig 8**) provides stunning selectivity for telegraphy reception (coincidentally, this is also based on an Irish design, stemming from the University of Belfast).

"Separating the detector from the feedback circuit, as suggested by GI3XZM, proved a masterful idea; it really does give very smooth regeneration control. Initially, I used a 10-turn trimpot for the 'reaction' control but later replaced it with an ordinary pot since, once it had been set to 'just oscillating', it has never been adjusted; it could be replaced by an internal preset. Even when I later added a 10.1MHz option, shifting the VFO to cover 8.4 to 8.45MHz, no adjustment was needed. It is a far cry from the old two-handed tuning of the straight regenerative ('blooper') receivers with which I started listening many years ago. The super-gainer technique isolates the detector from whatever the front-end is doing very effectively. Another possible reason is the gain control which is a 36dB switched attenuator between the antenna and the band-pass input filters.

"It is as easy to operate as any DC receiver and performs better than any I have ever built. It appears to be immune to hum, microphony and Radio Moscow. It also has a good 'presence': one feels right in among the signals and not isolated by high-technology.

Thanks, Des, for a really good circuit. I am now working on a transmitter to go with the receiver".

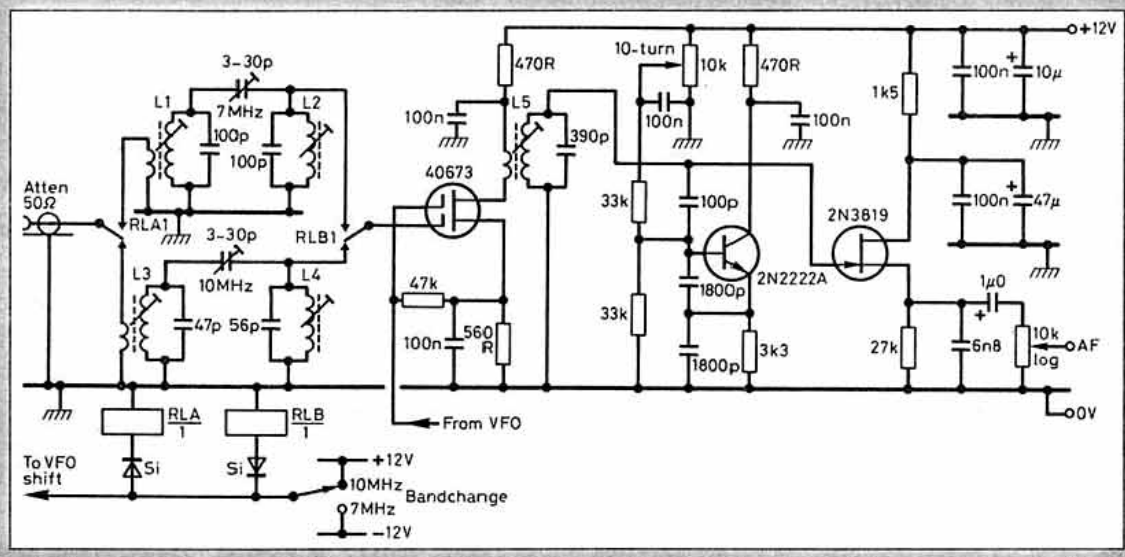


Fig 8: Heart of GM4HTU's super-gainer receiver for 7 and 10.1MHz showing the bandpass RF input filters, mixer and GI3XZM-type regenerative detector which operates on the fixed IF of 1700kHz. The VFO (not shown) covers 8.7 to 8.8MHz and is shifted to 8.4 to 8.45MHz for 10.1MHz. For CW reception an eight-pole Butterworth audio filter (not shown) is used. L1, L3 Toko KANK3334R 5.5µH. L2,L4 Toko 4.8µH; L5 Denco Red 3 adjusted to 1700kHz.

rejected in favour of the PLL frequency synthesizer despite its more 'noisy'output.

There is, however, another possibility emerging, as John Townend, G3BBD has found. This uses a low-cost ceramic resonator instead of a more costly quartz resonator. Ceramic resonators can be 'swung' over a much wider frequency range than quartz crystals; there is the snag, however, that the temperature co-efficient of ceramic resonators is considerably greater than that of a 'zero-temperature-coefficient' AT-cut crystal. But let G3BBD describe his experiences with ceramic resonator oscillators, sparked off by a *TT* item summarising some of the results achieved by Al Helfrick, K2LBA (*Ham Radio*, June 1985, pp 18-26) using ceramic resonators as mechanically and varactor tuned oscillators on 10 and 14MHz.

G3BBD writes: "Noting the *TT* (December 1985) item on the use of ceramic resonators in oscillator circuits, my interest was aroused by the inclusion in the *Radio Spares* (RS) catalogue of a number of ceramic resonators and, in particular, one having a frequency of 3.58MHz costing a mere 54p (RS part number 656-170).

"Experiments with this resonator in an oscillator circuit using one hex-inverter section of a CMOS 4069 IC showed that it produced a frequency-stable output provided that there was little change in the ambient temperature. The wide frequency change that could be achieved compared with a quartz crystal was confirmed. With the circuit-arrangement of **Fig 6** some 70kHz shift could be obtained with the 375pF variable capacitor. It was also found that the oscillator could be keyed by breaking the supply to the device and this produced a very acceptable keyed waveform without chirp provided that the supply voltage did not exceed 7 volts.

"A simple QRP (1W) driver/amplifier transmitter was then constructed (**Fig 7**) using the oscillator. This provided a frequency coverage from 3.522MHz to 3.590MHz - a most useful section of the 3.5MHz CW band. Because the oscillator is keyed, full break-in operation is provided.

"For this QRP transmitter, a second section of the 4069 IC was used as a buffer stage driving a VN10K VMOS device providing an output of a little over a watt. This would be more than adequate to drive one of the VMOS or HEXFET amplifiers described in recent issues of *TT* should an output of, say, 10W or so be required. Construction is extremely simple and, provided care is taken to ensure a reasonably constant temperature around the oscillator, temperature drift is minimal. In practice it was found to be less than 200Hz during the course of a 30-minute QSO.

"A number of further developments would seem possible. Firstly, the use of the two remaining 4069 hex inverters to act as an audio side-tone oscillator. The variable oscillator could be used also for a direct conversion receiver turning the transmitter into a transceiver. Although I have not tried it, a 4.00MHz ceramic resonator (RS part number 656-186) could be used as the variable frequency oscillator for a superhet receiver having an IF of 455kHz (possibly in conjunction with an NE602 mixer-oscillator - G3VA) which would cover most of the frequency

range of the transmitter. A 455kHz ceramic resonator could be used for the BFO. These devices are available from Cirkit at only one-fifth the price of a crystal.

"Further uses of ceramic resonators were considered. For example **Fig 9** shows an arrangement that provides a 1750Hz tone burst signal for a 'home-brew' 144MHz FM transmitter. Again, the 3.58MHz resonator is used with the oscillator output fed to a CMOS 4020 binary divider IC. The divide-by-two output on pin 15 provides a stable 1750Hz output, the oscillator being set to 3.584MHz. The remainder of the circuit uses a 555 timer IC which acts as a monostable, providing a high output on pin 3 which is sufficient to power the oscillator. The 555 is triggered when the PTT switch is closed and the duration of the burst is controlled by the 1MΩ preset resistor.

"To sum up. I am most impressed by these

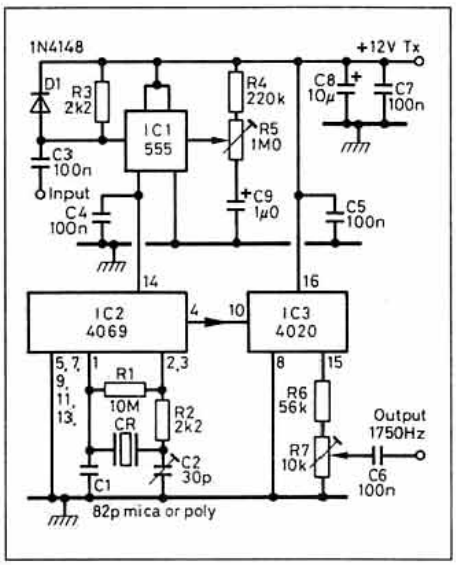


Fig 9: Use of 3.58MHz ceramic resonator oscillator (tuned to 3.584MHz) to provide 1750Hz tone burst signal for a 144MHz transmitter as used by G3BBD.

ceramic resonator devices. Used in oscillator circuits, they provide a good compromise between a crystal VXO and an LC variable oscillator without some of the difficulties experienced with the more complex LC circuits. The frequencies readily available are limited, but mixing techniques using conventional crystal oscillators should enable the wide frequency swing of the ceramic resonator to be achieved at any required frequency".

HEAVY-CURRENT 28V PSU

A NUMBER OF heavy-current (up to about 30A) 13.8V power supply units have been described in *TT*. However it has long been evident that for high-power linear amplifiers there are considerable advantages (including improved linearity) in using RF power devices (bipolar or FET) designed for higher voltage supplies such as the 24-28V commonly used for professional aeronautical equipment etc. A 28V PSU intended for use with high power linear amplifiers (eg 300W PEP output) has been described by Brian Jones, VK2BRD in *Amateur Radio* (VK) December 1990, pp15-16: **Fig 11**. (May I take this opportunity of thanking Bill Roper, VK3ARZ, General Manager & Secretary, Wireless Institute of Australia, for arranging to send me airmail copies of the excellent WIA journal *Amateur Radio* - a much appreciated gesture!)

The VK2BRD PSU features good regulation based on the use of four LM338 IC regulators, plus also survivability from accidental overloads. As VK2BRD puts it: "Good regulation is essential to prevent distortion in a high-power linear amplifier. Other factors taken into account in this design are controlled dissipation by all components to reduce the energy wasted at both low and high load currents. Component types used were chosen for their characteristics and reliability. "The hefty power transformer should be rated at about 1kW, with a heavy current secondary delivering 32V RMS (42/1.414 + 2V). An

AURAL PCB TRACK-TRACER

IT IS SELDOM EASY to trace the track layout of a printed circuit board for which no layout details are available, particularly in the case of double-sided boards. An ohmmeter or continuity tester, although useful, can pose the problem of trying to keep an eye on the display while holding both probes on the tracks. A tester needs to differentiate between the low resistance of a continuous track and the forward voltage drop across a semiconductor junction in order to eliminate false indications. It is, of course, also necessary to ensure that the active devices on the board are not subject to damaging voltages or currents from the tester.

A simple PCB track-tester, with aural rather than visual indication of continuity, has been described by Brian Weller, ZS2AB (*Radio-ZS*, March 1990, p11): **Fig 10**. This uses a 311 IC comparator with a reference voltage value of only about 0.2V established at pin 3 by the forward voltage drop of a *germanium* diode, while the other input on pin 2 is clamped at 0.6V by a silicon diode (1N4148). The 0.2V is below the forward voltage drop across the silicon semiconductor junctions of the board components and thus eliminates false indications from the junctions found on most PCBs.

Aural indication of continuity is provided by a piezo bleeper of the type with a built-in driver circuit; these bleep when DC is applied across their terminals. The 5K6 resistor limits current through the probes to about 1mA when these are short-circuited. Since the unit has low current consumption, power can be derived from, for example, four 1.5V penlight cells. There is no need to worry about the polarity of the probes when using the tester.

As long as the test-probes are not short-circuited through a track or low resistance, the voltage at pin 2 of the 311 IC is higher than at pin 3 and the output is 'high' so that the bleeper remains silent. As soon as the voltage at pin 2 drops below the 0.2V reference at pin 3, the 311 output switches to 'low' and the bleeper sounds.

ZS2AB found that his original unit would sound when the probes were across resistances of less than 300 ohms and could provide a false indication of track continuity. To reduce this, a 150 ohm resistor was added as shown in Fig 10. This overcomes the problem unless the on-board resistor has a value of less than about 100 ohms; such low-value resistors are uncommon on most PCBs. He describes track-tracing with the aid of this little unit as 'magic' and believes that it is likely to prove useful for other applications.

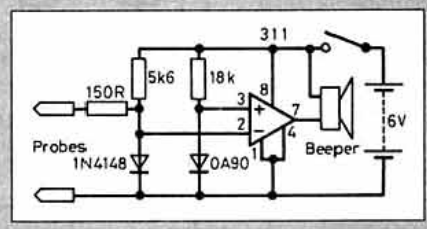


Fig 10: ZS2AB's simple PCB track-tester provides aural indication when the probes are short-circuited leaving eyes free for the probes.

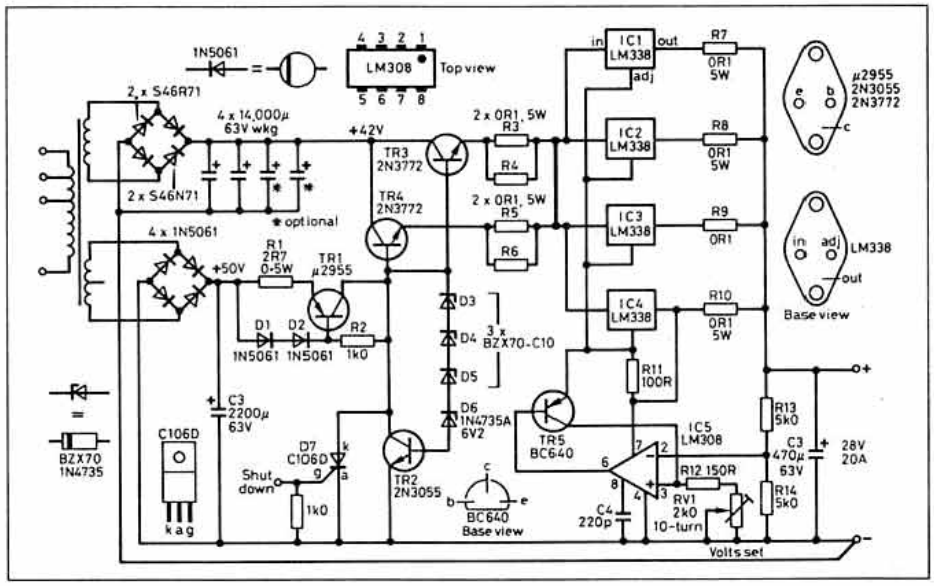


Fig 11: VK2BRD's heavy-current (over 30A) 28V power supply unit.

auxiliary supply requires a 37V RMS winding which can be on the same or a separate transformer; continuous load on this winding is only about 100mA.

The main rectifier uses four stud-mounted diodes (400V PIV, 40A) in two complementary pairs, mounted on two 76mm lengths of Philips 35D heatsinks, mounted vertically and insulated from each other and from earth, with insulated (mica) spacers. The 'normal' pair on one heatsink, providing positive output; the 'reverse' pair on the other heatsink providing negative output. Since up to 20W needs to be dissipated on each heatsink, VK2BRD warns against using four-terminal bridge rectifier assemblies as they may be unable to dissipate sufficient power and are likely to fail in this application.

Main filter capacitors should have low equivalent series resistance (ESR) and be rated for high ripple current in order to reduce the power dissipated by the series-pass devices. Similar care should be taken with wiring and layout: "Wiring technique and component placement are important around the rectifier area. A minimum of 4mm hook-up wire should be used and wire lengths kept as short as practicable. Capacitors should be mounted near the main rectifier but not so close as to heat them. Wiring should go from the transformer to the rectifier; from the rectifier to the filter capacitors; and then from the capacitors to the regulator components. The series-pass pre-regulator uses a 'zener diode' network comprising D3, D4, D5, D6 and TR2. This network dissipates most power at minimum PSU loading. The current source comprises R1, R2, D1, D2 and TR1, the voltage drop across R1 being held constant by the voltage across D1 and D2 and the beta of TR1. Both TR1 and TR2 are mounted on 76mm lengths of Philips 35D heatsink. All TO3 devices in this design mounted on heatsinks need to be insulated from them using high-quality mica washers with 'copious quantities of thermal paste applied'. The TO3 devices should have TO3 transistor insulator caps fitted to minimise voltage hazards. TR3 and TR4 series-pass transistors are heat-sinked with the IC regulators, using two 200mm lengths of Philips 55D heatsink (mounted vertically): TR3, IC1 and IC2 on one heatsink; TR4, IC3 and IC4 on the other. Load current sharing resistors are used with TR3, TR4 and the four IC regulators.

To prevent the IC load-sharing resistors from degrading the output voltage regulation, an LM308 op-amp (IC5) is used to monitor the output voltage and feeds a modified control voltage to the IC regulator 'adjust' pins via TR5. Output current is limited by the input-to-output voltage differential across the regulators. All wires carrying the heavy current lines should comprise short lengths of 4mm wire. Other wiring can use 0.5mm insulated wire.

HARRIS CATHODE-FOLLOWER (SOURCE-FOLLOWER) OSCILLATORS

IN THE STILL important world of analogue electronics, much basic solid state circuitry can be traced back to the valve era. Developments are often optimised solid-state versions of circuits pioneered in the heydey of valves. For much of that period, there was intense interest in improving the characteristics of tunable LC oscillators: Hartley, Colpitts, Franklin, ECO, Gouriet-Clapp, Seiler, Vackar oscillators all had their enthusiastic followers - and all have since appeared in solid-state guise.

My interest in one largely forgotten form of oscillator, first described by H E Harris in 1951, was aroused by the Dutch journal *Electron* (December 1990) which reprinted from its February 1958 issue an article by J J van Gelderen, PA0VGR describing a form of Harris VFO, using a 6J6 valve.

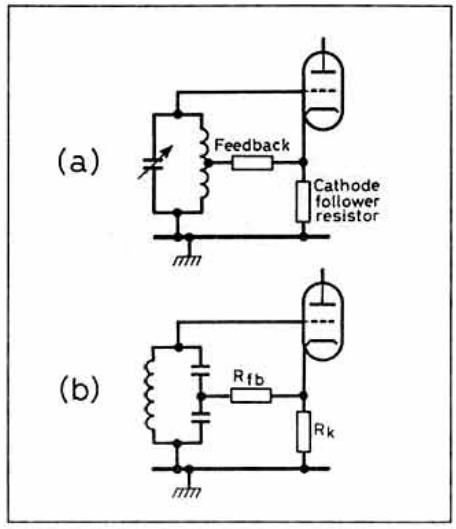


Fig 12: Two basic forms of the Harris cathode-follower stable LC oscillator.

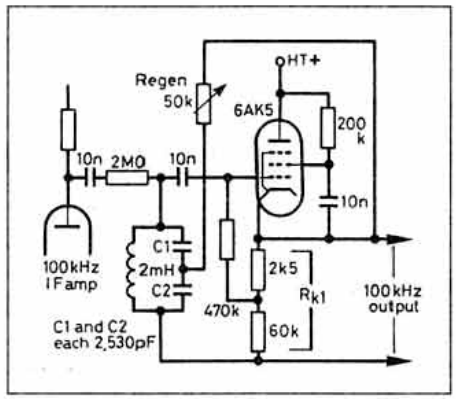


Fig 13: The simplified 100kHz Q-Multiplier described by H E Harris in *Electronics* (April 1951) using regenerative cathode-follower stage to provide variable selectivity.

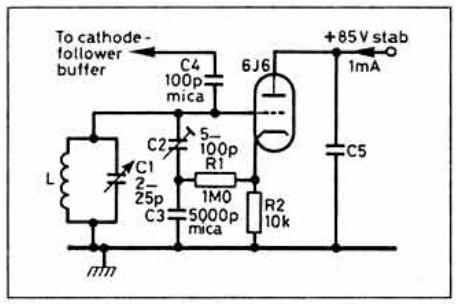


Fig 14: A Harris cathode-follower oscillator used for a 3.5MHz VFO by R Ropes and adopted also by PA0VGR. The Ropes design used both sections of the 6J6 dual-triode with 150V (regulated) HT (anode current 1.2mA) covering 3.5 to 4MHz (approximately 90% rotation of the 25pF tuning capacitor) with L 21µH (24 turns No 22, enamelled copper wire closewound on 1.25" diameter former).

The *Electron* item led me to *Radio & TV News*, June 1957 'A high-stability oscillator circuit' by Robert J Ropes; this in turn referred me to J K Clapp's 'Frequency stable LC oscillators' (*Proc IRE*, Aug 54) providing a detailed survey of a number of LC oscillators and to the original presentation of the cathode-follower family of oscillators by H E Harris in connection with an article on a 'Simplified Q Multiplier' (*Electronics*, May 51,).

In the Harris oscillators (**Fig 12**) use is made of the fact that while a cathode-follower has less than unity voltage gain, it has power gain, good phase regulation and presents a very high impedance at its grid. With a valve having a low grid-cathode capacitance this means that full advantage can be taken of the high-Q LC tank circuit with good isolation between the i/p and o/p circuits. In other words, stability is largely determined by the LC tuned circuit.

In effect, a portion of the cathode-follower output is stepped up by passive components and fed back to the grid of the valve to provide the positive feedback necessary to sustain oscillation. In the original application as a (regenerative) Q-Multiplier, it gave controllable selectivity of a very high order with excellent stability: **Fig 13**. The later applications, developed by Ropes and PA0VGR, showed that the basic Harris ideas could usefully be applied to HF VFOs for amateur radio, providing a stable output that can remain constant over wide variations of the LC ratio, a characteristic that cannot be achieved with the conventional high-C Colpitts oscillator.

R J Ropes dubbed his version a 'Class A Colpitts' (more precisely Class AB) but pointing out that it differs radically from the conventional Colpitts oscillator: "Since the oscillator operates in Class AB, no grid current flows during any part of the oscillatory cycle, there is no 'grid-leak' capacitor and no grid-bias voltage is produced by grid-current flow, as is the usual case in a Class C oscillator."

He also noted that: "As pointed out by Clapp, the frequency coefficient of an oscillator is independent of the LC ratio *if* the operation of the circuit is *linear*, that is Class A, AB or B. Since Class A operation of an oscillator is, for all practical purposes, impractical, Class AB or B operation must be used to give the necessary linearity of oscillation."

As with other Colpitts, Hartley, ECO type oscillators, maximum stability is obtained when the capacitive divider or inductive tapping is as close as possible to the earthy-side of the tank circuit while still providing the necessary feedback. With capacitive tapping, this implies making the lower capacitor of higher value than the capacitor connected to the grid. It should be noted that R1 (**Fig 14**) provides the positive feedback and is not intended to pass DC in the manner of a grid leak. For Q-multipliers, the degree of positive feedback and hence the onset of oscillation can be controlled by making this resistor variable. Active devices should have reasonably high gain and low input capacitance. Ropes used a 6J6 twin-triode with both sections in parallel. PA0VGR's circuit shows only a single section of the 6J6.

There seems no reason why Harris-type oscillators should not work well with FET source-followers provided that the input-capacitance of the device is reasonably small.

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RADCOM CONSTRUCTION FEATURE

How to Lay Out RF Circuits

. . . and how to build them

The first of a 2 part article by Ian White, G3SEK

A GAP IS OPENING up between experienced radio constructors and the larger number of people who started electronics in the age of PC boards and kits. Many people feel cut off from the constructional side of amateur radio, because they don't know how to get started. One of the basic problems is how to translate a circuit diagram into a real-life *working* RF circuit. Another is the perception that everything needs to be built on a printed circuit board - which actually isn't true; there are easier ways. But the biggest problem in getting started with RF construction is the lack of *practical* information - so here goes . . .

Printed circuit boards are everywhere - in all kinds of consumer electronics, in all your amateur radio 'black boxes' and in almost every constructional project in *RadCom* and other magazines. If you're a relative newcomer to amateur radio, you might imagine there's some law against building equipment in any other way! So why does everyone use PC boards? The big advantage of PC boards over all other methods of construction is that they are reproducible. They allow many units to be mass-produced using exactly the same layout, reducing the time and tedium of conventional wiring and minimizing the possibilities of wiring errors. Reproducibility is also important for *RadCom* authors, who want readers to experience the minimum of problems in building their designs.

Absolute newcomers to home construction always feel more secure when construction has been simplified to the mere assembly of components onto a PC board. If you want to get started on home construction - and you're missing the best part of amateur radio if you don't - then make a start by assembling a few kits using PC boards.

'ONE-OFF' PROJECTS

BUT THERE'S ANOTHER side to radio construction - building and developing your own circuits, starting from circuit diagrams. For this kind of personal 'one-off' construction, proper PC boards are really not necessary. It takes time to lay out, drill and etch a PC board, and alterations are difficult if you change your ideas or make a mistake. Most important of all, PC boards aren't always the best technique for building RF circuits.

In this article, I will describe several other ways to build circuits for HF, VHF and UHF. Mostly I'll be concentrating on the type of construction required for receivers, exciters and low-power transmitters - the kind of thing described in the excellent *Solid State Design for the Radio Amateur* [1]. If you're even mildly curious about the constructional side of amateur radio, buy that book - it's a gold-mine of good ideas and will provide you with many hours of happy experimenting. *[See page 78 for RSGB Mail Order Price List]*

'UGLY-BOARD'

COPPER-CLAD FIBREGLASS PC board is by far the lightest and most easily soldered form of sheet copper, and if you drill or peel away the copper it's also an excellent RF insulator. The constructional methods I'm going to describe are based on single-sided PCB material, using the expanse of copper as a low-impedance RF groundplane. None of these techniques looks as pretty as a properly etched PC board - in fact their generic name is 'ugly construction' or 'ugly-board' - but they are at least as effective in terms of RF performance.

LAYOUT

IF A CIRCUIT IS WELL designed on paper, it only has the *potential* for working well. How it works *in practice* depends on the layout. Poor layout can ruin the performance of even a well-designed circuit.

Most layout problems with RF circuits can be traced to unwanted coupling or feedback of signals from one part of the circuit to another. Strong positive feedback can cause oscillation, and negative feedback may cause mysterious lack of gain. At lower levels of unwanted feedback the equipment may work after a fashion, but behaves in a skittish and unreliable way.

The basic ideas of good layout are very simple, and are far easier to implement with 'ugly' construction than with properly-designed PC boards. 'Ugly' construction gets its name because you pay no attention to making the result look pretty - your only concern is to make it *work*.

A circuit diagram is a poor guide towards an appropriate layout. Circuit diagrams are drawn to look neat on paper, and they follow drawing conventions which have very little to do with the way the circuit works. The European convention is to draw the positive DC supply rail along the top, and make almost all ground connections onto a common 'busbar' along the bottom. In US publications, the convention is to scatter 'ground' and supply-voltage symbols all over the place. Both of these are strictly *drawing* conventions, so the First Rule of RF Layout is - **DO NOT WIRE RF CIRCUITS AS THEY ARE DRAWN!**

HOW TO LAY OUT A CIRCUIT

THE EASIEST WAY TO explain about good layout is to take you through an example. **Fig 1** is the circuit diagram of a two-stage receiver IF amplifier using dual-gate MOSFETs - it's nothing special, so I haven't even included any component values. Study Fig.1 carefully and ask yourself three questions -

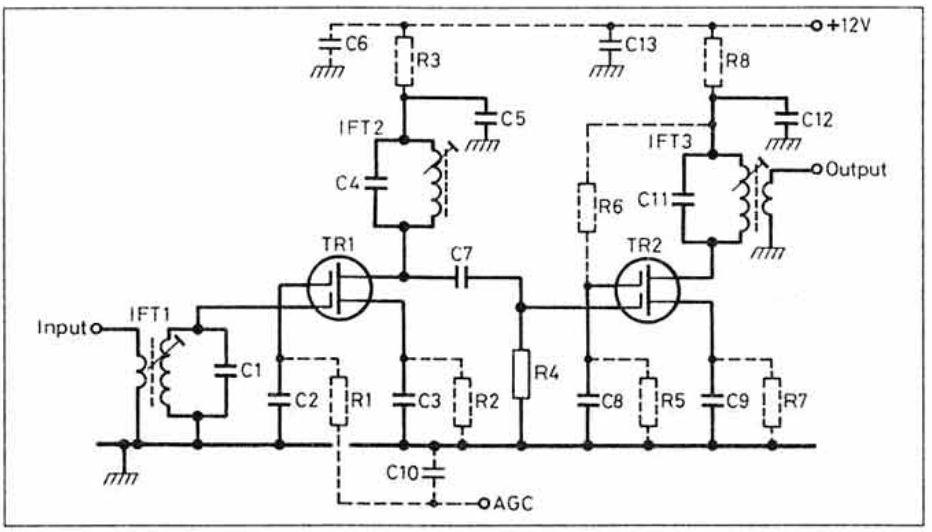

Fig 1: IF amplifier used in layout example

1. Which are the RF components, and which are only involved with LF or DC?
2. Which components are in the main RF signal path?
3. Which components are in the ground return paths?

To answer question 1, the RF components in Fig 1 are shown in heavy lines, though not all of these components are in the main RF signal path. The answer to question 2 is that the RF signal path consists of IFT1 and C1, TR1, IFT2 and C4, C7, TR2 and IFT3 and C11. These need to be laid out in almost a straight line, to avoid feedback from output to input, so you can pencil them in to form the backbone of your layout (**Fig 2a**).

Question 3 requires some further thought - what do we really mean by 'ground' and 'ground return paths'? Some points in the circuit need to be kept at RF ground potential, and the nearest you'll find to true ground potential on a PC board is a copper groundplane covering the whole of one side. Points in the circuit which cannot be connected directly to ground for DC reasons must be bypassed ('decoupled') to ground by capacitors which provide ground return paths for RF. In Fig 1, the components in the ground return paths are the RF bypass capacitors C2, C3, C5, C8, C9 and C12. R4 is primarily a DC biasing component, but it is also a ground return for RF so its location may be important.

The values of RF bypass capacitors are chosen to present a low reactance at the frequency in use; typical values would be 0.1µF (100nF) at LF, 0.01µF (10nF) at HF, and 0.001µF (1nF) or less at VHF. Not all types of capacitor are suitable for RF decoupling; for preference, use miniature disc or plate ceramic capacitors - and always with *short leads*.

