Radio Communication

The Journal of the Radio Society of Great Britain

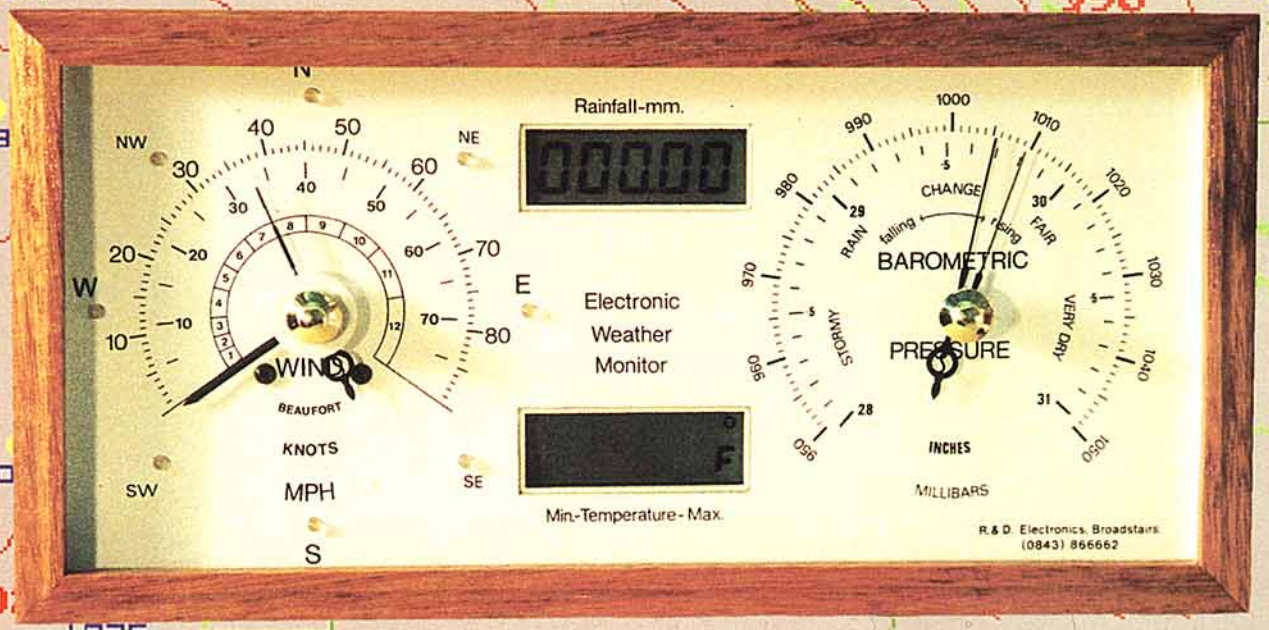
July 1994

Volume 70 No 7

THE VOICE OF AMATEUR RADIO FOR 81 YEARS

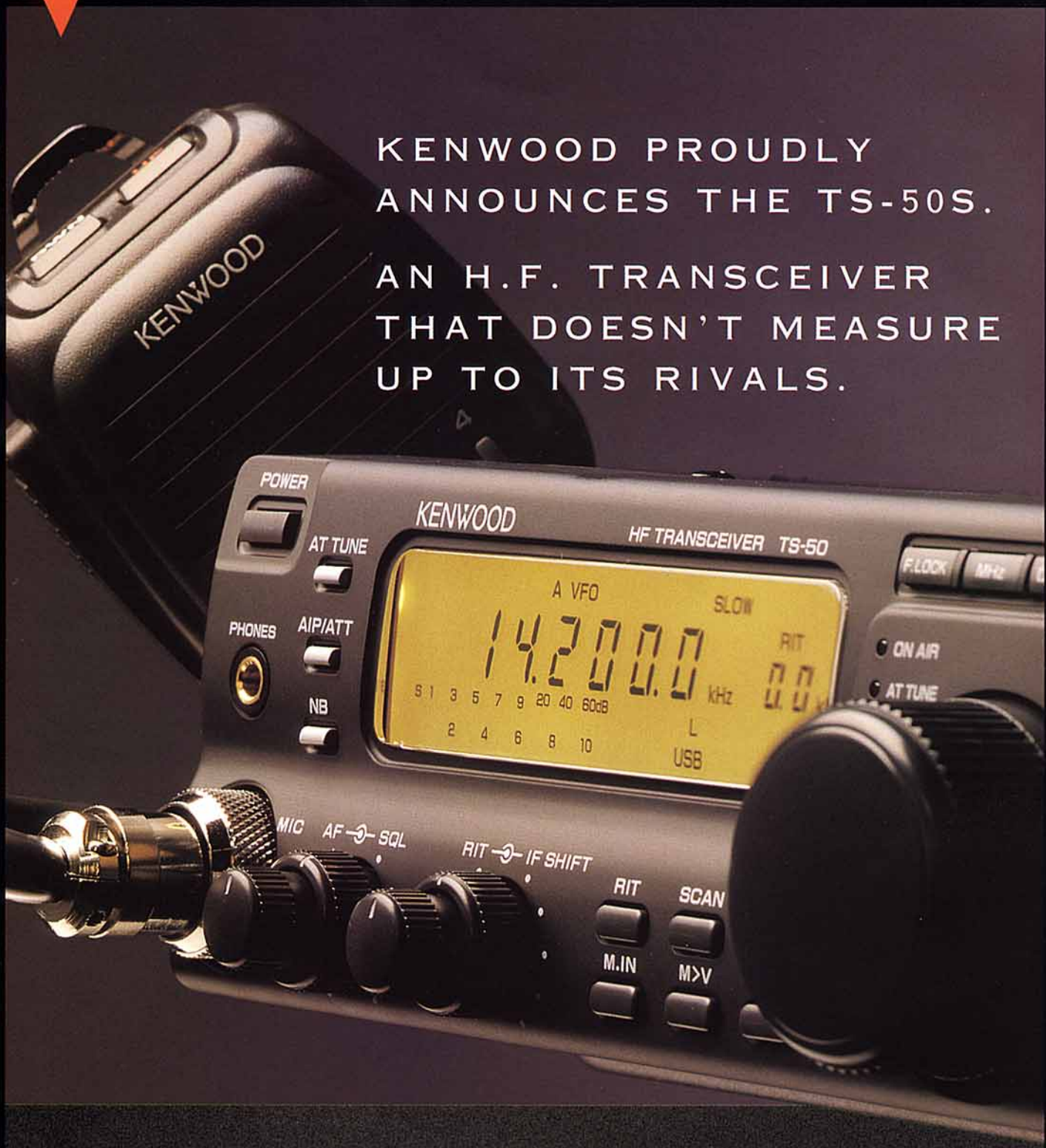
Be Ready for the Next VHF Opening:

Win this Weather Station



R & D Electronics Weather Station Reviewed: page 73

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



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Radio Communication

COVER PICTURE:
Radio conditions are often closely linked to the weather. This month's review is a Weather Monitor which would grace any shack wall. Feature: page 73. Photographs: Background screen print from the ICS SYNOP III software (see *Product News*, January). Foreground: R&D Electronics Weather Monitor BDSTR

NEWS AND REPORTS

TECHNICAL FEATURES

REGULARS

REVIEWS

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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Corporate (Concessionary): £27.00 over 65 or full time student under 25. (Applications should provide proof of age at last renewal date and/or include evidence of student status.)
Affiliated club or society/registered group (UK): £16.00 (including *Radio Commmunication*). (Subscriptions include VAT where applicable.)

Special arrangements exist for blind and disabled persons. Details are available from RSGB HQ.

Membership application forms are available from RSGB HQ

RSGB Main Switchboard:
0707-659015

The RadCom Leader

Initiatives

SOME TIME AGO I WROTE A LEADER along the theme of 'never a dull moment' in amateur radio.

June sees another of those busy periods when everything comes along at once. The beginning of the month saw a very successful HQ Open Day. Despite the weather, which was most unseasonal, a large number of members visited HQ and met the staff. This year we enlarged the event to encompass some trade stands, which was a definite success, so we are already planning to expand even more at next year's event scheduled to take place on Saturday, 17 June 1995.

On the evening of Open Day, the President, Vice-President and myself travelled north to Brighouse, West Yorkshire, for a Regional Meeting. These meetings, which are part of the President's initiative for 1994, are most important as it is an opportunity for us to gauge what the ground swell of opinion is on amateur radio matters throughout different parts of the country. More regional meetings are already planned, one in Bristol on 22 October and one in London, the date of which has yet to be arranged. If possible, please try to get to one of these meetings; it is your opportunity to voice your opinion directly to senior members of the society.

June continues with rally teams attending the Hamfest at Friedrichshafen and the Longleat Rally - so we are well and truly 'out and about'.

Time is Running Out

THE CLOSING DATE FOR THE Young Amateur of the Year Award is 31 July. This is an excellent competition for young people with an interest in amateur radio. There are some valuable prizes to be won, so if you know any youngster worthy enough to be awarded the prestigious title 'Young Amateur of the Year', forward their names without delay.

The second item is not a competition. You will be aware that the Society for the past few months has been offering a 'Three Month Free Trial' membership. This offer has been a great success; however it is due to close shortly, so if you have a friend who has an interest in amateur radio but is not a member of the national society, why not steer them towards the Society's 'Gold Membership Scheme' where they have the opportunity to try us out before they commit themselves fully.

We have another initiative that has just started.- 'Introduce a Friend'. Get a friend to join and you will receive book vouchers that can be exchanged for RSGB publications.

Peter Kirby, G0TWW, General Manager

NOTICE BOARD

***WIN*– A PRO-44 Scanner worth £150**
(see this month's label carrier)

***WIN*– A Weather Monitor worth £270**
(see pages 73/74)

***WIN*– Up to four tickets to this year's Royal Tournament, worth £17.50 each**
(see page 7)

NEWS & REPORTS

● GB4AFS WILL BE activated by RSARS members from the 21st Signal Regiment Open Day on 9 July. All are welcome at Colerne Airfield, nr Chippenham, Wilts, and the event will raise money for the Royal Signals new museum project. Call 0225 743240 ext 5256 for details.

● THE DANISH Freedom Fighter Museum in Copenhagen has a radio station, OZ5MAY – Danish Liberation was on 5 May 1945. It uses CW on most days using a B2 transmitter and AR88 receiver. Regular frequencies are 14.038, 14.043 and 14.046MHz.

● GB75FC CELEBRATES the 75th anniversary of the Forestry Commission on 2/3 July. The station will be located at the site of a three-day festival in Dalby Forest, North Yorkshire. Operation is around 3725 and 7055kHz, plus the 2m and 70cm bands.

● EXAMINATIONS FOR the US amateur licence will be held on 25 June, 16 July and 29 October in London. For details, contact Yves Remedios, AC4WT, London ARRL-VE Team, 44 Kingsway, Wembley HA9 7QR.

● THE 2ND IEE International Conference on Advanced A – D and D – A Conversion Techniques and their Applications will be held in Cambridge, 6 – 8 July. Details 071 344 5471.

● THE 6TH IEE International Conference on HF Radio Systems and Techniques will be held at the University of York 4-7 July. Details 071 344 5469.

● THE ITU COUNCIL has authorized South Africa to participate fully in its affairs. It had been excluded since 1989 until the elimination of apartheid.

● JAPANESE AMATEURS may now use the following parts of the 80m band: 3500 – 3575, 3747 – 3754 and 3791 – 3805kHz.

● THE LATEST CALLSIGNS issued by SSL at 8 June were in the G*0UY*, G*7SK*, 2*0AI* and 2*1DC* series.

● DISABLED? Contact Margery Hey on the Radio Amateur Invalid and Blind Club's Helpline: 0953 454920.

HQ's Two New Licensees

RSGB HEADQUARTERS staff members Sylvia Manco and Marcia Brimson recently took and passed a Novice course and examination. Their calls are 2E1CYL and 2E1DAY respectively.

Railwaymen and VIPs from France and England Join by Radio to Celebrate Channel Tunnel Opening.

Oversea Link Marks Undersea Triumph

PHOTOGRAPHS: G3FIB

Shepway Council Chairman Dick Pascoe, G0BPS, speaks to the Mayor of Wimereux. Left is SWL T Hanney, right is Alf Sanders, G4VEF; and at the back Brian Joyner, G8ZYZ; Roger, SWL; Geoff Livesey, G3FIB and Daphne Pascoe.

CELEBRATING THE official opening of the Channel Tunnel on Friday 6 May were special event stations TM5TSM at Wimereux, near Boulogne and GB0CT from New Romney near Folkestone. The English station was run by the British Rail ARS, and the French by the 'Federation Internationale des Radio Amateurs Cheminots.

Operating on the Friday, Saturday and Sunday, the stations had a two-way ATV link, across the channel, set up by courtesy of the Kent Television Group/BATC.

The chairman of Shepway District Council, Dick Pascoe, G0BPS, visited and spoke to the Mayor of Wimereux on 23cm and exchanged television shots of Wimereux Town Hall & Wireless Museum and the Romney, Hythe & Dymchurch Miniature Railway trains. At the Wimereux end of the link, a site where Marconi made experimental transmissions to England, were the President of the Russian Amateur Radio Society, the grand-daughter of the person who assisted Marconi some 95 years ago and a cosmonaut who flew with Helen Sharman (GB1MIR) on the Mir space station.

The aerials were mounted on a Romney, Hythe & Dymchurch Railway shed.

Operation Market Garden

AN EXHIBITION commemorating the 50th anniversary of the Battle of Arnhem is being held at Fulbeck Hall, famous for its Historic Georgian Mansion and gardens. The exhibition, which is open daily from 3 to 31 July (also 28/29 August and 1/2 October) from 2 to 5pm, features the Maps Room of 1944 used by Gen Roy Urquhart (Sean Connery's character in the film about Arnhem: *A Bridge Too Far*). Photographs, maps and artifacts have been borrowed from veterans and organisations in the UK and Holland to restore the room to its wartime look.

The RAF Waddington Amateur Radio Club has been asked to put on a special event station at the Fulbeck Hall using the call GB50OMG. Operation will be during July when the final plans for the invasion were finalised and the weekend of 17/18 September when the airborne invasion took place.

The GB50OMG QSL card is shown on page 34.

Young Amateur of the Year – Nominate Now

THERE IS still time to nominate someone under eighteen for the prestigious title Young Amateur of the Year.

This annual award is sponsored by the RSGB and the Radiocommunications Agency, together with representatives from the amateur and professional radio industry. In addition to the title, the winner and runner-up qualify for a number of prizes. If you know of a young person who could qualify, do not hesitate to ask for a nomination form.

Full details of the Young Amateur of the Year award can be found in *RadCom*, April, page 67, or can be obtained by telephoning Justine Hodges at RSGB Headquarters on 0707 659015. **The closing date for nominations is 31 July.**

No Fee Increase

AT A RECENT meeting, the RA assured the Society that the amateur licence fees would not be increased during the next year. The last increase was made in April 1991.

Geoff Watts, BRS3129, who died on 9 May aged 75. A mine of DX information, he founded the *DX News Sheet* and was its editor from 1962 – 1982. He also created the Islands on the Air Award Scheme, and produced definitive Prefix Lists for sale until just before his death. He was the first British SWL to have all 40 ITU Zones confirmed and the first to have 300 countries confirmed. He will be greatly missed.

A Thousand Instructors

IN MAY, the number of Instructors registered with the RSGB under the Novice Licensing Scheme topped the 1000 mark. This is a most encouraging sign that amateurs are willing to give back to the Amateur Service some of their time, expertise and enthusiasm. Many Instructors have commented that their reward is hearing the students use their hard-won callsigns and obviously enjoying every minute of their new-found hobby.

Huge Donation to Phase 3D

THE UK'S amateur satellite organisation AMSAT-UK has donated £68,500 to enable the AMSAT Phase 3D team to obtain a higher capacity battery. This is expected to prolong the life of the transponders to between 10 and 12 years. Phase 3D is a new type of satellite – see this month's *Satellites* column – which should bring space communication within the reach of the majority of the world's amateurs. It is due for launch in July 1996.

Worked All Britain Lifeboat Award

TO COMMEMORATE the 25th Anniversary of the Worked All Britain (WAB) Award Scheme, an appeal is in progress to raise £10,000 to provide a 'D' Class lifeboat for the RNLI. The Lifeboat Award is one of the special awards to aid the fund raising.

To qualify for the Lifeboat Award, work ten lifeboat stations on the HF bands, or five on VHF. SWLs may claim awards on a 'heard' basis.

Many GB calls will be active from lifeboat stations over the weekend of 16/17 July and these will count towards the award (turn to the *GB Calls* listing on page 88). In addition, GX6HH will be on air from Hastings, GX4ARF from Barrow in Furness and GT3FLH from Port St Mary, Isle of Man (24 July).

Claims should be sent to the WAB Awards Manager: Keith Draycott, G3UQT, 28 Ladywood Road, Kirk Hallam, Ilkeston, Derbyshire DE7 4NE, listing the log data for the stations heard or worked, together with a minimum donation of £3 towards the WAB Anniversary Appeal.

RadCom Readers' Awards

WE ARE pleased to announce two new awards for writing in *RadCom*: Columnist of the Year and Feature Writer of the Year. These differ from the various awards which are currently presented on the recommendation of committees, in that they will be voted for by you, the members of the Society.

Columnist of the Year

Vote for the person who has, during the period 1 July 1993 to 30 June 1994, written what you consider to be consistently the best regular column. Columns, in alphabetical order are: *Contest Exchange, Data Stream, EMC, Emergency!, Eurotek, HF News, IARU, In Practice, Microwaves, Novice News, Novice Note Book, Peter Hart Review, QRP, QSL, Satellites, Simply Silicon, SWL News, Technical Topics, VHF/UHF News.*

Feature Writer of the Year

Vote for the author of the best single feature (which could be technical, news or operating) published between 1 July 1993 to 30 June 1994. Take a good look back through the last year's *RadComs* (or the index published in February) and choose your favourite one-off feature.

Applications

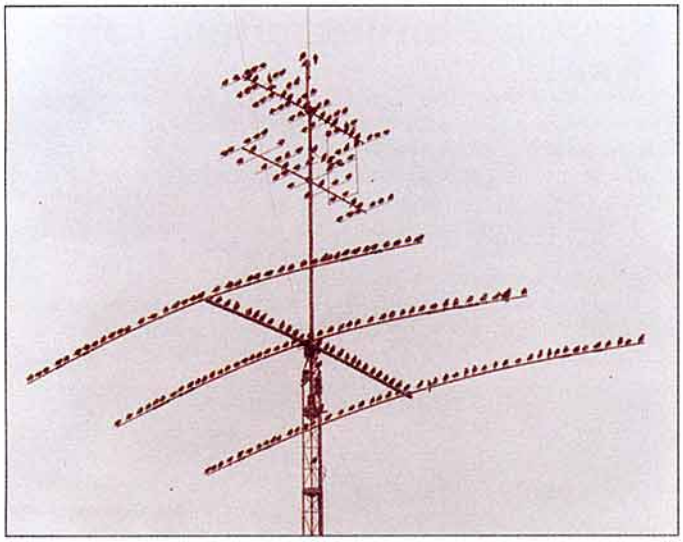
Please write your nominations on a single piece of paper in the following form:

"I <your callsign or RS number> nominate <name of columnist> as Columnist of the Year for writing <name of column>".

and

"I <your callsign or RS number> nominate <name of author> as Feature Writer of the Year for writing <title of feature>".

Post your vote to: Readers' Awards, Radio Communication, RSGB, Lambda House, Cranborne House, Potters Bar, Herts EN6 3JE. **The closing date for nominations is 30 August 1994.**



G3GVM's aerial has obviously got a good take-off. No doubt he measures its performance with a through-line bird meter.

Spectrum Management Review

ON 22 MARCH, Michael Heseltine, President of the Board of Trade, announced the publication of *The Future Management of the Radio Spectrum – A Consultative Document.* The document seeks views on proposals to manage the spectrum to maximise the economic benefit derived from it whilst preserving access by the armed forces, the emergency services and the widest range of other users such as the scientific community and hobbyists. It also proposes changes to the basis of charging for access to the spectrum to give more incentive to use the spectrum efficiently.

The Radiocommunications Agency has said that this review has no major implications for amateurs. However, it does propose major changes in other areas, and the Society will be examining it in detail, and making a strong case for amateurs to continue to have access to the spectrum at a reasonable cost.

Levy Decision Postponed

AT ITS MEETING on Saturday 14 May 1994, the Council of the RSGB discussed the possibility of seeking a once-only levy on members to provide a contingency fund to be used for resisting the imposition of unacceptable licence conditions in any case involving Electromagnetic Compatibility.

After considerable debate it was decided to review the matter in twelve months' time.

RAE and Morse Courses

A **MORSE** CLASS for beginners will run from early September to Easter 95, taking students up to 12WPM. It will be run by **Southend** and District ARS. Details from Steve, G4UOL on 0702 334014 (evenings/weekends).

An **RAE** course aimed at the December 1995 examination is being run at the Lee Valley Leisure Centre, Edmonton, **London N9.** The course is run in association with the Southgate Amateur Radio Club. Further details from the instructor Steve White, G3ZVW, on 081 882 5125.

1994 Royal Tournament

THIS YEAR'S Royal Tournament will again include a stand run by the Air Training Corps and featuring their radio activities. GB4ATC, G3ATC and G8RT will operate on HF between 1100 and 2200BST for each of the 12 days of the Tournament, 19 to 30 July. Alongside the amateur station will be Air Cadets using their own allocated radio frequencies.

Free Tickets

We have four Royal Tournament tickets to give away. Write and let us know how many you would like and the first out the hat will receive tickets for the day of their choice.

● KN6HF IS THE call of a special event station in California which will help the New Hope Assembly of the International Order of Rainbow Girls commemorate their Founders Day. They will use 15, 20 and 40m on 16 July.

Centenary of Radio Test

THIS MONTH sees a grand celebration of the 100th anniversary of the world's first public demonstration of wireless by Sir Oliver Lodge who showed the effectiveness of wireless long before Marconi arrived in England. His book *Signalling Through Space Without Wires* was published in 1894.

Many of his tests were carried out between the Victoria Building in the University of Liverpool and Lewis's department store. He coined the term 'coherer' for his very sensitive detector and was the first person to use resonance or 'syntony' as he called it for selective tuning.

At that time Lodge was Professor of Physics at the University and he went on to become one of the best known British scientists of his day. In 1925, he became the RSGB's third President.

The centenary is to be marked by several events in Liverpool:

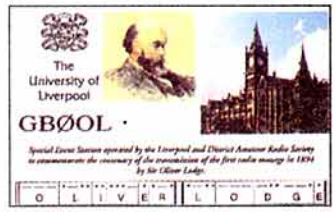
A history of technology weekend organised by the Institution of Electrical Engineers will be held in the University of Liverpool from Friday to Sunday 8 to 10 July.

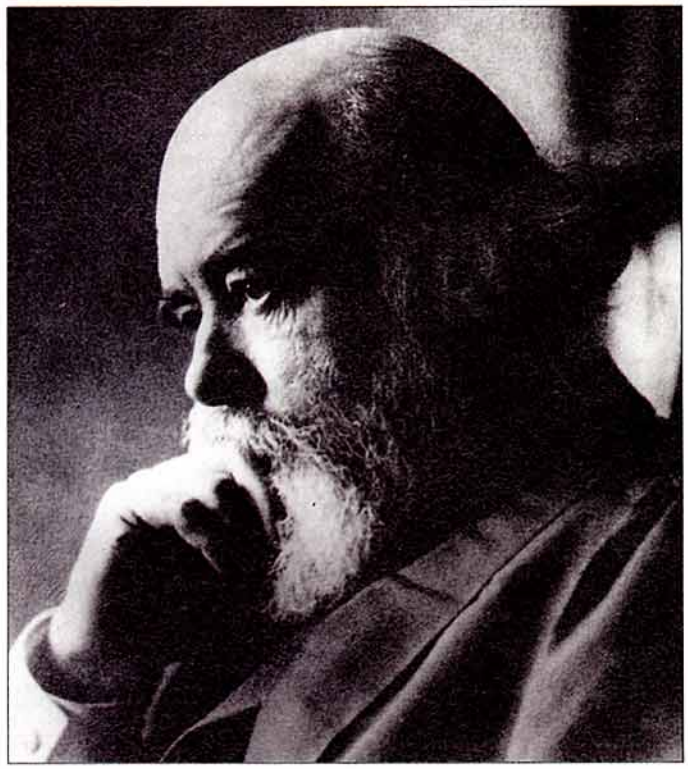
A conference, organised by the Liverpool Physical Society, on the development of radio by Sir Oliver Lodge takes place on Monday 11 July. Aimed at the non-expert, the conference will include the recollections of two of Lodge's grandsons, demonstrations and an exhibition. The conference fee is £10 which includes tea, coffee and a buffet lunch. Contact Dr David Edwards on 051 931 4636 for further information.

The annual meeting of the International Union of Radio Science will be held in the University of Liverpool on Tuesday and Wednesday 12 and 13 July.

There will be an exhibition in the University of Sir Oliver Lodge's notebooks, apparatus, photographs and other memorabilia from the collections of the Universities of Liverpool and Birmingham, the Science Museum and private individuals.

The Liverpool and District Amateur Radio Society will be operating a special event station, GB0OL, from 9 to 11 July from the University and from Lewis's.





Sir Oliver Lodge FRS, DSc, LLD (1851 – 1940) was elected President of the Radio Society of Great Britain in 1925.

Annual Meeting Minutes

PETER CHADWICK has clarified the remarks attributed to him in the first column of the Minutes of the informal session of the 1993 RSGB Annual Meeting published in last month's *RadCom*. They should read:

"The President then gave a short commentary on matters that had affected amateur radio during the previous year. He spoke in particular of Society representation at a number of overseas events and the importance of maintaining such contacts. He drew attention to the EMC Directive of the European Commission which, he said, was widely regarded in professional circles as poorly conceived and drafted. The specific exemption of home brewed amateur radio equipment was a matter on which all amateurs should be grateful to those who had got the exemption included, but the Society had considerable concerns about the inclusion of kits within the orbit of the regulations – a situation which did not apply in all member states of the Community.

"The possible applications of other EC legislation to the Amateur Service could well occur if constant vigilance was not exercised, and it was, he said, vital to lobby Members of the European Parliament to ensure that any Directive concerning radio specifically excluded radio amateurs and their equipment. The RSGB will monitor developments, but clubs could help by inviting their MEPs to suitable events in order that a better understanding of amateur radio could be fostered at Parliamentary level."

AMSAT-UK's Colloquium

THIS YEAR'S Satellite Colloquium is to be held 28 – 31 July at the usual venue, the University of Surrey. Once again, the comprehensive lecture programme covers the whole spectrum of space communication and has something for the beginner as well as the expert.

If you haven't yet booked your place, contact Ron Broadbent, G3AAJ, (not the University) for details. His address is: 94 Herongate Road, Wanstead Park, London E12 5EQ. **Last date for booking is 15 July.**

More EMC Coordinators Needed

THE RSGB EMC Committee would like to increase its network of EMC Coordinators who deal with members' EMC problems by telephone.

Areas in particular need of additional coordinators are: Birmingham, Northampton, Swindon, Cardiff, Ipswich, Carlisle and Sheffield.

Members who feel they have the relevant background should contact the Chairman Robin Page-Jones, G3JWI, QTHR.

Operate in Israel

ISRAEL HAS signed the CEPT TR61-01 agreement which means that a reciprocal licence is no longer required for British stations to operate in Israel, and vice versa.

Attendance at Council Meetings 1.1.94 to 30.6.94 (3 Meetings Held)

Name	Callsign	Attendance
I D Suart *(President)*	GM4AUP	100%
J Allaway	G3FKM	66%
J Bazley	G3HCT	100%
G L Benbow	G3HB	66%
P E Chadwick *(Immediate Past President)*	G3RZP	66%
M H Claytonsmith	G4JKS	66%
D A Evans	G3OUF	66%
J N Gannaway	G3YGF	100%
D Gourley	G0MJY	66%
J E Greenwell	G3AEZ	66%
F D Hall	GM8BZX	100%
I J Kyle	GI8AYZ	100%
N Lasher	G6HIU	100%
T I Lundegard	G3GJW	100%
N Roberts	G4IJF	100%
P R Sheppard	G4EJP	100%
C N Trotman *(Executive Vice President)*	GW4YKL	100%
R P Horton *(Honorary Treasurer)*	G4AOJ	100%
J C Hall *(Company Secretary)*	G3KVA	100%
P A Kirby *(General Manager)*	G0TWW	100%

French 20m Intruder Stopped

A PERSISTENT INTRUSION by a French Military station using a 96 Baud ARQ-E transmitter on 14322kHz has finally been cleared. This transmission was found and identified by the RSGB Intruder Watch (see 'Inside the RSGB Intruder Watch', *RadCom*, June 94, p38) and the information passed on to the Radiocommunications Agency Monitoring Station at Baldock.

Following confirmatory monitoring, Baldock brought this intrusion to the attention of the French authorities and maintained contact with them until the transmission eventually ceased. The transmitter, which is located on Reunion Island in the Indian Ocean, has not been heard on this frequency since the end of January.

A tiny part of the vast Hamfest, held in April at Dayton, Ohio.

Repeater Proposals

THE RSGB Repeater Management Group has forwarded a batch of eleven repeater applications to the Radiocommunications Agency as follows:

New repeaters

GB3AT (24cm ATV Southampton)
GB3MX (2m, Mansfield, Notts)
GB3UY (23cm speech, York)
GB3XG (3cm ATV, Bristol)

Frequency Change

GB3BX (2m, Wolverhampton)

Site changes

GB3BM (2m, Birmingham)
GB3MM (23cm speech, Wolverhampton)
GB3SE (23cm, Stoke on Trent)
GB3ST (70cm, Stoke on Trent)
GB3VT (2m, Stoke on Trent)
GB3YC (2m, Scarborough)

It is anticipated that the **minimum** time for clearance by the RA is three months for VHF and SHF, and six months for UHF units. As usual, the RSGB will inform repeater keepers of progress by distributing the RA's monthly progress reports.

Past Presidents at Headquarters

ON WEDNESDAY 18 May, the Society held its annual lunch for Past Presidents. Ten were able to attend: John Allaway, G3FKM (President 1976 and 1982); Bob Barrett, GW8HEZ (1984); John Case, GW4HWR (1991); Peter Chadwick, G3RZP (1993); Sir Richard Davies, G2XM (1988); Julian Gannaway, G3YGF (1989); George Jessop, G6JP (1974); Willie McClintock, G3VPK (1986); Geoff Stone, G3FZL (1964); and Fred Ward, G2CVV (1971).

The lunch was followed by a wide-ranging and very lively discussion on the future of amateur radio.

Propagation Tapes

THE RSGB Propagation Studies Committee is willing to produce tapes for blind amateurs on propagation matters.

The Committee Chairman Charlie Newton, G2FKZ, would be interested to know what the demand is and what subjects are of greatest interest. Call him on 0924 258681.

MID-SUMMER SPECIALS AT HAMSTORES NOW!

ALSO AT STAFFORD HAMFEST STAND A.C.

(1)

PICK UP A BARGAIN at RADIO HAMSTORES today, even if you cannot come in person, you can take advantage of our quick 'n' easy MAIL-ORDER and INTEREST-FREE CREDIT terms.

ICOM MODELS INCLUDED IN THIS MID-SUMMER OFFER ARE:

- IC-3230H. 2m/7cm Mobile Tx (1) ..... £595.
- IC-4iE. 70cm Handheld ..... £239.
- IC-P4E. 70cm Handheld ..... £249.
- IC-P4E/T. 70cm Handheld ..... £269.
- IC-2SRE. 2m +Wideband Rx ..... £369.
- IC-4SRE. 70cm +Wideband Rx ..... £389.
- IC-X2E. 70cm/23cm Handheld ..... £459.
- Maruhama RT618 0.5-1300MHz Handheld Scanning Receiver AM, FM, WBfm + SSB. *SPECIAL PURCHASE* (2) ..... Only £269.
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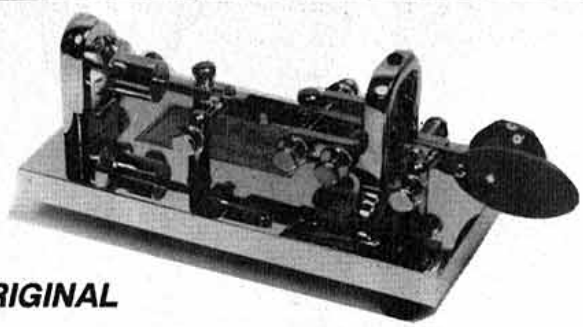

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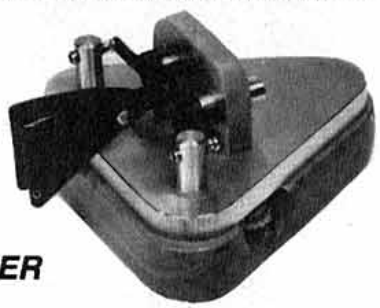

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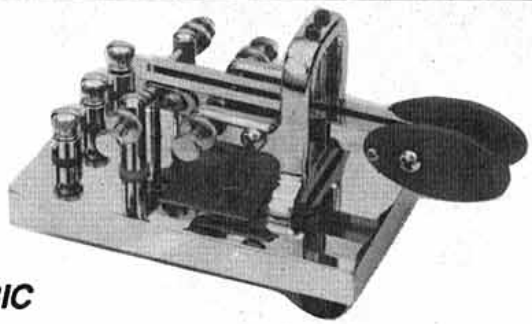

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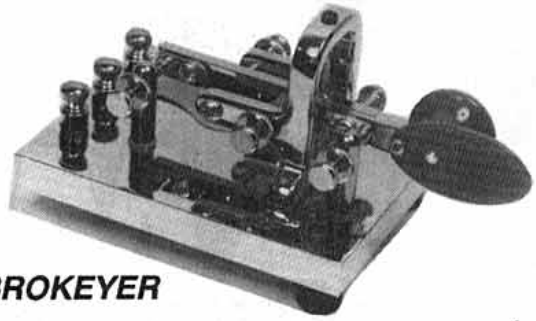

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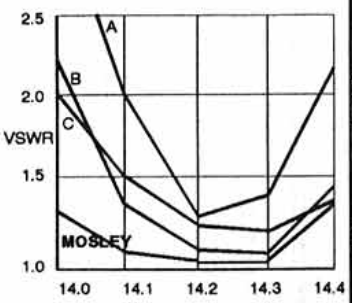

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THIS MONTH'S LEADING PROJECT

The VHF Log Periodic Yagi

by Mike Gibbings, G3FDW

MY INVOLVEMENT with VHF Log Periodic Yagis (LPYs) began as a result of problems with long boom high-gain VHF yagis. The severe weather at this northern QTH caused metal fatigue due to boom whip, which resulted in a loss of elements. Long booms are necessary for high performance VHF operation using yagis; it is common knowledge that you cannot get high gain from a short boom yagi. [1].

G3MY threw me a life-line in the form of an LPY for 6m, which was said to give a gain of at least 8dBd yet the boom was less than 6ft (1.83m) long (0.3λ). This antenna was constructed and its performance, compared to a 0.22λ two-element yagi, had to be heard to be believed. It also survived winds up to 115MPH (185km/h) and still remained in working order.

I then designed a bigger and better LPY for 70MHz. It was a complete failure. There was obviously more to Log Periodic Yagis than met the eye!

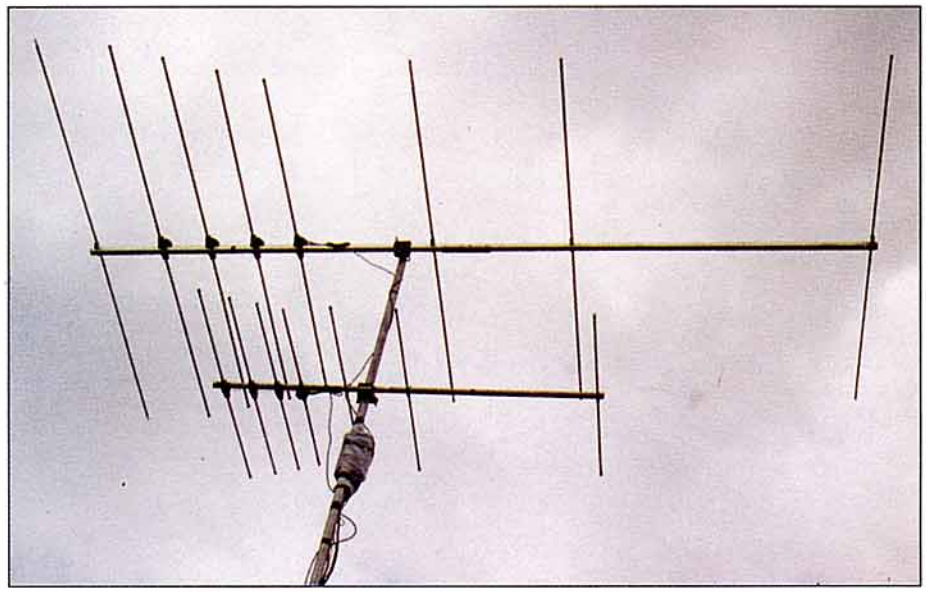
After many hours of work I figured out how the LPY can be adapted to other frequencies and other combinations of elements. Basically, the LPY is the amalgamation of two antenna systems which have complementary attributes, ie the log periodic and the yagi antennas.

THE LOG PERIODIC ANTENNA

THE LOG PERIODIC was designed to provide moderate gain but with a wide band width; six to eight elements can produce a gain of 4-5dBd over a 2:1 frequency range with an SWR better than 1.3:1 via a simple balun. Such an antenna has attractive features such as only one coax feed, driven elements connected via open line feeder and a gain better than many multi-band three element beams [2].

THE YAGI

THE YAGI PROVIDES high gain on a single band but the boom length becomes very large, the feed impedance becomes very low, the antenna becomes difficult to match and the more elements you use to get the high gain the more the polar diagram resembles the plan view of a hedgehog! Also, the SWR varies wildly over the design frequency band; the yagi is a narrow-band device. To obtain a gain of 9dBd on 50MHz you need a six-element yagi over 20ft (6m) long. On 70MHz it is over 14ft (4m) long.