Almost every RF circuit has an input, an output and a common ground connection. Many circuits also have additional ground connections, both at the input side and at the output side. It is vital to keep input and output ground connections distinct, and to place a low-impedance common ground between them. The input ground connections for TR1 are the grounded ends of C1 and the two windings of IFT1. The two ends of an IF transformer winding are generally not interchangeable; one is designated as the 'hot' end, and the other must be connected or bypassed to RF ground. The tuning capacitor is often mounted inside the can of the IF transformer, leaving only two component leads to be grounded as shown in **Fig 2b.**

The common RF ground for TR1 is its source connection via C3. Since TR1 is in a plastic 'cross' package which can be mounted either way up, we can choose to make the common ground either above or below the signal path in Fig 2b. Although the circuit diagram shows the source at the bottom, the practical circuit will work much better with the source at the top, because of the pin connections to IFT2. It's a good idea to locate the 'hot' end of the main winding close to the drain lead of the transistor package, so the other end will be towards the top of Fig 2b. If the source of TR1 is also towards the top of the layout, we can establish a common ground point for C3 (the source bypass capacitor) and the output bypass capacitor C5. Gate 2 of TR1 can safely be bypassed towards the bottom of the layout.

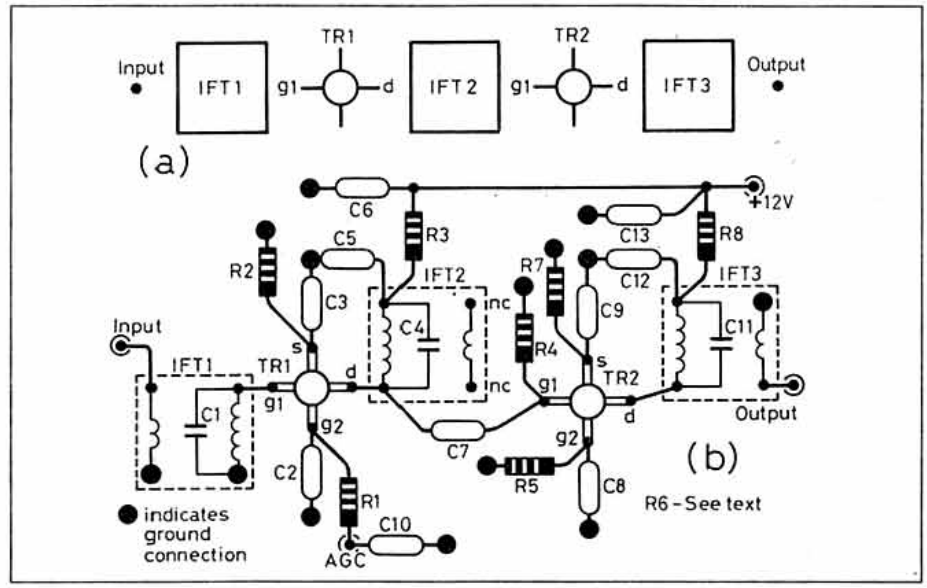

Fig 2. Layout sketches - a) preliminary line-up and b) the final RF layout

C7 carries the signal from the output of TR1 to the input of TR2. The source of TR2 should be bypassed towards the top of the layout, in exactly the same way as the source of TR1. R4 is not particularly critical, but it might as well be connected on the same side also. Note how the pinout of IFT3 has placed the output connection as far as possible from the input. With this layout for the signal path and the critical RF components, the circuit has an excellent chance of working properly.

DC COMPONENTS

THE REST OF THE components carry only DC, so their layout is much less critical. Even so, try to keep everything well-separated from the main RF signal path. It's pretty obvious that the +12V rail should go along the top of the layout, and the AGC connection at the bottom. The source bias resistors R2 and R7 can be placed alongside C3 and C9. The gate-2 bias resistors for TR2, R5 and R6, are not RF components so their locations aren't too critical. However, R7 has to cross the signal path in order to reach C12, and the best way to avoid signal pickup would be to mount R7 on the opposite side of the copper groundplane from the signal wiring. Generally speaking, the best types of resistors for low-level RF circuits are the compact and reliable 0.125W or 0.25W metal-film or carbon-film types.

Actually, it's not quite true to state that resistors such as R3 and R8 are 'not RF components'. Their function is to provide a relatively high impedance to RF in the positive supply lead. Because of R8, for example, the RF currents circulating in IFT2 will prefer to take the easy route to ground via C5 rather than wandering along the +12V rail and perhaps causing unwanted RF feedback. Just to make sure, C6 bypasses the top end of R3, and C13 serves the same function for R8. Note that the gate-2 bias resistor R6 is returned to C12 rather than directly to the +12V rail, to take advantage of the extra decoupling provided by R8 and C13.

If you build something, you want it to work first time - *don't cut corners*! Some commercial PC boards seem to take enormous liberties with layout, bypassing and screening; but don't assume that you can do the same. Never skimp on extra decoupling components such as R3, C6, R8 and C13, even though they might not all be absolutely necessary. If other people's designs have left them out, put them in again. In the long run it's far easier to take a little more time and use a few extra components, to build in some insurance that your circuit will work first time.

Let's summarize how we got from Fig 1 to Fig 2b.

1. Lay out the signal path in a straight line.
2. By juggling with the orientation of the components in the RF signal path, group the RF ground connections for each stage close together, without mixing-up the input and output grounds.
3. Place the non-RF components well clear of the signal path, throwing in some extra decoupling components for luck.

And that's how to plan the layout of an RF circuit - simple, wasn't it?

REFERENCES AND NOTES

[1] *Solid State Design for the Radio Amateur* by Doug DeMaw W1FB and Wes Hayward W7ZOI (ARRL). Published in 1977, this is still the best introduction to RF design and construction in amateur radio.

To be concluded . . .

Next month Ian White deals with the various construction mehtods: wired tracks, pin-and-wire, surface mounting, dead bugs, sticky copper and other construction methods.

A Magnetic Loop Antenna for the Low Bands

(40,80 and 160 Metres)

by Roberto Craighero I1ARZ

THE GOOD RESULTS obtained with the loop antenna for 20m and above [1] persuaded me to try a similar antenna for 40m and below. My original intention was to build a circular antenna with a circumference of 10. 5m (corresponding to a quarter wavelength at 40m) to obtain maximum efficiency at 40m, and reduced performance on the lower bands. In my search for suitable copper tubing for the loop, I found some 40mm diameter pipe with a wall thickness of only 1mm, and thus very lightweight. However, as it was impossible to bend it without cracking or buckling the tube, I decided to design a square loop to overcome the bending problem. The radiating efficiency of a square loop is less than that of a circular one, but the constructional advantages in my case were compelling. This article describes the square loop I built, together with constructional details for a circular loop.

SIZE AND TYPE OF LOOP CONDUCTOR

FOR THE RANGE OF frequencies to be covered (1.8 - 7.2MHz), a large diameter copper pipe should be used, certainly no less than 25mm, and preferably 30 to 40mm. Aluminium tubing with diameters greater than 30mm could be used, but most amateurs do not have access to welding equipment needed to make reliable, low resistance connections to this material. To keep losses low, the loop should be carefully polished and given at least three coats of marine varnish before erection.

TUNING CAPACITOR

THIS IS THE MOST important part of a transmitting loop antenna, and every attempt must be made to obtain a good quality capacitor. The best (and most expensive) is a vacuum capacitor with a maximum value of around 1000pF and minimum of 7pF, which can sometimes be found on the surplus market. A unit rated at 7kV will operate safely with over 100W RF input power. Alternatively, a split stator or butterfly capacitor with double the nominal loop resonating capacitance can be used. This may not be practicable for operation on 160m, where around 1600pF per section would be needed.

PHYSICAL CHARACTERISTICS OF THE ANTENNA

THE SQUARE LOOP HAS sides of 2.50m, requiring 10m of tubing. The four corners are standard 90° copper elbows used for water or gas installations, and should ideally be brazed to the pipes. Alternatively, soft soldering with a gas torch will serve. All brazing or soldering should be carried out on a flat (concrete) floor to ensure that opposite loop sides remain parallel. A 100mm gap should be cut in the centre of the top pipe of the loop, and a bar of PTFE or Perspex should be inserted and locked in place with screws to stabilise the structure.

If construction of a circular loop is contemplated, the diameter should be 3.40m, requiring 10.67m of tubing including the length of connection straps to the tuning capacitor. Form two half-loops, and join them at the base by brazing, so that only one joint is required. A PTFE or Perspex bar will be needed between the free ends (as for the square loop) to make the structure rigid.

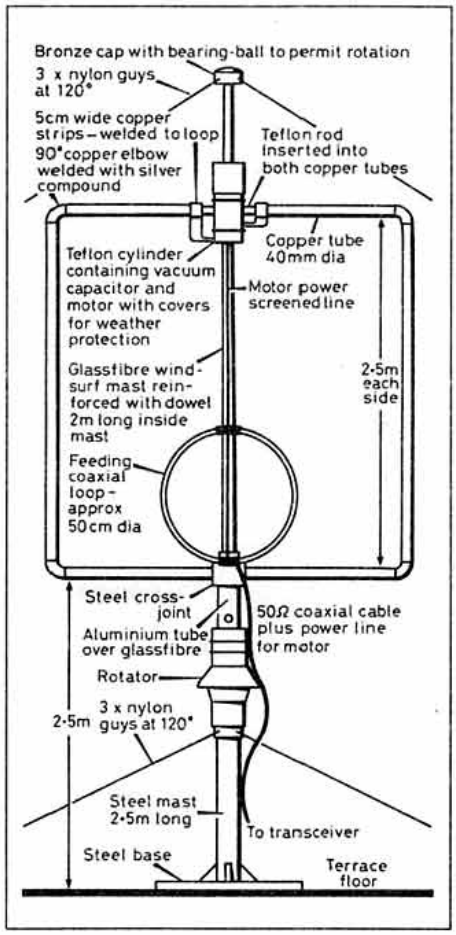

Fig 1: General arrangement of loop antenna system

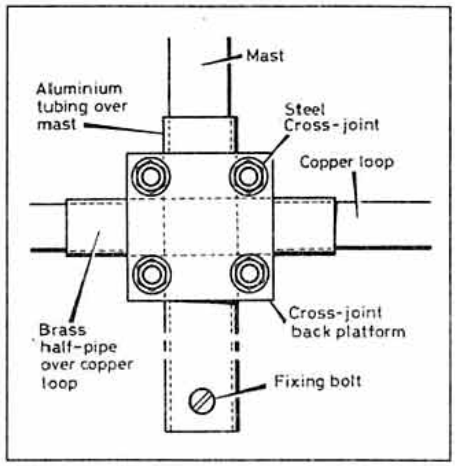

Fig 2: Detail of mast attachment, bottom of loop

THE SUPPORTING MAST AND PEDESTAL

THE GENERAL ARRANGEMENT of the loop antenna is shown in **Fig 1.** I support my loop with a discarded fiberglass windsurf board mast. The mast is reinforced with a 2m tapered wooden dowel inserted from the base. A thick-walled PVC tube could be used as an alternative support. The bottom of the loop is fastened to the mast by a stainless steel crossover clamp. The copper tube is protected from the clamp by 300mm of brass tubing, split and fitted over the loop tube before tightening. The mast is reinforced at the crossover with a sleeve of 60mm diameter, 3mm wall aluminium tubing, located by a bolt passed through the sleeve, mast and reinforcing dowel, and bonded to the mast by filling the gap with epoxy glue, (**Fig 2**). The mast is capped with a bearing fitted to take three guys at 120° intervals, arranged so that the mast and loop can rotate freely. The guys should be made from nylon or polypropylene rope. A similar system would be required to support a circular loop.

My loop is mounted on a flat roof on a very heavy circular steel base, to which is welded a 2.5m long, 60mm diameter steel mast which carries the rotator. This mast is kept in place by three equispaced thick nylon guys tensioned by turnbuckles. With this supporting structure the loop has survived very high winds without problems. Do not underestimate the weight and wind loading of a loop of this size!

THE LOOP FEEDING SYSTEM

THE BEST METHOD OF feeding is by inductive coupling with a small loop made from RG8 or RG213 coaxial cable as shown in **Fig 3.** The inner and outer of the cable are shorted together and connected to the outer at the base of the loop. The cable is cut at the top centre of the loop, and the inner of the driven side is connected to both inner and

outer of the remaining part of the loop. The diameter of the coupling loop must be found by experiment, but should be about 500mm. Adjustment is easier if a slightly oversize loop is built, and symmetrically trimmed back at the top connection. The free cable end is terminated in a plug, which is connected to the end of the feeder via a barrel (socket to socket) connector. This avoids the need to braze a flange to the main loop, as described in my earlier article [1]. The connectors must be sealed and waterproofed, of course. The coupling loop is held in place by a copper strip soldered to the braid at the bottom of the coil. The strip is formed round the aluminium sleeve at the base of the support mast, and the ends pulled together by brass bolts run into nuts brazed or soldered to the strip, **Fig 4**. About 50mm of PVC tubing with a bore slightly larger than the cable should be slipped over one half of the loop before the ends are joined and the diameter adjusted for minimum VSWR. On completion of the adjustments (see below), the soldered joint should be carefully taped up to prevent moisture ingress, and the PVC tube slid over the joint to protect the tape. The top of the loop should be fastened to the mast with a plastic clamp.

THE TUNING MOTOR DRIVE AND FEED WIRING

THIS WAS DESCRIBED in detail in my original article [1], and an electronically controlled alternative was published in *Technical Topics*, November 1989, page 37 [2]. The latter has two errors; the motor is shown as 'meter' on the diagram, and the minimum motor voltage should be 3 to 4V, not 0. 75V. Richard Kelsall, G4FM, has sent me details of another method to drive the capacitor on a high band loop which he says, has the advantage of band selection by switch, rapid band changing, fine tuning within each band and direct indication of the band in use. Although I have not tried this myself, his circuit is reproduced in **Fig 5**, with his permission.

The motor feed wiring should be screened and secured to the support mast with plasic clips. The screens must be bonded to the motor body and to the grounding point at the centre bottom of the loop, and the motor leads must be bypassed with 10nF capacitors bonded to the motor body. Do not attempt to run the motor feedline through the tubing of the loop, as the radiation efficiency will be greatly reduced.

VACUUM CAPACITOR INSTALLATION

THE ARRANGEMENT I USED is shown in **Fig 6**. The aim is to keep the RF resistance to a minimum. Two brass bushings were made to fit the vacuum capacitor contacts exactly, each secured by at least three large screws bearing on the contacts. Do not try to solder to the capacitor directly, as you will break it. The loop connections are made with 50mm wide, 0. 5mm thick copper strips about 300mm long, which are brazed to the brass bushings prior to assembly. If possible, silver plate the straps and bushes to reduce the RF resistance. The capacitor is housed in a PTFE or Perspex tube with slots to clear the connecting straps, and is fixed in place by three

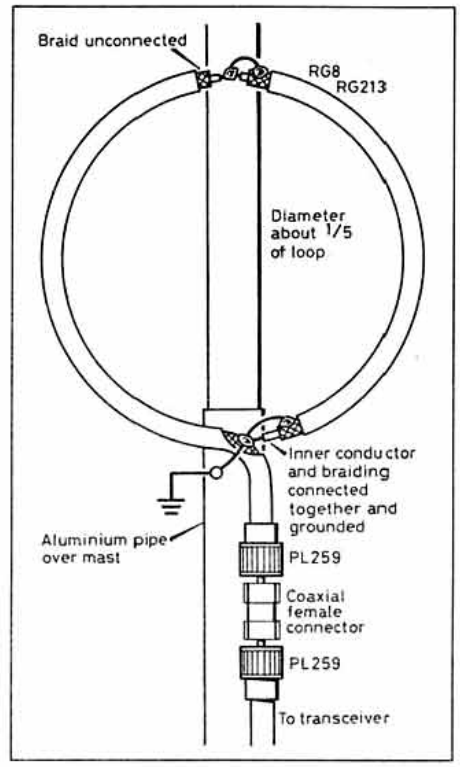

Fig 3: Detail of coupling loop

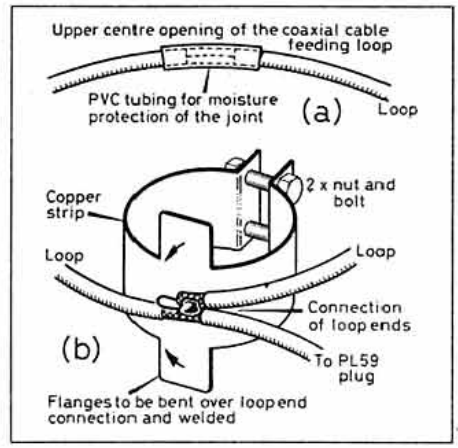

Fig 4: Detail of coupling loop fastening and sealing arrangements

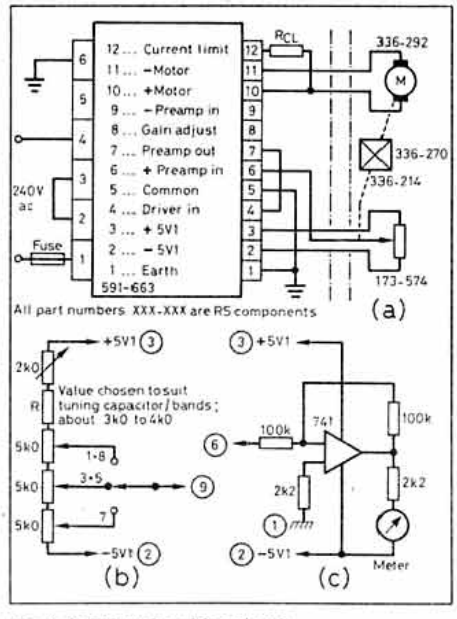

Fig 5: G4FM tuning drive circuit

equispaced screws through the tube bearing on each of the bushings. The ends of the tube are closed with PTFE or Perspex caps secured with self-tapping screws, the uppermost cap having a central hole to clear the capacitor drive shaft. Partial filling of the tube with silica-gel to absorb moisture will help to prevent oxidation of the silver-plated components. The upper cap carries the motor, reduction gear and the insulated shaft coupling in their own weatherproof housing. Cable and connecting strap entries should be sealed with silicone rubber compound. The assembly should be secured to the mast with two brass U-bolts, the closing bar being made from thick nylon or other plastic to avoid forming a 'shorted turn' round the capacitor (**Figs 7 and 8**). Alternatively, the assembly could be lashed to the mast with polypropylene rope secured with epoxy adhesive. The top of the main loop can be secured to the mast with brass bolts and a plastic bar in a similar fashion. Braze or solder the capacitor straps to the loop ends, removing the plastic spacer whilst this is carried out.

ADJUSTING THE ANTENNA FOR MINIMUM VSWR

THIS MUST BE CARRIED OUT with the antenna in its final position, with the coaxial feeder and the motor control line dressed vertically below the base of the loop for at least 1m, otherwise results will be unreliable. Fit an SWR meter in the feeder at the coupling loop; a second meter next to the transmitter is helpful in tuning to resonance. Do not use an antenna tuning unit for these tests.

Apply minimum power to the antenna and adjust the tuning motor for resonance. If the SWR is too high, try deforming the coupling loop slightly; if this does not produce desired results, change the size of the coupling loop. With a little patience, a VSWR below 1.5:1 can be obtained on all bands. I obtained VSWRs of 1. 5, 1. 2 and 1:1 on 40, 80 and 160m respectively. The transceiver load capacitor should be adjusted to the minimum capacitance that gives acceptable results.

LOOP PERFORMANCE

THE LOOP VSWR BANDWIDTH is very narrow. On 160m, I notice that although I obtain a 1:1 VSWR on tune-up, the SWR jumps to high values on SSB modulation peaks. This is not a problem when using CW, of course, due to the narrower bandwidth of this mode.

A rotator for turning the loop is preferable, but not essential. I notice different degrees of directivity according to propagation conditions, but the directivity seems greater for this loop than the high-band version. The maximum to minimum signal ratio for ground waves is about 18dB (3 S-points) in both transmission and reception tests.

The loop performs well, and I am well pleased with it. The performance is similar to a dipole a half-wave above the ground, and best reports are obtained on 40m where the efficiency is highest. I have worked several USA East Coast stations obtaining S9 report with 50W of RF power. Daytime reports for distances below 500km are usually 20 to 25dB over S9. The antenna is excellent for reception, as most man-made noise, static

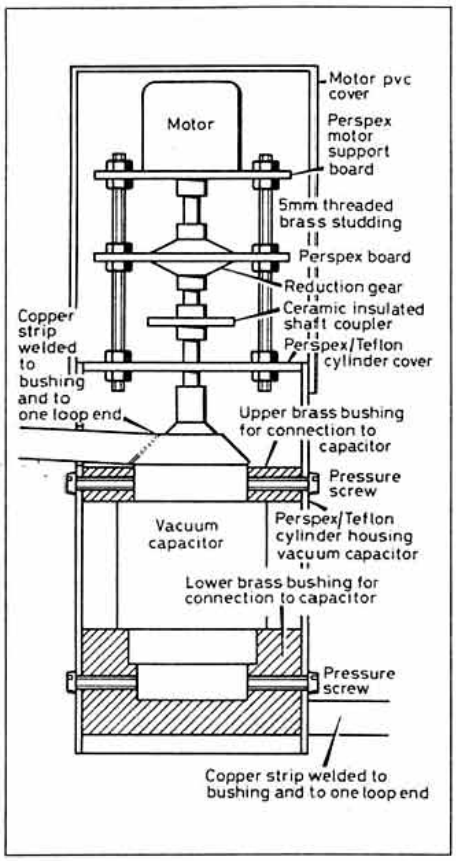

Fig 6: Vacuum capacitor housing and driving arrangement

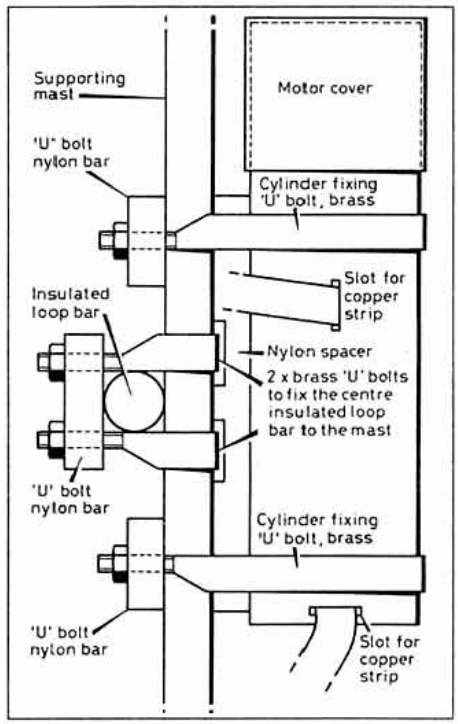

Fig 7: Vacuum capacitor mast mounting arrangement

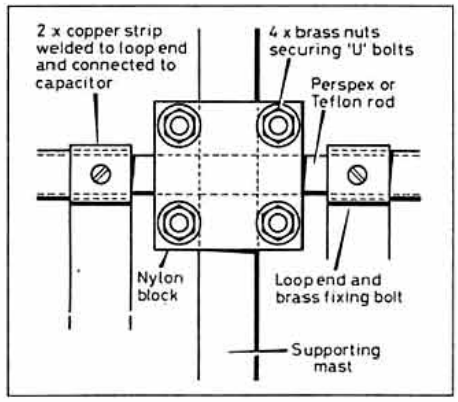

Fig 8: Detail of mast attachment, top of loop

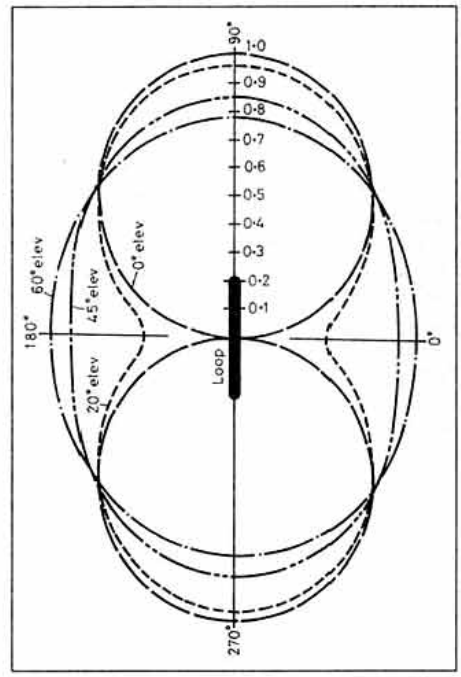

Fig 9: Radiation patterns

and splatter is greatly reduced because of the high selectivity, and you can hear weak signals that would otherwise be lost in the noise.

I was surprised at the performance on 160m, which I had not originally intended to try. The first QSO that I had with a station 500km away returned a report of 20dB over S9! I know from theoretical calculations that the efficiency of the loop is much less than 10% on this band, but I worked 13 countries in a couple of hours during an SSB CQ World Wide Contest with excellent reports. I had not been able to work 160m before because of lack of space for wire antennas for this band. For people unable to use large wire antennas, the loop, in my opinion, offers an alternative with good possibilities of satisfactory results.

TAILPIECE

A GOOD EARTH CONNECTION at the loop helps to ensure stable VSWR adjustments, and a groundplane beneath the loop, even if not connected to it, will increase the efficiency [4]. The use of monoband loops should be considered where possible, as the efficiency of a small loop is greatest when the circumference is a little less than one quarter wavelength, and declines quickly as the frequency decreases. The tuning range of a multiband loop should not exceed 2:1 for this reason.

The monoband loop offers other advantages as well:-

- Reduced Q factor and lower capacitor RF voltages.
- Wider bandwidth and less critical tuning, allowing higher tuning motor speeds.
- Smaller capacitor needed to resonate the loop.

For monoband operation, a smaller range, cheaper tuning capacitor can be used in parallel with a fixed capacitor. A good quality fixed capacitor is needed for transmission, but for powers up to 100W, a piece of RG8 cable (100pF/m) or copper clad printed circuit board [2] can be used. To avoid heating problems, several capacitors of equal value can be connected in parallel - the RF current is then divided between them.

The radiation pattern for the loop for different elevation angles is shown in **Fig 9**, and is suitable for DX, medium and short range operations.

The loop should be kept away from large conducting objects like fences, masts, pipes and cables, which affect radiation efficiency because of the currents induced in them. I would also discourage the use of the loop indoors close to the shack because of the risk of RF burns if touched, and the possible risks associated with long-term exposure to high RF (magnetic) fields.

The references below include new material not listed in the reading list at the end of my earlier article [1].

MAIN ELECTRICAL CHARACTERISTICS OF THE ANTENNA

		Square shape MHz			Circular shape MHz		
		7.0	3.5	1.8	7.0	3.5	1.8
Radiation resistance	Ohms	0.36	0.023	0.002	0.76	0.05	0.003
Conductor length	metres	10.0	10.67	10.67	10.67	10.67	10.67
Conductor diameter	mm	40	40	40	40	40	40
Conductor losses (copper tubing)	Ohms	0.058	0.04	0.03	0.05	0.04	0.03
Efficiency	%	88	36.5	6.3	93	53.5	10
Loop inductance	µH	8.2	8.2	8.2	9.6	9.6	9.6
Inductive reactance	Ohms	360	180	93	422	211	108
Q factor	Q	440	1454	1466	258	1187	1650
Theoretical bandwidth	kHz	15.9	2.4	1.23	27	3.0	1.09
Voltage across tuning capacitor (100 watts)	kV	4.0	5.1	3.7	3.3	5.0	4.2
Tuning capacitance	pF*	63	252	953	54	215	815

* Including length of the connection straps to tuning capacitor.
* When using split stator or butterfly capacitors this value must be doubled for each section.

REFERENCES

[1] R Craighero "Electrically Tuneable HF Loop" *Radio Communication*, February 1989 pp38-42
[2] *Radio Communication*, Nov. 1989
[3] *ARRL Antenna Book*, 15th Edition, 1988
[4] Ted Hart "The Convoluted Loop" *Ham Radio Magazine*, April 1989

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IDEAS FROM ABROAD

TRANSLATED BY ERWIN DAVID, G4LQI

ORIGINALLY FROM ***CQ-DL*** (Oct '89) is an invention (patent pending) by **Karl H Hille, DL1VU** with top band through VHF applications. DL1VU's **SARDINE TIN OPENER** proves that, for some antenna elements, reduced size does not mean reduced performance. A follow-on article will contain some MININEC-based comments and several applications. Translated and edited by **Erwin David, G4LQI**

T-ANTENNAS - BETTER AND SMALLER

IF A FULL-HEIGHT VERTICAL radiator for low-angle DX working is impractical, a lower one with top loading can be almost as good. Two simple versions have been known for ages: inverted-L and T antennas. The inverted-L combines low-angle vertically polarized radiation with high-angle horizontally polarized radiation; occasionally, the combination is useful. The T-antenna gives mostly vertically polarized omni-directional low-angle radiation but some radiation from the horizontal member remains. Special reduced-radiation top loading elements have been devised; this article describes the latest and smallest.

Consider the single-wire top load of the basic T-antenna. To achieve a current maximum at the top of the vertical radiator, the horizontal top loading wire must be $\lambda/2$ long. This creates at the centre of that wire two half current loops and, at that same spot, a voltage node and thus a low impedance **(Fig 1a)**.

Fig 2 shows the current distribution on that centre-fed horizontal wire. The area between distribution curve and wire is a graphic representation of the radiation from the conductor. Also indicated is the current phase angle in electrical degrees: $\lambda = 360°$.

Note that the current curve is shown above the wire on the left and below the wire on the right, corresponding to the direction of the current: from 0-90° the current flows centre-left and from 270-360° centre-right. The orientation of the current areas and the corresponding degrees can be visualized from a sine curve.