LOG PERIODIC YAGI DESIGN

THE LOG PERIODIC YAGI design can be broken down into two parts: the log-periodic feed cell and the coupling of this feed cell to the yagi section. This arrangement results in both a high gain and efficient wide-band feed, all on a short boom, which gives lower wind resistance and greater strength than a yagi of similar gain.

Although a log periodic antenna can cover 50 – 70MHz using eight elements, only three to four elements are energised on each band, the others remaining passive.

With an LPY the single band log cell is optimized for maximum gain with the minimum number of elements.

To design an LPY for any frequency you require you have only to know how to operate an electronic calculator. All the design factors are given in this article.

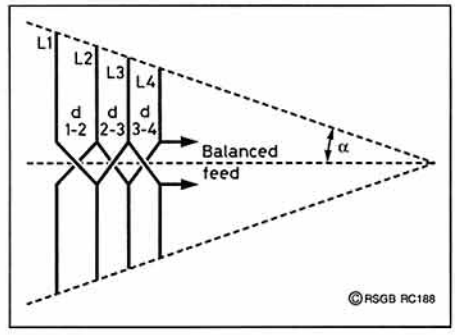


Fig 1: Basic log cell.

THE SINGLE-BAND LOG CELL

THE BASIC LOG CELL is illustrated in **Fig 1**. Certain design factors for a log cell need to be established.

Tau (τ) is a geometric constant smaller than 1, used to calculate the lengths of successive elements, L1, L2 etc and their spacing d1 – 2, d2 – 3, etc. If the lowest frequency for the log cell is f1, then the length of that element L1 is given by 492/f1 feet (150/f1 metres).

In the log cell, L2 = τL1, and L3 = τL2 etc. For a single band cell τ lies between the values of 0.85 and 0.94.

Rho (σ) is the relative spacing between elements. For single band log cells, σ lies between 0.05 and 0.06. From these values of τ and σ we can calculate other values for the log cell.

Alpha (α) is half the angle at the apex of the cell assembly. We need to know cotα to calculate other parameters for the log cell.

$$\text{Cot}\alpha = 4\sigma/(1 - \tau)$$

The spacing between cell elements is given by

$$d1 - 2 = \tfrac{1}{2}(L1 - L2)\cot\alpha \text{ and } d2 - 3 = \tau d1 - 2$$

It is useful to calculate the minimum number of elements which can be used to make a single band log cell for an LPY. The number of elements N is given by the formula:

$$N = 1 + (\text{Log Bs}/\text{Log}(1/\tau))$$

Bs is the structure bandwidth and is found

from Bs = B x Bar where Bar is the array bandwidth, and B is the bandwidth required for the single band cell.

$$Bar = 1.1 + 7.7(1 - \tau)^2 \cot\alpha.$$

If we design our log cell with B = 1, ie for a single frequency, and we make $\tau = 0.9$, and $\sigma = 0.06$, then Bs = 1 x Bar.

$$\text{Now } Bar = 1.1 + 7.7(1 - 0.9)^2 \cot\alpha \text{ and}$$
$$\cot\alpha = 4 \times 0.06/(1 - 0.9) = 2.4.$$

$$\text{Therefore, } Bar = 1.1 + 7.7(1 - 0.9)^2 \times 2.4 = 1.2848, \text{ and } Bs = 1.2848.$$

The number of elements:

$$N = 1 + (\log 1.2848/\log(1/0.9)) = 1 + 2.38 = 3.38 \text{ elements.}$$

It would appear that the feed cell could be made with only three elements, but if the calculation gives an answer above 0.3 of an element, the result must be rounded up. In this case four elements are required for the basic log cell for a single band LPY. Optimum figures for a four element log cell are $\tau = 0.94$ and $\sigma = 0.06$, and this basic log cell gives a gain of 5.4dBd.

The gain increases with higher values of τ, or σ. This results in a longer boom to accommodate the extra elements. A modest increase of τ to 0.95 and σ to 0.08 increases the number of elements to six and the boom length increases by some 58%. The increase in gain however is only an extra 0.5dB.

THE LOG-PERIODIC YAGI

THE GAIN LIMITATION of the log cell can be overcome by marrying a log periodic to a yagi. Adding a director to the log cell does the same as adding a director to a dipole. If correctly spaced, and of the correct length, we increase the forward gain and lower the feed impedance of the array. The log cell provides a gain in its own right so putting a director in front of it will also increase the forward gain. From the available literature it appears that the addition of a single director increases the gain by at least 4dB.

Compare this to the gain realized when adding a single director to a two-element yagi. The approximate maximum figures quoted are 4.5dBd for the two element and 7dBd for a three-element yagi, an increase of 2.5dB [3].

So why is the LPY some 1.5dB better than a yagi? It is said to be due to the better illumination of the director by the log cell. There may be merit in using log cells with higher gain than my four elements but this has not been tried.

All directors are made of one continuous length for both strength and low resistance at the current maximum. They are cut and spaced as follows (except on 144MHz):

D1 is 0.45λ with 0.15λ spacing, and, if used,

D2 is 0.44λ with 0.15λ spacing and D3 is 0.43λ with 0.3λ spacing.

So the gain of the combined array is 5.36dBd from the log cell plus 4dB from a single director, a total of 9.36dBd; >2dB more than the best three-element yagi and yet the length is only 5ft 10in (1.78m) on 50MHz! The gains from further directors are also impressive: D2 adds another 1.5dB, and D3 yet another 0.5dB [4].

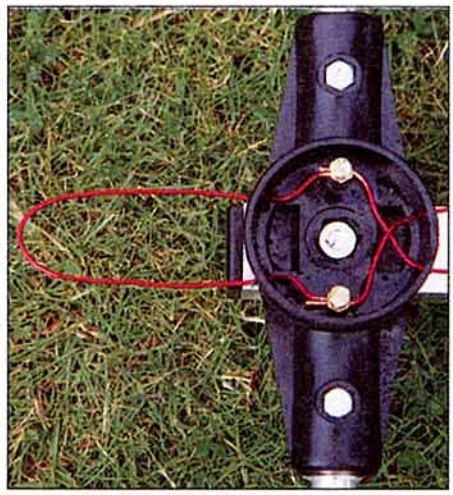


Photo 2: Connections in box L1. Shorting loop on 50MHz LPY shown.

The log cell has a 12 to 15dB front to back ratio. If you add a reflector, the F/B ratio is improved to a maximum of 25dB, but there is no measurable increase in forward gain.

As with a yagi, adding directors lowers the feed impedance but somewhat less dramatically. The feed impedance of a log cell is basically dependent on the construction and dimensions of the feed system and α. Impedance measurements indicate that an LPY is fairly broadband, unlike a yagi. The impedance is mainly resistive with very little reactance over the operating frequency.

THE LPY MATCHING SYSTEM

WITH DESIGN PARAMETERS of $\sigma = 0.055$ and $\tau = 0.94$, it has been found that, dependent on the characteristics of the open wire feedline, the feed impedance is between 200 and 300Ω for a multi-element LPY. Other σ and τ parameters seem to give impedances which are difficult to match. The feed impedance is only affected by director spacing if this spacing is close.

Most LPY designs rely for a match to coax cable on the use of very large diameter wires or tubes for the feed lines of the feed cell. I tried and found that they were difficult to assemble and were easily damaged. Also they needed to be supported and were not adjustable. On 50MHz the solution was to use 2mm diameter enamelled copper wire and to alter the spacing to control the impedance. These wires need no support, have never been damaged by wind (or birds!) and only need straightening out if they have been bent in transit. For 70 and 144MHz LPYs, 1.6mm wire is recommended.

An adjustment range of the antenna feed impedance of 2:1 was achieved. It has been possible to adjust these feeders to a minimum of 1/8in (3mm) spacing without flash-over at 100W RF, even in the rain.

SAFETY NOTE:

Do not use more power than just sufficient to give FSD on the SWR meter when tuning for best SWR. Less than 1W is suggested.

Using a coaxial balun with a 4:1 impedance step-down, it was possible to obtain a 1.2:1 SWR using either 70 or 50Ω coaxial cable. That is a feedpoint impedance of 200 or 300Ω at the input of a seven or eight element 70 or 144MHz LPY.

The 50MHz five-element design with $\sigma = 0.05$ gives a feedpoint impedance of about 90Ω. The design works well with just the one director and the boom is only 6ft (1.83m) long.

THREE PRACTICAL LOG-PERIODIC YAGI DESIGNS

DETAILS ARE GIVEN of a 70MHz, eight-element and a 144MHz seven-element LPY with a calculated gains of 11.4dBd; and a 50MHz, five-element LPY with a calculated gain of 9dBd. All have been built, tested and used for some years and are of similar straightforward construction. The materials have been obtained from:

Sandpiper Communications, Aberdare, Glamorgan. 0685 870425.

TAR Communications, Stourbridge, West Midlands. 0384 390944.

DIMENSIONS FOR THE 8-ELEMENT 70MHZ LPY

Log cell design frequency = 69.75MHz

L1 = 84.6in (2.15m)	d1-2 = 9.3in (236mm)
L2 = 79.5in (2.02m)	d2-3 = 8.8in (222mm)
L3 = 74.8in (1.90m)	d3-4 = 8.2in (209mm)
L4 = 70.3in (1.79m)	
D1 = 76.3in (1.94m)	s1 = 25.3in (641.m)
D2 = 74.3in (1.89m)	s2 = 25.3in (641.m)
D3 = 72.5in (1.84m)	s3 = 50.3in (1.28m)
Rfl = 86.5in(2.20m)	s4 = 14.3in (363mm)

Table 1a.

MATERIALS FOR THE 70MHZ 8-ELEMENT LPY

Qty	Description
2	Boom, 1in (25.4mm) square-section, 6ft (1.83m) lengths
1	Boom coupling tube, 12in x 7/8in OD (305 x 22.2mm) and self-tapping screws
4	Insulated blocks, 1in square boom to ½in dipole fitting
8	Seamless tube, 3ft 6in x ½in OD (1.07m x 12.7mm)
2	Seamless tube, 6ft 6in x ½in OD (1.98m x 12.7mm) for D1 & D2
2	Seamless tube, 6ft 6in x 3/8in OD (1.98m x 9.5mm) for D3 and Rfl
2	Seamless tube, 6in x ¼in OD (152 x 6.3mm) secured in each end of reflector with a self-tapping screw.
4	Mounting clips, 1in square boom to ½in element
	5 UHF coax fitting with lightning arrester as illustrated in photo 5. As the feed elements are not earthed to the mast this is a safety precaution.
2	End caps for 1in square
2	End caps for 3/8in OD tubing.
12	End caps for ½in OD.
	12ft (3.66m) enamelled copper wire, 1.6mm dia.
	9ft (2.75m) UR47 coax for balun and feeder.

Table 1b.

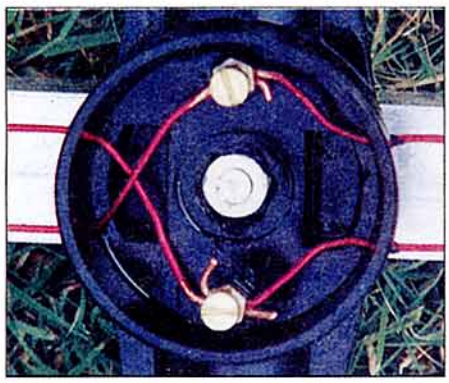


Photo 3: connections in boxes L2 and L3.

AN EIGHT-ELEMENT HIGH GAIN LPY FOR 70MHZ

THIS BEAM (**Fig 2, Photo 2, Tables 1a, 1b**) has been used for nearly four years, including VHF NFD 1991 and 1992 (first place in the low power section), and at home in Cumbria. Its all-up weight is below 7lb (about 3kg). The overall cost was under £50, using all new parts. The parameters are: $\tau = 0.94$ and $\sigma = 0.055$ as recommended earlier. The log cell plus three wide-spaced directors and a close-spaced reflector on a 12ft (0.85λ) boom produce a calculated gain of 11.4dBd.

The feed impedance was measured to be about 300Ω. A 4:1 coaxial balun was used to give an unbalanced coax feed and the feedline spacing was then adjusted to give a 1:1.2 SWR at 70.2MHz using 50Ω coax. The beam was then raised to 22ft (6.70m) over sloping ground and tested using the GB3BUX beacon on 70.0MHz.

The F/B ratio was 25dB with a close-spaced (0.085λ) reflector and 12dB without the reflector. The side to front ratio was guessed to be over 30dB as the S9 signal from GB3BUX disappeared over a large angle off the side. The measured half-power (–3dB point) beam width was between 40 and 45°.

The gain of a beam can be calculated from the half power points (–3dB) in the following way:

$$\text{Gain (dBi)} = 10 \log (41253/\theta h \theta v)$$

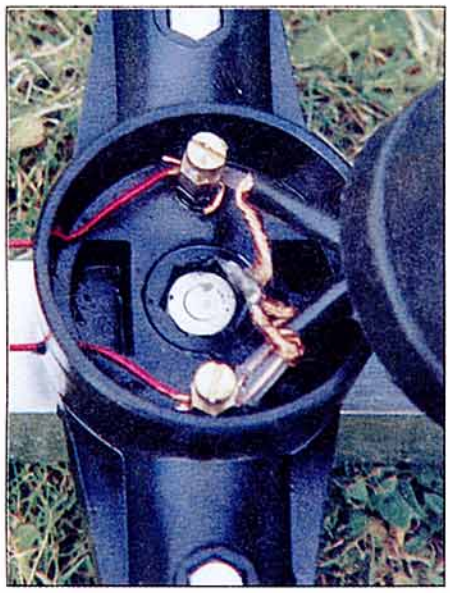


Photo 4: Connections in box L4 showing feedline, feeder and balun connections.

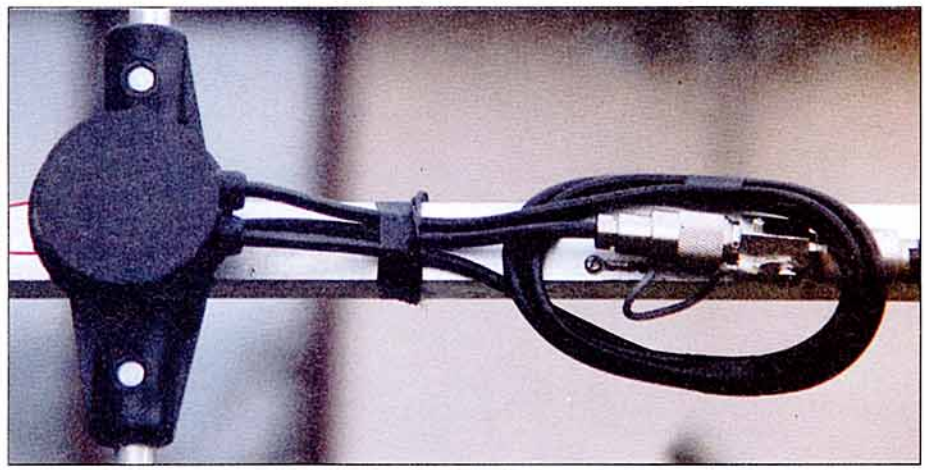


Photo 5: 4 to 1 coaxial balun and lightning arrester.

where θh and θv are the horizontal and vertical beam-width respectively. It was assumed that θh and θv were equal as the measurement was made over correctly sloping ground [5]. Therefore, the gain is between 13.1 and 14.1dBi, ie 11 to 12dBd. This is the closest correlation between calculated and measured gain I have ever seen.

It is thought that this beam is equivalent to a yagi over twice its size and constructed to the eight-element, NBS specification (1.75λ) boom.

Construction of the eight-element 70MHz LPY was as follows, (the construction of the other antennas is similar):

1. Join the two halves of the boom using a 1ft (30cm) length of 7/8in (22mm) OD tubing and self tapping screws.
2. Drill all the element locating holes in the boom.
3. Mount the four feed cell insulating boxes.
4. Drill two holes in the L1 and L4 insulating boxes and four holes in the L2 and L3 boxes, 3/4in (19mm) apart, for the 1.6mm wire feedline. The holes are best drilled from inside the boxes and will then have a slight downward angle to prevent water ingress (Photo 2).
5. Make sure that all the connecting posts in the insulating boxes are pulled down tight and are correctly aligned for the feedline connections.
6. Connect the enamelled copper wire feed line, making the crossover connections in boxes L1, L2 and L3; see **Photo 3**.
7. Connect the coaxial feeder in the L4 box; **Photo 4**. All outer braids will be soldered together but not earthed to the boom; see step 10 below and **Fig 3.**
8. Drill and fit the half elements L1, L2, L3 and L4 but make them all too long. Measure and mark elements L1 and L4, lay a straight edge between these marks and mark off L2 and L3. Cut elements to size. This ensures the correct taper of the log cell.
9. Make director and reflector elements and cut to length in situ. All directors and the reflector are of one continuous length, but the reflector has two 6in x ¼in OD (152 x 6.3mm) extensions, each fixed with a single self-tapping screw.
10. Make the 4:1 coaxial balun from exactly 55.5in (1.41m) of UR47 coax. The connections are as shown in Fig 3 and Photo 4 and **Photo 5** of the L4 connecting box. The balun is coiled up and strapped to the boom. The coax feed is via a UHF connector with lightning arrester

17

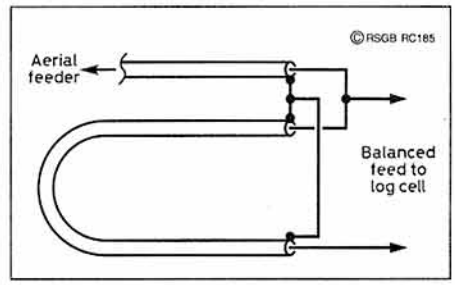


Fig 3: 4 to 1 coaxial balun, connections.

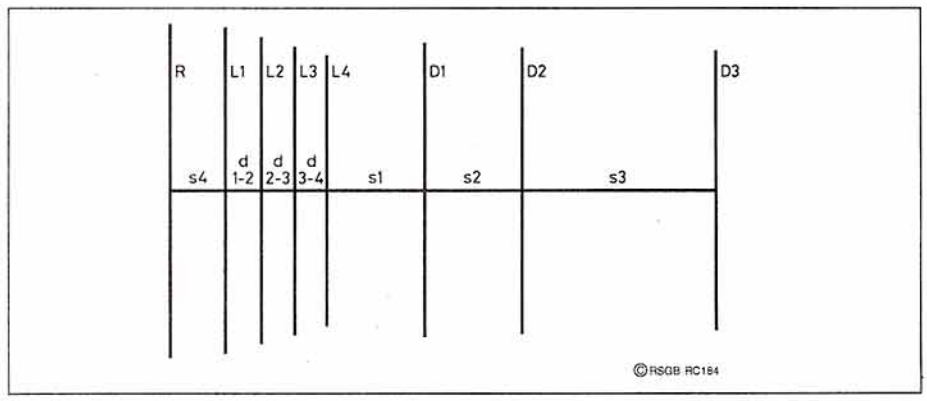


Fig 2: 70MHz 8-element LPY, dimensions.