The 'area under the curve', ie between wire and current plot, is a measure for the radiation from that conductor. This area, eg from 0-90°, can be calculated as a simple integral, if, as in fig 2, the current plot has the shape of a sine wave. Graphically, if you draw the area 0-90° and take 90° as $\Pi/2$, its length is 1.57cm. The current loop at 90° is drawn 1cm high. The area now is exactly 1cm².

IMPROVED CONFIGURATIONS

NOW LOOK AT THE DERIVATIVES of the T-antenna, of which fig 1a shows the original. **Fig 1b** shows the 1939 model by Norman Wells. The 3-wire horizontal span is only $\lambda/4$ long. **Fig 1c** shows my 1976 design, UK patent No. 1,454,101. The horizontal span has been reduced to $\lambda/6$. The idea for an even smaller top load came to me in 1988: a two-wire top load in the shape of a sardine tin opener comprising a total wire length of $\lambda/4$ and a span of only $\lambda/8$, the ultimate reduction: **Fig 1d**.

EVALUATION OF THE IMPROVED MODELS

THE PURPOSE OF THE TOP load is to create a point of low impedance where it connects to the vertical radiator while minimizing radiation from the top load. The latter is achieved when currents within the top load are arranged so that radiation from its parts largely cancels out. How this cancellation works is easy to see by looking at the current distribution on the conductors. If two radiation plots face each other with equal areas but opposite sense, the net radiation is zero. This is the principle of any two-wire feeders such as ribbon or open-wire lines. If the facing areas are not equal, there will be net radiation of a magnitude approximated by the difference between the two areas.

As an example, **fig 3** shows the approximate current distribution of my 1976 flat top. The italic numerals give the size of the area in which they are printed. Using a traditional method, the numbers were calculated from the integral mentioned above for a current of 1A in the current loop and the phase angles in degrees as inscribed in small numerals. The net radiation can be calculated by algebraic addition of the areas. In the left half this yields: +0.129 + 0.492 - 0.355 = +0.267 and in the right half -0.267. Radiation from the short jumpers at each end is extremely small and may be neglected.

From the basic $\lambda/2$ T of fig 1a (left +1.0, right -1.0) via Wells' 3-wire $\lambda/4$ span of fig 1b (left +0.414, right -0.414), a clear progression towards the suppression of unwanted radiation and reduction of span is shown.

To be concluded . . .

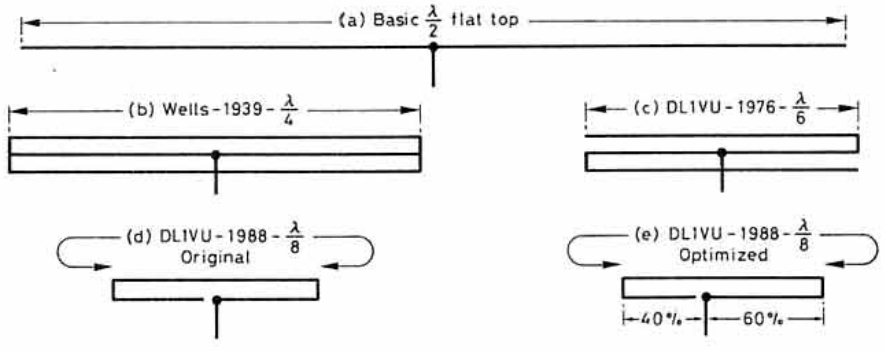


Fig 1. Four generations of T-antennas. a) basic $\lambda/2$ model. b) $\lambda/4$ span according to N Wells, 1939. c) $\lambda/6$ span by DL1VU, 1976. d) symmetric $\lambda/8$ span by DL1VU, 1988. e) optimised $\lambda/8$ span by DL1VU, 1988.

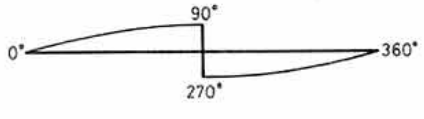


Fig 2. Current distribution on the $\lambda/2$ flat top of the basic T

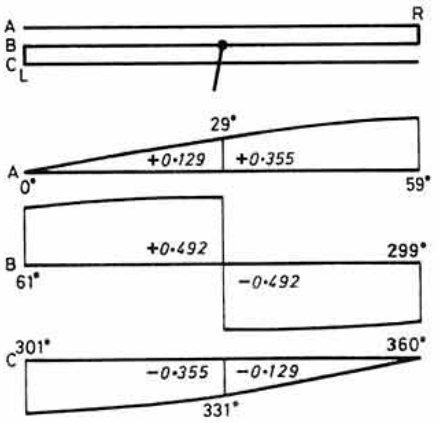


Fig 3. Current distribution and cancellation on DL1VU's 1976 flat top

A Handful of Watts

QRP on 20m

A User View of the Mizuho MX-14S Transceiver and the Sagant 14 portable Antenna by the Rev George Dobbs, G3RJV

Front panel of MX-14S Transceiver

USUALLY I AM NOT AN impulse buyer, but there are exceptions. At the '87 Dayton Hamvention, I was doing my duty on the G-QRP Club stand when a radio amateur from Illinois appeared with some QRP equipment for sale. This included two interesting miniature SSB transceivers; one for 80m and one for 40m. They were the Mizuho MX range of handheld HF transceivers. "Neat little rigs", he said. I agreed and bought the 80m version.

I took it home in my tobacco pouch and had several enjoyable excursions on eighty using the diminutive rig. I got a certain amount of pleasure from calling into sideband nets and telling them I was using my 80m handheld. It also gained me a number of very worthwhile CW QSOs at the lower end of the band.

I showed it off at several QRP lectures at radio clubs. Many people expressed interest in the rig but I could not help them with a suitable supplier. I knew that Waters and Stanton had once sold a similar 2m SSB transceiver and that they had later advertised MX transceivers. In fact, I did not keep the 80m transceiver for very long because a friend set his eye on it and I part exchanged it for some of his equipment that I coveted.

When the chance came to try the 20m version of the transceiver I was pleased to accept the offer. If people ask me which band is the best for the beginner trying QRP operation, I usually advise twenty. It is possible to work a good range of countries on the band using a modest antenna and a couple of watts. It is also a good band for portable QRP. A simple dipole is small enough to carry around, can be strung from trees or buildings and will yield a decent quantity of contacts.

Waters and Stanton sent me a MX-14S transceiver, the MS-1 Speaker Microphone and a PM-1 DC/DC Converter to run the transceiver from a 12-14V supply. They sent me another item, which I did not expect: a ZA-14 Antenna.

THE MX-14S TRANSCEIVER

THE MX-14S IS OF GENUINE handheld proportions with a sturdy grey steel case measuring 66mm x 39mm x 142mm. It is a superhet transceiver with a nominal 2W output, VXO (Variable Crystal Oscillator) tuned with two switched frequency ranges, each covering 500kHz of the band. It came with the standard 14.200-14.250kHz range and I was also supplied with a crystal to cover 14.050-14.100kHz for CW. This was an unwise choice but my own fault as I had asked for the range which included 14.060kHz, the International QRP calling frequency. I would have had a better CW coverage with 14.000-14.050kHz.

The transceiver is designed for battery operation with internal space for a set of AA cells to give 9V. The battery compartment has spaces for NiCad cells or, with the supplied dummy cell, normal batteries may be used. Although I tried the transceiver initially using batteries, most of my operation was done with the PM-1 DC/DC Converter using either my shack 12V supply, or the cigar lighter socket in my car.

The front panel controls are tightly packed but not difficult to manipulate. There are three knobs: a volume control with on/off switch, a main tuning control and an RIT control with a centre indent to indicate the off position. Two switches offer a noise blanker (an optional extra) and the band switch, marked A and B. The front panel includes external speaker and microphone sockets designed to fit the MS-1 speaker/mic, a Power Out/S Meter, the BNC antenna socket and a tiny push button which can be used as a morse key.

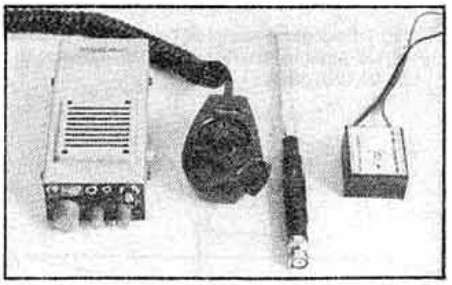
The bottom panel offers some further switching options: a power input socket with a switch enabling it to be used either for an external 9.5V supply or for a charger, the SSB/CW mode switch and an 'option' switch. In the version supplied this is fitted with an attenuator which reduces received signals by about 10dB. A socket is provided for the use of a real morse key, as opposed to the push button on the front panel. The side of the case has a PTT (press to talk) change-over button.

The main tuning control knob is marked in divisions from 0-50 and 50-100. The markings have to be related to the crystals in use. In my case they indicated (14.0)50 to (14.)100 and (14.2)00 to (14.2)50kHz. Although this must be related to the non-linear pulling of a crystal oscillator, a check showed a reasonable tie up with actual measured frequency.

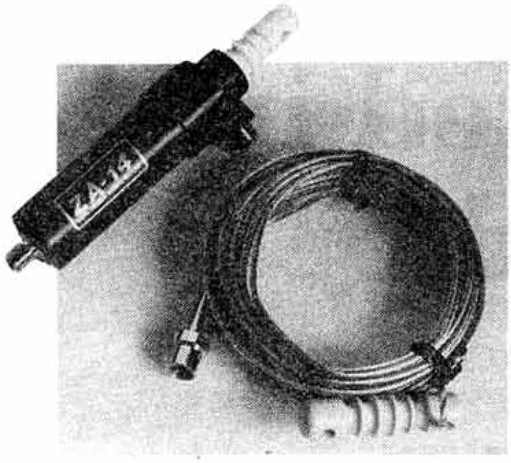
THE MX-14S IN USE

THE HANDBOOK CONTAINS warnings not to use a supply of over 9.6V and to match the antenna impedance closely to 50Ω. My initial testing was done with the internal battery supply, and open-wire fed doublet antenna tuned with a Z-match. Switching on revealed a very lively receiver. My first QSO was conducted using the tiny push button as a key, and without benefit of sidetone, but it gained a 589 report from UB4UHT. It was a little odd holding the PTT button on the side of the case and pushing a small button to send CW. I wired up a morse key to a 3.5mm jack and added the MS-1 speaker/microphone to use the PTT button on the MS-1 case. Since I did not have the optional sidetone, I used my CW Monitor unit. This is a little Kanga kit which sits on my ATU and bleeps in response to RF.

Using this set-up I had several very worthwhile excursions on 20m CW. The little transceiver worked 19 countries in a week of casual operating. Reports around Europe ranged from S5 to S9. I had several contacts with North America including a two way QRP contact with VE2KN who gave me 559.



Left to right: Mizuho MX-14S 20m SSB/CW transceiver, MS-1 speaker/microphone, AN14 whip (optional), PM-1 DC/DC converter.



ZA-14 end fed Zepp antenna encapsulated matching unit and half wave wire.

I am not a keen SSB operator but I put the little rig through its paces on that mode. My first contact gave me a report of 56 from I6JSH/190. Contacts were a little more difficult to win on SSB, but that is usual with low power operation. Over a period of a few days I had worked much of Europe with reports from 53 to 58.

THE SAGANT ZA-14 ANTENNA

THE ZA-14 IS THE 14MHz version of a range of single band antennas described as 'end fed half-wave Zepp antennas'. It comprises a half wavelength of stout plastic coated multicore copper wire, terminated with a plastic encapsulated matching network. This matches the antenna to a 50Ω coaxial socket. The 20m version is physically small, less than 10m in total length. It can be mounted horizontally, vertically, or as an inverted V or inverted L in very restricted spaces. A loop arrangement at the far end of the antenna allows fine tuning. This seemed to offer good possibilities for portable operation: a compact wire antenna which could be mounted to trees or up the side of a building and which does not require an antenna tuner.

To try the ZA-14, I strung it up in my modest front garden between the house and a tree. It was only some 30ft off the ground and I had to allow a sag in the middle to fill the space. A very quick adjustment gave a very low SWR on 14.060KHz which was still 1.2:1 at the higher end of the SSB portion of the band.

The initial testing of the ZA-14 was done using 4W from my Argonaut 515 transceiver. The first QSO gave me 599 from UW9CM: very acceptable. Then, listening on 14.060KHz, I heard FY/DJ0PJ calling "CQ QRP". I was tempted to switch back to the main antenna but I did not wish to miss him, so I called him on the ZA-14. He came back with a report of 569. I was well pleased; obtaining 569 from South America using 4W to 30-odd feet of wire sagging across my front lawn won the ZA-14 a convert in one go.

I tested the MX-14S and the ZA-14 antenna as a portable station whilst on a caravanning trip to Brittany. We finally settled on a site which gave my sons a good swimming pool and gave me a chance to settle for a few days and play amateur radio. Sadly, the site was very full and I had to settle for a position away from large trees but which gave me some 15ft conifers. I raised the ZA-14 to that height and ran the MX-14S from the 12V caravan supply via the PM-1 DC converter.

I cannot say I set the band alight but I certainly had several days of very worthwhile operating. I worked 12 countries on CW including a 539 from W3ARK. Again, my SSB operations were very limited but I had several enjoyable Continental QSOs including a long one with I5HLK (he gave me 58).

CONCLUSIONS

I ENJOYED USING THE MX-14S. It is not only a fun rig but a viable portable station. The receiver performed well; at no time did I have to use the attenuator to help it cope with conditions. Ergonomically it is clumsy, but perhaps that can only be expected on such a compact space. Within the usual constraints of QRP operation, it performed like any 2W transmitter on 20m. People who have not used these power levels on the band will probably be in for a pleasant surprise.

The ZA-14 antenna performed very well indeed for its size. In fact, I left it up in my front garden for several months and enjoyed using it with a variety of transceivers on 14MHz. It represents a very promising little antenna for anyone who has restricted space.

A combination of the MX-14S and the ZA-14 could provide a useful little station for a radio amateur with home location problems. The transceiver is easy to pack away in a drawer and the ZA-14 can be contrived to fit very small spaces. I suspect that such an arrangement, modest and simple though it would be, could provide a station capable of many enjoyable contacts on a popular band with the chance of some DX contacts.

The same combination will also provide a portable station which is easy to transport and set up. It would pack into a small bag or rucksack, and the ZA-14 could be thrown up into a tree or two. The MS-1 DC converter is a very useful addition for car-based or home operation and the MS-1 speaker/microphone certainly makes operation easier.

SPECIFICATIONS

Frequencies:
Any two 500KHz sections from 14.000 to 14.350KHz tuned by VXO.
Modes:
CW and SSB
Power requirements:
9VDC (batteries) or 9.5VDC external supply
Consumption 70mA on Receive, 600mA (peak) on Transmit
Transmitter:
Transmit Output: 2W RF
Carrier suppression: 40dB min
Sideband suppression: 40dB min
Receiver:
Single Superhet with 11.235MHz IF
Sensitivity: 15dB S/N at 0.5µV min
10dB switched attenuator fitted
Size:
66mm(W) x 39mm(H) x 142mm(D)
Weight: 590gm

Getting Started in Packet Radio

by Clive Smith G4FZH

JARGON ABOUNDS IN books and articles on packet radio; it comes so thick it is ready to fall out on a heap from the first page! The same problem may be encountered on asking an expert, even if he wants to discuss the basics with you. Packet radio can be learned from talks at clubs but not everyone, because of where they live, has this opportunity. The purpose of this article is to provide a simple introduction to the concepts of packet radio for both the SWL and licensed amateur, and the equipment required. It assumes no more than an understanding of the basics of transmitters and receivers and the simple concepts of digital electronics. Where technical terms are included, I have tried to explain them the first time they occur.

BASIC CONCEPTS

AMATEUR PACKET RADIO can become a very complex subject so, in the brief space of this article, it is only possible to cover aspects fairly simply. Packet radio allows one to communicate with another station using information encoded into a digital format. This is similar to RTTY and AMTOR, but the data rates are higher and the final facilities offered are far greater. It allows the data to be checked for errors on receive and, if one has occurred, a re-transmission will be requested for up to a preset number of times. The characters to be sent (letters and numbers) are put into a digital code using the American Standard Code for Information Interchange (ASCII) and *assembled* ready for transmission, ie the characters are sent in groups or *packets*, not individually as in RTTY. This allows the transmission of both readily read text and also computer programs. The digital information - ones and zeros - is coded into two audio tone frequencies in a modem (*mo*dulator-*demo*dulator) and then passed on for transmission (**Fig 1**).

With voice, one merely picks up the microphone and calls the other station using the callsigns allocated by the licensing authority, and these callsigns are recognised aurally. With Packet communications, these callsigns must be embedded into the digital data and sent, along with the information and error checking arrangements. This collection of digital data ready for transmission is referred to as a *frame*, and a simple format is shown in **Fig 2**. The inclusion of source and destination callsigns is necessary so that the receiving equipment can recognise messages addressed to it amongst all of the other messages it can 'hear' on the radio channel, and so that it knows which station to respond to. This differs from a telephone line where the sender and receiver are connected by a single dedicated communication channel.

The *flags* are to signify beginning and end of the frame, whilst the *frame check sequence - FCS* - facilitates the error checking. On recognition of a valid incoming packet, communication can take place between the stations concerned. Because the signal is 'addressed' it is possible (indeed, commonplace) for more than one communication link to co-exist on the same frequency, though 'clashes' or 'collisions' of packets can corrupt each other.

Packet Radio also allows any station to repeat, or relay, a message. Intermediate stations can be used to pass a message to a remote station that cannot communicate directly with the originator. To be able to do this, the originator of the packet must know which amateur stations are available to be used in this way, and their callsigns (up to eight of them) are then included into the packet format. The format of the packet then becomes as shown in **Fig 3**.

EQUIPMENT REQUIRED

AMATEUR PACKET TRANSMISSION is permissible on all amateur bands. Apart from the usual radio and antenna, additional equipment is required for packet communication. One unit must assemble the digital data, provide the error checking sequence and convert the data to tones (and the reverse on receive). This is a *terminal node controller (TNC)*. This unit must be controlled by equipment that takes input from an operator (usually via a keyboard) and converts it to a digital form for transmission or for local control of the TNC. It must also display the received information. A typical solution is to use a personal or home computer.

The general arrangement for a packet station is shown in **Fig 4**. It should be mentioned, however, that there are variations on this theme for packet equipment.

The Terminal Node Controller

As briefly mentioned already, the TNC has several functions, these being:-

- a modem
- digital encoding
- digital decoding
- error checking (Rx)
- error coding (Tx)
- frame assembling (Tx)
- frame disassembling (Rx)
- communication to computer/terminal
- communication from computer/terminal
- data rate generator to Tx/Rx

A simple hardware arrangement is shown in **Fig 5**. The audio tones derived from the modem in the TNC are fed, via the microphone socket, to the transmitter; on receive the audio is normally taken from the loudspeaker output. These arrangements save internal modifications to the transceiver. Transmit control is also via the microphone socket (the PTT line) and it is the TNC which keys the transmitter, prompted from the controlling computer keyboard unless the TNC is acting as a repeater.

The data rates and tone frequencies used on the HF and VHF bands are shown in **Fig 6**. It is possible to use higher data rates but these are very much in an experimental stage at present.

The Computer

The computer is connected to the TNC via an RS232 serial link or similar. Some computers already have such a link fitted, eg BBC computer and most Personal Computers (PCs), others, like the Spectrum and Amstrad

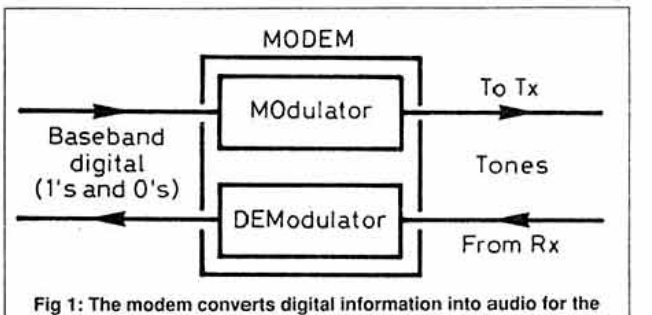


Fig 1: The modem converts digital information into audio for the TX and audio into digitial for the RX.

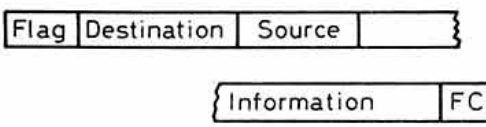


Fig 2: A simplified packet 'frame'.

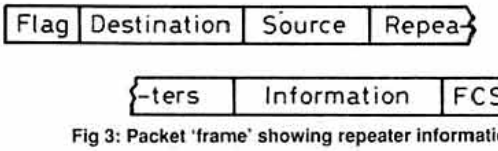


Fig 3: Packet 'frame' showing repeater information.

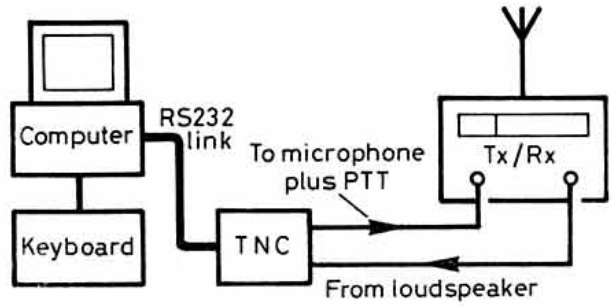


Fig 4: Typical packet station arrangement.

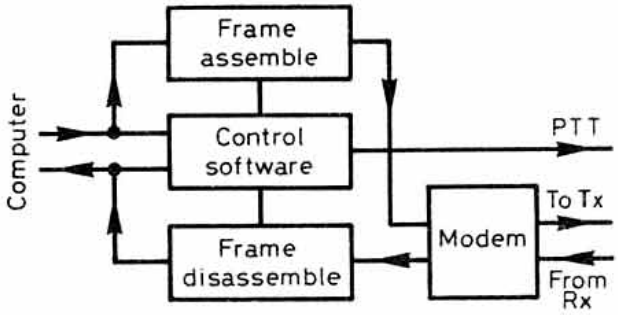


Fig 5: Block diagrams of a basic Terminal Node Controller.

	HF	VHF/UHF
Logic 1	1600Hz	1200Hz
Logic 0	1800Hz	2200Hz
Data rate	300Baud	1200Baud
Shift	200Hz	1000Hz

Fig 6: Packet standards.

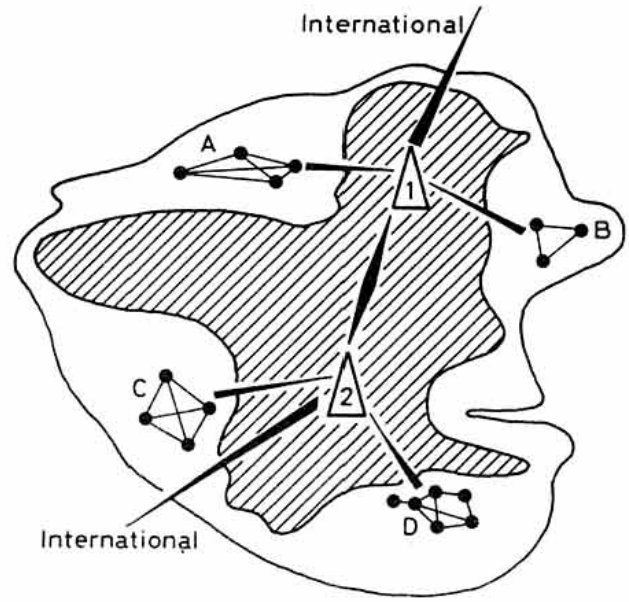


Fig 7: How packet stations inter-link; directly, via repeaters and between repeaters. High ground is shaded.

PCW8256 need an add-on box. In the first instance, a communications package (the sort of program used with telephone type modems) is all that is necessary for controlling the RS232 link to the TNC. The TNC is intelligent, in that it will accept commands to set up the protocols, data rates, tone frequencies, destination and source callsigns, repeater stations and many other functions. The data rate on the RS232 to TNC link need not match the radio transmission data rate. There is at least one software package in the public domain that is specifically for packet radio. Known as YAPP, it is specifically for PCs, although there may be similar versions for popular computers such as the BBC. This program is of American origin and allows screen scrolling, storage to disk, transmission from disk, input direct to printer, direct transmission from keyboard and other useful facilities.

FURTHER PACKET CONCEPTS

THIS SECTION LOOKS AT additional facilities that can be provided with packet radio plus a comment on operating a packet station.

Gateways

A gateway, in amateur packet radio terms, is the transition from one network to another, usually from a local packet network to networks which may cover a single county or region, country, continent or the world. This will be via a specific station that contains the facilities.

Consider a fictitious island as shown in **Fig 7** where there are several pockets of amateurs, normally associated with urban areas. These all have good local communications, but not group to group. The terrain is such that groups A and B can get access to each other via repeater 1 whilst groups C and D can use repeater 2. A network could be arranged so that repeater 1 could communicate with repeater 2, thus giving all stations in the groups A, B, C and D the ability to intercommunicate. Repeater 1 acts as a gateway to repeater 2 and groups C and D, and repeater 2 is similarly a gateway. In addition, it is possible that either repeater could be a gateway to long distance communication links.

Mailboxes

The above concepts explain how a typical packet system would function, the only element missing is that of mailboxes. This is a means whereby messages can be sent and held for a period of time whilst awaiting eventual collection, or reading, by the recipient.

There are two types of mailbox. First, there is the Personal Mailbox (PMS) which is associated with the home station and may be used purely for receiving and holding messages sent to that station (or originated by that station). Secondly, there is the general mailbox, sometimes called a bulletin board which, in the UK, have to be specially licensed under a GB7 callsign. These can usually be used as a gateway to a mailbox network so that messages can be sent to, and left in, remote mailboxes, anywhere in the world.

To be able to perform this latter function (linking) general mailboxes must be able to provide some of the following:-

- be a node in a packet network
- be a gateway into a mailbox network
- store information
- delete information
- add routeing information

To perform these functions, mailboxes are normally based on the ubiquitous and relatively cheap PC, with a hard disk and the appropriate software and hardware. The person responsible for the general mailbox is referred to as the System Operator (SysOp).

Operating

This is normally covered well in the manual which comes with a TNC. It takes some time to get used to, as does the quirks of some units on the market. It is not feasible to go through the many options here but a typical list is:-

- set data rates
- set tones
- set destination callsign
- make sure one's own callsign is present
- set up repeating route
- prepare any long message to transmit
- transmit or receive
- accept personal incoming mail
- respond only to certain stations

This article, as the name implies, is only a general introduction to packet radio. There are arguments for and against this mode, one comment being "is it really amateur radio?". Although it is possible to build a TNC, it does require a certain amount of expertise. One problem is that whilst one is still working on Mark 1 and debugging it the black box manufacturers are providing Mark 99 with all the latest gimmicks. It is really up to the individual amateur to decide but the world literally is the limit! ❑

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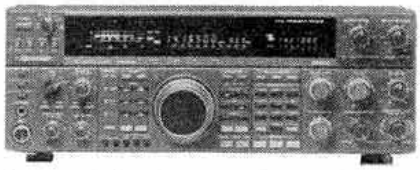

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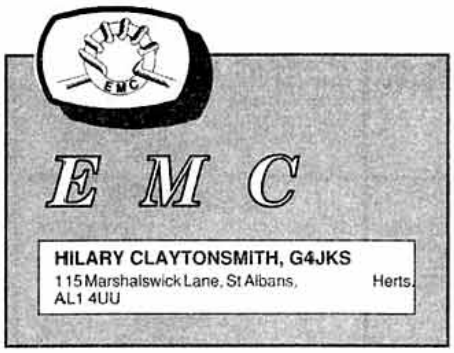

TELEPHONE BREAKTHROUGH

IF YOUR TELEPHONE IS rented from British Telecom then curing breakthrough is BT's responsibility. You should report the problem to your local Repair Service Centre. The number is usually 151 but check in the Local Information section of your telephone directory.

If the telephone is privately owned, British Telecom can be requested to attend on the basis that a charge will be made, plus the cost of any filters fitted. There is, however, no guarantee of success in solving the problem on your own equipment. BT *can* supply equipment which is breakthrough free.

In the past, when breakthrough has occurred and BT have been contacted, the response has been to get in touch with the Radio Investigation Service of the RA. This is incorrect, a telephone is not Wireless Telegraphy apparatus and therefore the RIS will not investigate. To quote from one of their information sheets "Interference to non-WT apparatus (eg telephones, domestic entertainment equipment) is a matter for householders to take up with their dealer/supplier."

If you get discouraged, ask for the Repair Services Centre manager, this should solve the problem. BT have had procedures for dealing with breakthrough since 1987. Under no circumstances should anyone attempt to modify a telephone, whether privately owned or rented from BT as this makes the telephone illegal and is subject to legal action.

External cures for breakthrough - two ferrite rings could be fitted to the line cord of a telephone but only on the new type of plug and socket - 10 to 14 turns for HF and 6 to 7 turns for VHF. They should be placed as near to the telephone as possible.

ADVICE TO NEIGHBOURS

IF YOUR NEIGHBOURS ARE having problems with interference to Wireless Telegraphy equipment (which includes VCRs and Hi-Fi tuners), and they feel they need further advice, the first step is for them to contact their dealer or rental company to check that all is in good working order. If they want to take things further they may want to call in the RIS. To do this they should obtain a copy of *How to Improve your TV and Radio Reception*. The dealer, aerial contractor or rental company engineer should fill in the back of the form which the neighbours have filled in with their personal details. The form should be sent, along with £21 (to cover the cost of an RIS visit) to the area RIS district office. A list of addresses is given at the back of the publication.

CHANGE IN DISTRIBUTION ARRANGEMENTS

THERE HAS BEEN A CHANGE in the distribution arrangements for the booklet *How to Improve your TV and Radio Reception*; they are no longer available from main post offices. There are two ways of obtaining a free copy. Either telephone 071-215 2072 (24 hour service) or write to the Document Distribution Centre, The Radiocommunications Agency, Rm 605 Waterloo Bridge House, Waterloo Road, London SE1 8UA.