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HUSTLER BASE:
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5BTV 10, 15, 20, 40 & 80m ground mount £145.95
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MO-3 54" long solid rubber coated res' mast £22.95
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RM-10 10m resonator 150-250khz band width 400w £15.95
RM-15 15m resonator 100-150khz band width 400w £16.95
RM-20 20m resonator 80-100khz band width 400w £23.95
RM-30 30m resonator 50-60khz band width 400w £24.50
RM-40 40m resonator 40-50khz band width 400w £24.95
RM-80 80m resonator 25-30khz band width 400w £25.95
RM10S 10m resonator 250-400khz band width 1kw £24.95
RM15S 15m resonator 150-200khz band width 1kw £26.95
RM20S 20m resonator 100-150khz band width 1kw £29.95
RM40S 40m resonator 50-80khz band width 1kw £34.95
RM80S 80m resonator 50-60khz band width 1kw £45.95
(Resonators mast's require a 3/8 female mount CB style)

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TSB3001 1X5/8 £29.95
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TSB3301 2m/6.5 - 70cms/9.0 (3.07m) £89.95
TSB3303 2m/3.0 - 70cms/6.0 (1.15m) £39.95
TSB3304 2m/6.0 - 70cms/8.4 (2.4m) £94.95
TSB3305 2m/8.5 - 70cms/11.9 (5.4m) £129.95
TSB3306 2m/3.5 - 70cms/6.0 (1.29m) £54.95

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70cms 13 Element long yagi £19.95
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2m 5 Element ZL special £24.00
2m 7 Element ZL special £32.95
2m 12 Element ZL special £52.00
70cms 7 Element ZL special £14.95

G5RV's:
1/2 size 51' long £16.95
Full size 102' long £18.95
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HB9CV:
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4m £19.95
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2m SO 239 £14.95
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G600RC VHF/UHF medium duty. HF light duty. 700kg-cm £349.00
G800S VHF/UHF medium duty. HFmedium duty. 800kg-cm £349.00
G800SDX HF medium / heavy. 1100kg-cm £419.00
G1000S 800kg-cm £399.00
G1000SDX 11000kg-cm £469.00
G2700SDX 3000kg-cm commercial duty £879.00

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GP5 2m/6.0 - 70cms/8.6 (2.42) £99.95
GP15 2m/6.2 - 6m/3.0 - 70cms/8.6 (2.42) £94.95
CA2x4DXM 2m/9.9 - 70cms/12.2 (6.05m) £179.95
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CX-903 2m/6.5 - 70cms/9.0 - 23cms/13.5 (2.95m) £139.95
CX-902 2m/6.5 - 70cms/9.0 - 23cms/9.0 (3.07m) £99.95

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2m:
20804 4 element 8.9dbi (0.93m) £42.95
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20809 9 element 13.1dbi (3.47m) £44.95
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20818 9 element crossed 13.1dbi (4.62m) £86.95
20822 11 element crossed 13.1dbi (4.62m) £115.95
20811 11 element 13.1dbi (4.62m) £77.95
20813 13 element 14.0dbi (4.43m) £64.95
20817 17 element 15.3dbi (6.57m) £92.95

70cms:
20909 9 element 13.0dbi (1.24m) £43.95
20919 19 element 16.2dbi (2.82m) £52.95
20438 19 element crossed 16.2dbi (2.82m) £61.95
20921 21 element 18.2dbi (4.6) £68.95

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TSA6001 1.3-170mhz & 350-540mhz £32.95
CF4160 1.3-170mhz & 350-540mhz £29.95
CF413 1.3-460mhz & 840-1400mhz £42.95
CF416 1.3-170mhz & 350-540mhz £32.95
CF360 1.3-30mhz & 49-470mhz £39.95
CFX514J 1.3-90, 130-200 & 380-500mhz £49.95
CFX4310 1.3-150, 350-500 & 840-1400mhz £45.95

New!

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14 - 18 - 21 - 24 & 28 MHZ

THE NEW COBWEBB IS STRONG, LIGHT WEIGHT AND SMALL, Yet is fully resonate on all 5 bands (5 fullsize halfwave dipples) allowing full height power handling. It is horizontally polarized & Omni-directional, feed with 50 ohms coax. It's fibreglass constructions keeps the weight down to 6kg, suffers no corrosion & withstand 100mph winds. With a choke balum system risk of TVI /RFI is minimal. Each side is 2.5mtrs (8 feet) long with a total turning circle of 3.9mtrs (12 feet). It's easy to construct and comes in a 1mtr long pack. At £199.00 including FREE delivery you'll never look back. (Please send S.A.E for info sheet)

COASTAL
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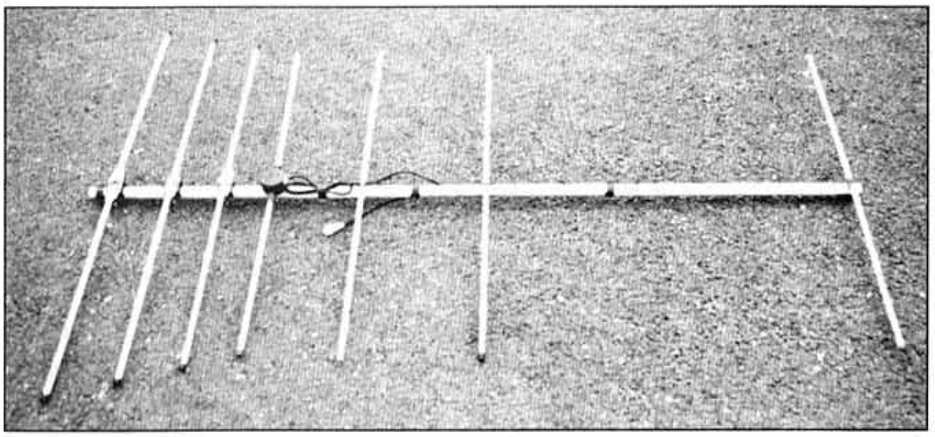


Photo 6: 50MHz 5-element LPY.

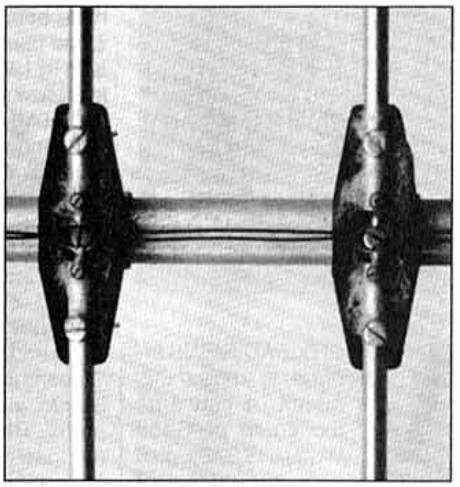


Photo 7: Close up of 144MHz log cell feedline.

DIMENSIONS FOR THE 50MHZ LPY FIG 4

L1 = 118.1in (3.00m)	d1-2 = 12.0in (305mm)	D1 = 108.3in (2.75m)
L2 = 111.1in (2.82m)	d2-3 = 11.3in (287mm)	s1 = 35.5in (902mm)
L3 = 104.8in (2.66m)	d3-4 = 10.6in (270mm)	L4 = 98.7in (2.51m)

Table 2.

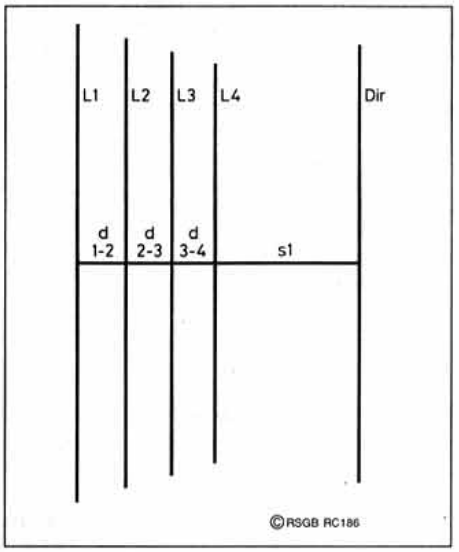


Fig 4: 50MHz five-element LPY, dimensions.

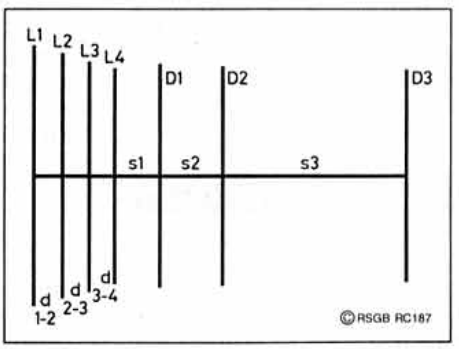


Fig 5: 144MHz seven-element LPY, dimensions.

15 with its earth strap taken to a self-tapping screw into the boom. On completion spray inside each dipole box with Finnigans Waxoyl (obtainable from Halfords) and refit lids.

THE ORIGINAL 50MHZ FIVE-ELEMENT LPY

THE CALCULATED GAIN was 9.36dBd using $\tau = 0.94$ and $\sigma = 0.05$. Total boom length was under 6ft (1.83m). See **Fig 4** and **Table 2**.

This antenna has been used for over four years both portable and at home. It stood up to very high winds and came through battered but in working order. I have worked all continents on 50MHz with it.

The feed to the log cell uses a short length of thin 70Ω coax wound in six turns on an RSGB ferrite core to form a choke balun. The coax ends are connected to the feed cell terminals.

The original was built with a 1in (25mm) OD round boom but a square boom, as in the eight-element 70MHz beam, could also be used. Construction for the log cell is as for the 70MHz LPY. Use 70Ω coax feeder. To improve the F/B ratio L1 is fitted with a 7in shorting loop (see Photo 2).

THE 144MHZ SEVEN-ELEMENT LPY

THE CALCULATED GAIN is 11.4dBd using $\tau = 0.94$ and $\sigma = 0.055$ and the boom length is 5ft (1.52m). This beam was designed for the low end of the 144MHz band. See **Fig 5**, **Photo 6** and **Tables 3a, 3b**.

The feed cell design frequency chosen was 141MHz to improve the F/B ratio to 15dB without the use of a reflector.

As on the 70MHz LPY, the feed cell feeder spacing was adjusted to give a SWR of 1.1:1 at 144.3MHz. At 145.5MHz the SWR was 1.5:1.

The connections to L1, L2 and L3 from the 1.6mm wire feeder are made using small solder tags attached to each element end by self tapping screws (**Photo 7**). All connections are soldered in situ.

ACKNOWLEDGMENTS

TO DR G M KING, G3MY, for all his help and encouragement and who inspired me to think that there must be something better than a Yagi. Also to Dr T H Wilmshurst, G3IBY, who gave me food for thought with his contribution to *Technical Topics* (Aug 1990) on the accurate measurement of 6m beam gain.

REFERENCES:

[1] *ARRL Antenna Book*, 1988, Chap.11 Figs 20 and 21 (see *Book Case* pages 94 and 95).

[2] *ARRL Antenna Book*, 1988, Chap.10

[3] *Yagi Antenna Design*, (Dr James L Lawson, W2PV), Chap 1, table 1.5

[4] 'LPY Gain' by Lea Johnson, *Ham Radio*, May 1983, pp78-82.

[5] 'Moxon Slopes', Les Moxon, G6XN, *RadCom*, June 1988.

DIMENSIONS FOR THE 144MHZ LPY

L1 = 41.9in (1064mm)	d1-2 = 4.6in (117mm)
L2 = 39.4in (1000mm)	d2-3 = 4.3in (110mm)
L3 = 37.0in (939mm)	d3-4 = 4.1in (104mm)
L4 = 34.7in (881mm)	
D1 = 35.9in (912mm)	sl = 7.3in (185mm)
D2 = 35.3in (895mm)	s2 = 10.0in (254mm)
D3 = 34.1in (866mm)	s3 = 29.5in (749mm)

Table 3a.

MATERIALS FOR THE 144MHZ 7-ELEMENT LPY

Qty	Description
1	Boom, 5ft (1.52m) x 1in OD tubing. Do not substitute a square boom.
3	open 1in boom to 3/8in dipole fittings
1	connecting box, 1in boom to 3/8in dipole fitting
3	1in boom to 3/8in ele mounting clamps
1	3ft enamelled copper wire, 1.6mm dia
1	27in (686mm) (exact length) UR47 coax for balun.

All elements: 3/8in (9.5mm) OD seamless tubing

Table 3b.

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

VERY SAD NEWS indeed to report this month. It concerns the death of Geoff Watts, RS 3129, on 9 May. Geoff was the founder of the *DX News Sheet* which he produced from 1962 until 1982 when it became the *RSGB DX News Sheet*. He also began the Islands On The Air programme. He never wanted to have a licence and was the only listener ever to be awarded the *CQ* DX Hall of Fame. He was a real gentleman and an outstanding SWL.

Sincere apologies to Paul White, G0BHA. In the May column under the heading 'Blue Mountains Expedition' I gave his callsign as G0HBA. Apologies also to the real G0HBA who might have thought that he was destined to be sent to the Arctic!

G0DNV (a self confessed 28MHz addict) has suggested that it would be a good idea to restart the 28MHz Countries table to stimulate some activity. So it will start again, and I suggest that to try to be fair, we count everything from 1 August 1994 this time and perhaps carry on until 31 December 1995. It's surprising what a "CQ" call on a 'dead' 28MHz band can produce!

DX NEWS

THE ARRL issued a News Release on 6 May concerning the **North Korea** activity by P5RS7. It says: "Further documentation has been received from the P5RS7 operation. It has been sent for translation from the original Korean. When the document has been translated we will begin our investigation into the other aspects of this operation. Cards should not be sent to the DXCC desk at this time".

According to *RSGB DX News Sheet* Gerard, F2JD (ex-5Z4JD), will next be heard from **Colombia** in the HK4 district and should be there for at least six months. *DXpress* says that KW2P, WA4DAN, AA4VK, and N0TG – and maybe also W0RJU – plan to operate from **St Paul Is** during the first week in July. Landing permission and transportation have been arranged. This is the same team who visited KP1 and KP5 in 1992 and 1993. V31PA is in **Belize** and is to be found near 14.150MHz between 2030 and 2200 mostly at weekends. Amateurs in **Canada** were granted permission to use the following alternative prefixes between 28 May and 28 July to mark the fiftieth anniversary of D-Day: XK2 = VA2, XK3 = VA3, XL1-XL9 = VE1-VE9, XO1 = VO1, XO2 = VO2, and VG1-VG2 = VY1, VY2. Stations in Ontario are now being issued with calls using the VA3 prefix. They were first allocated to those who had been licensed for ten years or more, and more recently to new licensees.

ZK1AT will be on the **S Cook Is** until September when he is due to return to the **N Cook Is.** VK4CRR has written to the *RSGB DX News Sheet* listing the calls of those for whom he acts as QSL manager – and for those for who he does *not* act. The latter include VK0MA, VK0MD, C21MM, 3D2A, V85AA, ZK1NC, VK9CO, and VK0HH. The ones for which he does act include: V85AH (1987-1989), VK4VD (1992), T30DP (April 1993), T30RT, T30D (April 1993), 3D2KM, VK9LD (Nov 1992), VK9CE (July 1993), VK9MM (Sept 1993), VK9XO (Dec 1993), VK4CRR/P, P29VH, and T32DP (ie T30DP operating from T32). At the moment **Scarborough Reef** is the subject of speculation as a possible new DXCC country. It seems that OH2BH and DL5VJ recently chartered a plane and flew over the area. With the exception of a small number of rocks and coral heads the reef is totally submerged and staying on the permanent soil would not be possible at high tide. They considered that the only possible place to operate from would be from one of the many ship wrecks!

Peter, ex-XT2BW, is now on the air from **Ghana** as 9G1PW. At the time of writing John, ST0/PA3CXC, in **Southern Sudan** was being reported as active once more on 10 and 18MHz at around 1700. *RSGB DX News Sheet* says that Pierre, HB9AMO, is in **Angola** for a few months. F5OIJ is in **Tchad** for a short period as F5OIJ/TT8 or TT8PS and should be found on all HF bands on CW and SSB. FT5XJ, on **Kerguelen Is**, has been found near 14.188 and 21.197MHz at 1040 according to *Lynx DX Bulletin*. The same news source says that V51JM has now moved to **Tanzania** and his new call is 5H1JB. He will probably be there for one or two years.

At the time of writing there were problems in **Yemen.** However it had been reported earlier that N4GCK (who was one of the 3Y0PI expeditioners) had obtained permission to operate from there for a few days this month as 7O0CW. He is short of vacation time after taking so much time off during the Peter 1 Island expedition so his stay may be restricted to four or five days, mostly on CW. *RSGB DX News Sheet* gives information supplied by HA0DU about the present situation in **Cambodia**. HA0CW was due to arrive on 10 May and to have the callsign XU0HW, and he was expected to leave after about two weeks. The authorities say that there were only two other valid licences – XU7VK and XU0HW and that all others are pirates.

TK3K and TK3KLS will be the callsign of a group of members of the Saar Lorraine DX Club who will operate from **Corsica** between 20 August and 10 September. *DXpress* reports that a group of Dutch amateurs will be visiting **Malta** between 24 June and 4 July. They will be using various 9H3 callsigns on CW and SSB on all bands from 3.5 to 28MHz.

BAND REPORTS

Everyone is complaining about poor propagation and hence the relative scarcity of reports. However, I do have to thank the following who sent in logs: G2HKU, G3GVV, G3YRM, GJ4GG, GW4KGR, G4OBK, G0MHC, and the UK Packet Cluster via G4PDQ. Callsigns in italics were of stations using CW:

1.8MHz
0000 *OJ0/OH2BBF, 9K2ZZ.*
0400 *SV8ZS, VO2GUY, W1AW.*
1900 *A71CW, TK/DK7DB.*
2200 *TF3GB, 3A/DF1AL/P.*
2300 *VQ9SS.*

10MHz
0000 *TI4/AA7JM, 6W1/F5NHJ/P.*
0100 *ET3VZ, VP2EJA.*
0500 *KH6AFS, VY1JA, ZL3GQ, 9J2BO.*
0600 *KL7U, VK9NS, W6PM, ZA1AJ, ZB2AZ, ZL4DU.*
1700 *BV2FG, HL1IUA, JR5XP, JT7FAA, S92SS, DL8YR/ST2.*
1800 *A22DX, ET3VZ, JA1LZR, S79CK/C, ZA1E, 7X2DR*
1900 *C53HG, OY1G, 5X/F5FHI, 9M6SF.*
2100 *A71CW, D44BS, FS/W1FC, TL8NG, VP2VE, ZL3GQ, 5U7Y.*

14MHz
0600 *DL8YR/ST2, SU1STAR,* YI1VIT.
0700 *FK/F6GYU, FO5DV,* KH8BB, P29SC, *T32AF, WL7EP,* ZK1AYR, *5W1GC.*
0800 KH3AF, KH8BB, S0RASD, SU1STAR, TG9NX, *V85KK.*
0900 BY4AA, FO4OK, *NL7VJ.*
1000 *A35MW,* C53HG, SV2ASP/P, *T28RW, V73C.*
1400 E28DX, HS0/G4UAV, S21ZG, 9M2ZA.
1500 **A71BH,** JT1BG, V63SD, V85SS, 9N1AA, 9V1ZR.
1600 BV6ER, EP2MKN, KL7XD, SU1STAR, XU0HW, 9M8BL.
1700 JA, *XW2A.*
1800 DU1SAN, V85GA, 9M2FK.
2000 FS5PL, FY5FJ, PY0TUP, PY0ZFB.