CONTACT WITH INDUSTRY CONTINUES

THE EMC COMMITTEE HAS, for some time now, been in touch with various industries in its attempt to make manufacturers aware of the potential problems which may arise through not designing their products with EMC in mind.

One area of concern at the moment is the motor manufacturing industry. Over the years, cars have been equipped with an ever increasing range of microprocessor and electronically controlled systems - electronic gearboxes, anti-lock braking systems, electronic ignition systems and central locking, to name but a few. It does not take too much imagination to realise the potential hazards if the RF immunity of the system is not adequate. Our main concern is the failure of braking and ignition systems when subjected to a high level of disturbance. Equally problematical is the effect that CB and Amateur radio transmissions 'in car' may have upon such things as the central locking system.

As part of our awareness drive, we are in touch with motor manufacturers generally, but recently we sent a report to Citroen UK Ltd, based on information obtained from members. In a letter from their Technical Adviser he says "We thank you for taking the time and trouble in copying your report to us. The contents were studied with great interest, as all independent research of this nature is important to us." We hope to be able to write a full report on the case when we receive a detailed response from the parent company in France.

CLIP-ON CHOKES

CABLES, SUCH AS THOSE connecting a computer with its keyboard, may act as unintentional radiating antennas for computer-generated interference, while others, such as audio system loudspeaker cables may act as unintentional receiving antennas, resulting in breakthrough. It is normally the case that this problem is caused by 'common mode' currents. These may be substantially reduced by a common mode choke made by winding a number of turns of the cable through one or more ferrite toroids.

Where a cable cannot be disconnected or connectors cannot be removed, split ferrite cores which can be clipped around a cable are an attractive option. Split beads are available in various sizes for circular cables, while two part ferrite bars can be fitted around flat ribbon cables. Such a clip-on choke may not produce much improvement however, particularly if it is only possible to pass the cable once through the core aperture. The main

THE EMC TOP TWENTY.

1. Make friends with your neighbours before putting up or changing antennas.

2. Make sure your TV and video are free from breakthrough in case you need to demonstrate the fact to your neighbours.

3. Keep your shack as far away from the neighbour's property as possible. Doubling the distance from transmitter to TV/radio receiver will *quarter* the strength of any unwanted radiation he may receive.

4. Keep antennas as far away from adjoining properties as possible. A 3-element beam or a G5RV draped over your neighbour's (or your own) roof is asking for trouble.

5. Choose antennas which are in keeping with your property and the amount of land available.

6. Use screened antenna leads next to properties.

7. When using a dipole or any other balanced antenna with coaxial cable or other type of unbalanced feeder, use a balun between the two.

8. Use an ATU.

9. Choose the best quality, low loss coaxial cable even though it is more expensive.

10. Get your antenna as high up as possible so that the neighbour's house is outside the main lobe of the antenna. (Tilting the aerial can sometimes help).

11. Use your power in a sensible way. Why use 400 watts when 10 will do? "How low can you go for a QSO"!

12. Do not overdrive your transmitter. An overdriven transmitter causes harmonics and splatter as well as possible spurious signals.

13. Place your VSWR meter before any output filter.

14. Remember that house wiring and long leads can pick up and carry unwanted signals.

15. Keep your HF station on the ground floor and keep all ground connection leads short.

16. Isolate the mains supply at RF with a filter (ferrite rings on mains lead).

17. Have a stock of ferrite rings and filters handy to *lend* to your neighbours - they should fit them themselves.

18. Do not touch any electronic equipment belonging to your neighbours.

19. Never open up and/or modify any equipment, especially telephones (see above).

20. If you have a problem, contact your nearest RSGB EMC Co-Ordinator.

R.Adam	GM4ILS	Elgin	0343 545842
R.M.Allsopp	G1YFT	Leicester	0533 833714
A.Armstrong	G0FBW	Peterlee	0915 864500
L.K.Ayre	G3DPR	New Milton	0425 615676
C.Barnes	GW4BZD	Bangor	0248 361195
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Rev.S.Bennie	GM4PTQ	Stornoway	0851 3609
G.Brooks	GM4NHX	Caithness	0847 83570
N.Carr	G0JHC	Preston	0772 742710
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J.Lawrence	GW3JGA	Prestatyn	0745 63255
A.D.Maish	G4ADM	Worcester Park	0813 372123
Mrs.S.Morley	G0MCV	Leicester	0533 374999
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S.O'Sullivan	G8VPG	Bristol	0225 873098
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D.W.Smith	G3LIS	Ormskirk	0695 77960
R.P.Smith	G3SVW	Sale	0619 693999
R.Sykes	G3NFV	Leatherhead	0372 372587
K.N.Watkins	G3AIK	Martock(SOM.)	0935 825266
S.M.Wood	G4OWI	Newark	0636 72625

Table 1: EMC Co-Ordinators

application of such single turn chokes is to reduce VHF radiated emissions from equipment by a few decibels in order to meet a particular standard. For a substantial reduction in emissions or breakthrough, particularly in the lower HF bands, 10-15 turns may be required.

A useful clip-on choke is the AKD 'Unifilter' which is available in packs of 4 or 8 from Cirkit. A similar item is available in packs of two from Tandy and is listed in the catalogue as a "Snap Together Toroid Choke" No. 273-104. The characteristics of the two brands of clip-on chokes are similar, and the EMC Committee suggests that, for effective suppression at HF, the same rule should be applied as for RSGB toroids. This is that number of turns squared, multiplied by the number of cores, should equal about 200 or more. This could be achieved with 14 turns on a single core (two halves), but the area of the core window is substantially less than for an RSGB toroid so there is unlikely to be room for 14 turns except with thin loudspeaker cable. For thicker cables, more cores will be required to provide the same impedance; for example, 10 turns on 2 cores (4 halves) 7 turns on 4 cores (8 halves) or 5 turns on 8 cores (16 halves).

When using any type of split bead or clip-on choke, it is important to ensure that the winding does not force the cores apart as any air gap between the halves of the core greatly reduces the inductance. The two halves of the AKD Unifilter cores are clipped together securely with a releasable cable tie whereas the clip arrangement of the Tandy core is less effective.

The EMC Committee is currently evaluating various types of ferrite toroids and split cores for EMC applications. Details will appear in a future edition of *RadCom*.

AMSTRAD PC 1512 AND 1640

THE EMC COMMITTEE IS currently investigating methods of reducing the levels of radiated and conducted interference from these computers. Significant interference is produced by the PC 1640 ECD colour monitor, both by the digital circuitry and by the video drive to the CRT. The latter peaks at around 50MHz and it is possible to receive a screen image of a PC 1640 operating in CGA graphics mode on a nearby VHF television tuned to channel E2 (48.25MHz). In CGA mode, the line and frame timebase frequencies are 15.7kHz and 60Hz respectively whereas in the normal EGA mode, the line frequency of 21.85 kHz is outside the range of a normal TV line timebase.

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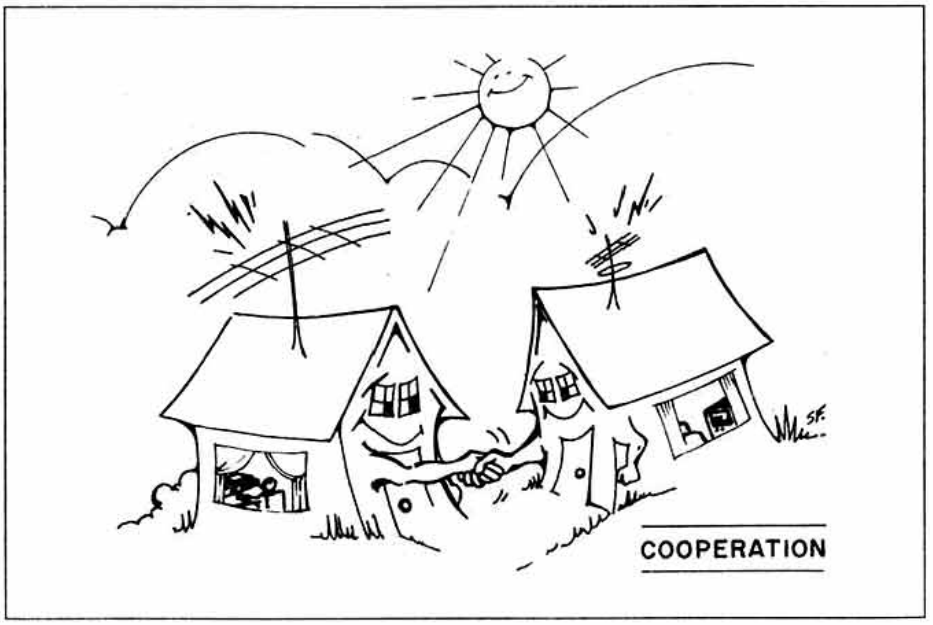

ADVICE LINE

EACH TIME I GET A LETTER or a phone call relating to EMC redirected to me from Lambda House I wonder why. Why do members insist on writing or phoning an administrative HQ in search of a detailed and immediate answer to a highly technical question on EMC? The EMC Committee has established a 'help' structure which is easy to use and which avoids the seemingly much favoured circuitous route via HQ.

1. In the first instance, there is a whole raft of volunteer EMC co-ordinators around the country who are willing to help on the telephone with any queries (see **Table 1**).
2. Any general enquiries can be sent to me at the Column.
3. Only detailed and specific high level cases - i.e. those where courts, councils or solicitors are involved - should be sent to the EMC Chairman, Bob Peace, 2 Heron Close, Great Glen, Leicester, LE8 0DZ.

THE ULTIMATE COLOUR CAMERA SYSTEM

A WELL KNOWN GERMAN company has produced a monochrome and colour camera system which functions in areas where electromagnetic interference prevails. It is equipped with a CCD semiconductor sensor and is so well shielded that it can be used in EMC test houses as well as in the field of radiation of microwave and radar equipment. The camera system housing constitutes a Faraday cage. All the control and transmission electronics are accommodated in this housing. The immunity of the camera system to interference in the frequency range from 10kHz to 18GHz at a field strength of 200V/m has been confirmed !

PLANNING PROBLEMS

ANYONE SEEKING PLANNING permission is advised to obtain a copy of the RSGB *Planning Permission* booklet. Towards the back of this informative publication (appendix G) there is an extract from the Department of the Environment *Planning Guidance Notes PPG8 - Telecommunications* Jan 1988, which is current. In appendix H on Radio Interference it says "In most situations therefore questions of potential interference are of no relevance to the determination of planning applications for the masts or antennas needed to operate a transmitter". It is advisable that anyone who may anticipate a problem should read the whole of the document paying particular attention to paragraphs 12, 13, A15 and the whole of appendix H.

Raynet

RONALD M COWAN, GM4SRL
516 Clarkston Road, Netherlee, Glasgow
G44 3RT

THE WEEKEND OF 7-9 December proved to be a busy one for RAYNET groups in many parts of England when a blizzard swept south across the country, with the worst areas remaining affected until the middle of the following week. RAYNET help was requested by County Emergencies Planning Officers and the Police to carry out duties ranging from coordinating traffic and weather information to reporting of power and water disruptions. Some groups were asked to despatch observers to report on the situation at different locations, but travel was at best difficult, and at other times impossible owing to the volume of falling and drifting snow (drifts of up to 10ft were not uncommon in places). In many cases due to the extreme conditions, members were discouraged from using their own transport.

STRANDED

INFORMATION ABOUT OLD folks homes which were stranded without heat and light was dealt with, as were reports about drivers stuck in their vehicles. In Staffordshire, due to power and telephone line failures, the RAYNET station was relocated from the County Buildings to the TA centre, and finally to the County Police Headquarters.

Warwickshire provided radio operators for four-wheel-drive vehicles which were used to transport heaters and so on to the elderly. Emergency Centres were set up at Corley Services on the M6 and at a local garden centre. A RAYNET talk-through unit was used to link these centres to Shire Hall. Also in this county, a RAYNET operator gave valuable assistance on an ambulance which was on an emergency long distance journey.

LIGHTNING

ONE MEMBER IN LEICESTER suffered a direct lightning hit which took out much of his base station and antennas, but he was quickly back on air, if slightly shaken! In Leicestershire, the A1 was largely unaffected, but this was certainly not the case with the M1, and the Leicester Group established themselves on GB3CF and ran a traffic information service for fellow amateurs throughout the weekend.

Particularly badly hit was the area between junctions 22 and 24 on the M1 and, by the Saturday evening, conditions here had brought traffic to a standstill, with queues stretching for a total of 64 miles. Many motorists were trapped overnight, with the heavy goods vehicles not being released until the Sunday evening. The Birmingham repeater was not operational owing to a power failure, making the Leicester repeater even more vital. Castle Donington was another area where RAYNET helped in the relief of those hit by power failure resulting in no heating or hot food.

PHONES DOWN

ZONE 3 HELPED THE CEPO with comms links, providing assistance between County Hall and a community centre near Worksop where telephone links were down but power was unaffected. In another case, links were made to other community centres and old folks homes which had neither power nor telephones. A request for RAYNET operators to help assess areas of need was abandoned owing to the difficulty of moving about. With the full support of North Notts RAYNET, the Bassetlaw (Worksop) group supplied the District Council with radio links on 145.225MHz and 144.850MHz. Telephone links from the north of the county were sometimes impossible, and at other times unreliable. The CEPO was asked by Notts Police to implement the Emergency Centre facilities at County Hall. South Notts RAYNET established contact with Bassetlaw via a relay, as the Bassetlaw District Emergency Centre was unable to use its generator and the team moved to the administration building. The initial priority of CEPO was to establish how help could be provided from County resources. For several hours, many questions could only be answered via the RAYNET link, the telephone system being restored on the Sunday evening and fully established by the Monday afternoon. RAYNET then returned to standby until the Wednesday evening, keeping in touch on a working frequency every two hours.

Other areas, including North Yorkshire and the West Midlands, were badly hit too. Similar reports were generated by RAYNET in these areas.

FLEXIBILITY INVALUABLE

ONCE AGAIN, THE FLEXIBLE communications provided by RAYNET proved invaluable, with members providing service despite their own problems which, at times, were quite considerable. Were lessons learned? Yes, the need to maintain stand-by power provisions in good order and able to run for at least forty eight hours on full power, the need to think early about manning and relief, the need to have stand-by antennas ready if the main ones are damaged by storms, and the realisation that all the good relations built up with the User Services paid off after all!

TELEPHONING HOURS

A COMMENT FROM ONE or two controllers recently is that they are disturbed by badly timed calls, especially in the evening. It is recommended that you telephone only between 1800 and 2100. Calls outside these times, or to a work location should not be made unless it is an emergency, or you know that your call will be welcome.

PHOTOGRAPH: GM4SRL

Seen on the Raynet stand at the Scottish Convention: Dave GM0ADF, and Jim, GM0GMN, talking to Stephen, G6FPX.

Q R P

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

IN MY LAST COLUMN, I reviewed a new book: *QRP Classics* [Now available from RSGB Sales see pages 78/79 - Ed]. Hot on its heels has come another ARRL publication which, although not specifically a QRP book, is nevertheless full of QRP circuits and practical ideas. Is this telling us something about the way the hobby is going?

W1FB'S DESIGN NOTEBOOK

DOUG DeMAW, W1FB, IS readily identified with the lucid writing of practical amateur radio construction articles. He was a member of the ARRL Headquarters staff from 1963, becoming *QST*'s Senior Technical Editor in 1970. During his time with the ARRL, readers of *QST* came to expect a succession of easy to digest articles on the practical side of amateur radio. In 1983, W1FB retired early from the ARRL and returned to the family farm in Michigan. These latter Michigan days have produced several fine *QST* articles and a series of books, of which *Design Notebook* is the latest. Other titles have included *QRP Notebook*, *Antenna Notebook* and *Help for New Hams*.

In a foreword, David Sumner, K1ZZ, asks "Do you like to build amateur radio equipment? Would you like to? If your answer to either of these questions is yes, then this is the book for you." It sounds like a good start. I notice that more simple, buildable, practical projects was one of the top requests in the recent *RadCom* readers survey. How well does the book live up to this promise?

W1FB's Design Notebook offers simple practical projects for the bands below 30MHz with explanations of how components and circuits work. The book is divided into 6 sections: Diodes, ICs and Transistors, Transistor Applications, Diode and IC Applications, Construction Practices, Practical Receivers and Techniques and Transmitter Design and Practice. It ends with an appendix entirely devoted to the design and building of crystal ladder filters.

The theory is of the "what these things do" type which almost entirely avoids mathematics. The theory chapters end with a glossary of technical terms, useful for those who are hazy about the correct words in technical articles. The sections which deal with components describe in simple terms what they do, and offer advice for their application and safe use. Good homely advice sets the scene for the use of the common electronic components.

The applications chapters are of the 'recipe' sort, offering the reader a vocabulary of the basic circuit building blocks used in amateur radio construction. The circuits have assigned values for the component parts which allow the circuits to be duplicated as building blocks in circuit composition. The transistor section deals with all of the common circuit blocks in Tx and Rx design. The chapter on IC applications is entirely devoted to analogue circuits; the digital designer will have to look elsewhere.

The Construction Practices section is not on how to build circuit boards so much as component selection and handling. There is a good section on the use of toroids, with some handy data charts. The chapter also includes data on preferred values, resistive attenuators, and broadband transformers.

The final chapters of the book give examples of projects to build, some of them with PCB layouts. The receivers range from a very simple direct conversion receiver, through a simple superhet to the building blocks for more sophisticated projects. The transmitter section includes several complete designs as well as useful boards such as a 10W linear. Complete circuits and printed circuit plans are given for a 1.5W 40m Portable CW transceiver. The book also includes the through-line, bi-direction wattmeter designed by David Stockton, GM4ZNX, which originally appeared in *Sprat*, the journal of the GQRP Club.

The 'professional' radio amateur will probably criticise the simplicity of the circuitry offered in the book. If you want sophisticated. state of the art, radio communications circuits, there are few of them here. However, the book is full of good workable and buildable circuit ideas which will give many amateur constructors hours of enjoyment. Some of the circuit techniques may be dated and predictable but I bet they all work.

This is a useful, well written, and enjoyable book; an ideal aid to bridging that gap between being a basic constructor who simply duplicates projects exactly as they are, and being a seasoned constructor who takes circuit elements and ideas to build composite projects.

AN EXTRAORDINARY QRP EVENT

TAKE A MEDIUM SIZED church hall, make plenty of space for people to sit and talk, add a few lectures on radio construction, invite some QRP kit manufacturers, tell people to bring surplus items to sell, put a circuit archive alongside a photocopier and serve meat pies and mushy peas. The result is the second GQRP Club Mini-Convention in Rochdale. Some 300 dedicated QRP fans turned up for the day, listened, talked, showed off their home built equipment and bought and sold odds and ends.

The extraordinary thing was where some of them came from. Amongst them were Paula Franke, WB9TBU, and Luke Dodds, W5HKA, President and Secretary respectively of the American QRP ARCI. The two halves of the now united Germany were represented by DK4UH and Y24TG. VE7QK came over from British Columbia and PE1MHO brought a car-load of Dutchmen across the North Sea. Also attending were W9NWN, SP7OQR and SP7OQS.

Modest though it was, the event exceeded all expectations. G3ROO lectured on circuit building blocks, G3PDL gave a blow by blow account of his home-made contest grade transceiver and GM4ZNX, he of the wattmeter mentioned above, lectured on transmission lines. The event will be repeated in 1991 on October 19th.

PHOTOGRAPH: ROCHDALE OBSERVER

Pictured at the QRP Mini-Convention, Left to Right: Derry, VE7QK; Paula, WB9TBU; Peter, PE1MHO; Klaus, Y24TG; Luke, W5HKA; Rudi, DK4UH and G3RJV

INTERNATIONAL CO-OPERATION

THE SUCCESS OF THE ABOVE event owed much to the way in which QRP organisations worldwide co-operate in the enjoyment and fulfilment of their amateur radio. For example, the GQRP Club now has arrangements for many members to pay their subscription in local currency in their own countries. This includes Germany, The Netherlands, France and the USA.

UK members of the American QRP ARCI are now able to renew their subscriptions in sterling, via Dick Pascoe, G0BPS. This does not include the initial joining of the QRP ARCI. Enquiries about this, and requests for an application form, should go to Mike Kilgore, KG5F, 2046 Ash Hill Road, Carrollton, Texas 75007, USA. The joining fee is $14.00 for non-USA members, with renewals at $6.00. Overseas and UK radio amateurs can receive details of the GQRP Club from David Jackson, G4HYY, Castle Lodge West, Halifax Road, Todmorden, Lancs. OL14 5SQ.

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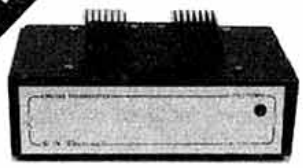

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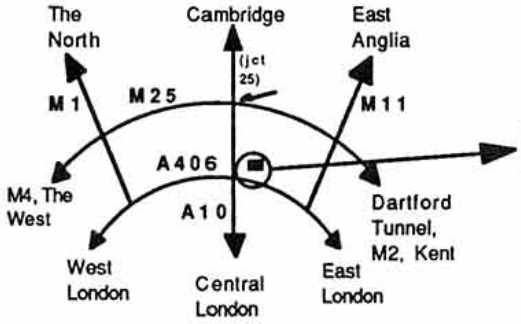

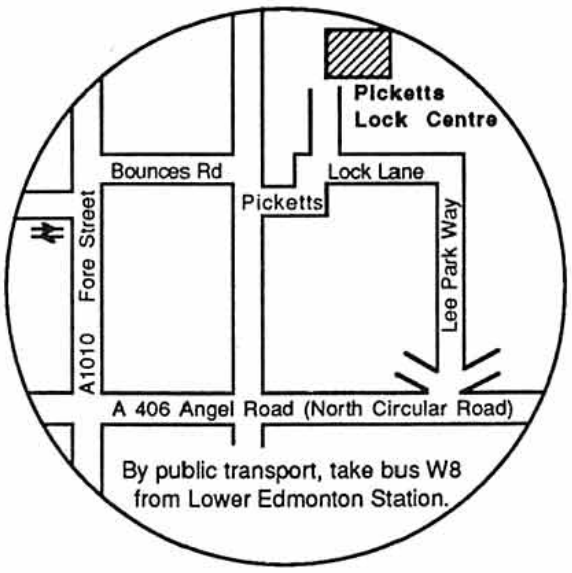

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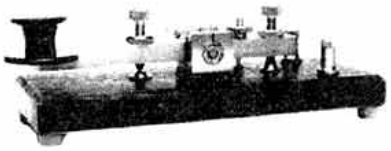

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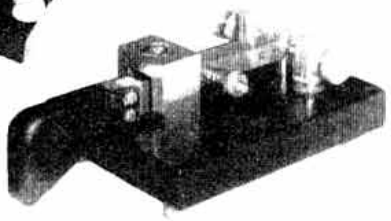

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CONTEST NEWS

HF RULES

HF CONTESTS CHAMPIONSHIP 1991

1. The Championship will be decided on the basis of RSGB HF contests held between 1 January 1991 and 31 December 1991 (single-operator entries only).

2. Every UK station entering 2 or more of the events listed below will *automatically* be entered for the Championship. For each event the entrant will be awarded points according to his/her score expressed as a percentage of the score achieved by the leading UK station in that contest. These points will then be multiplied by the appropriate factor for the contest:-

LF Phone	20
1st 1.8MHz	10
7 MHz CW	20
Commonwealth	30
ROPOCO 1 & 2	10
County Roundup	10
21/28MHz Phone	30
21 MHz CW	30
2nd 1.8MHz	10

The winner will be the station with the highest number of points at the end of the year.

3. Awards: The G2QT Trophy will be awarded to the winner, and the runner-up will receive a certificate of merit.

LOW POWER CONTEST 1991 RULES

1. The general rules for RSGB HF contests (as published in January *RadCom*) will apply.

2. Date and Time: 0700-1100GMT, Sunday 21 April 1991

3. Frequencies, mode and power: 3.510-3.560MHz and 7.010-7.040MHz, CW only. Max power: 5W RF output

4. Exchange: RST + serial number (commencing at 001) + output power eg 559001 3W

5. Scoring: 15 points for each contact with another QRP station; 5 points for all other contacts. The same station may be worked for points on both bands.

6. Equipment: The Tx or final PA stage shall not be capable of RF output power in excess of 15W. A description of any method of power reduction to comply with the contest rules, and of the equipment used to measure power MUST accompany each entry.

7. Awards: The 1930 Committee Cup will be presented to the winner. Certificates of merit will be awarded to the second and third placed stations, and also to the highest placed entrant using completely 'home-brew' equipment. A further certificate will be awarded to the highest-placed entrant using 1W (or less) RF output power.

NATIONAL FIELD DAY 1991 RULES

1. The General Rules as published in the January 91 *RadCom* will apply

2. Notification: Each group intending to compete must send details of the site to be used to the address given in 8, to arrive no later than Saturday 27 April 1991. Details must include the name and address of the person responsible for the entry (to whom contest stationery will be sent in May); section to be entered; name of group; callsign(s) to be used; NGR and sufficient access information for an inspector to be able to locate the site.

3. Date and time: From 1500GMT Saturday 1 June to 1500GMT Sunday 2 June 1991.

4. Sections: Both sections Multi-Operator, one transmitter and one receiver (or one transceiver) only, *maximum RF output power 20dBW.*

(a) Open Section: Any number or type of antennas, maximum height 65ft (20m).

(b) Restricted Section. One antenna which must be a single element (eg dipole, vertical, end-fed wire etc), with not more than two elevated supports, maximum height 35ft (10.7m) above ground at any point.

Notes: (i) Stand-by equipment may be kept on site, but may not be connected to a power source when the main equipment is in use.

(ii) All stations are liable to inspection by representatives of the HF Contests Committee. Should an inspector be unable to locate a site due to inadequate or incorrect information, the entry may be disallowed. In the event of a late change of site, it is the responsibility of the group to make arrangements for the inspector to find the new site. The inspector must be given immediate access to all parts of the site with the right to stay as long as desired, and to return at any time during the contest. The inspector may also visit in the 24 hours before the start of the contest. *The presence on site of any amplifier or modified commercial equipment capable of excess power may result in the entry being disallowed, and in such an event, all operators associated with the station may be barred from entering any RSGB HF contest for a period of up to five years.*

5. Frequencies and mode: CW (A1A) only in the 1.8, 3.5, 7, 14, 21 and 28MHz bands. On 3.5 and 14MHz the IARU Contest preferred segments (3510-3560 & 14010-14070) only may be used.

6. Exchange: RST and serial number starting from 001.

7. Scoring: Credit must not be claimed for contacts made by a competing station with members of its own group. Contacts count as follows:

Fixed stations in UK & Europe-2 points

Other Fixed stations -3 points

Portable and Mobile stations in UK & Europe-4 points

Other Portable and Mobile stations-6 points

Contacts on 1.8MHz and 28MHz should be scored as above and the totals multiplied by two to obtain the band score for the RSGB listing. An IARU Region 1 listing will be collated by the Region 1 contest manager, and the totals in this list will not include the above factor.

8. Address for entries: Entries & checklogs to be addressed to **RSGB HF Contests Committee, c/o JC Burbanks G3SJJ, Southlands, 16 Cotgrave Road, Plumtree, Nottingham NG12 5NX**. Please note that the old PO Box 73 address is no longer available.

9. Awards.:(a) The National Field Day Trophy to the station having the highest checked score, regardless of section.

(b) The Bristol Trophy to the station having the highest checked score in the other section.

(c) The Gravesend Trophy to the runner-up in the section having the highest number of entries.

(d) The G6ZR Memorial Trophy to the runner-up in the other section.

(e) The Scottish Trophy to the Scottish station having the highest checked score.

(f) The Frank Hoosen G3YF Trophy to the station having the highest checked score on the 14MHz band.

(g) Certificates of merit to the leading three stations in each section and to the station in each section with the highest checked score on each band.

10. Check logs: While overseas stations are not eligible to enter NFD, checklogs are very welcome. A certificate will be awarded to the overseas station in each continent whose checklog shows the most points contributed to competitors.

1.8MHZ SSB CONTEST 1990 RULES

PLEASE READ THE GENERAL RULES CAREFULLY.

1 Date & Time. 2100GMT 23 March to 0100GMT 24 March 1991.

2 Sections. Single or Multi operator, UK or Overseas, and Receiving. Overseas entrants may work/report only UK stations for points.

3 Band and Mode. 1.8MHz band, SSB only. UK entrants must transmit within the sub-band 1840kHz - 1960kHz.

4 Exchange - Other Data. UK stations send County Code.

5 Scoring. Three points per QSO.

5.1 Multipliers. UK - One for each UK county and one for each country outside the UK. Overseas - One for each UK County.

6 Awards. Certificates of merit to the first three entrants in each section.

1ST 28MHZ CUMULATIVES 1991

1. Entrants: Single operator UK stations only. Entrants may operate from a portable location but this must be the same for all sessions.

2. Dates and Times (GMT):

Session 1, Sun 14 April, CW 1900-2000, SSB 2030-2130.

Session 2, Mon 22 April, SSB 1900-2000, CW 2030-2130.

Session 3, Tue 30 April, CW 1900-2000, SSB 2000-2130

Session 4, Wed 8 May, SSB 1900-2000, CW 2030-2130

Session 5, Thu 16 May, CW 1900-2000, SSB 2030-2130

3. Frequencies: CW 28.0-28.1MHz, SSB 28.5-28.6MHz

4. Sections: CW, SSB, Combined

5. Exchange: RS(T), serial number beginning with 001 on each evening (running continuously through both modes if appropriate) and County Code as published in January RadCom. The same station may be contacted for points once on each mode on the same evening.