18MHz
0700 A45ZZ, *DL8YR/ST2, TU4SR, 5R8AL.*
0800 *JT1CD, XU0HW, VK9NS.*
0900 *BY1QH,* BZ1RL, JT1BG.
1100 *C21/ZL1AMO,* T30NJ, TJ1MR, 9G1SD.
1200 TU4SR, *XU0HW.*
1400 *C53HG,* F5OIJ/TT8, *SU1STAR,* SV2ASP/A.
1500 *ET3YZ, 5R8AL, 7P8SR, 9M2FS.*
1700 TJ1AD, TL8LD, V51BG, ZD9BV, *9M6HF.*
1900 PJ8AD, PY0TWP, ZD7WRG, VP8GAV.

21MHz
0800 BZ4RBV, C93BQ, HL0Y, JT1CT.
0900 BY4WNG, FR5BT, XW2A, 7O1AA, 9N1AA, 9N1WU, 9U/F5FHI.
1000 H44KA, P29VH, S21ZG, SU1STAR, V63SD.
1200 A61AF, D44BS, FT5XJ, XX9AS, 5R8DS, 6O0H, 6O0Z, 9N1HA.
1300 D2EGH, D68LC, FH5CB, ZD7SAS, ZD7WRD, 9M8BL.
1500 D2EV, ET3SID, PY0ZFB, S21A, ZS8MI, 9M6JC.
1600 J55UAB, S0RASD, F5OIJ/TT, ZD7GWM, ZD9BV, 3X0YU, 9Q5EXV.
1700 PY0ZFB, TU2VZ, V85SS, VP8CPU.

24MHz
1200 *A71CW, S79CK/C, VK6APZ.*
1300 *FT5XJ, TL8NG, XU0HW.*
1700 *S92SS.*

1994 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G4OBK	95	142	98	335
EA5DQE	–	92	49	141
G0MHC	37	58	26	121
G3KKJ	17	53	39	109
GJ4GG	30	45	18	93
G0MHC	29	36	14	79
G4CMZ	31	16	1	48
G3IAR	26	11	1	38
G0TMZ	21	11	–	32
G4FVK	12	7	7	26

DK0WCY

I HAVE JUST received from G3USF up-to-date information on this beacon. Since the end of April it has been transmitting daily propagation forecasts between 0600 and 0700 and again between 1430 and 1600 on

From left: Jennifer Short, G7FHW; Bob Short, G3GNR; Dave Miller, NZ9E; and Sue Miller, KA9UCK, met at the Valley of the Rocks Hotel, Lynton, Devon, last April. Dave and Sue come from Lynton, Illinois.

3.553MHz. It is equipped with a computer controlled 25W (output) transmitter and a dipole antenna. A typical message looks like this: "Info 10 May 0501UTC – for 09 May r16 flux 77 Boulder a 26 – forecast sunact quite – magfield active condx expected – AR". Its experimental licence is valid until the end of 1994, and there may be changes following that time. Reports from amateurs would be very welcome and should be sent to Emil Johannsen, Hamm 4, D-24392 Scheggerot, Germany, or cards can be sent via the DARC bureau. Martin also sent information about Czech beacons – OK0EM uses 1.840 and 3.579MHz and OK0EN 3.6MHz.

CONTESTS

IARU HF WORLD CHAMPIONSHIP

1200 9 July – 1200 10 July

1.8 – 28MHz (no WARC bands). Single operator phone, CW, or mixed modes, and multi-operator single transmitter mixed mode only. IARU Member Society HQ stations send signal report and official society abbreviation (eg '599 RSGB'). Others send report and ITU zone (UK is 27). The same station may be worked on each mode on each band but bandplans *must* be followed – and only one multiplier may be claimed. QSOs with own ITU zone and with all Society HQs count one point. QSOs with different zone in own continent count three points, and with different continents five. Multipliers are the total number of ITU zones plus HQ stations on each band. Total score is multipliers times total QSO points. Entries must be postmarked no later than 10 August 1994. Official forms are available (two IRCs please) from the ARRL/International Secretariat at IARU HQ, Box 310905, Newington, CT 06131-0905, USA. Entries may be submitted on disk. I suggest that serious entrants ask me for a copy of the rules (SASE please).

CQ WW WPX CW CONTEST

Results of the ***CQ* WW WPX CW Contest** have appeared in the May issue of *CQ Magazine*. Worthy of particular note is that **G3LNS** came first in Europe on 7MHz. UK scores are as follows (callsigns in italics were entrants in the **QRP section** and those in bold type received certificates): **(All-bands) G4BUO** (3,778,218), G3TXF (333,086), ***G3SWH*** (996,812), ***G4ZFE*** (623,224), ***GW3JI*** (550,715),, *G0IDE* (516,384), *G3ESF* (497,600), *G3OOU* (234,780), *GX0AAA* (233,240), *G4ZME* (131,936), *G4OBK* (33,372). **(28MHz) G3SQX** (5,605). **(21MHz) G4CNY** (1,421,809), ***G3SSO*** (431,552), ***GM3CFS*** (121,632). **(14MHz) *G0NWG*** (177,936), **(7MHz) G3LNS** (2,500,400), ***G4ZOB*** (244,664). **(3.5MHz) G3YBT/P** (136,320). In the **QRPp** class **GX5QK/P** scored 227,800 to be 11th in the world listing, **GM4HQF** scored 88,800 and GM0GNT 10,614 points.

INTERNATIONAL 'GOODWILL GAMES-94'

2100 23 July – 2100 24 July

CW and SSB on 1.8 – 28MHz (no WARC) following IARU Region 1 band plans. Multi-band single and multi-operator single transmitter classes. Mixed modes only. Exchange RST and serial QSO number from 001. Three points for QSOs with different continents, one with different countries in own continent. Two points for CW contacts. Same station may be worked on each band. Multipliers are the countries on the 'R-150-S' countries list. Entries must be sent no later than 22 August 1994 to the Krenkel Central Radio Club of the Russian Federation, PO Box 88, Moscow, Russia.

SEANET WORLD WIDE DX

0001 23 July – 2359 24 July (CW)

0001 20 August – 2359 21 August (SSB)

1.8 to 28MHz (no WARC bands). Single operator single and multi-band and multi-band multi-operator sections. Exchange RST plus serial QSO number from 001. Contact SEANET area stations – A4, A5, A6, A7, A9, AP, BV, BY/BZ, DU, EP, HL, HS, JA, JD1, JY, KH2, P29, S21, S79, VK, VQ9, VS6, VU, V85, XU, XV, XW, XX9, YB/YC/YD/YE, ZK, ZL/ZM, 3B6/3B7/3B8/3B9, 4S7, 4X, 8Q7, 9K, 9M2, 9M6, 9M8, 9N, and 9V. Entries must be received no later than 31 October 1994 by: SEANET Contest Manager 1994, Eshee Razak, 9M2FK, PO Box 13, 10700 Penang, Malaysia.

COLOMBIAN INDEPENDENCE CONTEST

0000 to 2400 16 July

Single-operator single and multi-band, multi operator single and multi transmitter sections. 3.5 to 28MHz (no WARC bands). Phone or CW. One point for contact with stations within own continent, three points with other continents, and five with Colombia. Multipliers are DXCC countries on each band plus the number of HK zones on each band. Logs must be sent to Liga Colombiana de Radioaficionados, Colombian Independence Contest, PO Box 584, Santafe de Bogota, Colombia, to arrive before 30 September 1994.

I have photocopies of the rules of each of the three previously mentioned contests – SASE please.

RUSSIAN DX CONTEST

NOTE THAT the date of this contest has changed as it clashed with other events. The new dates/times are Friday 29 July, 2100, to Saturday 30 July, 0900.

AWARDS

THE FIRST three of the following awards are issued by the Czech Radio Club and the fee for each is 10 IRCs or US$5.00. Endorsement stickers cost two IRCs or US$1.00. Lists of QSLs certified by a national society awards manager (in the case of RSGB this is now G4BWP) may be submitted. Applications should go to: Czech Radio Club, Awards Manager, PO Box 69, 113 27 Praha 1, Czech Republic.

S6S

For those with confirmed contact with at least one station in each continent since 1 January 1950. All phone, all CW, all RTTY or all SSTV. Stickers are available for single bands (3.5, 7, 14, 21, and 28MHz).

P75P

To qualify it is necessary to make confirmed contacts with at least one amateur fixed station in each of 50 ITU zones since 1 January 1960. Endorsement stickers for the basic award are available for 60 and 70 zones. Also available to listeners.

100-CS (WORKED 100 CZECH STATIONS)

For confirmed contacts with at least 100 different OK/OL stations since 1 January 1993. Mixed, all phone, all CW, all RTTY, all SSTV, all 1.8MHz, and all 144MHz and up versions available. Endorsements for the basic sticker are available for every additional 100 confirmed up to 500. This one is also available to listeners.

continued on page 21 ▶

Presentation to the Fisher's Ghost Amateur Radio Club (see text).

HF F-LAYER PROPAGATION PREDICTIONS FOR JULY 1994

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

Time / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHZ 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	...........1..	...........1..	....1...22.	...123212552	213556555896	766544445689	753222122468	42.......35
MALTA	...........1..	..........1.	....11...33.	...133222562	312566556897	867655455789	886322223478	++3.....24+
GIBRALTAR	...........1..	...........1..	...........2.	....111..341	2..255443785	854665555789	987532223578	++42....24+
ICELAND	...........1..	...........1..	...........2.	...........2.	1..123222464	634555555678	776533223456	4442.....23
** ASIA								
OSAKA	...........1..	...........1..	...........1..	....11111.11	1.123322434 3	1...21.12463	131	....
HONGKONG	...........1..	...........1..	....11..12..	...122113411	1.112322465 4	2...1.12475	143	....
BANGKOK	...........1..	...........1..	...1121.22..	..122322442 1	211123235675	31....12477	1.......145	22
SINGAPORE	...........1..	...........1..	...122111....	..123322 21..	211223234431	41....12466	1.......146	23
NEW DELHI	...........1..	.........1..	...112112 41.	..123322 4641	322222235785	63....12478	41......156	23
TEHERAN	..........1..	....1..122.	..122221355 1	..233333577 3	434322235787	853.....2478	73......256	4........23
COLOMBO	..........1..	....1..1...	...223213...	..233433511.	222213235343	63......2477	51......256	2........23
BAHRAIN	..........1..	....11..132.	..122322465 1	1.233333587 4	535222235788	863.....2478	73......256	4........24
CYPRUS	..........11.	...1111.133.	..134432476 2	2.256655688 5	646655556899	986332334589	8631...11367	54.......34
ADEN	..........11.	...1.11123..	...223335622	2.243444674 5	645311235788	873.....2478	751......156	42.......24
** OCEANIA								
SUVA/S	...........1..	...........1..	...........1..	....11..11.	..232222.442	..3421.11431	...1....11.	....
SUVA/L	...........1..	...........1..	1..........22	21.1.....44	2224......64	.1341....242	..11....11.	....
WELLINGTON/S	...........1..	...........1..	21	63	11233.....63	12332...1153	..11....131	....
WELLINGTON/L	...........1..	...........1..	1..........2	21.........5	4331......26	2343.....53	..22....131	....
SYDNEY/S	...........1..	...........1..	...11.....	..1231.....1	11354 21.11.4	212321..2344	...1....142	....
SYDNEY/L	...........1..	...........1..	1..........2	3..........5	5213......16	21241.....44	...2....142	....
PERTH	...........1..	....1.....1..	...233.....1	..24541.....1	32345 32.....	52112...134.	2.......243	23
HONOLULU	...........1..	...........1..	...........1..	....1...111	1.222211242 1	.1342 1.122..	..11.......	....
** AFRICA								
SEYCHELLES	.........1...	...11.112...	...2223352..	..24334464..	..532223564 1	543.....2477	751......156	42.......24
MAURITIUS	.........1...	....1111121..	...2233354 1.	..244544663 1	1.542323577 5	6141....2478	741......156	43.......24
NAIROBI	.........11..	....1.1233..	...2224467..	..143456 82.	3.552223577 4	8552.....2478	773......156	44.......24
HARARE	.........123..	....112235..	...2234568 31	1..444457863	6.363223578 8	8463 1...2478	7741.....156	44.......24
CAPETOWN	.........1....	....1.222....	...1324441..	...3544563..	...653234 62.	22.42...1463	7611.....156	44.......24
LAGOS	.........1241.	....1.1246 3.	...1313468 6.	1..352456882	643642224686	8864 1...1478	7741.....146	44.......24
ASCENSION Is	..........31.	....1..1253.	....3212476.	....532368 82	1...532246 87	72.12...1478	7711.....146	442......3
DAKAR	..........22.	....1..1254.	1...3223477 2	31.253345795	763553122688	9864 2....378	7752.....46	442......3
LAS PALMAS	..........11.	....1....23.	1...3223257 3	3..265455796	853676566799	9976433335 89	8863211112 57	++3.....25
** S. AMERICA								
Sth SHETLAND	..........1...	.........221..	.......1444..	.......25662.	.....123466 1	1.1.....1475	6541.....146	442......3
FALKLAND Is	..........21.	.........1143.	.......23476.	.......34588.	.....223468 3	5231.1..1367	7741.....136	442......3
R DE JANEIRO	..........12.	11341	.....223367 3	3....434478 6	741..323357 9	9861 21...258	7751.....26	442......3
BUENOS AIRES	..........12.	11241	1....123357 3	41...234468 6	8531.323357 9	8863.1..1248	7752.....26	442......3
LIMA	...........1.	21	1....12124 4	4....1.232356	8412423224 7	8864 21....14	6752.....2	442.........
BOGOTA	..........1...	11	1....1111144	4...1223225 6	841233231236	8854 21....4	6752.....1	342.........
** N. AMERICA								
BARBADOS	..........1...	21	1....2111254	4...1323236 6	841233221257	8864 21....25	7752.....2	442.........
JAMAICA	..........1...	11	1....11.133	3....122114 5	7311.222112 6	7854 21....3	4742.....1	.42.........
BERMUDA	..........1...	1	1....1.1.123	3....222124 5	7311322124 6	7853 21....14	5742.....1	242.........
NEW YORK	..........1...	12	12	2....111112 4	631..222113 6	6752 21....13	3742.....1	4..........
MEXICO	..........1...	12	12	2....111112 3	5211..222123	4653 1.....1	1542.......	.2.........
MONTREAL	..........1...	12	12	2....111112 4	621..222213 6	6753 21....13	3642.....1	.3.........
DENVER	..........1...	1	1	1..........1	421...11111 2	3553 1.....1	1342.......	....
LOS ANGELES	..........1...	1	1	1..........1	3111...12112	2453 1....1...	.242.......	....
VANCOUVER	..........1...	1	1	1	21111.111112	2353 21...1...	.141.......	....
FAIRBANKS	..........1...	1	1	1	1122211111 1	1234 21.11211	..11.......	....

The provisional mean sunspot number for May 1994 issued by the Sunspot Data Centre, Brussels was 18.2. The maximum daily sunspot number was 39 on 17 May and the minimum was 0 on 26, 27, 28, 29, 30, 31 May. The predicted smoothed sunspot numbers for July, August and September, are respectively: (classical method) 29, 28, 27 (±7); (SIDC adjusted values) 23, 21, 19 (±5).

HF NEWS

continued from page 19

THE WROCLAW AWARD

Available to licensed amateurs and listeners for contacts/confirmed reports with stations in Wroclaw since 6 May 1945. DX stations need ten points, Europeans 15. Each QSO counts two points, with SP6PKQ five points, and with stations using the prefixes SP0, SR, SN, SQ0, and 3Z seven. Each QSO made during the period of the 'Days of Wroclaw' (6 to 10 May each year) counts double points. The same stations may be worked on all bands and modes. Send a certified list and "QSL cards with contact SP0PKQ and SN0PR via SP6FER" plus 10 IRCs to Klub Krotkofalowcow SP6PKQ – 'IKAR', PO Box 2190, 50-985 Wroclaw 47, Poland.

WHITE WHALE AWARD

Issued by the Hervey Bay Amateur Radio Club Inc of Queensland. Hump Back Whales visit the area for about three months each year. Very few of them are white. The callsign will be VI4WWA, the award is a 10" by 8" photograph of a white whale. QSOs between 1 August and 31 October are valid and VI4WWA should be found on 3.794, 7.100, 14.235, 21.250, and 28.495MHz as well as Australian Novice frequencies. Applications for the award and/or QSLs go to: QSL Manager, HBARC Inc, PO Box 829, Hervey Bay 4655, Queensland, Australia. The cost is US$5.00.

FISHER'S GHOST

Stan Davis, VK2-G4SJD, recently accepted great hospitality when he attended a presentation at the Fishers Ghost ARC in Campbelltown, NSW. The club was given a three element beam by its sister city club the Koshigaya ARC from Japan (see photo). The strange name is reputed to have come from the murder of Frederick George Fisher on 17 June 1829 for which crime one George Worrall was duly executed. The legend says that a John Farley claimed that he had seen the ghost of Frederick Fisher sitting on the rail of a bridge and it had pointed to a paddock down the creek and then faded away. Police later found Fisher's body in the paddock . . . .

PROPAGATION

SMITHY'S COMMENTS say "very much as before" and I feel that nobody is going to argue with him! He says: "From mid-April to mid-May the HF bands continued to be dominated by low solar activity coupled with prolonged periods of unsettled geomagnetic conditions. The only change since the previous period was the onset of summer Es conditions to bring some life to the higher bands. The 27-day average solar flux finally levelled off at 79 sfu during the period and at the time of writing (mid-May) was just beginning to creep up again. This is the lowest value seen since mid-1987 and, of course, it was then about to start the steep rise to the peak whereas now the trend is downward towards the minimum. Just when a consistent up-turn will mark the beginning of the new cycle remains to be seen. The average length of the past seven cycles is 10.5 years but this includes one lasting only 10 years and one which dragged on for 11.7. Cycle 22 started in September 1986 so the minimum is probably at least two years away and could be as late as mid-1998. There is an outside chance that the cycle will be very short."

THANKS

TO THOSE who sent me information. These include the editors of *RSGB DX News Sheet* (G4DYO), *DXpress* (PA3FQA), and the *Lynx DX Bulletin* (EA2KL).

Closing date for the **September** issue will be 20 July.

QTH CORNER

ET3VZ	via OH2VZ.
FT5XJ	Pierre Clauzel, F5NLL, Le Capitaine Plaigne, F-11420, Belpeche, France.
PY0TUP	Box 108674, Sao Goncalo, RJ 24621-970, Brazil.
DL8YR/ST2	via DL8YR.
SU1STAR	via SU1ER.
T30JH	Jack Haden, PO Box 630, Elsternwick 3185, Australia.
F5OIJ	Box 265, F-67500 Haguenau, France.
XU0HW	Laszlo Szabo, PO Box 24, H-4151 Puspokladany, Hungary.
XW2A	via JA2EZD.
ZL1AMO	Ron Wright, 28 Chorley Av, Massey, Henderson, Auckland 1208, New Zealand.
ZD7WRG	Box 156, St.Helena.
7P8SR	Box 333, Maseru 100, Lesotho.

VHF/UHF NEWS

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

THE SPORADIC-E season on 144MHz from the British Isles got off to an early start. Before the end of May, many stations had worked into North Africa and southern Spain. 50MHz was awash with Es signals for much of the month.

REPEATERS

THE HUDDERSFIELD Repeater Group's UHF voice repeater GB3HD (RB9) was switched off at its Crosland Moor site at 1200 on 27 March by chairman John Goodwin, G0PRF. In atrocious weather, it was installed at its new site at Scapegoat Hill by a team of five. Service recommenced at 1650 and the coverage is greatly improved. The HRG produces a newsletter, *Repeater News*, and the secretary is Kevin Boothroyd, G1FYS (QTHR), if you want details of the group.

The Mid-Sussex RG operates UHF relay GB3HY (RB5 with CTCSS at 88.5Hz), which is located on the water tower at a hospital complex on the eastern outskirts of Haywards Heath (IO91WX). The hardware comprises a Motorola 20W Micor repeater with Avantek high intercept point receiver preamp. The antenna is a WX-1 dual-band fibreglass colinear fed with 0.875in Cellflex cable. Running expenses come solely from donations. If you'd like to swell the kitty, send yours to Mr C I Stiller, G0AUI, at QTHR.

The Kent Repeater Group operates eight assorted repeaters. The KRG's *Newsletter No 75* states that VHF relay GB3KN (R4) was moved to a new site on 5 May after a wait of nine months. 'Constant computer talk' through GB3KS (R1) has brought complaints from various users. Keeper G4SEJ asks: "Where has all the banter and fun gone from our normally very friendly box?"

G8JNZ is the keeper of UHF repeater GB3NK (RB4) and comments on the observed variations in signal strength over quite short distances. In summer, it is often three S-points stronger in the morning than it is in the evening, even though the Tx output is constant. GB3RE (RB11) will go QRT towards the end of the year due to the loss of the site at Chattenden. All KRG voice repeaters can be accessed either by a 1750Hz toneburst or a 103.5Hz CTCSS tone. No information is given in the Newsletter about the group's officers; the editor is G1AJY.

PUBLICATIONS

THE APRIL issue of Dave Hardy's, G8ROU, *VHF-UHF DXer* includes a report by Sam Jewell, G4DDK, on the noise figure measurements carried out at the Martlesham Round Table. Also featured is Ian White's, G3SEK, piece on High Quality Wideband Noise Sources which need not cost the proverbial arm and a leg if you can buy surplus components. Contact Dave (QTHR) for subscription details.

The Public Domain and Shareware Library's latest *PC Shareware Update Reference* is Issue 17, Supplement 3 and has over 40 pages of disk and CD-ROM software. The Ham Radio section includes Morse tutor, weather satellite, logging programs, packet radio, satellite and propagation software, both shareware and public domain. See their advert for their address.

The May *Newsletter No 14*, published by the European Radiocommunications Office, chronicles the latest radio regulation news from the European Union. Membership of the newly-formed CEPT Amateur Radio Society (CARS) is open to current and former employees of a CEPT organization, or of a radio regulatory administration in a CEPT member country. The ERO's office is at Holsteinsgade 63, DK-2100 Copenhagen, Denmark.

FIRSTS

PAT ALLELY, GW3KJW, lists the following possible firsts for the 430MHz band. From England: G2FKZ-G3CU 30/10/48 1846; G5ZT-GC2FZC 23/9/64 1850; G2JT-GD3DA/P 26/8/51; G2JT/P-GW4OS/P 19/6/49; G3LTF-KP4BPZ 13/6/64 2020 (EME); G3LQR-LA9T 3/12/62; G8ATK-OE2OML 9/70; G3LTF-OK1EH/P 17/10/65 2022; G3JMA-OZ9AC 3/12/62; G3KEQ-SM6ANR 12/6/59; G3LTF-VK2AMW 30/3/74 (EME); G4RGK-T70A 24/9/91 2048; G3LTF-WA6LET 25/9/65 1530 (EME).

From the Channel Islands: GC2FZC-DK6ASA 10/75; GC2FZC-G5ZT 23/9/64 1850;

GB2GC-GW3MFY 28/8/66. From the Isle of Man: GD8AGY/P-EI2W 30/7/66; GD8AGY/P-GD3FNQ/M 31/7/66; GD3DA/P-GI3GQB 14/6/53; GD8AGY/P-GM3FYB 5/8/66; GD3DA/P-GW5MQ 29/7/51; GD2HDZ-HB9AMP/P 10/75. From Ulster: GI3KYP/P-EI2W 24/10/64 1619; GI3GQB-GD3DA/P 14/6/53; GI8HXY-HB9AMH/P 10/75.

Obviously there is much missing information, so if you think you may have made a first contact with a particular country, please contact Pat at QTHR. Next month I will list the Scottish and Welsh firsts on 70cm.

PROPAGATION

THE BACK COVER of the *Six and Ten Reporting Club's* April report consists of histograms of solar radio flux at 10.7cm from April 1954, the start of Cycle 19, to February 1994, which is month 89 of Cycle 22. On the inside back cover there is a graph of the smoothed sunspot curves for Cycles 21 and 22, created by Patrick McIntosh at NOAA. This suggests the minimum will occur towards the end of next year and that SSNs may recover to around the 80s by the end of 1998.

The Report lists the geomagnetic K-indices at three-hourly intervals at Eskdalemuir (DGL). There were 15 disturbed days between the 2nd and 17th. By contrast, the mean sunspot number for the month was a mere 16.7, the maximum being 40 on the 24th; zeros were recorded on 3, 6 and 7 April. The solar flux varied between 73 and 87, averaging 79. There are the usual reports on 50MHz conditions from Brazil, Britain, Greece, Japan, Sweden and Zimbabwe. The Report is printed and circulated by Ian Brotherton, G2BDV (QTHR); contact him for subscription details. His packet route is G2BDV@GB7BNM.#45.GBR.EU.

A unique event will occur in the 16-22 July period when debris from the comet Shoemaker-Levy 9 collides with Jupiter, the largest planet in the solar system. This event was covered by Geoff Grayer, G3NAQ, in the June *RadCom*. On the 19th, Jupiter will be 5.163321 Astronomical Units from Earth, approximately 772 million kilometres. This means that electromagnetic radiation – eg light and radio waves – will take 43min to reach us.

Jupiter has a strong magnetic field which is bound to be affected by these collisions and it is possible that this could also affect Earth's magnetic field. With solar eruptions, particles take about 30-50 hours to reach Earth and perhaps cause auroras. Were any particles to be emitted in our direction from Jupiter, and not 'captured' by the Sun, they could, pro-rata, take 6-11 *days* to reach the magnetosphere.

METEOR SCATTER

THE PERSEIDS storm that some predicted last year did not occur although activity was three to five times higher than average at the peaks. As mentioned in the October 1993 *RadCom*, pages 17-18, Professor Iwan Williams of Queen Mary and Westfield College, London, suggested that 1994 activity should be twice last year's.

The *1994 Meteor Shower Calendar*, compiled by Alastair McBeath, Vice-President of the International Meteor Organization (IMO), suggests two peaks on 12 August at solar longitudes (LS) 139.45° and 140.1°. In UTC, these equate to 0700 and 1500 respectively, so visual observation for Europeans is out. The dynamic nature of this shower makes accurate predictions more difficult.

The radiant is above our horizon 24 hours a day. Times when reflection efficiency exceeds 50% are: NE/SW 0800-1800; E/W 1000-0130; NW/SE 1800-0400 and N/S 0800-1330 and 2200-0400. Your reports on this shower would be appreciated, particularly the period(s) of peak activity, even if you don't complete many random or scheduled contacts.

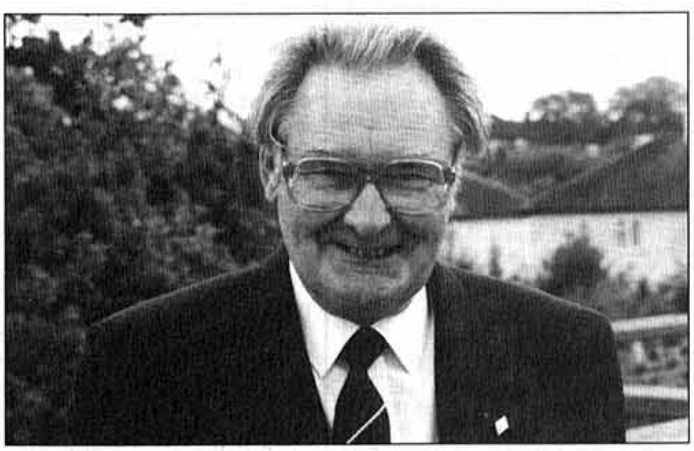
MOONBOUNCE

IN RESPONSE to last month's notes, several readers now have copies of VK3UM's latest EME Planner and Autotrack software – see page 21 in the June *RadCom*. Others have downloaded the files from CompuServe or Internet.

In the May issue of his *432 and Above EME News*, Allen Katz, K2UYH, reports mixed views on conditions in the REF 70cm Contest and sked weekend on 16/17 April. Some reckoned conditions and activity were superior, while others thought the turnout was lighter than expected and conditions were not particularly favourable.

G3SEK (IO91) reported terrible conditions on 70cm with a high Ap index and polarization rotated 60-90 degrees most of that weekend. However, this turned out to be quite good for Europe/North America QSOs. Ian's log includes JA4BLC (449/449), VE1BVL (O/O), ZS6AXT (O/O), VE1ALQ (449/449), 9M2BV (O/O) and VK5MC (O/O). Other Ws and Europeans brought Ian's score to 29,100 with 15 multipliers.

There is a sked weekend during VHF NFD on 2/3 July and the next one is on the 30/31 weekend – a day AM apogee one. This means that, although the Moon's declination is +17° and the 2m/70cm sky temperatures are 380/29° K respectively, the additional signal degradation is 1.9dB. However, the Sun offset is –90° so Sun noise should be no problem.



Ron Broadbent, G3AAJ, was presented this year with the VHF Committee's Louis Varney Cup 'for advances in space communication'.

50MHZ

BEACON NEWS

Geoff Brown, GJ4ICD, reports that the beacon for the Royal Jordanian ARS, built by Lawrence Woolf, GJ3RAX, and himself was soak-tested before taking it to Amman. The callsign is JY6ZZ and it operates on 50.075MHz at 8W output. 9M6SMC (OJ85AX), sponsored by SMC Ltd, is another Jersey-built beacon now QRV in Malaysia on 50.014MHz. The next project is for Guyana – 8R1SMC.

Julio, D44BC, has been asked if it will be possible to obtain a 6m permit for next summer for Es tests and to put a beacon, D44SIX, on the air. It should be possible to work the Cape Verde Islands from the British Isles by multi-hop Es.

DX NEWS

Ted Collins, G4UPS (DVN), reports that the San Marino PTT issued a special CW and SSB permit for June and July to the club station T70A (JN63FW). From the Belarus Republic, EU1AA (ex-UC2AA) was very active from mid-May in KO33SJ; QSL via PA3BFM. Z32BU (KN01RX) was widely worked on 16 May. Bob runs 25W to a dipole and his QSL address is PO Box 467, 91000 Skopje, Macedonia.

OJ0/OH1VR and OJ0/AC6T (JP90NH) were QRV from Market Reef on 15 and 16 May making over 300 QSOs. QSL via OH1VR and OH3NE respectively. CU1EZ's QSL manager is JA1VOK. R3VHF (LO16) has a 6m permit and his QSL address is PO Box 73, 603000 Nizhny Novgorod, Russia. RA3TES (LO15JW) is also QRV; QSL to Andy Kamaev, PO Box 13-A, 607220 Arzamas, Russia.

ACTIVITY

Herb Spoonts, W3IWU (FN20FC), heard EA8/DJ3OS, CU1EZ and CU1CB on 17 May, 1920-2150UTC and says that: "This is the earliest trans-almost-Atlantic Es activity in my recollection". They made numerous contacts with stations in VE1, VE9, south to Virginia and as far west as Wisconsin.

On May 15 and 21, Terry Chaplin, G1UGH (SFK), had Es QSOs with EH7s, EH1s and F6ANQ (IN94). The 22nd brought contacts with SM4, I0, 2, 3 and 4, EH3 and YU7, with IS0KEB heard. Bryn Llewellyn, G4DEZ (ESX), uses a TS-780 transceiver with muTek transverter ". . . . and a 4-ele beam that has seen better days. SWR 2:1 and rising!" In the 14 – 17 May period, Es QSOs were made with CT1, CN8, EH6/7, ES5/6, F, I, IS0, IT9, LZ, TK, YO, YU, 9A and 9H stations.

Phil Catterall, G4OBK (YSN), was one of the original 6m permit holders but had been QRT since 1988. He is now QRV again with 10W from a TS-680S. He has a 6m single-element resonator on his HF Log-Yagi which seems to give the equivalent performance of a 3-ele beam. He would like to hear more CW on the band. In the 1-22 May period he worked 25 countries: C3, CT, DL, EA, ES, EU, F, G, GD, GM, HB, I, IS0, LZ, OH, OK, OM, OZ, PA, SM, SP, TK, YO, YU and 9A, which shows what was on offer.

ANNUAL VHF/UHF TABLE
JANUARY TO DECEMBER 1994

	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total
Callsign	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Points
G6HKM	24	31	–	–	50	13	24	6	2	2	152
G0FIG	–	–	–	–	61	16	24	9	4	2	116
G1AWF	6	5	–	–	69	15	1	1	–	–	97
G3FIJ	6	4	17	2	30	11	21	3	1	1	96
G4DEZ	3	16	–	–	29	13	5	5	2	2	75
GW0PZT	–	–	–	–	53	14	–	–	–	–	67
G4MUT	9	2	13	2	23	2	8	3	2	1	65
G8XTJ	15	3	–	–	30	7	–	–	–	–	55
GI4OWA	1	15	–	–	26	12	–	–	–	–	54
G3UOL	9	2	–	–	30	4	–	–	–	–	45
G1UGH	10	6	–	–	19	9	–	–	–	–	44
G4OUT	–	–	12	2	25	5	–	–	–	–	44
G4OBK	12	25	–	–	1	1	–	–	–	–	39
G3FPK	–	–	–	–	29	6	–	–	–	–	35
GW6VZW	9	11	–	–	–	–	–	–	–	–	20
GU4HUY	–	–	–	–	5	4	–	–	–	–	9

British counties are those listed on page 81 in the January 1994 *RadCom*; 77 in all. Up to three different stations allowed in each of the 12 GM regions. Do not include EI counties. Countries are the current DXCC ones plus IT9. Deadline for the **September** issue is **28 July.**

G4UPS turned in a massive five-page list of stations worked/heard from 25 April through 22 May. Since 1 January, Ted has worked 49 countries, the two latest being Z32BU at 1503 on 16 May and 5T5JC (IL30LM) at 1000 next day. He highlighted the following in May date, UTC, callsign, locator order: 15 1608 ZD8VHF beacon for 36min, 1704 OJ0/OH1VR, 1724 TK/F5HRY JN41IW; 16 1409 OD5SK working Europeans, 1425 OJ0/AC6T, 1448 EU1AA KO33; 16 1207 YU70AU KN04 – special call, 1730 beacon CU3URA S5. 17 1129 ES0SIX beacon, 1148 SR6SIX beacon, 1327 ES6SIX beacon on new QRG 50.073MHz, 1330 CU1EZ HM76, 1438 R3VHF, 1500 RA3TES, 1609 EU6MS KO45, 1636 EW1AA alias EU1AA, 1652 7Q7RM KH74, 1705 7Q7SIX beacon; 19 1047 HB9STY JN36 (running 1W), 1052 HB9SNR JN36 (running 1W to a discone antenna), 1154 C31HK JN02; 21 1329 CN8FD IM64; 22 1530 5B4CY, OD5SIX and SV1SIX beacons heard, 1618 5B4AAI KM64QN and 1700 4X4IF KM72.

Ela Martyr, G6HKM (ESX), began May with a couple of CT QSOs on the 1st. The 15th saw contacts with CN8, EH, ES and SP, the following day bringing three new squares, SP8CCC/8 (KO11), SP9DSD (JO90) and SV7CO (KN20). Other countries worked were DL, I, OE, OM, PE, S5, TK and 9H5. The 17th provided SP1CLY (JO84) for another new square and QSOs with CU1, EH8, OE, OZ, SP7FRE (also named Ela), YO and YU. C31HK on the 19th and EU6MS (new square KO45) on the 21st completed a satisfying period of DX.

Graham Carrington, G8WVI (NOT), heard 5T5JC and a couple of CN8s on 17 May but his 10W was insufficient to crack the pile-ups. Gerard Elliott, GI4OWA (LDR), had a good day on 21 May working 5T5JC for a new one; other QSOs were with C3, CT, EA, F, IS0 and 9H1. You don't need a mega-station to work DX, Mike Adcock, GW8CMU (GNS), worked 5T5JC at 1416 on 17 May and 7Q7RM later at 1657 using just 15W to an indoor wire dipole.

70MHZ

JOHN BAKER, GW3MHW (DFD), heard the 5B4CY beacon on 70.113MHz at 1630 on 22 May; its FSK had a slight chirp. He has built a system which enables him to remotely control his beacon in IO72XG by telephone. He can switch it on and off, change from long pauses to continuous sending and alter the message. Activity on the band is low, though.

144MHZ

TROPO

While the bulk of reports cover the Es openings, there was some worthwhile tropo in May. Alec Trusler, G0FIG (SXW), worked Fs in JN03, 25 and 35 on the 1st and 2nd, and DLs in JN39, 49, JO41 and 42 on the 7th. The 19th brought GM4CQR/P and GM8DCZ/P (DGL) while in the contest on 21/22 he QSOed GM4ZAP/P and GM0UVJ/P (DGL), GM0UPE/P (GRN) and G0PNN/P (NLD).

Andy Wyspianski, G1AWF (LDN), heard stations on the SE coast working Scandinavians in the afternoon of the 2nd, but his first QSO was at 1740 with LA4YGA (JO48), followed by OZ6ABA (JO57), LA2PHA (JO38), SM6UMO (JO68) and OZ1BEF (JO46). Dave Wood, G4CQR, was very active on the WAB nets when mobile as GM4CQR/M in DGL and SCD from the 19th. Andy appreciated all the hard work and mileage put into this effort and also thanks Ron McDonald, G(M)3DCZ, who was in on the act.

In the 21/22 May contest, Andy was troubled with wide signals from a few stations (I heard some anti-social ones at times at G3FPK, too). Best DX were GM4ZAP/P, GM0UVJ/P, GI7JYK/P, EI3GE, GI4KSO, GM0UEP/P and GM0TQB/P. On 2 May, G1UGH worked LA2PHA, LA4YGA, OZ6ABA and LA9YN (JO48). Peter Burt, G3NBQ (LNH), worked DLs and PAs in JO23, 43 and 44 on the 16th when the tropo finally reached the Blackpool area. Next day he worked GM0HTT (ORK).

Edward Allely, GW0PZT (GDD), copied beacon EA1VHF at S9 on 29 April but didn't hear any activity from northern Spain. Best DX in the 7/8 May contest was F6KIF (JN29). DL3EBM (JO30) was up to S4 but no QSO was made.