6. Scoring: 3 points for each completed contact plus a bonus of 10 points for each new County and each new Country *outside the UK* contacted. Entrants for the CW and/or SSB should submit logs for the three best sessions out of five on that mode and, for the combined section, logs for the best three evenings of the five. The contestant may enter any or all sections as desired. Logs for sessions other than those constituting entry would be most welcome as check logs.

7. Entries: to be post marked not later than 31 May 1991 and sent to the address in General Rules published in Jan *RadCom*.

8. Awards: Certificates of Merit to the entrants in each section with the highest check score. Further awards may be made if the entry for any section exceeds twenty.

HF RESULTS

IARU REGION 1 CW FIELD DAY 1990

This event is adjudicated from the logs submitted by the entrants to the various National Field Day Contests held during the first weekend in June. As each of the member societies who support the National Field Day event use different scoring systems, the IARU Region 1 judge the logs on the basis of the total number of checked contacts made by the leading stations in each section, with certificates being awarded to section leaders. This year some 298 results were notified to Region 1 for listing and awards. The leading stations in each section were as follows:

G6LX, Contest Co-ordinator, IARU Region 1.

NON-RESTRICTED CLASS: RSGB OPEN SECTION

1.	DL0HS/P	1047 QSOs*
2.	HB9H/P	1045 QSOs
3.	G3VER/P	1032 QSOs

RESTRICTED CLASS

1.	G0AAA/P	1044 QSOs
2.	G3VMW/P	1034 QSOs
3.	GW8GT/P	997 QSOs

QRP CLASS (10W - NO RSGB EQUIVALENT)

1.	DL0NF/P	370 QSOs*
2.	DL0KM/P	335 QSOs
3.	DL0KE/P	333 QSOs

SWL CLASS (NO RSGB EQUIVALENT)

1.	ONL973	527/P stations logged*
2.	ONL972	443/P stations logged
3.	ONL4180	321/P stations logged

* Certificate winner

2ND 28MHZ CUMULATIVES 1990

The number of logs received remains disappointingly small, but the HFCC has decided to continue with the Cumulatives in the hope that support will increase as the sunspots decline.

This series was a clean sweep for G4NOK, the Station of the North Wakefield ARC, operated by Jogn Muzyka, G4RCG.

G4IQM

CW

Posn	Callsign	Points
1	G4NOK	647
2	G4WVX	427
3	G3JJZ	377
4	G0AEV	365
5	G4AGQ/M	360
6	G3MCX	330
7	G3LIK	298
8	G2HLU	210
9	G3WRR	207
10	G3UJG	175

SSB

1	G4NOK	872
2	GW4JBQ	733
3	G4AGQ/M	549
4	G4WEY	539
5	G0AEV	460
6	G4MET	363
7	G3JJZ	240
8	G3UJG	161

COMBINED

1	G4NOK	1519
2	G4AGQ/M	900
3	G0AEV	825
4	G3JJZ	680
5	G3UJG	217

HF CONTESTS CALENDAR - 1991

Feb 2	7MHz Cumulative (Oct 90)
Feb 2/3	LF SSB (Jan 91)
Feb 3	3.5MHz Cumulative (Oct 90)
Feb 8	1.8MHz Cumulative (Oct 90)
Feb 9/10	1st 1.8MHz CW (Nov 90)
Feb 9/10	*Dutch PACC Contest (Jan 91, p17)*
Feb 16/17	*ARRL DX CW (Jan 91, p17)*
Feb 23/24	7MHz CW (Sep. 90)
Feb 23/24	*CQ 160m SSB (Jan 91, p17)*
Mar 2/3	*ARRL DX SSB (Jan 91, p17)*
Mar 9/10	Commonwealth *(Dec 90)*
Mar 16/17	*Bermuda*
Mar 23/24	1.8MHz SSB *(Feb 91)*
Mar 23/24	*WPX SSB*
Apr 7	Repoco 1 *(Jan 91)*
Apr 21	Low Power *(Feb 91)*
Apr 27/28	*Helvetia (CW/SSB)*
April	28MHz Cumulatives, *(see above)*

Full details of all RSGB HF Contests can be obtained from the Chairman of the HF Contests Committee, Dave Lawley, G4BUO, who is QTHR. Apologies for the errors which crept into this announcement last month.

The typeface in *Contest News* has been reduced at the request of the HF Contests Committee in order to do justice to the large amount of contest information requiring publication, whilst retaining the same page allocation.

VHF RULES

RSGB VHF/UHF/ SHF CONTESTS

50MHz Trophy Fixed / Single / Multi / Others

7 Apr: 1000-1800GMT

General rules apply, especially rule 16! Plus rule 24 (use Reg 1 or VHFreg2 obtainable from RSGB or VHFCC, please register two weeks before contest)

Sections: F Fixed station single operator; M Multi operator fixed station; O Others; L Listeners

Max score 25 points per QSO.

County and country multipliers as per rule 14 apply.

See new county list, there are changes to both codes and counties. It is the same as that used by HF Contests Committee.

The Telford Trophy will be awarded to the highest scoring entrant.

Adjudicator: G8XVJ, E Gedvilas, 518 Manchester Road, Paddington, Warrington, Cheshire, WA1 3TZ

1st 1296MHz Fixed/SWL

14 Apr: 1600-2200GMT

General Rules apply.

Scoring 1 point per kilometre.

Sections: F Fixed Station single operator; M Multi operator fixed; L Listeners

Adjudicator: G4PIQ, Andy Cook, Fishers Farm, Tendring, Clacton-on-Sea, Essex, CO16 9AA

432MHz to 24GHz

4/5 May: 1400-1400GMT

General rules apply.

Sections: S Single op stations (same call each band); M Multi op (different callsign each band); L Listeners

Scoring: Radial ring 432 and 1296. 1pt per kilometre all other bands.

Adjudicator: G8XVJ, E Gedvilas, 518 Manchester Road, Paddington, Warrington, Cheshire.

144MHz and SWL, Single/All Others

18/19 May: 1400-1400GMT

General rules apply. Rule 24 for SL and OL. (see above)

Sections: F Single Operator Fixed; S Single Operator Portable; O Others; L Listener; SL Single operator Fixed (25W PEP out from Tx); OL Others (25W PEP out from Tx)

Subsection: Single Operator Fixed (SS) (operation for any continuous 6 hour period, (no breaks, continuous 6 hours) starting at any complete hour ie 1400 to 2000, or 0000 to 0600, not 0823 to 1423!)

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

1.3GHz Trophy (see note)

2 Jun: 0600-1400GMT

General rules apply.

Sections: F Single operator fixed; O All other stations; L Listeners

Scoring radial ring

VHF Contest Committee cup to the overall winner.

Adjudicator: G4DEZ, 110 South Avenue, Southend-on-Sea, Essex SS2 4HU

2.3GHz Trophy

2 Jun: 0600-1400GMT

General rules apply

Sections: F Single operator fixed; O All other stations; L Listeners

Scoring 1 point per kilometre

The G6ZR trophy to the overall winner

Adjudicator: G4DEZ, 110 South Avenue, Southend-on-Sea, Essex SS2 4HU

432MHz FM Fixed and Open

22 Jun: 1400-1800GMT

General rules apply

Sections: F Single operator fixed; O All other stations; L Listeners

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

432MHz CW Single/Multi Op

22 Jun: 2000-2400GMT

General rules apply.

Sections: F Single operator fixed; O All other stations; L Listeners

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

432MHz Trophy/SWL

23 Jun: 0900-1700GMT

General rules apply

Sections: F Single operator fixed; S Single operator portable; O All others; L Listeners

The 1951 Council Cup will be awarded to the overall winners.

Note:

All entries must be postmarked at the latest by the 16th day after the end of the contest ie. if contest ends on a Sunday (say the 1st of Octember) then the entry must be postmarked on or before the 3rd Tuesday after that Sunday (17th Octember). For VHF Field Day an extra week is allowed, ie. the 4th Tuesday.

Any late entries can only be accepted at the discretion of the adjudicator.

No recorded delivery or registered post.

Entrants can obtain a proof of posting certificate from the Post Office which we will honour if an entry has been delayed in the post.

QTH information to be exchanged on 70MHz only.

General rules: 1 to 9, 11,12,13, 15 to 23, and 25,26. apply to all contests any changes will be noted in individual contest rules.

Rule 24, please use REG1 or VHFreg2 obtainable from RSGB or VHFCC, this is to allow the VHFCC to inspect, if felt necessary, any station, in any contest. Normally will be used for low power sections or 50 MHz where the incidence of cheating is highest.

Adjudicators will not normally enter contests which they are adjudicating, however if the adjudicator does wish to enter then his entry will be vetted by a subcommittee before entry allowed.

Every contest is open to foreign entrants who will be listed separately from UK stations, certificates will be issued to section winners (and runners-up, if enough entries).

Please note four new contests this year 432 and 1296 MHz short length Fixed and SWL, and Christmas Holiday 4M, 2M and 70 Cm Fixed station contests. Note to SWLs there will be a SWL section in EVERY contest even if not mentioned in rules or write-ups. We still need more SWLs to enter, the currrent leaders can be beaten, just as the top transmitting people/groups have.

G4DEZ

VHF RESULTS

MAY 432 MHZ - 24 GHZ CONTEST 1990

These are regarded by many as specialised and technically demanding frequencies, so it was pleasing to note an increase of activity by the larger contest groups tackling the higher microwave bands. The availability of boards and kits from the Microwave Committee is encouraging experimenters and groups to expand their capabilities. Conditions on the higher bands rewarded the East Coast stations with good ducting and many PA stations were worked, with Scandinavian stations providing best DX in several cases up to 13cm. DL's were also active. Better future co-ordination and publicity of contests and continental activity periods could help to maintain the interest and activity. Whilst it is hoped the results will encourage fixed stations to use microwave bands during lift conditions (why not during all conditions? You would be surprised at the result. G4DEZ). G6DER, an active microwave band enthusiast, sacrificed his chances from home by loaning Northern Lights the 3.4GHz equipment to experiment with, and this provided keen competition to the Hadrabs and Tarts CG, between two well sited contest groups. Congratulations to winners and runners-up on the various bands.

G8HHI

432 SINGLE OPERATOR FIXED SECTION

Pos	Callsign	Pts	QSO	Loc	Pwr(w)	Best DX	Km
1	G4PIQ	2071	223	01MU	400	LA6HL	838
2	G8OPR	308	61	91FE	35	PA0EZ	479
3	G4LRT	9	3	92KJ	30	GW4HRY/P	142

432MHZ - ALL OTHER SECTION

1	G4GCM/P	3837	278	94RJ	400	SM6HYG	853
2	GW4HRY/P	2589	270	82JG	400	HB9FX/P	947
3	G4PUB/P	2475	221	01QE	200	DL0EU	656
4	G4JKN/P	1969	196	81CC	400	DF1VW/P	787
5	G0GJV/P	1880	188	01QX	400	OK1KTL/P	825
6	G4RFR/P	1789	223	80UU	400	GM4ZUK/P	676
7	GW4BVY/P	1312	166	81NV	400	DL8QS	808
8	G3FVA/P	880	136	93EH	150	DK0MU	624
9	G1OHM/P	25	5	92GB	10	G4JKN/P	193

432 SWL SECTION

1	BRS52543	173	27	83LT		PE0MAR/P	522

1296MHZ SINGLE OPERATOR FIXED SECTION

1	G3ZTR	248	18	94VB	12	DF0HS/P	541
2	G6HKM	238	30	01FT	10	DF1EQ	468
3	G8OPR	159	27	91FE	100	PA0EZ	479
4	G4EQD	152	22	93QN	60	PI4GN	496
5	G4LRT	50	10	92KJ	140	G4XUM/P	225

1296MHZ ALL OTHER SECTION

1	G4XUM/P	1807	119	94RJ	300	SM6HYG	853
2	G0ALE/P	1389	120	01QE	400	LA6LCA	1050
3	G3UHF/P	528	62	93EH	80	SM6HYG	983
4	GW8IFT/P	521	61	82JG	150	DF0HS/P	652
5	G8OHM/P	251	47	92GB	100	GI4OPH	384
6	G0FRR/P	219	31	80UU	10	G4XUM/P	411

2320MHZ SINGLE OPERATOR FIXED

1	G3ZTR	2440	8	94VB	20	PA0EZ	414
2	G4EQD	1123	7	93QN	8	PE0MAR/P	364
3	G4LRT	494	5	92KJ	10	G1KDF	174
4	G8OPR	323	3.5	91FE	30	GW0KZP/P	166

2320MHZ ALL OTHER STATIONS

1	G0EMG/P	13463	35.5	94RJ	70	SM6HYG	853
2	G4JAR/P	12144	42	01QE	55	SM6MRT	1010
3	GW0KZP/P	3706	17	82JG	15	PE0MAR/P	501
4	G8SMR/P	3538	12	93EH	15	SM6HYG	983
5	G3OHM/P	2253	14	92GB	30	PE0MAR/P	382
6	G0FRR/P	829	8	80UU	5	GU8IRF	159

3456MHZ SINGLE OPERATOR FIXED STATION

1	G4LRT	185	2	92KJ	001	GW3FYX/P	142
2	G4EQD	161	3	93QN	001	G3OHM/P	175

3456MHZ ALL OTHER STATIONS

1	G4EZP/P	3960	16	01QE	7	DJ6XV/P	396
2	G0EMG/P	2797	8.5	94RJ	8	PI4RCG	458
3	G3OHM/P	1329	8	92GB	20	PE0MAR/P	382
4	GW3FYX/P	950	5	82JG	5	G4EZP/P	337
5	G4AUC/P	608	7	01QX	1	PA0EZ	263

5760MHZ SINGLE OPERATOR FIXED STATION

1	G4LRT	22	5	92KJ	1mw	G3OHM/P	44

5760MHZ ALL OTHER STATIONS

1	G3OHM/P	142	2	92GB	7.5	GW3FYX/P	121
2	GW3FYX/P	121	1	82JG	1	G3OHM/P	121

10GHZ ALL OTHER STATIONS

1	G4EZP/P	2471	12	01QE	2	PA2HJS	328
2	GW8KQW/P	655	7	82JG	2	G8FWA	150
3	G4DDK/P	568	4.5	01QX	06	PA0EZ	263
4	G0DJA/P	47	1	82WJ	005	G3UYM/P	47
5	G3MZU/P	35	1	92GB	-	G3UYM/P	35

24GHZ ALL OTHER STATIONS

1	G4EZP/P	21	2	01QE	007	G8KBV/P	19

OVERALL POSITIONS SINGLE OPERATOR FIXED

Pos	Callsign	432	1296	2320	3456	5760	Norm tot pts
1	G4LRT	3	5	3	1	1	2407
2	G3ZTR	-	1	1	-	-	2000
3	G4EQD	-	4	2	2	-	1942
4	G4PIQ	1	-	-	-	-	1000
5	G6HKM	-	2	-	-	-	960
6	G8OPR	2	3	4	-	-	921

ALL OTHER SECTION

Pos	Group	432	1296	2320	3456	5760	10g	24g	Tot
1	Hadrabs & Tarts	3	2	2	1	-	1	1	5316
2	Northern Lights	1	1	1	2	-	-	-	3706
3	Wulfrun C G	2	4	3	4	2	2	-	2595
4	S.Birmingham RS	9	5	5	3	1	4	-	1662
5	Bracknell RS	5	-	-	5	-	3	-	874
6	S.Manchester RC	8	3	4	-	-	-	-	784
7	Flight Refueling	6	6	6	-	-	-	-	648
8	Exmoor RC	4	-	-	-	-	-	-	513
9	GW4BVY	7	-	-	-	-	-	-	342
10	G0DJA	-	-	-	-	-	5	-	19

Checklogs gratefully received from G0MTV/P, G8ADM, G6MXL.

432MHZ TROPHY CONTEST MAY 1990

Conditions favoured the East coast stations who had a steady path to the continent, whilst those inland did not find so many openings. An exception was G3CKR/P, the Warrington Contest Group, who nearly lost their position to the Windbreakers CG due to silly logging errors. One group thought the trophy contest lasted 3 hours, yet had logs for the full 24hrs for the 432-24GHz. section, this cost many points and 4th position! PLEASE READ THE RULES.

There are mixed feelings about having just an 8hr period for the Trophy section, your views please to the committee. Congratulations to the Northern Lights in winning the Open Section, and to G4PIQ the single operator section. *(It's getting to be an embarrassment that committee members keep winning; please, please somebody beat them! G4DEZ).* Thanks to SWLs for supporting the contest. Certificates go to winners and runners up in each section.

G8HHI.

OPEN SECTION

Pos	Call	QRA	Pts	QSO's	BestDX	Km
1	G4GCM/P	IO94RJ	2559	176	SM6HYG	853
2	G3CKR/P	IO93AD	1756	209	DF7VX	746
3	G4ZTR/P	JO01PU	1750	169	Y22ME	904
4	G4SIV/P	JO03CE	1634	146	LA6HL	721
5	GW4BVY/P	IO81NV	1312	166	DL6QS	808
6	GW4HRY/P	IO82JG	1263	165	DK0JJ	721
7	G4RFR/P	IO80UU	1012	130	GM4ZUK	676
8	G0GJV/P	JO01QX	685	70	DL1BBO	531
9	G4THB	IO92OE	655	106	DL2NO	645
10	G0MTV/P	IO94JF	650	74	DL8QV	670
11	G4NOK	IO93FR	432	77	DL2NO	664
12	GM4ZUK	IO86RW	169	11	G4RFR/P	676

SINGLE OPERATOR FIXED

1	G4PIQ	JO01MU	1261	156	LA6HL	838
2	G1OGY	JO01GR	335	66	DK0JJ	460
3	G8DQK	IO83RK	227	35	PE0MAR/P	477
4	G1NWO	IO91OL	207	53	PE0MAR/P	331
5	G1NMF	JO01HN	157	27	PA3BLS	314

SWL SECTION

1	BRS52543	IO83LT	83	15	G4RFR/P	332
2	BRS31976	JO01HO	66	16	GW4HRY/P	273

Checklog gratefully acknowledged from G6MXL.

1990 70MHZ CUMULATIVE CONTEST

Activity was good for most sessions with leading stations managing to average 40 to 50 QSOs, whilst the lower powered and possibly poorer sited stations averaged 15 to 20. Hence it was dissapointing to see the number of entries actually sent in, as it does not highlight the band occupancy during the contests.

Conditions for the band and time of year were again average, but several Gs managed good distance contacts with GM and GJ. Comments from contestants, - 10am start, 1989 results still unpublished, lack of rules in Radcom, dislike of cumulative with fixed contest on the same date - have all been noted and are being dealt with.

The VHFCC acknowledge some of the errors which are due to RSGB organisation and VHFCC membership changes and will improve for next year.

Congratulations to winners and runners up in the two sections, please send in more entries next time. Don't forget SWLs can participate in all VHFCC contests.

OPEN SECTION

Pos	Callsign	Loc	Pts	Sessions	Best DX	Km
1	G4RFR	90AS	1214	3,4,5	GM4AFF	695
2	G4BVY/P	82LB	947	1,2,5	GM4AFF	554
3	G4ZAP	93DC	678	1,3,5	GJ1TJP	432
4	G7APD/P	92LJ	458	3,4,5	GM4AFF	519
5	G8MFV	01KF	434	2,3,5	G0MEJ	426
6	GM4HAM/P	85RU	392	3,4,5	G4RFR	567

FIXED STATION, SINGLE OPERATOR

1	G3UKV	82RR	563	2,3,5	GM4AFF	477
2	G3NAQ	91HL	517	1,2,3	GM4AFF	654
3	G0MGI	02DL	219	2,3,4	G4RFR	246
4	G4SJH	91PI	113	1,4,5	G6ZTU	249

Checklogs received with thanks from G8EIK/P G3BPM.

DIRECTION FINDING

SOUTH MANCHESTER QUAD NIGHT

Date: 9 March

Map: 109 (Manchester)

Assembly: 1900 for 1920 GMT start

Location: Sale Moor Community Centre, Norris Road, Sale; NGR 798909

Competitors requiring supper should notify D Holland, 32 Woodville Drive, Sale, Cheshire; Tel 061 973 1837 (home), 061 224 5650 (work), no later than 5 March.

GEOFF PECK MEMORIAL TROPHY

Date: 24 March

Map: 175 (Reading and Windsor)

Assembly: 1300 for 1320 BST start

Location: Holtspur picnic area (low headroom) on B4440 just south of junction with A40, NGR 922894.

Competitors requiring tea should notify R Goodearl, 120 Straight Bit, Flackwell Heath, High Wycombe, tel 06285 21230, not later than 16 March.

RSGB VHF CONTESTS CALENDAR - 1991

20 Jan	144MHz CW Single Op Fixed /All other (Jan 91)
27 Jan	70MHz Cumulatives (Jan 91)
3 Feb	432MHz Fixed/AFS/SWL (Jan 91)
10 Feb	70MHz Cumulatives (Jan 91)
24 Feb	70MHz Cumulatives (Jan 91)
2/3 Mar	144/432MHz (Jan 91)
10 Mar	70MHz Cumulatives (Jan 91)
24 Mar	70MHz Cumulatives (Jan 91)
31 Mar	70MHz Fixed/SWL (Jan 91)
7 Apr	50MHz Trophy Fixed/Single/Multi
14 Apr	1st 1296MHz Fixed/SWL
4/5 May	432MHz to 24GHz
18/19 May	144MHz and SWL Single/All Others

A full list of 1991 RSGB VHF Contests appears on page 65, December 1990 *RadCom*. Dates of publication of rules in *RadCom* are shown in brackets.

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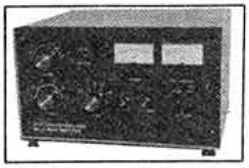

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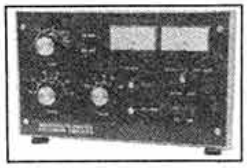

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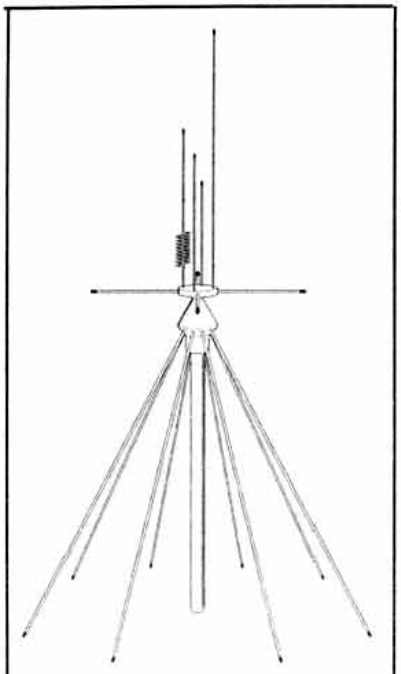

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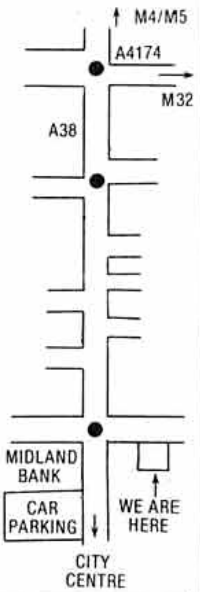

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Warning: Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.

FOR SALE

01 BARGAIN. YAESU FT901DM HF tcvr 10-160M, great cond: £475. FT480 2M m/m 10W good cond: £275. IC02E 2M h/h. nice cond: £175. IC202S 2M ssb tvcr mint cond: £150. Tokyo hipower 50MHz tvcr ssb/cw: £195. MM tvtr 144MHz-1296MHz with attn'r, inst'ns: £125. Daiwa 1296MHz swr meter: £60. MM tvtr 144MHz-432MHz: £125. FRG7 with weefax, manuals: £125. Datong morse tutor: £35. Dick T0BPS QTHR (Folkestone) 0303 276171.

101ZD FM FAN mic, looks and performs like new: £390. Matching FT901R trnsvtr, 70cms 2M 6M fitted, excellent: £300. G0KSL (Pinner) 081-868 6815.

12.5V 50A GOULD switch mode power supply, working: £25. Texas TI99/4A computer with "Hamsoft" interface giving rtty, ASCII, cw Tx/Rx, comprehensive facilities, printer port, cassette recorder, joysticks and various other items of radio related s/ware etc: £70ono. Dave G0CAD (Stadhampton) 0865 890066.

132FT LONG wire possible! QTH, 3 bdrm semi, conservatory, long garden, urban setting, fertile soil, rotovator, garage, sea! G3DGT not QTHR (Portchester) 083483 369.

1kW HF linear amp Heath S1000, unbuilt kit: £750, Dot matrix printer Mannesmann Tally MT80+ Parallel i/f. Slight head misalignment, but fine for listings etc: £60. Buyers collect or pay carr. G3RFI QTHR (Potton) 0767 260800.

3X JAYBEAM 2M 8XY beams, all as new cond: £30 each (carriage at cost) or swap rotator WHY? Nevil (St Austell) 0726 63882.

40A LINEAR PSU, fully metered, crowbar, current limit, professional smart finish: £100. Trnsfrmrs: (1100-0-1100 200ma £5) (0-1000V 170ma £5) (0-3000V 100ma £5). Collins LS1 EHT trnsfrmr: £20. S/Pole h/duty 9-way ceramic band switch: £3. Wide spaced capacitors (30-270pf £12) (25-75pf £10). Will not post the PSU. Tony, G4KDZ QTHR 0375 390268.

6M TRANSVERTER RN Electronic WITD 7db attenuator: £145. KR400RC rotator: £75. G1VOQ QTHR (Daventry) 032762126 or 0831412148.

70CMS LINEAR mml 432/50, 50W out, 10W drive: £50ono. Bob G0KYS QTHR (Plymouth) 0752 670490.

AEA MP1 MBA-TOR s/ware: £60. Chrome Vibroplex lambic keyer: £75. Chrome Bencher lambic keyer: £75. Hi-mound Bug key: £20. G4CJY QTHR (High Wycombe) 0494 30018.

AEA PK88 HF/VHF TNC March 89, boxed, manual, little used: £90. Icom 1050 legally converted 10M FM: £30. Les, GM3HVN QTHR (Nr Aberdeen) 0358 21324.

ALINCO DJ100E h/h 2M two battery packs standard 7V plus 12V high output with chargers r/duck plus .25wave: £130. G0LWV (Orpington) 0689 876733.

AMSTRAD 6128 colour monitor RS232 light pen wizard interface spectrum emulator protext lots ham s/ware and others. Buyer collects: £295. G0EZW (Selston, Notts) 0773 810010.

ANTIQUE valve, 327-A mounted on persplex base: £12; valve sale over 120 various types incl 18 acorns and 9 bases: £15. Moving coil meters 15 types: £9. 829B: £3. Wanted GPO key model 3142 glass and brass cover. G3IJL QTHR (London) 081 749 1454.

AR800E VHF/UHF h/held scanner boxed C/W Helical, Charger as supplied by Lowes: £120. G4RWD QTHR (Burton-on-Trent) 0283 33161.

ATARI 8MHz PC clone, 20MBHD, 2x5.25ins, 640K, metal case, good keybd, Samsung colour monitor: £650. HQ1 beam/rotator: £120. G0NIL (Stalybridge) 061-303-0409.

ATC shack clearance, several L/band AM sets all working when last used. Cambridge, Olympics, Reporters, Plus sig generators, Meters etc. Sets at £15 each ovno. Rest open to offers. PX for UHF h/held considered. Full list G6BJJ QTHR (Plymouth) 0752 560223.

BBC-B twin 40 track disk drive, BBC cassette tape drive, ROM board, ROMs EPROMs, s/ware galore. 2 printer cables, service manual, books galore. All vgc, best offer secures. Paul G3PCT QTHR (Nr. Chelmsford) 0245 321086

BELCOM LINER 430 worked Oscar13: £100. 432/28 cnvtr: £15, new QOV06-40 & base: £15. 1000V powerpack, unfinished, PR30 preselector, Heathkit Q-multiplier, valve sw radio 500KHz-30MHz, box new/used valves: £10 ea. 1930's 3 valve radio: Offers!. G8ATE QTHR (Leicester) 392842.

BELCOM LS -20XE 2M handie, mains & 12V chargers, battery cover missing: £20. ZX81 16K ZX printer, psu, unconnected keyboard:£25. ZX81 32K Alphacom printer, psu, unconnected keyboard: £35. Homebrew Howes 80M tcvr 5W digital readout plus GM3HAT 80M dipole of delight: £50. Intercom master and 3 slaves: £10. Unused door phone: £8. BT Hawk cordless phone: £40. Unbuilt XZ81 add ons. Scarab rtty kit. PW interface kit: £12.50. Graphics ROM: £5. Buyer collects or carriage extra. Aerials 2M 9el crossed tonna: £15. 7el Met: £8. Five band trap dipole 80-10: £15. Small rotator and CV: £12.50. Buyer collects. G0FVE QTHR (Dereham) 0362 696993.

COLLINS KWM 380. 30LI amp. JST 135. Yaesu 757 + auto ATU. Swan 700CX. Icom 761. Icom 500 ATU. TET 10-15-20 Beam. All open to reasonable offers. Clearance of other gear. sae for list. G4JWY QTHR (Nr. Woodbridge) 0394 460321.

COLLINS KWM2A with PM2 power supply manual: £495. Eddystone 940 GC Rx with spkr plinth: £145. good cond. G4LW QTHR (Trowbridge) 0225 753166.

COLLINS TCS12 3Tx 1Rx units with racking and original plus homebrew PSU, spare valves, handbook. Buyer collects. G0HIK (Barrow-in-Furness) 0229 830069.

COMPACT antenna Navy special for 20M or 15M: £12. inter'al monital phone timer: £6.50. New rechargeable batteries, 6 of HP11 and 4 of HP2: £8.50. WANTED GPO Morse key model 3142 with glass and brass cover. G3IJL QTHR (London) 081 749 1454.