Welcome to John Bradford, GW4ZQV (GWT), who runs an IC-271E with muTek 'front end' and a 200W PA. The antenna is an 18-ele Cushcraft Yagi at 60ft with a masthead preamp at his 820ft ASL site in IO81LQ. On 1 May he worked Fs in JN04 and IN94 and next day F6GPT (IN94) at 2102, then SM6UMO at 2125. At 0530 on the 8th he heard S53M who returned his call with 'W4ZQV 59302 JN86BS' apparently an MS contact.

Joe Ludlow, GW3ZTH (GNM), has been out portable at IO81FP. On 30 April he worked a few PE, ON and F stations, best DX being EA1TA (IN53) with S9 reports both ends. Next morning 14 stations in 11 squares in SE France were contacted. On 2 May he worked 37 stations in 21 squares, best DX being DL2IAN (JN49).

SPORADIC E

The first reported Es opening was 4min one at 1800UTC on 16 May when Lyn Leach, GW8JLY (GNS), worked 9A1EZA (JN86) with an IK7 heard. The biggest event was on the 21st, starting around 1220. G0FIG worked CN8ST (IM64), EA4CTP (IM69) and EA4EHI (IM68). John Hunter, G3IMV (BUX), completed with EA7TL, EA9AI (IM75IV) in Ceuta, North Africa, EA4CTP, CN8SD (IM64NA), EA7WM (IM67ME) and EA7BGB (IM67) between 1231 and 1244. Dave Dibley, G4RGK (BUX), had a half-QSO with EA7BGB but couldn't hear the CN8 and EA9.

G6HKM completed with CN8ST as did John Cooper, GW0ACH (GNS), who also got EA9AI. John runs a TS-790E, 400W PA to a pair of 17-ele Cushcraft Yagis. He contacted CN8ST on 20m on the 26th and learned that Rik had logged 54 UK stations. His friends 50 miles from Casablanca were hearing strong Gs on FM on 145.500MHz. GW0PZT heard CN8ST and worked EA7ZM and EA7GIR (IM76), EA7GXH (IM77) and EA9AI. The event finished at 1255. GW4ZQV caught this opening at 1242 and John worked CN8ST and EA9AI as did GW8CMU with a 5-ele Yagi.

AURORAS

On 1 May, G1AWF caught a short aurora working GM6VIU (IO85) at 2323. G3NBQ worked DL, G, LA, PA and SM stations in this event and Peter heard beacon GB3LER aurorally on 3, 5, 10 and 11 May. GW0PZT found the 1 May event at 1830 and worked GM4JJJ (IO87) with SM5BSZ heard at S9A.

430MHZ

NEW SQUARES for G0FIG on 8 May in the contest were F5KCR/P (JN26) and F6KIM/P (JN38). GW3ZTH/P found conditions good on 2 May but only worked GW1MNC and G4RGK. Andy Cook, G4PIQ (ESX), reports that the LA1EKO team (JO16) on the North Sea Ekofisk platform, planned to put up a 70cm antenna on 12 or 13 May. They have a transverter.

SIGN OFF

THAT'S IT for this month. The copy deadline for **August** is **30 June**, for **September 28 July**, and for **October 25 August**. PLEASE NOTE that the BT Gold mailbox is now 87:CQQ083. My telephone answering and fax machine is still on 081 763 9457, the CompuServe ID is 70630,603 and via Internet the address is 70630.603@compuserve.com.

Contest Exchange

ANDY COOK, G4PIQ
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G4PIQ @ GB7MXM.#36.GBR.EU

IN THE APRIL column I covered the microwave cumulative contests and what was needed to have a play in these events. Listening around on the 2m talkback frequencies, it certainly seems that a good number of you have been taking up the challenge. However John Tye, G4BYV, took me to task for listing 2m as the only talkback option for the microwave bands. Quite rightly he says that, while 2m is heavily used within the UK, most of the microwave activity in the rest of Europe uses 432.350MHz as its talkback frequency and, if you want to exploit the exciting water paths, this is where you need to be.

Still on this subject, the VHF Contests General Rules have strictly speaking made it illegal to use 2m talkback in a contest where 2m itself is not included – for example the October UHF/SHF event. The offending rule has now been changed to allow 2m talkback to be used for the microwave bands, and a formal amendment will appear in due course.

DUPES

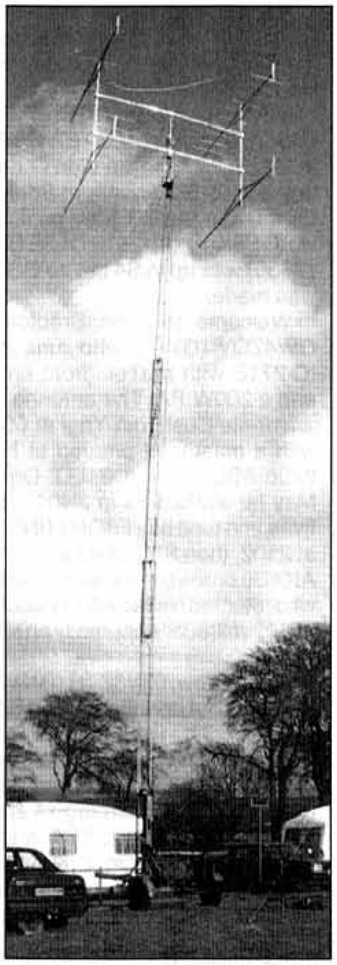
ONE TOPIC which from time-to-time raises its head in discussions between contesters is what to do when someone calls you who you have worked before. If you are using a computer to log contacts, you will have immediate notification that he/she is a 'dupe' and will have to decide what to do about it. Some people take the view that it is always quickest just to work them again. Personally, I'm less convinced, and, certainly for SSB contests, will say something like 'G0ZZZ, sorry we've worked, G4PIQ Contest'. On CW the decision is less easy – it takes a bit longer to send an appropriate message, and I generally send something like 'G0ZZZ QSO B4 TU G4PIQ TEST'.

In fact, with the CT contest logging software you can program it to automatically send such a message when you enter a duplicate call! If all goes smoothly and the recipient of this message understands, this is definitely quicker than working the station again.

However this horribly comes to grief in the 10% of cases where, either the other operator doesn't understand what you sent or, even worse, enters into a debate with you as to whether you really have worked before or not. They want to know what the previous QSO number was, what the time was, and what colour jumper you were wearing at the time because if it was a red one isn't there a special contest rule which says you can have two QSOs on each band, and so on . . . !

When this happens you immediately regret not *just working* them, since the rhythm of the pile-up has been broken and the QSO rate has been smashed by this long QSO. I also find that, sometimes when a 'dupe' calls me, a second sense tells me: "This one is going to be trouble" and I work him anyhow – but, to say the least, this is a somewhat unscientific criterion!

This subject has recently been discussed on the contest forum on the Internet E-mail network. The jury seems to be out on the decision, with most of the top contesters taking the 'work them anyway' attitude, but still with a significant portion of world class operators opting to send a QSO B4 message.



The North Wakefield Radio Club's, G4NOK/P, 2m antenna system for the March 2m and 70cm contest.

After a recent experience during the May 2m contest, it is probably worth reminding people that you cannot have contacts with both G4PIQ and G4PIQ/P counting towards your score.

If, as a few people did in May, you plan to enter the Backpackers contest on a particular weekend, but would also like to give a few points away from home in the concurrent main contest, then you need to use a different callsign for the two sessions to be able to work the same people! A good option here is to use a club callsign, but do make sure that you obey the appropriate licence conditions!

CHANGES TO HF CONTESTS

PLANS ARE emerging to hold a Europe-wide 160m contest on the weekend of the traditional RSGB November 160m contest. The current structure of the RSGB event is based on bonuses and a short four-hour format. Likely trends for the pan-European contest would be towards a longer event which is based around multipliers.

While being keen to co-operate closely with our European neighbours, the HFCC are concerned that this could change the character of the contest, placing somewhat greater emphasis upon the requirement for DX antennas. On the other hand, a pan-European event would increase activity and add some more variety to the event; perhaps the impact on those people who are not going to be at the top of the table anyhow may be less than anticipated since the bulk of UK stations will still be there to work. However, there again, many people may not wish to stay up for the extra hours required and the QRM level will be worse.

One option may be to have a UK event running over a subset of the hours of the Europe wide event much as is already done at VHF where eight-hour RSGB trophy contests are held within a portion of a 24 hour long IARU contest. There are a stack of possible options here and the HFCC would like to hear your views – you can make them known by writing to Chris Burbanks, G3SJJ, QTHR.

Another set of rules which the HFCC is debating are those for the October 21/28MHz contests. At present there are two separate events where the UK works the rest of the world, and which are held on consecutive weekends — one CW and one SSB. The HFCC is considering amalgamating the two events into a single multimode contest with CW only, SSB only and mixed sections.

This would particularly help the non-UK contestants in Europe who have propagation for the whole event but who run out of UK stations to work early on. In fact it would probably benefit everyone, as the effective number of stations available to work would increase – at least for participants in the multimode section.

Activity is likely to be a significant factor in this event as we slide down the slippery slope of the sunspot cycle over the next few years! Again the HFCC would like your input, preferably by mail to Chris, G3SJJ as above.

JULY EVENTS

JULY IS a busy month for contests. On HF the IOTA contest dominates – see p81 of *RadCom* May '94 for last year's write-up and p92 of March '94 for this year's rules. This new contest took off in a big way last year, and you can be assured of plenty of activity. With the new single operator section where operation is limited to 12 hours and 3 bands, it is as well suited to club entries as it is to single operators. There is also an unlimited single operator section, and CW, SSB and mixed categories.

The IARU HF Championship in the middle of the month will bring a lot of activity and DX too. Also, don't forget the low power field day on 80m and 40m which is a fairly relaxed contest – ideal for a dabble on a Sunday.

On the higher bands, VHF NFD dominates the calendar. If you have not pre-registered for this one you can't enter, but why not go on and give some points away on 4m, 2m, 70cm and 23cm anyhow, or enter the Backpackers 2m contest on the Sunday afternoon for which you don't have to register beforehand. From the level of activity in the first backpackers event these look like they are going to be very popular, but don't forget to send in an entry after *each* event.

The other popular VHF contests in July are the 2m and 70cm low power eight-hour events which each have a 25W limit.

As a finale, I'm pleased to be able to pass on the news that both the VHFCC and the HFCC are happy to accept entries from blind operators in contests on audio cassette.

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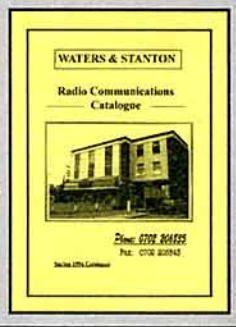

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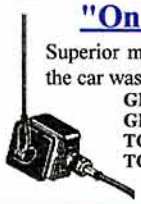

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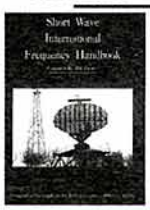

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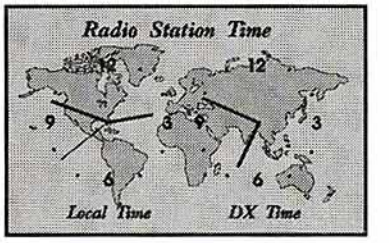

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SWL NEWS

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

EVERY NOW and again, I have the sad job of reporting on the passing of an SWL, so it is with deep regret that I have to report that Geoff Watts, BRS3129, died following a heart attack in early June. Readers will be aware that it was Geoff who founded the *DX News Sheet* in 1962.

He had every DXCC country confirmed and was installed in the *CQ* DX Hall of Fame in 1977 for his services to DXing through DX News Sheet. He is the only listener to have been honoured in this way.

DOLDRUMS AND JULY CONTESTS

AS THE HF bands have been poor in the last few weeks, the traditionally poorer summer months may be somewhat tiresome this year as we are well and truly on the bottom curve of the sunspot cycle.

Solar Flux numbers as low as 75 in early May are likely to dip even lower during the summer. Listeners will have to be lucky, or in the right place at the right time to catch what juicy DX might be on offer.

Although the HF bands are unlikely to provide really good DX, the Society has its annual SWL contest on 9/10 July to coincide with the IARU Region 1 transmitting contest. With listener participation at an all-time high at present – judging from recent contest results – the HF Contests Committee hope that the trend will be continued for this SWL event. There were thirteen entries last year – the results were in the February issue. The full rules are shown on the right of this page.

The second Islands on the Air (IOTA) contest takes place on 30/31 July. Last year saw 19 listener logs, but there were few from the British Isles.

July may be a holiday month, with many SWLs away from their receivers, but hopefully there will be a more sizeable entry from the UK – for both contests – this year.

LOOKING FORWARD

ONCE WE are through July, the most interesting First Firth Weekend, which takes place on 27/28 August, will be the next event on the SWL calendar.

SWL participation for the 1993 Lighthouse Weekend was fantastic, with over 60 SWL applications received for a very fine Award. More details next month.

An early reminder next for the Society's 1994 International HF and IOTA Convention. The event will be held at Windsor on 7/9 October. A number of talks are planned, and some which may interest listeners are 'My First 100 Countries' and 'Computers in the Shack' – see page 44 for further details.

LOOKING BACK

INTERNATIONAL Marconi Day on 23 April was well supported by listeners judging from the logs which you sent to me. There were over 30 stations active, but the stations which were due to be active from Brazil were difficult to find on the bands. Most listeners found VE1IMD, VO1IMD, the Italians, DA0IMD and OE1XRW, plus all the GB and EI activity.

Logging all of those would have been sufficient to get you the award featured in April *RadCom*.

COMPUTER LOG

FOLLOWING MY reference to the lack of 'Real Time' logs for SWLs in the May issue, G0MDO, the producer of EASILOG, wrote to say that he would be willing to produce a version for SWLs (news of SHACKLOG next month – details just received). Unlike Turbolog or Super Duper his program does not perform contest scoring, but is a more general purpose and awards type of log. However, he is prepared to adapt it.

As soon as more details are available I will let you know. In the meantime, if any SWL would be interested in a computerised general purpose SWL log or a contest scoring log for the major SWL contests please let me know.

HAB

DENNIS, GW6JNE, the SWL Liaison Officer, never fails to be amazed at the number of SWLs claiming HAB Awards. From a long list, congratulations seem in order for SWLs Gibbs, Lewery and Seaward who have all qualified for fresh awards.

CONTENTED SWL

LIAM O'HARA, RS95272, who was featured in the March issue with the DR48 receiver donated by A92EV, has written about his exploits to date.

He reports many hours of enjoyment listening to amateurs, commercial broadcasts, aircraft and aircraft control over Shanwick, Gander and Santa Maria.

The stations had been heard with a simple end fed wire, but Liam explained that the receiver's built in ASTU was a great help. He is waiting for a Novice Licence Training Course to be run in the London SE5 area, and has a Howes transceiver kit to build as well as the ASTU and SWR kits.

FINALE

DEADLINE DAY for the **August** issue is **15 June**.

The shack of Maurice Wilcox, BRS50930, in Hartlepool.

RSGB LISTENER CONTEST 94 RULES

OBJECT OF THE CONTEST

To log as many stations in QSO as possible. The contest is over 24 hours but only 18 hours may be used during the 24, and a continuous 6-hour rest period *must* be clearly marked in the log.

DATE AND TIMES

1200UTC 9 July to 1200UTC 10 July 1994

SECTIONS AND BANDS

(a) SSB only
(b) CW only

Only one section may be entered – mixed-mode entries will not be accepted. The 28, 21, 14, 7, 3.5 and 1.8MHz bands may be used. Please note that entrants from the British Isles *must* be members of the RSGB.

SCORING

For scoring purposes the station logged must be in QSO with another amateur station. It does not matter whether the station is taking part in a contest or not. CQ, QRZ or similar calls cannot be counted for scoring. One point to be claimed for each station heard on each band. A multiplier may be claimed for each different country heard on each band. In the case of the USA, Canada, Australia, New Zealand and Japan, each call area numbered prefix may be claimed as a separate multiplier, for example: W1, W2, VE2, VE3, VK5, VK6 and so on. All other countries will be determined by the ARRL Countries List.

The final score is made up by the addition of the points scored on all bands multiplied by the total number of multipliers claimed on all bands.

LOGS

Logs should show in columns, time (UTC), callsign of station heard, callsign of station being worked, an RS(T) report on station heard at SWL's QTH, multiplier (if any), points claimed.

If both sides of a contact are heard, they may be claimed as separate stations, and the callsigns are to appear in the station heard column. Each station heard can only appear once in the station heard column on each band. In the column for station worked, a callsign must only appear once in every three contacts logged (1 in 3) unless it is a new multiplier for the receiving station. The same 'station worked' may not be used for more than three successive multipliers.

Logs should be submitted with each band listed on separate sheets, 28MHz on one sheet, 21MHz on another and so on. A separate sheet listing all multipliers for each band should also be included.

Duplicate loggings for which points have been claimed will be penalised at 10 times the contact value.

ADDRESS FOR ENTRIES

R A Treacher, BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ, England. Entrants should ensure their entries are postmarked no later than 1August 1994.

AWARDS

Certificates will be awarded to the leading three entrants in each section in the British Isles section provided there is a minimum of 10 entrants. A certificate will be awarded to the leading station in each country in the overseas section provided that station scores at least 50% of that section winner's score.

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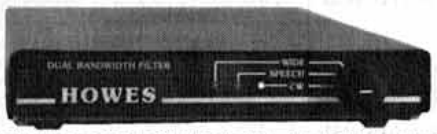

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Sorry about the small type, but we thought a more extensive list of our kits might be of interest. Even so, not everything is listed here. Please send an SAE for a data sheet on any product you are interested in, or give us a ring to discuss the kits and optional hardware packs. Kits are also available as assembled and tested modules at extra cost. 'Phone for prices.

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CTX80	80M QRP CW	£15.50
AT160	80 & 160M AM/DSB/CW	£39.90
MTX20	20M 10W CW	£29.90
HTX10	10 & 15M SSB Exciter 50mW	£49.90
HPA10	10 & 15M 10W Power Amp	£39.90

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CTU30	30W HF & 6M	£39.90
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AP3	Auto Speech Processor	£16.80
MA4	Mic Amp/Filter	£6.20
CM2	Mic with VOGAD	£13.50
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DFD4	Add-on Digital Readout	£49.90
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ST2	Side-tone/Practice Oscillator	£9.80
SWB30	SWR/Power indicator/load	£13.90
XM1	Crystal Calibrator LF to UHF	£16.90

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CA30M	Houses CTU30/SWB30/ST2	£34.90
CA80M	20, 40 or 80M CW Transceiver H/W	£34.90
HA11R	Houses XM1	£11.90
HA12R	Houses ST2	£10.10
HA13R	Houses AP3	£11.90
HA30R	Houses CTU30	£17.90
HA150R	Houses CTU150	£16.90

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73 from Dave G4KQH, Technical Manager.

NOVICE NEWS

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

MIKE, G3VTO, had four Novice students on his first training course (the first course is always the hardest as it is uncharted ground). Mike found, like other Instructors, that exam centre fees vary from college to college. After several enquiries he discovered that Salisbury College was the most economical, so he enrolled his four students from the Bath area there when they were ready to take the exam.

Congratulations to all four on their success. Mike's next ambition is to teach them all Morse and lead them towards the Novice 'A' licence – a worthy ambition. Thanks to Ian, G0GRI, for sending me this information.