COMPLETE HF station QRT sale. Trio TS940S, MC60 mic, SP940, HS-5 PH, Junker straight key, FX-1 absorption frequency meter SEM noise bridge, Trio HC-10 world clock, US & international call books: £1300. TL922 2kW Lim Amp: £700. Versatower minitower P25 telescopic tilt over with head bearing: £100. Ground post available from manufacturer. Jaybeam TB3: £100. Daiwa DR7500R rotator, control box requires attention: £50. Buyer inspects & collects. GM4ORL QTHR (Glasgow) 041-641-2377.

COUNTY DOWN FT101 needs attn. Hamarlund HQ180A. KW107 tuner. Heathkit scope SB610 Turner crystal mic: offers. Barry GI3TTY (Comber) 874076.

DATONG m/mode filter model FL3 in mint cond,. New Rx makes item surplus to requirements: £110 only. G3HNP QTHR (Gt Yarmouth) 393560.

DATONG Morse tutor model D70: £38. Not QTHR (Altrincham) 061-941-6443.

DATONG morse tutor, as new: £30. Lake TU1 atu, factory built, new cond: £25. G3YPS QTHR (Gainsborough) 0427 611160.

DRAKE SSRI GWO CW dupl h/book and circuit diag: £100 plus carr. G3AZW QTHR (Trowbridge) 0225 752655.

DRAKE TR7A tcvr with power supply Drake L75 linear Drake MN2000 atu. All ex condx: £1400. No split. G4DIC QTHR (Hinckley) 0455 636315.

DTR3 CW 80M tcvr, made by Lake Electronics: £95. Matching ATU with swr meter: £35. Compact wooden lockable carrying case: £10. New straight key: £12. All above as new. Complete QRP stn for £145ono. G4FMH QTHR (Somerset) 0278 784812.

DUMB terminal HAZELTINE 1410, vgc, combined keyboard monitor for RTTY: £30. Will work with PK232. G4CCM QTHR (London) 081 445 8477.

FDK700 2M/FM 0-25W + hand mic: £120. Heatherlite mobile mic for FDK700:£15. FC707 ~ATU: £95. G0LHW QTHR (Chester) 0829 40020.

FLDX400 HF Tx WID YD844 matching mic: £125. 0582 508370 (evenings).

FRG 8800 Rx 12 memories, as new: £495. FRT7700 ATU: £40. Redifon GR410(T) SSB Tx/Rx with PU: £75. G1NAX QTH (Plymouth) 0752 775375.

FT101 Tcvr, with mic: £210. G4LUF QTHR (Devon) 054 882 442 anytime.

FT101Z, all bands, CW filter, mic, NBFM, ex cond: £375. LCL CB working on 29MHz: £25. G3UNT (Maidstone) 0622 755297.

FT102 boxed, mint, with manual, spares, PA's & Driver:£600. TS52CSE, as new, boxed, CW filter, spare PA's: £375. FC102 tuner, boxed, as new: offers. Buyer inspects, collects. Trio PS30 30amp PSU, new cond: £150. G4PPG QTHR (Wigan) 0257 421442.

FT201 5-band 240V/12V tcvr with homebrew FM, spare PAs and driver, C/W Europa 2m tvtr, Shure 401 mic, Datong RF clipper and homebrew second VFO. gwo, C/W manuals: £295ono. Would consider exch for VHF/UHF multimode rig. G4LBH QTHR 0582 415846.

FT208R 2M h/h c/w case charger mic and nicad: £135. Trio TR7730 mobile 5/25W: £160. FT790R, boxed with manual ETC: £250. Dave G0OFC not QTHR (Northampton) 0327 842141.

FT290R Mk 1, as new, soft case, nicads, charger, manual: £235. Also Ten-Tec Argosy II, mint. Complete with CW filter, ideal mobile rig: £295. Valves, brand new 6JS6C: £220 pair. 12BY7A: £8 each. Hammarlund HQ120 Rx: Offers. Buyers to collect. G4HHB QTHR (Hemel Hempstead) 0442 217461.

FT690 Mk 2 6M multimode, mint cond, hardly used, still in box with 15W linear amp: £275. (Reading) 0734 696471.

FT690 MKII:£295. With 15W PA or swap for FT726 70cm and sat units. Tono 100W 2M PA with pre-amp: £85. Star 15in carriage printer for IBM/clone: £185 or Epson 15in printer: £125. With cables, gwo. G6XID (Chester) 0244 674998.

FT727R dual-band h/h, extended range, 2xFNB-4 nicads, FBA-5 battery case, chrgr, spkr-mic, tone squelch, mob brckt, case orig pkg, new value £500+. £335ono G8PRR (London N4) 081 340 4139

FT736R 2M 70cm fitted.PK232tnc.Power swr meter. G400RC azimuth rotator. KR500 elevation rotator. Oscar special ant. 2M 100W lin/amp. 70cm 50W lin/amp:£1470. No separate items. G0EJV QTHR (Lincoln) 0522 683113 anytime

FT75 5-band xtal VXO mobile tcvr, gwo, manual: £65ono. G4LBH QTHR (Luton) 0582 415846.

FT780R YM38 mic: £250ono. Jaybeam 18ele Yagi 70cm: £20ono. 2M 8eleX needs attention hence £10. 2 x 14E met 2M Yagi: £20 ea. Datong speech pros, not auto: £20. Kennt iambic keyer: £12. 2 iambic hi-mound key's: £5 ea. 70cm Halo, silver plated: £8. Get onto 20M cheap Howes 20M to 2M tnsvrtr, boxed: £40. Works fab, offers: 6 turn 70cm helix. All are carriage extra or collect. G0DAY QTHR (Burntwood) 0543 685810.

FT790R multimode, vgc: £250. BNOS 432-1-50 LPM, vgc: £100. G6UMP (Kenilworth) 0926 511493.

FT901DM am fm filters service manual: £465. SP901: £20. Both good clean cond. AR88D: £40. Heathkit SB101 HP23 psu: £175. 2M 5/8 whip g/mount: £10. 70cm co/lin g/mount: £10. Lamda psu's 5V 10.5A, 22-32V 1.2A, 28V 3.5A: £10 each. Icom 1050 10fm: £20. 70cm Pye Westminster: £15. All plus carriage. G4VAO QTHR (Norwich) 0603 872853 after 7pm.

FV-101DM VFO (suitable FT-101ZD tcvrs XX24001 and above) plus instruction manual: £150ono. Vgc. G4IIS QTHR (St Albans) 0727 53536.

G4MH MINIBEAM in good order, complete with instructions: £35. (Crawley) 0293 527288.

GOING QRT. Trio TS530S tcvr, no mods, with spare PA valves. Buyer collects: £500. No offers. G4LPV QTHR (Lincoln) 0522 754957.

H/D 60FT Westower FBP type, with winches, thrust bearing: £500ono. Linear bits SASE list. Sagant trap dipole. John, G4AOS QTHR (Newcastle-on-Tyne) 091-236-2013.

HAMMARLUND HQ120X Rx, 0.54 to 31 mc/s in 6 steps, working, complete with circuit details, 17in x 10in x 12in. Heavy, so buyer needs collect. Offers invited. G4TDJ (Falmouth) 0326 250078.

HEATHERLITE Hunter amplifier, beige/brown, single 3-500Z, ex cond, 850W output, front panel variable ALC (nice feature): £675. G4OBB QTHR (Oxford) 0865 61866.

HF linear amplifier, Somerkamp FL2000 400V. Re-valved & in gd cond, in original box with instructions: £175ono. G0EAF QTHR (Basildon) 0268-550678.

HIGH POWER new 7213 ceramic triode. 1.5KW out on any band up to 432MHz: £250. New 4CX1000: £75. Both post free. Four new Cushcraft 19ele boomers, brand new, never used, complete with phasing harness, cost £115 ea. Bargain. Buyer collects: £250 the lot. Also I am looking for 1940 to 1950 valve data books (domestic radio) and old radio valves. GJ4ICD, No 1 Belmont Gdns, St. Helier, Jersey, CI. 0534 67450 or 0534 77067.

HISTORICAL INTEREST? Research material? IEE journals mid-20's mid-60's. Delivery Bucks/London (or post). Proceeds local Scouts. John, G4KGT 071-920-8142 daytime.

HP100E Mk11 scanner 8-600, 805-1300MHz am fm wfm, boxed, as new: £180. Trio R1000 comms Rx 200KHz-30MHz am nam usb lsb/cw, gwo, instruction manual, mains & 12V leads, headphones: £190. John G7HPJ (Bognor Regis) 0243 582723.

HUDSON TxRx AM108 low band: £10. Armstrong FC48 Rx chassis SW1 SW2 MW LW with circuit diagram: £20. Radiomobile car radio type 200X with vibrator power pack: £20. Wearite IF trnsfrmrs type 400B, type 411B: £2 ea. Minicoil IF trnsfrmrs valve type: £3 ea. Plugs AM 10H425: £1. Valves Marconi HL410: £4. HL2: £5. Cossor 7S7: £4. G3OEG. (Staines) 0784 454757

IBM COMPATIBLE Brother PC (B10) paper white monitor: £420. Brother 1209 printer: £175. Both b/new cost £1000+. Chris Marsden (Great Missenden) 0240 62668 (after 6pm).

IC751A + inbuilt psu all modes + rtly: £900. FT411 2M h/h, nicad, adonis mobile mic, charger: £250. FT480R 2M m/mode: £250. G3WFM (Potters Bar) 0707 51532.

ICOM 202S 3 yrs old, some mods, fully xtald: £130. Uniden 10 FM spectrum conversion, 15W amp: £35. Tony (Batley) 0924 474548.

ICOM 251E, 2M Allmode with Mutek front end. Superb contest rig: £450. BNOS 2M 10/180W linear amplifier: £180. 9ele Tonna: £10. Packet tnc leads and s/ware for Commodore 64; £100. G0BUK (Nr Uckfield, East Sussex) 082581 3356.

ICOM 720A R-44 speaker ICSM5 desk mic

workshop manual, ex cond: £550. Bill G0MNG (Nr Shefford) 0462 812 992.

ICOM 505 ex cond, boxed, with 3el beam: £350ono. Steve (Wakefield) 0924 823866.

ICOM 725 HF tcvr with FM board and narrow CW filter, h/book, hand mic and SM6 desk mic, boxed in mint cond. £650. Martin G0HRZ 081 590 5490.

ICOM IC-475H 70cm all-mode base stn, 75W, 500Hz CW narrow filter, high stability xtal unit. As new with orig packing: £850ono. Bruce, G4WVX not QTHR (Bucks) 0628 664415 or 0831 135604 anytime.

ICOM IC-R100 mobile/base scanner, 500kHz-1800MHz continuous. AM/FM WFM boxed, as new. Genuine reason for sale: £350. Stuart, G0LOE (Dukinfield) 061-330 8149.

ICOM IC251E Mutek front end, vgc: £500. ICOM IC211E Mutek, recently serviced at ICOM, vgc: £425. ICOM IC720A tcvr, vgc, warc bands am/fm/ssb, filters incl PS15 psu: £675. G4HXE (Dover) 0227 476616 (day) or 0304 824505 (evenings).

ICOM IC275H, 2M 10-100W tcvr, speech, as new: £675; Trio 201A 5-25W 2M mobile with remote control unit, rarely used: £175. Daiwa DK210 electronic keyer with bencher iambic key, perfect: £85. Tennamast tilt-over ground post (uses scaffold pole) with winch & head unit: £80. AR40 rotator, hardly used: £80. DRAE 6amp PSU: £35. All boxed Packer 2M ATU: £20. (Dunstable) 0525 222163.

INTERNATIONAL reply coupons, 800. Offers for all or split. (Bishop's Stortford) 0279 757924.

JAYBEAM 8XY crossed Yagi: £25. Microwave module 30LS linear: £75. G0ENW QTHR (Nr Guildford) 04865 2808.

KENPRO KR500: £60. Yaesu FTV707 144MHz trsvtr: £89. Rhys GW4RWR (Denbigh) 0256 790195. (weekdays).

KENWOOD 830S tcvr, plus AT230 atu, SP230 spkr, MC60 mic. Ex cond: £650ovno. G4TZS QTHR (Wigan) 0942 59053

KENWOOD TH75E 2M/70cm h/h tcvr with SMC32 spkr/mic & s/case, virtually unused, still guaranteed: £315. Also Hokushin HS727VME 2M/70cm mobile antenna: £25. G4MRD (Cambridge) 0223 61876 after 6pm.

KENWOOD TR-751E 2M multimode tcvr 25W output mobile mount, boxed, mint cond: £485ono. Malcolm G0HOG (Ruislip) 0895 676919.

KENWOOD TS530S, immaculate cond, original packing and manual: £550. G3YNC QTHR (Romford) 0708 749175.

KENWOOD TS830M WARC bands, orig packing, service manual etc: £525. Icom IC740 FM module, new: £35. G3JTQ (Highcliffe) 0425 277767.

KENWOOD TW4000A dual band tcvr, boxed: £300. Trio TH21E h/held, boxed: £110. Both good cond. G0DGB QTHR (Durham) 091 3847306.

KW/2000B with AC PS/spkr, h/books, spare valves: £145. G3SLN QTHR (Manchester) 061-643 9014.

KW107 supermatch ATU, features built-in dummy load, all bands, handles up to 1KW: £60. (Plymouth) 0752 401437.

KW2000B checked over, fitted fan, good cond, used as receiver in spit freq, working h/book. Buyer inspects/collects: £180. (Peterborough) 0733 232211.

KW2000B HF Tx Rx, all mods done, not T8, doesn't chirp, slow-mo drive doesn't crackle, full output even on 10M, buy with confidence: £165. AR88D, matching spkr, HF listener's dream: £65. Advance E2 sig-gen 100KHz/100MHz: £25. Hygain rotator AR40, suit VHF or light HF: £25. CW buff's key, AM10A, type D: £10. BC221 het, freq meter, rock stable, accurate and useable: £15. Heath SWR bridge HF/VHF: £10. Marconi TF1041 vtvm: £15. 160M fun rigs, am/cw Tx, nice mod, valves: £15. DF Rx, works sort-of: £5. AM TxRx, incomplete, nice case, dials and bits: £5. Sale obo the late G4GVO estate. G3ROZ weekends, G3VUE weekdays. (Sandy) 0767 680828.

LAFAYETTE HA700 hf Rx 1-30MHz: £20. Howes 80M tsvtr (built): £30. Maplin rtty TU1000 (built): £25. Variac 0-240V @ 6A: £10. Sweep oscillator 1-50MHz: £15. FM40 10M FM incl 50W pa: £40. Buyers collect or p&p. Richard G0MIE QTHR (Haslemere) 0428 653948.

LATTICE mast sections (5), triangular (14ins sides). Each 12ft 6ins long, very robust: £25 ea. G4KJD (Taunton) 0823 480074.

LDF2-50 HELIAX, 200M with six unused matching 'N' type male connectors for same: £200. MM144/100-LS 2M linear: £150. FT207R 2M h/h: £85. Sommerkamp FT277 (same as YAESU FT101 Mk.1): £180. Heathkit HW101: £25. Pair 4CX350A: £20. G4DJB QTHR (Camberley) 0276 66432.

LIFETIME technical magazine collection: QST Nov'37 onwards, 245 copies. Ham Radio (USA) Feb '73 on, 148 copies. Wireless Engineer Jan'45 to end, 121 copies. etc. Also test equipment suitably priced for beginners - heavy! Send for lists G0AUO QTHR (Daventry) 0327 703964.

M/MODULES 70cms-10M converter: £40. Howes built ATU: £25. Howes built SWR meter: £25. JEP rtty/cw filter + Spectrum s/ware: £20. G0IRX (Stockport) 061-494-1817.

MASSIVE CLEAROUT. AVO valve tester with book: £40. Pye 405 telly pink screen: £40. Big boxful EMI 2001 colour camera spares: £30. Multicore cable 80-way: £1/metre. Boxful 100 old valves: £15. Boxful 100 new boxed valves: £100 or split. Enamelled copper wire gauges 28-50. Teachest full assorted wire/cable: £20. Assorted aluminium sheet/bar/etc: 50kg for £50. 25kg assorted ex-computer PCBs (1000s of components): £50. 25kg assorted chassis, modules, sub-assemblies for spares: £25. Ex-IBA 4 channel UHF TV Tx (tunable 432MHz) with manual, EHT PSU loads of accessories, very useful: £150. Colour TV: £29. Ex-BBC video matrix: £100. Ex-BBC "white" & "grey" units with 19ins rack mounting chassis, about 50 units for £150. Free local delivery/elsewhere at cost. (Birmingham) 021-472 3688.

MICROWAVE Modules M1A 144V 2M preamp: £15. Microwave modules MMS1 the Morse talker: £50. Akai 4000D 7in reel to reel tapedeck: £40ono. Valves: 2C39A (mil spec), 4Cx250B, 00VO3-20, CV118, CV1136, CV1935, CV1067, CV1053, CV1863, CV1932. Contact Dave G1ASR not QTHR (Hereford) 0432 761835.

MM 432/50 linear amplifier: £70. MM 432/28 transvert, works perfectly but has a wandering birdie on receive: £60. GW4HBK QTHR (Blackwood) 0495 228516.

NRD525 communication receiver, 90KHz-30MHz, immac, box, manual: £725ono. J. House, 4 Elizabeth Way, Kenilworth, Warwicks, CV8 1QP 0926 54556.

OSCILLOSCOPE Solartron CD1016 double beam: £85. Computer TRS-80, mod III with twin disk drives, s/ware: £110. 5.25in drives: £10. G3JNM QTHR (Bolton) 0204 43999.

PHILIPS 2531 4 valve 1930's receiver: Offers. (Wolverhampton) 0902 780299.

PROFESSIONAL tape recorder, EMI, TR90, with h/bk: £25. Naval Rx CAS 1.47-30MHz, requires PSU: £45. Mufax courier: £38. Racal HF DF FH5 installation, 2-30MHz, RA153, MA173 display, RA261 demodulator, MA277 aerial switch RA279 RA278 PSU leads, requires cabinet, some info: £85. Marconi marine kestrell III AM Tx, 1.6-4.5MHz, 100W, part transistorised TT22 PA 24v, PSU, with h/bk: £38. Buyers collect. G3RBY QTHR (Waterlooville) 0705 251218.

PYE Base station Tx401 Rx401 RCU400 & control box. Pye M293 4M A/M mobile. Pye MF6AM 4M A/M reporter, mobile, open to offers. Storno base station Tx & Rx CQF 634 & control. Storno mobile AM CQM734 information with M293AM MF6AM. Nova mobile 4M A/M o.t. offers. Icom h/held 70cm IC-04E: £150. 70ft 3 section lattice mast with winch: £150. Eddie (Oxford) 711167 (evenings) 770959 (daytime).

QRT SALE Tentec century 22 with psu: £275. AOR 950 scanner: £175. FT200 with psu, spare valves with RF clipper, needs slight attn: £120. Tiny 2 tnc: £80. Pye Westminster xtalled for Packet: £40. DLMB terminal: £20. YAESU FC301 atu: £75. Kent keyer: £35. Kent iambic paddles: £35. Boxed Howes audio filter: £10. Boxed Howes qrp swr meter: £10. M1ZHO 40M qrp Tx/Rx: £30. Ex- CB 40 channel 10M Tx/Rx: £25. Pye Cambridge 2M: £10. All ono, buyer inspects/collects, cash please. Ian G0EQC (Prudhoe) 0661 34137 after 6pm.

RADCOMS 1967 1969-77 1980-88 some bound volumes: £35ono. Buyer collects or could deliver. G3YWU QTHR (Delamere) 0606 888277.

REVOX A77 tape recorder, vgc, h/book, cover, NAB spools: £250. House, 3 bdrms, fgch, garage, good cond, convenient location for London, Surrey M25: £74,500ono. Phil Moss (Surbiton) 081-337 7309.

ROTATOR Emotator 105TSX, new and unused. Cost £160, will accept £100. For quick sale, good reason for disposal. GM3CEA QTHR (Stranraer) 0776 2716.

RS 19in racking case, style 3 - 21x16x12in type 6U, suit linear: £20. G4RAW QTHR (Halifax) 203062.

SCANNER PRO2005 + disconne Book: £250ono. Scope Hameg 20MHz: £250ono. Bencher iambic key: £55. Hi Mound straight key: £30. G0MPN (Washington) 091 415 1550 after 2pm.

SIGNAL designs QRP Tx, factory built, as new, 80M CW three crystals instructions Kent key: £42. G2BGG QTHR (Liverpool) 051 427 1903.

SEM QRM eliminator: £45. Icom SM8: £40. Global AT-1000 coupler: £40. Carr each £2. G3FPD QTHR (Horsham) 0403 723205.

SHURE 444D magnetic fixed station mic, ex cond: £30. G4NLL QTHR (near Darlington) 0325 720783.

SILENT KEY sale IC PS20A, new: £150? YAESU FT211RH, new: £200ono. FRG7 as new: £150? YAESU FC901 ATU: £120? D52 D43 scopes: £99 ea? D53S storage scope: £200? Heath exciter PSU SB104A SB604 as seen: £149? All items ono. G3LCS QTHR (Milton Keynes) 0908 313379

SILENT KEY sale Swan 350C, 5 band tcvr, Swan 230XC PSU, KW105 ATU Aldes rotator new mic phones morse key, two fans, assorted cables plugs etc. Offers for all only. Pestell G3BPB QTHR (Grantham) 0476 65751.

SINCLAIR PC200 MS-DOS, 640K ram. two 3.5in disk drives, mouse, as new: £240. BBC-B, data recorder, as new: £135. Dragon 64k, rtty cartridge: £40. 4CX250B 144MHz linear DK10F design, professional build standard, new valves, all info, requires v minor attn. Buyer to inspect and collect: £120. G4JXK QTHR (Fareham) 0329 230737.

SIX METRE station; HT106 1OW CW/SSB, 3-ele Yagi, SWR meter and rotator, cables etc incl in price. Can be seen working: £300. Going HF. Mr. Scott-White G6JOI (Henfield, W Sussex - close to A23) 0444 881520.

SPECTRUM Analyser 0-90MHz professional appearance. 250mmx165mmx8mm high. RadCom Nov 89. Surplus to requirements - I have two. £180. G3NXD 0562 850570.

SUPERB Rx JRC NRD515 Ser No 25534, one of the last batch of this famous Rx manufactured. Complete with CW filters, little used, pristine cond, boxed: £550. YAESU FL2100B HF linear amplifier, ex cond, boxed: £450. G3LPA QTHR 0536 760336.

TEKTRONIX 545A scoope, a real 60's monster, full working order, badly needs servicing, dual beam 20MHz, incl circuit diagrams, all valves, superb shack heater. Buyer brings his own low loader: £25. G1UOR QTHR (Skelmersdale, West Lancs).

TEXTRONIX 515A scope: £20. Telequip D51 DB scope: £25. Levell RC Osc 1Hz-1MHz: £25. Levell AC µVM 1Hz-3MHz: £25. Fluke DMM 8022A: £85. Marconi VTVM TF1041B 500MHz: £10. Sinclair DVM DM2: £20. Scanner SX200:£100. Trio TR2300: £85. All h/books. Nick, G3ZUE QTHR (Bridport) 0297 89239.

TONO 9000E multi application communications terminal, Morse, Baudot RTTY, ASC11 RTTY, Word Processor, selective calling system: £150. Ted G0GBT QTHR (Sandwich) 0304 611744.

TRIO 1000 Rx, mint, boxed: £250 ono. G2CYN QTHR (Bedford) 0234 711538.

TRIO 180S tcvr, SP180, PS30, Drake MN7TU, MC30 mic, all bands. G5RV 3 band vert, vgc, boxed. Ad in Call Book: £800. G4NPI QTHR (Dukinfield).

TRIO 2500 2M fm handie with car adaptor and charger: £120. (Bromsgrove) 021 445 2685.

TRIO 9130 2M m/mode BO9A base vgc: £325. Kenwood 7800 2M FM mobile: £100. Kenpro KR500 elevation rctator vgc: £100. WELZ SP200 SWR/power meter: £40. Yaesu FRG7 gen coverage Rx: £100. MM 144/28HP receive conv: £15. G6VCI (Towcester) 0327 52866 evenings/wkend.

TRIO JR500S Rx, gwo: £45. TriStar m/mode converted DTI authority, toneburst, 100KCs shift and linear: £65. G4UOS QTHR (Burnham-on-Sea) 0278 783941.

TRIO R2000 gen coverage Rx 150KHz to 30MHz AM FM SSB CW memories, scanning, h/bk, boxed, superb cond: £350. AR900 scanner with charger, mint cond: £140. Buyers collect or split carr. G0MHQ QTHR (Peterborough) 0733 230088.

TRIO TS515 SSB/CW Tcvr 80-10M, fitted, TS820 500Hz CW filter, also PS515 PSU, VFO5 remote VFO, h/books, boxed, ex cond: £250. Free to buyer of above - Palomar Tcvr preselector 1.5-54MHz 20dB gain, RF actuated. G3JFC 0474 872743.

TRIO TS520 mic, manual, vgc, gwo: £325. YAESU FRE7 hf Rx, gwo, Wadley loop circuit: £100. Battery mains. G3DQY (Polegate) 03212 5704.

TRIO TS530SP with filters: £550. GM4SVM QTHR (Stirling) 0786 75834.

TRIO TS780 2M/70cm multimode, case slightly scratched, v good wkng order: £550. Tempo 2002 144MHz amplifier 400W+++ vvgc: £650. Carr extra. 0744 892549.

TRIO TS830S fitted DS-2 12V converter plus new 6146B's by Lowe: £675. VFO-230: £150ono. SP230: £40. MC50 mic: £25. All above £850. YAESU FL2100Z linear: £450. G4MET QTHR (Hereford) 0432 355297.

TRIO TS940S automatic ATU: £1400. Kenwood TS430S FM: £650. TL922 linear: £1000. FT726R, 70cm, 2M, 6M: £850. 50MHz linear: £150. (Maidstone) 0622 850510

TRISTAR 747 working on IDFM only require two xtals for full multimode coverage. DTI authorisation circuit inc. G4GLI QTHR (Gt Yarmouth) 0493 732278.

TS520SE cw filter, mic, manual, gwo, new pa's fitted: £290. TS510 80M-10M tcvr, just overhauled, mic, manual, gwo: £150. G/whip multimobile, complete, plus coils for 80M, 40M, used once: £60. MC50 desk mic, vgc: £30. Sig gen to 30MHz: £15. Microwave modules rtty tcvr: £110. Datong speech processor: £30. ASCII to morse converter: £25. Pet Commodore computer: £20. G4ILA QTHR (Lymm) 0925 75 2388.

TS530S ATU 230 SMC trap difole mic 35S Samsun 5Ckey phone HS4: £CALL. G0FDY QTHR (Felixstowe) 0394 286971.

YAESU FT-2700RH 2M/70cms: £350. Trio TR7730 2M: £250. WANTED any parts info for R1155. G0HVW (Mildenhall) 0638 510220.

YAESU FT1 complete with MDI desk mic, fm, and filters, mint cond. It's yours for £900. (Hitchin) 0462 457687 (evenings).

YAESU FT101. good cond, works well: £210ono. Belux 12V 15A power supply, good cond: £20. Bob G8SAS QTHR (Tonbridge) 0732 351361.

YAESU FT101Z fm, cw filter, spare valves. AT200 atu, SP520 spkr. All boxed with manuals, ex condx: £400. G4NFX QTHR (Scunthorpe) 0724 865881.

YAESU FT200 complete for spares. YAESU FV200 pwo: £50ono. YAESU FP200 pwo: £30. NEC 6JS6C pair: £35ono. NEC 12BY7A: £20ono. GI4JTF 02317 2762.

YAESU FT221R Mutek F/E fitted, manual, gwo: £350ono. BNOS 144MHz 10/100W linear, gwo: £130ono. Valves: 3 off 5D21: £40 ea. 3 off TT21: £25 ea, 1 off CV345: £10 ea. Eddystone 770U, 20-160MHz Rx - any offers? Prefer buyer to inspect and collect. G0BKR QTHR (Luton) 0582 26390.

YAESU FT290 Mk 1 fitted Mutek frontend complete with mobile mount, nicads and h/book, exc cond: £210. BNOS linear amp LP144-3-50, brand new, unused, ideal for use with FT290: £110. YAESU rotator G-600RC, brand new, unused, complete with lower mast clamp:£200. TS940S fitted auto ATU, little used, exc cond, complete with h/book, service manual and desk mic: £1700. MFJ deluxe Versa Tuner II, model MFJ 949-C 300W pep atu: £100. G4VMX QTHR (Newport Pagnell) 0908 618809.

YAESU FT290R 2M multi-mode tcvr with nicads and 2M aerials: £220. G4UCX 0473 218462.

YAESU FT707 HF tcvr. 80M to 10M plus WRAC bands: £350. Base station mic type YM35: £25. PSU type FP707 20A: £150. All immac. G4ODD QTHR 0777-871915 (Tuxford) after 6.30pm.

YAESU FT726 with 2M/70cm/6M sat board fitted: £899ono. MMT 70MHz tnsvrtr: £99ono. MML432/50 70cms linear: £99ono. Mutek 43R mast/head preamp: £99ono. Aerials 2x21ele tonnas + power divider: £50, 4ele J/B 4M: £25, 24ele J/B 70cms: £15. All + p&p. WANTED FT225RD c/w Mutek f/e. G1SDX QTHR (St Austell) 0726 66093.

YAESU FT727 dual band h/held, 3 nicads, charger, mobile PSU, spkr mic, all boxed: £325ono. FT73R extended coverage, nicad charger, case etc: £175ono. Both boxed with manual. FT23R unmodified, 6 months old, 2 nicads, charger, case, spkr mic: £225ono. YH2 headset: £10. Nick Buckley, G7EQM QTHR 0742 751031 (work) 0433 51572 (home). Not advertised elsewhere.

YAESU FT77 all options: £385. Realistic PRO57 scanner: £75. M/modules Tvtrs 28/144: £75. 28/432S: £85. 144/432R: £95. Tono 144MHz masthead preamp: £35. Base mic: £20. Daiwa notch/cw filter: £50. Icom IC2SE extended Rx/Tx: £220. 144MHz beams 16/12/7 element. G0HAS QTHR (Swindon) 0793 874614.

YAESU FT980 HF tcvr, gen-cov Rx, mint cond, mic, manuals, boxes: £1020 incl delivery. May PX good gen-cov HF Rx + cash. GW4RLP QTHR (Caernarfon) 0286 5264.

YAESU FTdx401 tcvr with ext VFO FV401, mic, manual, most spare valves, odd spkr. Usual 401 features, built-in psu, xtal calibrator, noise blanker, cw filter. Could deliver Suffolk, better buyer inspects, tests, collects: £250. Sorry no split. G0BYY QTHR (Bury St Edmunds) 0284 702281.

YAESU mobile mounting bracket MMB-11 for FT290, virtually as new: £15. G3MRT QTHR (Camberley) 0252 547900.

YAESU YC-355D digital frequency meter, mains operated: £50. Telequipment S54A oscilloscope, mint: £100. IC22A mobile VHF Tx/Rx: £65. G8BJP QTHR (Westgate, Kent) 0843 31069.

YEASU FRDX400 Rx, 80m - 10m, + 4m, + 2m conv. SSB & CW filters, matching spkr: £120. Also FRDX400 without options: £100. G4AZO QTHR (Woking) 0483 721649.

YEASU FT ONE, gwo, clean cond: £950. CAPCO SPC300 ATU: £150. Both for £1000. Consider Rx in p/ex. G0IKN QTHR (Bournemouth) 0202 481273.

Z88 LAPTOP 128K go anywhere computer, built-in word processor & spreadsheet, mains adaptor, two 32K Eproms IBM PC link Eprom eraser and spellmaster (spell check) for w/ processor: £250. Would exchange for FT690, FT790 or FT290 WHY. John, G6COB QTHR (Winsford) 0606 550258 after 6pm.

ZENITH Z-140 8MHz PC clone, CGA, 2 x 5.25ins drives, 640K, 12in mono monitor, incl MS DOS 3.3 plus, manuals boxes etc: £330. (Brentwood) 0277 355731.

WANTED

PRE-WAR television receiver. Also Sony 405 line cctv equipment. Andrew Emmerson, 71 Falcutt Way, Northampton NN2 8PH. 0604 844130.

AP1086 ISSUE ONE 1938/1952 (RAF radio stores ref nos). Also any air publications relating to Radio-Radar equipments, exc prices offered. Would purchase post-war to current Magnetrons, Klystrons, T/R cells, TWT's, Photo-Multipliers, most CV types and special types of EEV, Ferranti, Varian, M-OV, RCA Valves. Have you any of these tucked away? GEE Receiver type R1355 Ref: 10D/13032, Control Panel Type 3 Ref: 5U/1269, Loading Units Types 2 or 51 Ref: 10B/13239, 10B/16025, W-Plugs large Six Pin Type 201. M. Gee, 17 Foxley Close, Mountford Estate, Ferncliff Road, Hackney, London E8 2JN. 071-254-9083 or 071-790-2846 any time.

AP1086 issue one 1938/1952 (RAF Radio Stores Ref Nos). Also any air publications relating to radio, radar equip. Exc prices offered. Would purchase post-war to current magnetrons, klystrons, t/r cells, TWTs photo-multipliers, most CV types of EEV- Ferranti M-OV valves wanted Gee Rx type R1355 unmodified. M. Gee, 17 Foxley Close, Mountford Estate, Hackney, London E8 2JN. 071-254 9083 or 071-790 2846 anytime.

AUDIO FILTER Datong FL3 or ERA BP34 or similar. Straight heavy Morse key with fine adjustment WHY. Chris G7IOB (Wilmslow) 0625 531154 anytime.

BLUE GLASS Arcturus UX valves, especially types 47 80. Also to complete project HIVAC SG220SW and PX230SW. Have alternatives for exchange. Bernard Litherland G4IMT QTHR (Chippenham) 0225 891254.

BOOK, Antenna Theory and Design, part 1, by H Williams, published by Pitman. Also BK100 mechanical bug. G3KTH QTHR (Droitwich) 774624

CIRCUITS info for Marconi test set TF982. Marconi valve voltmeter TF1041. Advance J1 oscillator. Taylor multimeter 100A. G1FPV QTHR (Rugby) 0788 521282.

CUSHCRAFT R5 vertical antenna 10 15 20 12.17M, no radials needed, only 17ft high, as new: £190. 0474-82 3797.

DATONG ASP RF speech processor or the earlier RF speech clipper. G3POX QTHR (Huntingdon) 0480 811549.

ELECTRONIQUES QP166 complete front end. Mr. R. Mills, G8CQC, 48 Ladybank, Birch Hill, Bracknell, Berks RG12 4BH. Please write, no telephone.

FC102 or FC907 ATU in wkng order. Cash available - urgent. 0737 373373 (evenings).

FILTER YG-455C. Pair new matched 6146B. One new 12BY7. MB-100 mobile mount for TS130. SP-120 spkr. John, G4XTS (Essex) 0268 521915.

FOR GRUNDIG Satellite Receiver: the re-chargeable 476 Accumulator, in good cond, please, with regular charge/discharge history. G4TDJ (Falmouth) 0326.250078.

FRG7700 memory unit. G2LL (Bexhill on Sea) 04243 4657.

FT290 Mk 1 or Mk 2, also 25W linear. Must be in mint working order. (Buxton) 0298 71020.

HEATHKIT HW8, kit preferred. Must be complete. If built must be original and in working order. G0MHQ QTHR (Peterborough) 0733 230088.

HEATHKIT PSU HP23 for HW101 or SB101. Any condition as long as working. G4BJN QTHR (Hemel Hempstead) 0442 241281.

HF225, R1000, R2000 FRG7700 or similar general coverage receiver. 0744 884244 evenings or weekend.

HUNTRON tracker any model in good condx. (Shrewsbury) 0743 884858.

KENWOOD TL120 TS130V, TS120V. Tim, VE6SH, 107 Strathearn Rise, SW Calgary AB Canada T3H1RS.

KEYBOARD suitable for, and wired for, MM RTTY Tcvr MM 4000. Not pressure type please. G3ZOG QTHR 091 5280080.

KW 160 ATU. G3FVC QTHR (Watchet, Somerset) 0984 34271.

LINE OUTPUT trnsfrmr and circuit diagram for Decca PN0780 Rx/monitor (viewdata terminal). Also mains trnsfrmr for telequipment D65 or D66 oscilloscope. May also consider complete units of both items working or not for spares. Dave G0CAD not QTHR (Stadhampton) 0865 890066.

MANUAL & CIRCUIT Storno Viscount CQM 19-25/50 fitted eight crystals 10W RF transmit valves EF95 EF95 EL95 QQVO3-10 cast iron box 12ins 9.5ins 4ins high. R. Mills, G8CQC, 48 Ladybank, Birch Hill, Bracknell, Berks RG12 4BH. Please write, no phone.

MANUAL or circuit diagram for BT Robin phone answering machine. Borrow or buy. Dave (Watford) 081 950 5405, evenings.

MARCONI Key type 971, also RAF type D, Ref 10A/7373, must be complete and undamaged. G3TSS QTHR (Corbridge) 0434 633125.

MICROWAVE moddules MMT70/28 4M linear trsvtr 28MHz IF. G3UGL QTHR 0234 750050.

NATIONAL NC303 Rx or NC300 or EA12 with circuits/handbk. Also KW vanguard etc. AM Tx. W.H.Y? G3WRT 0473 311665.

OIL FILLED capacitors 3.5kV or more. CAP anything over 2MFD. G3LTF (W Sussex) 0403 753339 after 7.30pm or weekends.

OPERATING MANUAL for Racal RA217 and RA1217 in good condition. Service manuals if possible. Any spares or parts of these Rx's working or not. Urgently require two tuning knobs for above. G4AJE QTHR (March, Cambs) 0354 741168.

PF9 TX and Rx. Any condition considered. Jerry (Lightwater) 081-979-2204 daytime, 0276-79396 evenings.

POST OFFICE type straight brass key at reasonable price, in good cond. L. Willford RS90234 (Plymouth) 0752 261269.

POWER supply unit for Solartron oscilloscope CT436. This unit is marked 6625-99-914-5027 for A/C mains. Also Datong morse tutor and small coil winding machine. G3CUR QTHR (London/Kent) 03224 38662.

QSL CARDS for school communications project. Reasonable carriage costs refunded. Dave Morton G4LQT, Barnfields Primary School, Wildwood, Stafford ST17 4RD. 0785 663688, daytime.

R210 70mm, 52in, film tuning scale, part number ZA-49511. Does anyone know how one can get some spares? Brook G7HJA (N London) 081-882-4110.

RX/TX Type 18 + Type 68. Also RxTCS12 and RxAR88. Any condition. (Wem, Shropshire) 0939 34605.

SB220 HEATHKIT hf linear amp. Any cond considered. G3TCO QTHR (Bristol) 0272 681068.

SHURE 55SH mic, also any other 'classic' design or shaped mic, 30's, 40's 50's. 0875 33291.

SINCLAIR ZX printer. Reasonable price for RAIBC member. G4MAQ QTHR (Oxford) 0865-718430.

SM220 STATION Monitor with pan display unit and BS8 adaptor in gd cond. G4NGW QTHR (Leigh on Sea) 0702 710000 anytime.

SOFTWARE for AMT-1 either C-64 or IBM. G0IUW QTHR (Gloucester) 0453 765406, after 6pm please.

SPEAKER/mic SMC-25 for Kenwood TR2500, books Amateur Antenna Tests and Measurements by Hooton Antenna Engineer JASIK. G3REP QTHR (Worthing) 0903 879083.

SWITCHED mode power supply for YAESU 757. Also MD1 desk mic. Bruce G4YZH QTHR 0724 732226.

TEST GEAR Marconi TF995A/5 Sig Gen IS to 220 MHz, AM/FM: £60. Pye SG5U UHF Sig Gen: £40. Dymar mod meter 1785, AM/FM 30 to 480MHz: £50. Marconi AF/RF power meter TF1065/A: £30. MM trnsvtr 10M/2M: £75. Four section lattice mast 40ft, bottom section needs repair: £80. Video genie computer, faulty: £25. Buyer to collect. (Newark) 0636 71387 after 6pm.

TRIO SM220 station monitor with pan display capability and including leads and manual. Must be gwo. G3RKQ QTHR (Sheffield) 0742 377321.

VALVE QRO linears for 2M and 6M. Must be complete and working, preferably prof built. Cash available for right equipment. Will collect or pay postage. Nick Buckley G7EQM QTHR 0742 751031 (work) 0433 51572 (home).

YAESU ATU type FC102, must be as new or in mint condition. G3RLN QTHR (Tewkesbury) 0684-296769.

YAESU FT703R 70cm h/h in good working order. Fair price paid. Dan, GW0EGH (Chepstow) 0291 424725.

EXCHANGE

MICROWAVE modules MMT144/28 (28MHz in - 144MHz out). Hardly used, incl leads for TS430. Swap for scanner with airband. Phil G6DLJ (Southampton) 0703 840193.

HELP LINES

WANT TO LEARN SPANISH?

We have received a request from Mr Benito Calvar, EA1CNL, who would like to contact an English amateur who would like to improve his Spanish, in return for helping him to learn English. If interested please write to Beni Calvar, PO Box 1.110, 36200-Vigo, Pontevedra, Spain.

FT101ZD DISPLAY PROBLEM

Nigel Clayton, G0IFS, has a problem with the display on his FT101ZD. The 1kHz display segment keeps going blank after counting up to number seven; if the set is switched off and on again the display will work correctly for about 15 seconds. Is anyone aware of where he can obtain a display driver MSM.561 chip. Or perhaps someone has a faulty unit they would care to lose for spares. He can be contacted on 022779 2867.

2-PRONG POWER LEAD REQUIRED

Alun Hughes, GW6KAV (QTHR) needs a two-prong mains power lead suitable for a Grundig TK124 tape recorder (No.100403). He has been told that these are no longer available but wonders if anyone can supply the right plug. All expenses reimbursed.

DAILY SKETCH BOOK FOR BOYS

Does any erstwhile 'boy' of 1960 vintage remember an article which appeared in the Daily Sketch Book for Boys of that time, and featured amateur radio in the form of an interview with G4HD. If anyone can remember this, or better still, has a copy, please contact Mr S Slater, BRS92755, tel: 081 953 2164.

ICE WINCHESTER DISK

Has anyone had experience of using an ICE (Independent Computer Engineers?) Winchester Disk with a BBC micro? The unit is currently configured for Apple IIE, and conversion details are required by Alastair Turner, G4RUL, QTHR.

FRENCH THOMSON CSF EQUIPMENT

Mr Woods, G3OQC, is looking for information on the Emett/Recept ER95B and Ampli HF AM215A. He particularly requires the hand mic/tel connections and the interconnection details between the T/R and the 15W linear amp. Please ring him on Portsmouth (0705) 380705 if you can help.

AVO8 MK4 METER

A plea from Arthur Simpson for help in locating information, source of supply circuit and any other associated 'gen' for the multi-shunt in his tried and tested AVO8 MK4 meter. His address is 9 Dunheved Road South, Thornton Heath, Surrey, CR7 6AD.

POWER SUPPLY REQUIRED

Can anyone help find Harold Bent, G0EZW, an original No19 set power supply rotary converter type, if possible with plug lead connector. This is needed to refurbish No19 set that he hopes to use for demonstrations to various clubs. His address is 97 Nottingham Road, Selston, Nottingham, NG16 6BU.

MONITORSCOPE INFORMATION REQUIRED

Mr Trevor Artingstoll, G0JOE, is looking for information on his Heathkit type SB614 monitorscope. Photocopying costs will be reimbursed, and he can be contacted at 1 Whitefriars High Street, Chesterton, Cambridge, CB4 1NN. He also wonders if there is such a thing as a Ham Chess Club?

BOOK REQUEST

Evan Fell, VK4EF, a WWII signaller/historian restores old army radio equipment. He urgently needs the following books: *Secret Warfare* (Pierre Lorain), *History of Signals* (Maj Gen Nalder), *International Radio Tube Encyclopaedia*. VK4EF's address is 97 Jubilee Terrace, Bardon, Brisbane, Australia 4065.

BSX20 TRANSISTOR REQUIRED

Bill Stanway, G4ALP, is searching for a BSX20 transistor, a 120p 100v capacitor, and a varicap for the Cal Tune on his KW2000/B. Please write to him at 52 Bowerfield Avenue, Hazel Grove, Stockport, Cheshire, SK7 6JA if you can help.

MANUALS WANTED

Mr Broadberry, G1PNF, requires a manual for the Yaesu FRDX 400 receiver and the RDL 400 transmitter. Anyone wishing to contact him should write to him at 9 Maple Avenue, Fishponds, Bristol, BS16 4HJ.

Mr Dixon, RS90461 has purchased a Trio Communications Receiver and is anxious to obtain the operating manual for model No.JR60. Any costs would be reimbursed. His telephone number is 0278 426991.

Service Manual for the Hallicrafter S27 ultra high frequency communications receiver is required by Mr Clarke, G3UTF, QTHR. All expenses involved would be repaid.

Armando - ZS6ADB, ex CR7AR, has a problem with a faulty Marconi Instruments Frequency Counter, TF 2424A, and would appreciate a copy of the service manual/circuit diagram. G3HSG/ZS6 will arrange copying if required. Please write to Frank Pierson, G3HSG, 'Elmslac' Church Wynd, Burneston, Bedale, N Yorks, DL8 2JB.

COME IN G0NJI

W2FFE from Thorn-Camden, NJ, USA would like to get in touch with G0NJI who recently visited him. Mr Campbell, GM4WQQ passed on this request, after making contact.

RAF LITTLE SAI WAN

During the 1950s a Radio Club operating under VS6CT, but the station was closed by the Air Ministry and the callsign was reissued. Tony Bounds, G3KDP is anxious to contact some of his old colleagues with a view to meeting up occasionally, perhaps at a central rally. The photograph shows him in the foreground and G3KGX (Brian Lawrence) at the rear. Tony's telephone number is 0736 796405.

Helplines is designed to help put people in touch with each other. If you have a problem, it's more likely there's someone out there who has the solution; if you are looking for an old colleague or amateur friend, there could be a reader who has some news of their whereabouts: if you have solved a particular problem, write and tell the rest of us. 'Helplines' is there to help you and to give you the opportunity of helping others. Write to us marking your envelope 'Helplines' and we'll do what we can to get the message out.

SILENT KEYS

G7BID	Mr A C Taylor	13.11.90
G4CGT	Mr B G Clements	Feb 90
GI5UR	Mr R Barr	22.11.90
G1YSC	Mr R A Scott	16.11.90
G4ALV	Mr J M Caw	20.9.90
G4OLJ	Mr F H Smith	14.11.90
GW0KFK	Mr A Allsop	
G6ZTQ	Mr H J Drinkwater	
G4KXC	Mr T H McGuire	27.9.90
G3IAK	Mr S F Miller	March 90

CIRCUIT DIAGRAMS

A request from F6GPA for the copy of the circuit diagram for the Pye W30 AM and the Pye W15 FM. He really needs to trace the connections to the control connector SKB in each case. Anybody able to help will get a 10MHz crystal to say "Thanks".

You can contact him as Amateur Radio F6GPA, 41600 Chaon, France.

Mr Kirkup, G8YVU, recently purchased an extensively modified Radiovision 'Commander' communications receiver dated about 1950, and would like to restore it to its original condition. Perhaps someone can supply him with circuit details or alignment data. His address is 337 Wheatley Lane Road, Fence, Burnley, Lancs, BB12 9QA.

Mr Butcher, G4GWJ, is looking for a circuit diagram for a BC342 general coverage receiver to "put a mechanically good but electrically dead old warrior back into use". His telephone number is 0734 869721.

SIEMENS TELEPRINTER MANUAL

Basis O'Brien, G2AMV has, on behalf of a local RSGB mamber, been trying to (1) find a manual for the Siemens Teleprinter T100 and (2) obtain information about a Rohde & Schwartz L-Messgerat (LARU 160) Inductance Measuring Set. G2AMV is QTHR.

BURNDEPT NEEDS ALIGNMENT

Kris Partridge, G8AUU has a sample of the Burndept BE448 UHF transceiver, model number BE448/5/10/25/U and he would like to align it for the 433MHz band. He would appreciate any information, service handbook, alignment details, circuit diagrams, etc, and can photocopy details required. All costs will be refunded. Kris can be contacted QTHR.

LADIES' AMATEUR RADIO CLUB?

If any XYLs are interested in forming a ladies' amateur radio club in the Tavistock, Devon, area, please contact Pam Goddard, G7GYL, telephone Mary Tavy (082 281) 792.

2M CAVITY FILTERS

Do you work for an organisation which is scrapping, know where to source or have in your shack some 2m cavity filters suitable for a voice repeater? Bedford Repeater Group is looking for the above. Information to Doug Ash, telephone 0462 711722 (answerphone).

CLEARTONE MODEL CH600

Des Shepherd, G3LCS has a synthesized handheld transceiver made by Cleartone model CH600. It is VHF FM and currently programmed on 3 channels in the 168MHz band. He wants to reprogramme it for Maritime channels (156MHz) for use at sea. If anyone can advise him, please ring 0908 313379.

EVENTS DIARY

CLUB NEWS

DEADLINE - Items for inclusion in the April 1991 issue must be sent to HQ marked "Club News - DIARY", to be received by 16 February latest. If news is received by the published deadline, it will 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

GORDANO ARG - 27, talk "/MM on a Narrow Boat"; Mar 27, Annual General Meeting. Would all members please make a special effort to attend. Details 0272 853849 (evenings) 0272 857102 (office hours).

SOUTH BRISTOL ARC - 6, video evening; 13, VHF activity evening; 20, computer evening; 27, microwave workshop; Mar 6, Severnside TV Repeater Group Presentation; 13, HF activity evening; 20, exhibition of Radio Controlled Model Boats. Details Whitchurch 832222 on a Wednesday evening.

THORNBURY & DARC - 6, Radio Investigation Service; 20, HF activity evening; Mar 6, TBA.

WESTON-SUPER-MARE RS - 4, surplus equipment sale; 18, constructors night. Details 0934 514429.

BERKSHIRE

BRACKNELL ARC - 13, Tune..& Blow-up? - hands on experience of how to handle valve amps effectively; Mar 13, talk TBA.

BURNHAM BEECHES RC - 4, talk "Amateur Radio Software"; 7, quiz vs MADARC at Red Cross HQ, The Crescent, Maidenhead. Please note not the normal day; 18, talk "The Future of Amateur Radio" by David Evans, G3OUF; Mar 4, Annual General Meeting. Details 0628 25720.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 6, used equipment auction sale; 20, no meeting due to Repeater Group AGM at Stone, Aylesbury; Mar 6, talk "Oscillators", 20 Annual General Meeting. Details 0280 817496 or 0908 560026.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 1, talk "HF Antennas & Connecting them to your Rig"; 8, Rally briefing; 10, Annual Rally; 15, TBA; 22, informal & Morse class; Mar 1, constructors evening; 8 demonstration station to 1st Cambridge Scouts in the club shack.

CLWYD

DELYN RC - 12, talk & demo by MGR Communications; 28, open forum & discussion night plus a chance to prepare for the AGM; Mar 12, Annual General Meeting. Please try to attend. Details 0244 819618.

RHYL & DARC - 4, talk "Computers in Amateur Radio"; 18, quiz RAE multiple choice questions; Mar 4, demo "Fitting Coaxial Connections". Details 0745 336939.

WREXHAM ARS - 5, quiz; 19, projects night - get advice on your homebrew from other members. Details 0978 261482.

CO DURHAM

DARLINGTON & DARS - Now meets on a Monday evening (only). Details G0DTV (Secretary) 5 Mulheim Close, Darlington, Co Durham DL3 0UJ.

CUMBRIA

EDEN VALLEY RS - 28, BBC Club, bring & buy auction; Mar 28, BBC Club. Annual General Meeting. Please attend. Details G0MDV.

DERBYSHIRE

DERBY & DARS - 6, junk sale; 13, rig testing night; 20, talk "RF & Front Line Medicine"; 27, talk "Operating on Satellites"; Mar 6, junk sale; 13, talk "The History of Computers". Details 0773 852475.

DEVON

EXETER ARS - 11, talk "Power Supplies"; Mar 11, talk "Simple Test Equipment". Details 0392 78710.

PLYMOUTH RC - 2, Tech visit to Goonhilly Sat. Station; 12, talk by the DTI; 19, talk "CW QSO Diagnosis"; 26, WX feature explanation of WX charts. Details 363607.

TORBAY ARS - 1,8, club nights; 15, Annual General Meeting; 22, club night; Mar 1,8, club nights; 9, Annual Dinner & Dance - Sefton Hotel, Babbacombe, Torquay. Details 0803 526762.

DORSET

SOUTH DORSET RS - 5, TBA; Mar 5, bring & buy. Details 0305 781164.

ESSEX

BRAINTREE & DARS - ***NEW PUBLICITY OFFICER*** Margaret Andrews, 22 Arnhem Grove, Braintree, Essex, tel: 0376 27431. 4, discussion evening; 18, TBA; Mar 4, junk sale; 18, social evening with Braintree React.

CHELMSFORD ARS - 5, talk "Installing Mobile Equipment"; Mar 5, talk "Emergency Planning" by Chelmsford Council. Details 0245 260831.

LOUGHTON & DARS - 9, talk "Desk Top Publishing - How the Newsletter is Compiled"; 23, talk "At the Speed of Light - Lasers Explained"; Mar 9, Novice Licence. Details 081-504 4581.

VANGE ARS - 7, junk sale; 14, talk by G4FUF; 21, video presented by G4YVW; 28, Annual General Meeting. Details 0268 524453.

FIFE

GLENROTHES & DARC - 27, talk/slides "The Munros" by James, GM4WZP. Details 0592 755958 or 0592 743014.

GRAMPIAN

ABERDEEN ARS - 1, junk sale; 8, beginners' lecture; 15, on the air club contest No. 1; 22, talk "Ferromagnetics Used in Amateur Radio"; Mar 1, junk sale. Details GM0CSZ.

GREATER LONDON

ACTON BRENTFORD & CHISWICK ARC - 19, talk "Meteorology and VHF/UHF Propagation.

CRYSTAL PALACE & DARC - 16, Annual General Meeting and club constructional contest; Mar 16, talk "Workshop Practice". Details G3FZL.

ECHELFORD ARS - 11, construction evening; 28, surplus equipment auction. Details G0JSP.

EDGWARE & DARS - 2, GX3ASR demonstration station at Mill Hill Library. Details 09274 22776.

SUTTON & CHEAM RS - 21, talk "Wireless Before Radio"; Mar 21, constructional contest.

GREATER MANCHESTER

ECCLES & DARS - 5, discussion "Club Stand at the Norbreck Rally"; Mar 5, demonstration "Making and Marking Boxes for Projects". Details 061-773 7899.

SOUTH MANCHESTER RC - 1, Winter DF; 8, talk "Grid Pip Oscillator". Details 061 969 1964.

STOCKPORT RS - 13, talk "VHF Contesting"; 27, TBA. Details 061-439 3831.

GWYNEDD

DRAGON ARC - 4, video evening TBA; 18, films "Scenes of Penmaenmawr Quarry 1967/87"; Mar 4, problem night - a panel of club 'experts' will discuss your AR radio equipment problems. Details 0248 600963.

HAMPSHIRE

BASINGSTOKE ARC - ***NEW SECRETARY*** Lawrence Hughes, G0NCM, 15 Adam Close, Baughurst, Basingstoke, Hants. RG26 5HG, tel: 0734 811097.

FAREHAM & DARC - 13, talk "Simple 80M Rx Project"; 27, talk "Components" Part 2; Mar 13, talk "2 Metres - The First Ten Years". Details from Mr D M Hall, G0KCG.

HORNDEAN & DARC - 7, talk "Police Communications Control"; Mar 7, "Something Different". Details 0705 472846.

ITCHEN VALLEY ARC - 8, talk "Radio Aids to Light Aircraft Navigation"; 22, talk "Aerials". Details 0703 736784.

THREE COUNTIES ARC - 13, talk "UoSATs and OSCAR Satellites"; 27, talk "Tracing Your Family History"; Mar 13, talk "Earth Imaging from Space". Details 0420 489847.

HEREFORD & WORCESTER

BROMSGROVE ARS - 12, night on the air; 26, talk "Antennas"; Mar 12, night on the air. Details 0527 503024

HEREFORD ARS - 1, Annual General Meeting. Details Hereford 354064.

KIDDERMINSTER & DARS - 5, lecture; 19, quiz and ordinary meeting.

WORCESTER LIONS ARG - are running a coach to London AR Show, Picketts Lock on Saturday 10 March 1991. Pick-up points Redditch, Evesham, Worcester, M42 Junction Bromsgrove. Details 0527 79636.

HERTFORDSHIRE

HARPENDEN ARC - 20, talk "Oxidation and the Rusty Bolt". Details 0582 713970.

VERULAM ARC - 26, talk "UHF Compendium". Details G3PMF or G3JKS.

HUMBERSIDE

GOOLE R&ES - 1, discussion "Novice Licence"; 8, slide show "Aircraft"; 15, junk sale; 22, visit to BBC TV Leeds. Details Steve, G8VHL. Goole 769130.

KENT

MEDWAY AR&TS - 5, construction contest; 26, Annual General Meeting. Details from G8VJU QTHR.

WEST KENT ARS - 15, talk "Local Radio Forthcoming Developments".

LANCASHIRE

NORTH WESTERN REPEATER GROUP - meets at the Globe Bowling Club, Accrington on the third Thursday of every month. Secretary: David H Dyson, G7DHD, 5 Warwick Street, Church, Accrington, BB5 4AL; tel: 0254 397743.

THORNTON CLEVELEYS ARS - 4, sale of Silent Key's equipment (G0FPJ); 11, talk "Radio Controlled Models"; 18, quiz; 25, preparation for NARSA rally. Details G4BFH, QTHR.

WIGAN & DARC - 7, talk "Home Construction (Measurement)"; 21, general discussion - review of surplus equipment suitable for conversion; Mar 7, general discussion - update on Novice Licence. Details 0942 47416.

LEICESTERSHIRE

LEICESTER RS - 4, HF/VHF night on the air; 11, committee meeting, HF/VHF activity night; 18, talk "Jandek equipment and kits"; 25, HF Contest review, HF NFD preliminary planning meeting; Mar 4, quarterly progress, open meeting, 11, committee meeting, HF/VHF activity night. Details G3TQF.

LOTHIANS

LOTHIANS RS - 13, talk "Air Traffic Control"; 27, test equipment; Mar 13, TBA.

MERSEYSIDE

WIRRAL ARS - 6, President's night; 13, committee meeting; 20, talk "The Shortcomings of the Battery". Details 051 644 6094.

NORFOLK

NORFOLK ARC - 6, 'Real Radio' evening; 13, talk "The Construction Business"; 20, talk "Science for All"; 27, talk "The Fiery Finger of God - Lightning"; Mar 6, talk "Early Computers and Other Reminiscences; 13, surplus equipment auction/bring & buy (doors open 7pm). Details 0362 850591.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 7, forum followed by activity; 14, talk & demonstration "How to Use Club Equipment"; 21, activity and preparation for Thinking Day on the Air; 28, mini talk "Obtaining Planning Permission"; Mar 7, forum followed by activity; 14, exhibition of members' home-constructed equipment. Details 0602 733740.

MANSFIELD ARS - 7, talk "Your Signals are 5 and 0". Details from Mary, G0NZA, tel: 0623 755288.

ORKNEY

ORKNEY AR GROUP - 6, talk "Amateur Radio's Newest Frontier"; Mar 6, video "Secret Listeners".

POWYS

SOUTH POWYS ARC - 5, "Travelogue" by GW4FKW; 8, Club Dinner. Details GW6RUE QTHR.

SHROPSHIRE

TELFORD & DARS - 6, 2m station on air; 13, talk "Running a Repeater"; 20, Under a fiver construction competition; 23, Thinking Day on the Air - Stoke on Tern Hall; 27, Electronic Egg Race; Mar 6, 70cm on air; 13, construction competition. Details Bridgnorth 761203.

SOMERSET

TAUNTON & DARC - 1, talk "Air Traffic Control"; 15, RIS talk; Mar 1, talk "My Early Recollections of Radio in pre-war China" by G0GTR. Details 0823 680778.

YEOVIL ARC - 7, talk "A Simple ATU"; 14, talk "The 2 Element Driven Beam"; 21, talk "The 2 Element Yagi"; Mar 7, discussion evening. Details G0NMM, QTHR.

SOUTH GLAMORGAN

CARDIFF RSGB GROUP - 11, quiz night; Mar 11, display of members' prized Amateur Radio possessions. Details 0446 773212.

SURREY

SURREY RCC - 4, talk "Fast Scan TV"; March 4, surplus equipment sale. 'TS Terra Nova', 34 The Waldrons, Croydon. Details 081 647 9301.

TYNE & WEAR

SUNDERLAND & DARS - meets Mondays & Thursdays at 7pm at 27a Westbourne Road, Sunderland. Details 091 548 6547.

WARWICKSHIRE

RUGBY ATS - 12, TBA; 26, start of the 'Construction Race'(Details from G0AMD); Mar 12, Ben Nevis DXpedition video.

STRATFORD-UPON-AVON RS - 11, talk "10GHz the Easy Way"; 25, talk "Aligning Receivers"; Mar 11, discussion evening. Details 060 882 495.

WEST GLAMORGAN

PORT TALBOT ARS - 14, final preparation for GB2SDD; 21, talk "Linear Amplifiers for HF and Other Things"; Mar 1, Saint David's Day - GB2SDD. Details 0639 630880.

WEST MIDLANDS

COVENTRY ARS - 1, night on the air and Morse tuition; 8, quiz night vs Tamworth ARS; 15, night on the air and Morse tuition; 22, The Indoor DF Competition - Drive your Protractor around an OS map!; Mar 1, night on the air and Morse tuition; 8, trip TBA; 15, night on the air and Morse tuition. Details 0203 523629.

DUDLEY ARC - 11, social evening; 25, talk "Transceiver Calibration & Power Output". Details 0384 250018.

MIDLAND ARS - Beginners Morse class every

Wednesday commencing 2 Jan 91 at Unit 22, 60 Regent Place, Jewelry Quarter, Birmingham. Details 021 742 8712.

STOURBRIDGE & DARS - 4, on the air; 18, constructors' competition; Mar 4, on the air. Details G0HTJ.

SUTTON COLDFIELD RS - meets 2nd and 4th Monday of each month at 8pm at The Rugby Club, Walmley Road, Sutton Coldfield, West Midlands. Secretary - Tony Quy, G0FEO, tel: 0827 874010.

WOLVERHAMPTON ARS - 5, committee meeting; 12, talk "The Valve"; 19, night on the air; Mar 5, committee meeting; 12, talk and demonstration "War Games" by A Armstrong.

WEST YORKSHIRE

DENBY DALE ARS - 6, talk "Radio of the Past", 8.30pm, at the Pie Hall, Denby Dale. Details 0484 532371.

HALIFAX & DARS - 19, junk sale/surplus sale; Mar 19, talk "Radio Old and New". Details Halifax 202306.

NORTHERN HEIGHTS AR&ES - 6, constructors' clinic. 20, Mr. Dougherty's "Lecture"; Mar 6, talk and demonstration "Amateur TV". Details 0274 673116.

PONTEFRACT & DARS - 7, Annual General Meeting.

TODMORDEN & DARS - 4, Annual General Meeting and construction competition; 18, club station on air; Mar 4, trip to brewery (paid-up members only).

WILTSHIRE

TROWBRIDGE & DARC - 6, surplus equipment sale; 20, social evening. Details 0380 830383.

MOBILE RALLIES

This is a list of all rallies, 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'.

3 FEBRUARY

SOUTH ESSEX ARS Mobile Rally - The Paddocks, Canvey Island, Essex. Trade stands; bring & buy; boot sale etc. Inexpensive refreshments available; free car parking. Talk-in on S22 by G4RSE. Details Dave Speechley, G4UVJ, tel: 0268 697978.

10 FEBRUARY

CAMBRIDGE & DARC Rally and Car Boot Sale - The Ambulance Station, New Addenbrookes Hospital, Hills Road, Cambridge. Doors open 10am. Details from Nick, G6ASH, tel: 0223 836670 or Colin, G8CTX, tel: 0223 420909.

17 FEBRUARY

KIDDERMINSTER & DARS Rally - Harry Cheshire School, Habberley Lane, Kidderminster, Worcs. Doors open 10am. Talk-in S22. Details from 0746 780255 or 0562 746207.

23 FEBRUARY

RAINHAM Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. Entrance fee £1; doors open 10 a.m.; traders; bring & buy; refreshments. Talk-in by GB4RRR. Exit No. 4 on M2 motorway and follow the signs. Details 0634 362154.

24 FEBRUARY

EAST COAST AR & COMPUTER Rally - Clacton Leisure Centre, Vista Road, Clacton-on-Sea, Essex. Doors open 10.30; restaurant & bar, bring & buy, free car parking. Talk-in on S22. Details from Terry, G7DNS, tel: 0255 222207 or Tony, G0MBA on 0255 422843.

4th TAW & TORRIDGE Rally - BAAC Halls, Bideford, North Devon. Doors open 10.30 a.m. (10.00 for disabled visitors). Trade stands, bring & buy; refreshments; bar; car parking. Details John G0GFK, tel: 0237 476402 or Keith, G0AYM, tel: 0805 23776.

2 MARCH

TYNESIDE ARS Rally - North Eastern Exhibition Centre, Gosforth Park Race Course (2 miles north of Newcastle upon Tyne). Usual trade stands. Morse tests; bring & buy; refreshments and ample free parking. Talk-in on S22 and SU8. Details from Terry, G6VEG, tel: 091 2648196.

3 MARCH

WELSH Mobile Rally - Barry Leisure Centre, off Holton Road, Barry. Details from Dave Hughes, GW8PMJ, 45 Conybeare Road, Sully, Penarth, South Glamorgan CF6 2TZ; tel: 0446 738087.

9 MARCH

LAGAN VALLEY ARS Radio Rally - venue to be announced. Details from Colin, GI7CML QTHR.

17 MARCH

NORBRECK AR, Electronics & Computing Exhibition organisedby the Northern Amateur Radio Societies Association (NARSA) at the Norbreck Castle Exhibition Centre, Blackpool. Details from Peter Denton, G6CGF, tel: 051 630 5790.

TIVERTON SOUTH WEST RC 1991 Mid Devon Rally - Pannier Market, Tiverton. Doors open 10am; two halls of trade stands, bring & buy, mobile snack bar. Further displays and full refreshment facilities in the club room bar. Talk-in on S22. Easy access - only minutes from junction 27 on the M5. Free parking. Details from G4TSW, Mid Devon Rally, PO Box 3, Tiverton, Devon.

WYTHALL RC 6th Annual Radio Rally - Wythall Park, Silver Street, Wythall, Worcestershire (on the A435 near junction 3 on M42, South West of Birmingham). 3 halls plus marquee; usual trade stands; flea market; large bring & buy; bar & snacks; talk-in on S22. Admission still only 50p. Details Chris Pettitt, G0EYO, tel: 021 430 7267. Traders who have been to the rally in previous years and who have not received booking forms should contact the organiser above.

24 MARCH

BOURNEMOUTH RS Annual Amateur Electronics Sale - Pelhams Community Centre, Kinson, Bournemouth. Details from Vic, G4PTC; tel: 0202 516593 - evenings.

CUNNINGHAM & DARC DARC Magnum Rally - Magnum Leisure Centre, Irvine, Ayrshire. Usual stalls, raffles, bring & buy. Details from Peter Reid, GM0FCI, tel: 0294 72253.

PONTEFRACT & DARS Components Fair, Carleton Community Centre, Carleton, Pontefract. Doors open 11am; trade stalls; bookstall, bring & buy; refreshments; talk-in on S20. Car boot and van spaces available. Admission by prize programme (3 prizes). Details from Colin Mills, G0AAO QTHR, tel: 0977 615549 or Mr B Parkin, 5 Park Close, Darrington, Pontefract; tel: 0977 704067.

31 MARCH

CENTRE OF ENGLAND Easter Amateur Radio Rally - Motorcycle Museum, Bickenhill, nr NEC Birmingham Jcn 6 M42. Doors open 10.30am; admission £1 (concession for RAIBC members and senior citizens). Bring & buy; over 60 trade stands all in three exhibition halls. There are concessionary rates for all who wish to visit the museum and ample free parking. Talk-in from GB0COE from 7.30 on S22. Details from Frank Martin, G4UMF, tel: 0952 598173.

7 APRIL

CAMBRIDGE RG AR Rally - Philips Radio Communications - Catering Centre, St. Andrews Road, Chesterton, Cambridge. Doors open 10.30am; admission 50p; junk sale; bring & buy. Details from G0HEM; tel: 0799 23689.

LAUNCESTON Launceston 5th AR Rally - Launceston College. Details from Maggie, tel: 040921-219 or Rodney & Joy, tel: 0566-775167.

LOUGH ERNE ARC 10th Annual Mobile Rally - Killyhevlin Hotel, Enniskillen. Doors open 12 noon. Talk-in on S21, special guest Louis Varney G5RV. Details from Alwyn Magee, GI0BFD QTHR tel: 0365 323802.

WHITE ROSE Rally - Leeds University. Doors open 11am.Details G4DXA, PO Box 73, Leeds LS1 5AR.

14 APRIL

TRAFFORD Rally "The Great Northern Rally" - G-Mex, The Greater Manchester Exhibition and Events Centre, City Centre, Manchester. Details from Graham Oldfield, G1IJK, tel: 061 748 9804.

21 APRIL

MARSKE-BY-THE-SEA Annual Rally - Marske Community Centre. Usual traders. Details from G7CBR QTHR, tel: 0642 480055.

SWANSEA ARS Rally - Swansea Leisure Centre (on the Swansea-Mumbles coast road, A4067). Doors open 10.30am; trade stands; bring & buy; bookstall, HF/VHF demo stations, full catering, licensed bar. Talk-in on S22 from GB2SWR. Details from Roger Williams, GW4HSH, tel: 0792-404422.

28 APRIL

BURY RS Annual Rally - Castle Leisure Centre, Bolton Street, Bury. Doors open 11am; usual large number of exhibitors and a big bring & buy stall; catering facilities; early entrance for disabled visitors. Details from Lawrence Jones, G4KLT, tel: 061 762 9308.

5 MAY

BATC Rally - Harlaxton Manor, Nr Grantham. Details from Paul, G8MJW; tel: 0522 703348.

6 MAY

MID CHESHIRE ARS Rally - Civic Hall, Winsford. Details from David, G4XUV, tel: 0606 77787.

12 MAY

DRAYTON MANOR Mobile Radio Rally - Drayton Manor Park, Nr Tamworth. Details from Norman, G8BHE, tel: 021 422 9787 or Peter, G6DRN, tel: 021 443 1189.

YEOVIL ARC "The QRP Convention" - Preston Centre, Monks Dale, Yeovil. Details from Mr. David Bailey, G0NMM, QTHR as G1MNM.

18 MAY

SWINDON Radio Rally - The Oasis Leisure Centre, North Star Avenue, Swindon. Details from Jim, G7GEA, tel: 0793 611859 or John, tel: 0793 619014.

26 MAY

MAIDSTONE Mobile Rally. Details Mr. A. Judge, G0NCW, tel: 0622 750709.

PLYMOUTH Radio & Electronics Fair - Plymouth Radio Club Plymstock School, Church Road, Plymouth, Devon. Details from Jan Fisher, G0IVZ, tel: 0752 340946 evenings/weekends, 0752 262826 (daytime).

2 JUNE

SPALDING & DARS Mobile Rally - Springfields Arena Spalding. Details from T Kettlewell, G4TWR, tel: 0775 722940.

9 JUNE

22nd ELVASTON CASTLE Mobile Radio Rally - Elvaston Castle Country Park, near Derby. Details from John, G4PZY, tel 0332 767994 - Trade enquiries to Peter, G3WFU, tel 0332 700265 (evenings).

ROYAL NAVAL ARS Annual Mobile Rally - HMS Mercury, Nr Petersfield, Hants. Details from Cliff Harper, G4UJR, tel: 0703 557469.

SOUTHEND & DRS Annual Rally and Boot Fayre - Rocheway Centre, Rochford, Southend-on-Sea, Essex. Details from Steve, G1XGP, tel: 0702 712595.

16 JUNE

DENBY DALE & DARS Rally - Salendine Nook High School, Huddersfield. Details from J.D. Chappell, Secretary.

30 JUNE

LONGLEAT Amateur Radio Rally, Longleat House, near Warminster, Wiltshire. More details from Shaun, G8VPG, tel: 0225 873098.

7 JULY

YORK Radio Rally - Tattersall Building at York Racecourse. Details from Dave Moreland, G7FGA, tel: 0904 790079.

14 JULY

SUSSEX AR and Computer Fair - Brighton Racecourse. Details from Ron Bray, G8VEH, QTHR, tel: 0903 763978 or 0273 415654 (office hours).

21 JULY

COLCHESTER Mobile Rally - Highwoods Sport & Leisure Centre, Brinkley Lane, Colchester. Details from Frank Howe, G3FIJ QTHR, tel: 0206 851189.

28 JULY

RUGBY AR Car Boot Sale - venue to be advised. Details from either Kevin, G8TWH, tel: 0203 441590 or Peter, G0JEW, tel: 0455 552449.

SCARBOROUGH ARS Radio, Electronics & Computer Rally - The Spa, South Foreshore, Scarborough. Details from Ian Hunter, G4UQP QTHR, tel: 0723 376847.

18 AUGUST

WEST MANCHESTER RC Red Rose Rally - Bolton Sports & Exhibition Centre, Silverwell St, Bolton. Details from G1IOO, tel: 0204 24104.

25 AUGUST

TORBAY ARS 27th Annual Mobile Rally - STC Social Club, Brixham Road, Paignton, Devon.

1 SEPTEMBER

PRESTON ARS 24th Annual Rally - University of Lancaster. Details from Godfrey Lancefield, G3DWQ, QTHR, tel: 0772 53810.

8 SEPTEMBER

VANGE ARS Annual Rally - The Laindon Community Centre, Laindon High Road/Aston Road, Laindon, Basildon, Essex. Details from Doris Thompson (Secretary), tel: 0268 552606 or Mike Musgrave, G4NVT (Organiser), tel: 0268 543025 (24 hour answering service).

14 SEPTEMBER

WIGHT Wireless Rally - Wireless Museum, Arreton Manor, Nr Newport, IOW. Details from Douglas, G3KPO, tel: 0983 67665.

15 SEPTEMBER

BRISTOL Radio Rally - Brunel's Great Train Shed, Temple Meads Station, Bristol. Details from David Farr, G4WUB, tel: 0272 839855.

22 SEPTEMBER

CENTRE OF ENGLAND Autumn Amateur Radio Rally will be held at the British Motorcycle Museum, Bickenhill nr The NEC, Jct 6 M42. Details from Frank Martin, G4UMF, tel: 0952 598173.

29 SEPTEMBER

HARLOW AR&E Mobile Rally - Harlow Sports Centre. Details from - weekdays: Alf, G7FNY on 0279 418392; evenings & weekends: Mike, G7BNF on 0279 722569.

13 OCTOBER

HORNSEA Rally (ELHOEX Electronic Hobbies Exhibition) - The Floral Hall, Hornsea, East Yorkshire. Details from Jeff, G4IGY, tel: 0964 533331.

10 NOVEMBER

BARNSLEY & DARC Rally - Willowgarth Senior High School, Brierley Road, Grimethorpe, Barnsley.. Details from Ernie, G4LUE, QTHR, tel: 0226 716339.

24 NOVEMBER

WEST MANCHESTER RC Winter Rally - Bolton Sports & Exhibition Centre, Silverwell St, Bolton. Details from Dave, G1IOO, tel: 0204 24104.

OTHER EVENTS

24 MARCH

VHF Convention - Sandown Park. Details, G3FZL, QTHR.

27/28 APRIL

RSGB National Convention - NEC Birmingham. Details from Norman Miller, G3MVV, QTHR.

25 JULY - 28 JULY

1991 AMSAT-UK Colloquium - University of Surrey. Details from G3AAJ.

28/29 SEPTEMBER

RSGB HF Convention - Penguin Hotel, Daventry. Details from Bob Whelan, G3PJT, 36 Green End, Comberton, Cambridge CB3 7DY.

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 23 February. It was taken from the HQ computer on 11 January. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 FEBRUARY

GB0MDG	Manor District Guides
GB0THG	Taplow & Hitcham Guides
GB0WCG	West Cumbria Guides
GB2EHG	Ewyas Harold Group
GB2WGC	Woodlands Guide Camp
GB4AC	Air Cadet
GB4CGG	Chelsfield Girl Guides
GB4HMG	Hawksley Mill Guides

2 FEBRUARY

GB0CDQ	Coastal Defence "Q"
GB6MGB	Maltby Guides & Brownies

3 FEBRUARY

GB50ATC	Air Training Corps

6 FEBRUARY

GB50ATC	Air Training Corps

8 FEBRUARY

GB4MGR	Manx Girl Guides

9 FEBRUARY

GB2NGR	Norfolk Guide Radio
GB5TT	PACC Contest 1991

11 FEBRUARY

GB0ABB	Albany Baptist Brownies
GB1ABB	Albany Baptist Brownies

14 FEBRUARY

GB4SGB	Sanderstead Guides/Brownies
GB4SLA	Scouts Lochaber Area

15 FEBRUARY

GB5BG	Bodmin Guides

16 FEBRUARY

GB0CDJ	Coastal Defence "J"
GB0GNB	Guides of North Beds
GB0STB	Stoke on Tern Brownies
GB0VGC	Ventnor Guides Company
GB2RBP	Rettendon Brownie Pack

17 FEBRUARY

GB2BUH	Barton-upon-Humber

18 FEBRUARY

GB8GGS	Guildford Guides & Scouts

19 FEBRUARY

GB8BG	Beaconsfield Guides

20 FEBRUARY

GB0WGG	Wirral Girl Guides

22 FEBRUARY

GB0CG	Cheshire Guides
GB0EMB	Eleventh Maidenhead Brownies
GB0KBG	Kingskerswell Brownies & Guides
GB0MOC	Milton of Camsie
GB0WGB	Welton Guides and Brownies
GB2BWG	Beverley Westwood Guides
GB2CNG	Cumbria North Guides
GB2LHG	Lostock Hall Guides
GB2SK	Skellingthorpe Brownies
GB4CRA	Cramond Brownies
GB4GGS	Girl Guides Sandy
GB4RHC	Robin Hood Camp
GB4WCG	Watford & Croxley Guides
GB6ECS	Emmanuel Church Sidcup

23 FEBRUARY

GB0BOG	Bognor Guides
GB0CWG	Conisbrough Weslyan Guides
GB0DRG	Desborough Rothwell Guides
GB0GDG	Gillingham District Guides
GB0GGG	Gresford Girl Guides
GB1OGG	Orpington Girl Guides

The Last Word

THE PURSUIT OF EXCELLENCE

Once again, we seem to be engaged in correspondence (G4NJH, *RadCom* Dec 1990) about contesting and its effect on our bands.

I have always failed to understand why amateur radio in the UK (and I say this advisedly, as contesting and DXing are looked on far more favourably in most other countries) seems to be the only recreational activity in which the search for excellence and high achievement is scorned by a large proportion of its adherents. In most hobbies and sports, praise is heaped upon those who do well, and many become internationally renowned figures with the lifestyle to match.

Amateur radio has progressed over the years through a search for improvement, equipment performance and antenna design, driven by those at the leading edge of contest or DX operation. A successful contester needs to combine physical endurance with high technical and operating skills, and needs to know his opposition just as much as does a successful footballer or athlete. Similarly, he also needs to train regularly to hone his skills. Of course the nice thing about amateur radio contesting is that, unlike many other sports, it is not just confined to the Formula 1 brigade. Everyone can join in, and many contests offer a range of entry categories so that all can aspire to a certificate or accolade of some sort.

The sheer number of participants goes to show that contesting is no clique activity. Some tens of thousands of different callsigns appeared in logs submitted to last year's *CQ* Worldwide contests, far outnumbering the 'casual' operators to be found on the bands on non-contest weekends. Interestingly, a recent survey in *CQ* Magazine showed that contesters, as a group, were also more active than most in other aspects of amateur radio - as club officers, volunteer examiners, home constructors, etc. Contesters, to summarise, are the 'doers' of amateur radio as against the complainers.

In fairness, G4NJH's complaint appears to be targeted specifically at the CQWW contests, but these are the most highly supported of the lot, the Le Mans of contesting. And even during the October Phone leg of CQWW there were plenty of empty band segments for non-contest QSOs (above 14300, 21350 and 28700 in particular). Of course, the very level of support means that G4NJH is crying into the wind. The CQWW contests will live on - there is nothing he or even a national society can do to stop them.

Finally, can I dare to hope that *RadCom* will give wide publicity to the proposals by W2GD and others for the formation of a World Radiosport Foundation, aimed at raising the profile of competitive amateur radio and having a contesting event (something like the World Radiosport Championships in Seattle last year at which G3YDV and G4BUO did us proud) incorporated into the 1996 Olympic Games. Perhaps RSGB will be one of the first to take out a corporate membership of the Foundation?

Don Field, G3XTT

THANKS FROM CADETS

I am writing this letter to express my gratitude to two persons who have contributed by their generosity and donations to Montrose Air Cadets (2288 Squadron).

The first is Alec Allan, of Amcomm Ltd, who advertise regularly in your magazine. Mr Allan heard that the cadets had no radio sets, except CB radios, that could be used for exercises, and very generously donated several short range radios free of charge to the Squadron. I cannot express how beneficial the radios will be, especially from a safety point of view. I would also like to thank him for his enthusiasm, experience and advice, all given unstintingly. *[readers will remember that Mr Allan also organised the sending of AR equipment to Romania just after the revolution - Ed]*

The second person who deserves a big thank you is Dave Lunan, a local amateur who, following one conversation, generously donated a much treasured HF radio to the Squadron for the lads to learn the rudiments of short-wave radio, Morse etc. Any radio enthusiast who has ever possessed an item will know how difficult it is to part with it.

Never let it be said that radio amateurs are inward-looking individuals, solely concerned with their own hobby. With completely unselfish gestures like those of the two persons mentioned, radio can be opened up to everyone. With a few more examples like that, amateur radio is shown to be non-elitist, generous and community-spirited. Thanks again to both.

Mark Thomas, BRS92930

WHO SUBSIDISES WHOM?

I read with interest the letters featured in *The Last Word* (Jan 91) relating to our magazine and its contents.

Finishing work for the Christmas holidays on December 21st and coming home, I was greeted by an old friend coming to stay - it was *RadCom* - what a way to start the holidays!

If one looks back at all amateur magazines of the pre-1970 era, there were generally a lot more practical articles than appear nowadays. That simply was the nature of things then. Times change, and whilst we would all like to have lots more news and constructional articles etc, we also have to be realistic and realise that the RSGB and the membership must have the advertising which subsidises our subscriptions. There is no getting away from that fact.

The membership is not propping up the advertisers, it is propping up the amateurs who are not RSGB members but who indirectly get benefits of RSGB work towards the upkeep of the whole amateur radio movement. Why don't members moan about them?

SA Clatter, BRS92755

ESPERANTO ON THE AIR

Members may have noticed increased use of a language - sounding like a mixture of French, Spanish and Italian, with bits of English and German here and there - being spoken by a wide variety of amateurs ranging from Brazil to Siberia, from Sweden to Portugal and Bulgaria.

This is the international language Esperanto, and many of the speakers are members of the International League of Esperantist Radio Amateurs (ILERA) which now has a world-wide membership of almost 500, of whom 21 are in the UK. The small proportion of British members obviously reflects the widespread use of English between amateurs, even those whose native language is not English.

However, English is diffcult to learn compared with Esperanto which has no irregularities or exceptions, only one gender of nouns and regular spelling and pronunciation. There is also political prejudice in some quarters; many 'foreigners' do not accept that they should learn English as the 'international language', and reject the idea that they must do so in order to speak to us.

Diploma hunters may be interested to know that ILERA issues its Diploma to amateurs who have confirmed contacts, with cards bearing the word 'Esperanto', from 10 different stations. Higher grades from 25 up to 200 may be gained. Further details about the Diploma and membership of ILERA, or about Esperanto generally, can be obtained from: ILERA, Barry Foreman, 10 Wilmington Close, Brighton BN1 8JE. A free 12-part postal course on Esperanto is available from: Esperanto Centre, 140 Holland Park Avenue, London W11 4UF.

Barry Foreman, G0EXS

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.

VALUE FOR SUBS

At the recent AGM it was made very clear that the Society cannot continue to provide all the services now available to members free of charge, and that even at £30 our subscriptions only provide approximately 50% of the Society's income. It was apparent that Membership Services showed an increase from 1989 to 1990 of approximately the deficit for the Year.

Many of the Society's activities are essential to the future existence and growth of our hobby, but the report given by the *RadCom* Editor on the recent questionnaire on members' interests in the content of RadCom showed how the emphasis of space had been way out of line with majority interests, and a change of emphasis is already apparent in the Jan 91 issue. The Secretary acknowledged that the cost of HQ administration had not in the past been attributed to cost centres of the various activities, but that this is in hand so that Council will be able to see where costs are out of proportion to benefits to the membership as a whole.

Council, and the Treasurer, are evidently aware of the need to eliminate the present deficit and to keep control of expenditure in future. This must inevitably entail termination or reduction of some activities, or making charges for activities which are of minority interest. Although it was not possible at the AGM to be specific, I hope that Council will very shortly be able to decide on actions necessary to contain, and then reduce, the annual deficit and not merely take refuge behind the 'strong balance sheet', vide the President's penultimate remarks in his message in the November RadCom, which depends for its 'strength' on the revised valuation of Lambda House, and not on a favourable income/expenditure situation.

On a much lower plane, but important to me personally, I was very pleased to see the increased size typeface in the January 1991 issue, as well as the changed emphasis in content.

Tom Winchcombe, G6ZH

REPEATER SUBSIDY

As a member of a repeater group, let me say how good it was to see Geoff Dover's article on the costs of running a repeater (*RadCom* Dec '90). Many users take the presence of their local repeater for granted.

What Geoff Dover did not say in his article was that the RSGB has recently, without any notice, passed onto the repeater groups the cost of insurance and administration, a charge of £25 per repeater, per year.

Groups that have a 2m repeater will probably find it relatively easy to find the money, as they cover a greater geographical area and hence a large user group. For those groups who run only 70cm and 23cm repeaters, covering single towns and rural areas, the user groups are often small and income limited.

I feel that the RSGB has not given this matter much thought but has reacted on impulse to try to solve its own financial problems. For those repeater groups that have already budgeted for 1990's funds, and are not due to collect 1991's for several months this situation will cause an ongoing debt. This may be the last straw for some repeaters; probably the least used will go first, namely 23cm and above, followed by 70cm.

One must ask the question "why did the RSGB pick on repeaters?" Would it not have been better to charge users of the QSL Bureau a fee for cards sent out? I personally intend to continue to support my local 70cm repeater, my £30 will pay its yearly fees. You can't have it both ways RSGB!

Doug F Ash, G1BWW

[Be fair, Mr Ash. The RSGB has subsidised groups to the tune of some £5000 a year for nearly twenty years. The £25 charge represents approximately half of the cost of each repeater to the Society, so there is a continuing substantial subsidy. As for repeaters closing down through lack of funds, if local users do not feel the facility is worth £25 a year, why should RSGB members, many of whom never use a repeater, pay to keep it on the air? - Ed]

MORSE ODE

Caresses key with skilful hand,
Ears cock'd the while for VK land.
That must be he - his old mate, Ted -
VK2 dad-ex-something Z.
Tweaks the filter, never sloppy,
Confident that he can copy.
But what is this? It can't be true!
CQ (strength 9) CQ CQ . . . .

Ray Watson, G0FPS

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continued on next column

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Recently there have been some more publications with extended technical presentations of the CFA. Firstly: October 23rd IEE Colloquium on "Electrically Small Antennas"; we gave a paper "Crossed Field Antennas" authors Hately, Kabbary & Stewart. Ref IEE Colloquium Digest 1990/136 pp 5/1-5.

Secondly: Probably much easier to get hold of — Dec 1990 "Electronics World & Wireless World" Vol 96 pp 1094-99 "CFA: working assumptions" authors Hately, Kabbary & Stewart.

This article contains a description of the theory and construction of the CFA with test figures and photographs. It also contains a review of the working of the half wave dipole antenna, with a new explanation of how we believe it radiates. Poynting Vector Synthesis is shown to make more sense of the conventional wire antenna, as well as to lead to our development of the Crossed Field Antenna. Judging by the correspondence already received, this is a very useful approach, and we hope to be publishing more in the not too distant future.

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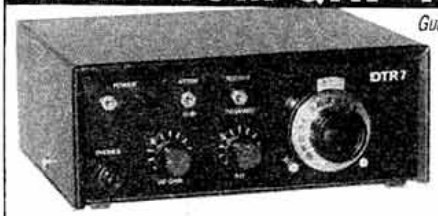

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