Please keep this sort of information coming. It is important to recognise the effort put in by instructors who give a great deal of their time and effort to introduce others to a hobby that has given them pleasure.

BIRTHDAY CELEBRATIONS

THE RSGB International HF & IOTA Convention takes place in the Beaumont Conference Centre at Old Windsor (Berks) from 7/9 October.

IOTA's thirtieth birthday celebrations will take place with a party on the evening of Friday, 7 October, followed by a DX dinner the next evening.

A list of confirmed talks has reached me and there are several which are of possible special interest to Novices. On offer is: 'First 100 countries'; 'Holiday operations from Islands'; 'Computers in the shack' to name but a few.

If you feel you would like to make a weekend of it, there may even be a bed left at the Beaumont if you are lucky.

If you are interested in knowing more and would like to attend any of the talks – contact Neville Cheadle, G3NUG, who is QTHR in the *RSGB Call Book* (see *Book Case* pp 94 and 95). Or ring him on 0442 62929. But hurry, or you may miss the chance to attend.

ANOTHER RECORD?

MICHAEL was very young when he expressed more than a passing interest in amateur radio. Father – Mike, G4VHM, nurtured his interest, became his Instructor and led him towards his Novice licence.

Michael was eight when he sat the NRAE and was just nine by the time he learned that he had passed. But he hadn't been idle before that. He took the Morse test on his eighth birthday and passed – at twelve words a minute. He now holds the callsign 2E0AHY – which arrived appropriately enough, on International Marconi Day. He is very active on the key – under supervision – using all bands. In fact, his very first contact was with Perth in Western Australia on 20 metres – and you can't work much further than that!

The story begins here. G4VHM, is a keen Morse user and says that he discovered his son's interest when he realised that he knew the letters – telling his dad who he was working. Each day, a word was learned, with his older sister joining in – to win a Mars bar at the end of each successful week! Outdoors the game was to say in Morse – car registration plates, street names, shop signs etc.

An avid reader of *Morsum Magnificat* (a very interesting magazine devoted entirely to Morse) Mike wrote and told their consultant editor Tony, G4FAI, who gave the boy a boost by including his efforts in the magazine. This is one instance where a love of Morse led to an amateur licence rather than the other way round.

Apart from his love of Morse, Michael has other varied interests. He likes watching Thunderbirds and Nigel Mansell on television, he plays snooker and races his remote controlled car and hovercraft. I can't see him ever complaining of boredom!

Congratulations to both father and son – and to Tony for inspiring this success – even if he was unaware of it at the time.

OPEN DAYS

BAINTREE AND District Amateur Radio Society is holding open days through the early Summer in liaison with various local charities and schools.

Actively involved with a local Scout Group during JOTA weekends in the past, they decided to extend their activities throughout the Summer. Apart from the usual HF and VHF stations, there will be a display of specific aspects of the hobby including computers and satellites – and especially the use of Morse.

This year the Club intends to highlight Novice entry into the hobby with displays on home construction, QRP activities, Raynet and in fact, any of the many associated interests within amateur radio. These displays will appear anywhere that presents an opportunity to bring amateur radio to the notice of potential Novices and to inform the attending public about the hobby.

Perhaps your Club has done something similar already and you feel that you can offer advice. Or perhaps you would like to consider running a similar project. If you have any material which could be used to spread the message, or feel you could help or advise in any way at all, I am sure that Dave, G3PEN, would like to hear from you – Dave is the Chairman of Braintree and District Amateur Radio Society. It may be that ideas can be exchanged. Discussions will follow in August to evaluate the success of the scheme and your contribution could be helpful.

If you can help or would like to discuss this, why not write to Dave Penny, G3PEN, 13 Newnham Close, Braintree, Essex CM7 7PR – or telephone 0376 326487.

Margaret Snary, 2E1AQS, was the first Novice Licensee to achieve the Worked All Britain Award (WAB), and the Solent Fortification Award, both under the supervision of G4OBE.

SCROOGE'S CORNER

MARK, G0KHB, is a QRP enthusiast and his equipment is all home-brew, with a crystal controlled Tx. It began life with a 3.579MHz 'TV' crystal, one of the cheapest 80m crystals you can get, to which a 3.686MHz microprocessor crystal was added. He then saved up and added the QRP frequency, 3.560MHz. This was much more expensive than the other two.

As 3.579MHz is within the Novice allocation and there is a cheap crystal available, this leaves a lot of change from an arm, never mind a leg!

ANOTHER OFFER

CANBERRA COMMUNICATIONS are offering their station logging programme to Novices in full time education at half the normal price. Interested? Read on.

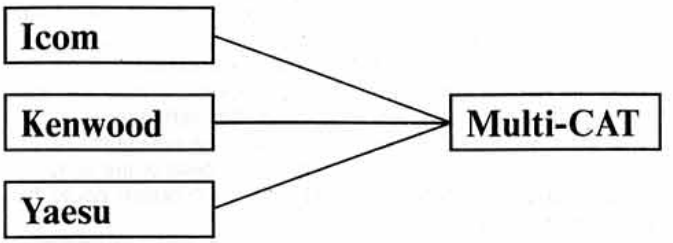
Many young amateurs own computers, and use them far more confidently than many of the rest of us.

TurboLog is claimed to be ideal for these newly licensed youngsters, who will be able to use it fully as they gain experience in the hobby. As very many experienced amateurs can testify, TurboLog can help them to gain maximum benefit from amateur radio. John G3WGV, has asked me to tell you of the offer.

The normal price is halved – to £30 – to Novices in full time education. They will receive the same support as full-price customers for a period of one year. Further, John will consider an instalments scheme, say, over three months. (John hopes that during that year, many will have gained Class A licences)

If you own a home PC and would like to know more, write to John Linford, G3WGV, Canberra Communications, Canberra Lodge, Heath Ride, Finchampstead, Berks RG11 3JQ, or ring 0734 733745.

We've got the C.A.T. in the bag!



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OUR DIGITAL RADIO BOOKLIST CONTINUES TO GROW...
If you are about to disappear on holiday why not keep in touch with the latest developments by ordering a book or two and while away those hours on the beach! Books available from Siskin include:

"A PRACTICAL GUIDE TO PACKET OPERATION IN THE UK" — now in its 6th update with over 200 pages packed with tips on how to start from scratch, BBS/Node Operation, maps, Basic TCP/IP and Satellite operation plus lots more! £9.95 plus £2 P&P.

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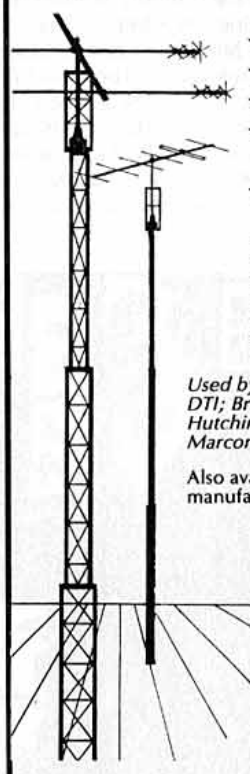

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RSGB National Mobile Rally

SUNDAY 7 AUGUST 1994 OPEN 10AM

WOBURN ABBEY, BEDFORDSHIRE

HOW TO GET TO THE WOBURN RALLY

Via the M1 - leave the M1 from north or south at junction 13, not 12 as signposted, and then follow signposts through Husborne Crawley to Woburn Abbey.

Avoid routes signposted to "The Wild Animal Kingdom" or "Game Reserve". The rally takes place in Woburn Park, and correct routes are signposted to "Woburn Park" or "The Abbey". Also watch for RSGB signs.

(COACH PARK SITE AVAILABLE)

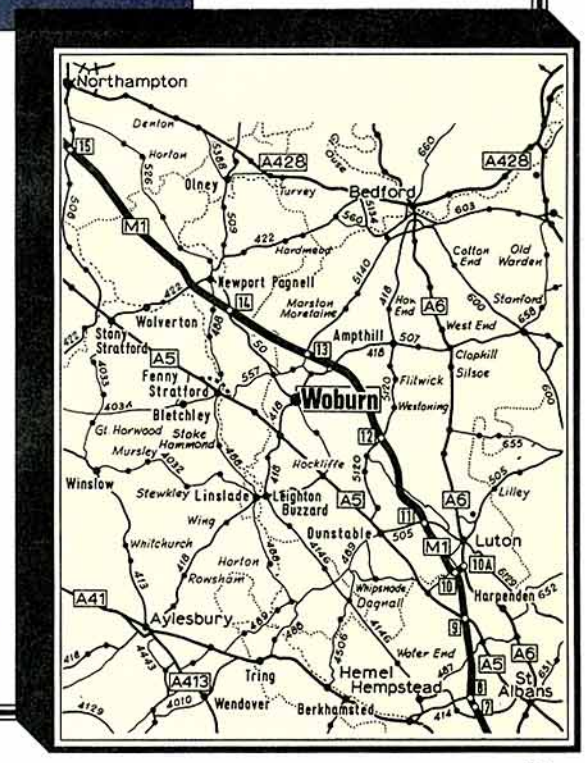
- **LARGE TRADE EXHIBITION (23,000 SQ FT)**
- **LARGE RSGB BOOKSTALL**
- **ALL UNDER COVER**

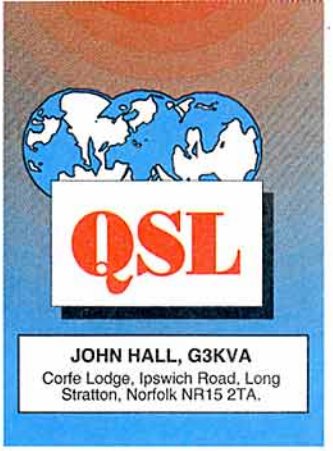
The RSGB makes no charge for entrance to the rally but all visitors must pay for entrance to Woburn Park, in which the rally takes place, at £5 per vehicle (including passengers), or £2.50 per vehicle (with single occupant).

Limited overnight caravan stay at £4 per night. Booking forms available from Norman Miller, G3MVV.

All the normal Woburn attractions will be available at small extra charges. Various bars and cafes are available nearby.

All enquiries regarding this event should be made to Norman Miller, G3MVV, 180 Warley Hill, Brentwood, Essex, CM14 5HF; Tel: 0277 225563.





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

DR MIRAMS, G4SFU, tells me that he recently received a YO QSL card personally delivered by an aid worker who had just returned from Romania. Apparently the aid worker had been shown an amateur radio project being set up out there and had noticed the card and offered to deliver it. Quite an unusual way to receive confirmation. Any more unusual deliveries that readers would like to share?

Gerald Stancey, G3MCK, says he has heard that the PY Bureau is only dealing with incoming cards and could we confirm this information. Well, not really, because only last week we received a delivery of cards from that bureau. However, we have had them arrive from Brazil by unorthodox methods in the past. I well remember a fairly large consignment of PY QSL cards being delivered to Potters Bar by an airline pilot who had been asked to bring them over with him!

Reg Woolley, GW8VHI (ex ZD8GW, DA4RG, VP8BPZ and EI3VPO), has kindly sent me a copy of the special event QSL card used to commemorate the 75th anniversary of the Royal Air Force. The station was operated on 1 April 1993 exactly 75 years after the formation of the RAF on 1 April 1918. The card is reproduced on this page. The station made 2045 contacts in a period of 24 hours. Reg also writes about IRCs. He says he has answered thousands of direct QSLs accompanied by IRCs and yet he says many of the IRCs are not valid. Reg says one problem is that some bear no post office franking stamp, others are franked in the right hand box which invalidates them. In case there are readers who are unsure a truly valid IRC should be franked by the issuing post office in the *left* hand box only. (Some are also franked in the middle box too but this does not invalidate them). The right hand box is put there to be franked when the IRC is exchanged for postage. However, I have never met anyone who had actually cashed one and some of the dates on them bear this out. One I've seen started its rounds before I was born! Reg also says that when QSLing direct it is essential to include an addressed envelope together with some contribution towards return postage. He says he still gets foreign stamps enclosed by people who don't seem to understand that they cannot be used in the UK!

The incoming QSL Bureau sub-managers coordinator for the Republic of Ireland – Robert McGrogan, EI4HE, has given me full details of how the Irish national QSL bureau works, for which I am grateful.

The outgoing service is looked after by two volunteers who collect the cards sent in by members of the national society. They are despatched overseas monthly to the popular bureaux whilst the lesser-used bureaux get a mailing at least four times a year.

Incoming cards go to PO Box 462 in Dublin and are sorted by prefix by volunteers and passed on to sub-managers monthly. They then sort them into members and non-members (who have to pay £20 if they wish to use the bureau, otherwise the cards are returned to the bureau of origin). The whole system is run by twelve volunteers: one PO Box Manager, two members looking after the outgoing service and nine sub-managers.

Robert reckons the Irish national bureau is despatching about 5000 cards overseas every month.

The QSL card for Operation Market Garden, from the painting *The Paras are Landing* by the artist Terence Cuneo, OBE, RGI, PSEqu.A (see page 6).

MISTAKEN NOTES

ALAN DAVIES, GW3INW (ex GW3INW/HK3), has returned from South America and is struggling to clear his QSL card commitment from that operation. He says he finds one or two cards with his callsign incorrect in every packet received from the bureau. Although a few are from people who could not cope with his limited knowledge of Spanish, the majority are from people who have English as a first language and reported Alan's signals as 59(9). Many of the mistakes are caused by people who keep notes on bits and pieces of paper and then cannot decipher them! The saddest mistakes originate from stations in the Americas who were so desperate to work Wales they studiously avoided noticing any addition to the call which, if taken account of, would have shown that Alan was just round the corner in most cases! Alan is fairly phlegmatic about it all and says that about 5% misdirected cards is only a small proportion compared to the reported 50% or more of stations that don't even bother responding to a card sent to them. Alan says the remedy to both problems lies largely within our own control.

GONE FOR A BURTON

TOM BARTLETT, G3ITB, tells me that in the 30s when he was a lad in Devon he distinctly remembers seeing an advertisement hoarding carrying an advert for Burton Ales which had as a caption 'Gone for a Burton'. So it must be that the RAF 'borrowed' the phrase for the war-time expression.

Joe Glover, G3FIC, writes to say that he always understood that 'gone for a Burton' does have a connection with the tailors of that name but relates to shrouds supplied by them. Well that's a new one!

Gerard Vallely, G4YRS, tells me he believes the phrase 'gone for a Burton' was coined by an NCO instructor at 13 Wireless School which was situated in the Winter Gardens, Blackpool. In support of this Alan Johnson, G0KCJ, tells me he trained at the school in late 1943. The tests for wireless operators were held in premises above Burtons, although the instruction was given in a place called 'Olympia' and the Winter Gardens.

The special QSL card produced to commemorate the 75th Anniversary of the RAF.

Michael, HH2HM/F, is the QSL Manager for 3X0DEX and TZ6JC, c/o PO Box 104, 22650, Ploubalay, France.

Colin Sumner, G0POS, who was a tail gunner on Wellingtons during WW2, tells me that he understands that the phrase 'gone for a Burton' was coined by airmen stationed at RAF Fradley in the Midlands. The station was known to the USAAF as 'Burton' because of its proximity to the town of that name. For a number of reasons, the main one being that the area was prone to mist and fog from the Grand Union Canal, the flying station suffered a high accident rate. QED: 'Gone for a Burton'. Top that story!

Martin Pirrie, G7OCV, says that his dad told him that 'gone for a Burton' came from a pre-war advertisement for Burtons Tailors. The advert showed two men in an office looking at an empty chair and saying that the missing person had 'gone for a Burton' meaning a Burton suit. This was adopted by the RAF to indicate an empty seat after an aircrew member went missing.

Ken Kirby, G4VKK, has a different view about 'gone for a Burton'. He says he only heard the expression when an aircrew colleague was killed and that the saying came about from the drinking habits for which aircrew are well known! Rather than say they had been killed they coined the phrase and linked it to Burton Ales. Ken says the USAAF never used it but said that a colleague 'had bought the farm'. That was abbreviated to 'bought it'. [This correspondence is now closed – *Ed.*]

Novice Note Book

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

I AM CERTAIN THAT I am not alone in having lots of small chargers for pieces of equipment as well as a number of useful spare units that have been picked up at rallies. The biggest problem is that the majority have been opened and the connections altered to change the polarity of the plug to suit different items of equipment.

It is easy to use the multimeter to check the unit but it is not particularly convenient. I found the best way was to use an old AVO minor specifically for this job and I kept it in the box of chargers for immediate use. This was fine until one day the glass of the meter got broken. What I needed to replace it was a very cheap rugged unit that could stand all the mistreatment that I am capable of giving it. That immediately ruled out the use of a meter! The ability to check the output voltage was of little importance as it is printed on the label, polarity checking was the main requirement.

After some deliberation I decided the minimum voltage it should be capable of handling would be about 3 volts and the maximum should be about 24 volts. The final circuit evolved is given in **Fig 1**.

The input sockets used can be decided by the constructor and I have included all the most common ones that I have come across. These are wired in parallel ensuring that all the barrels are connected together and all the tips are connected together. The series circuit of R1, D5, and D6 are connected across the sockets so that when a supply is connected a current will flow through the circuit producing a 3.9 volts across the two diodes. The reason we get 3.9 volts is that when the tip is positive D6 will act as a 3.3 volt zener and D5 will conduct in a forward direction giving a voltage drop of 0.6 volts. This makes the sum of 3.9 volts.

If the supply is of the other polarity and the barrel is positive D5 will act as a 3.3 volt zener and D6 a forward conducting diode. As the input voltage is increased the input current will increase, R1 and the two zener diodes must be rated to withstand the highest current expected. With an input supply of 24 volts, 20.1 volts will be developed across R1 and from Ohms law:

$$I = 20.1 / 220$$
$$I = 91 \text{ mA}$$

Now
$$P = I \times V$$
$$P = 0.091 \times 0.1$$
$$P = 1.8 \text{ watts}$$

R1 should be a 220Ω 2W resistor. Of course this is to ensure that it will never burn out. In practice the supply is only connected for a second or so and in my unit I have used a 1/4 watt resistor!

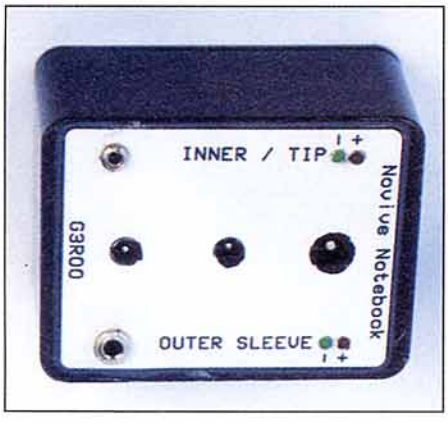
The same applies to the Zener diodes. The diode will have 3.3 volts across it and 90 mA flowing through it so it will dissipate:

$$P = I \times V$$
$$P = 0.09 \times 3.3$$
$$P = 0.297 \text{ watts or } 297\text{mW}$$

By the same token that the supply is only connected for a second or so we can get away with a 220mW diode.

D1 and D3 are red LEDs and D2 and D4 are green LEDs. we connect a red LED in series with a green LED and mount these on either side. The other pair of LEDs is wired the other way around. With LEDs there is no conduction when they are connected the wrong way round and so only the pair that are connected the correct way will light. R2 is included to limit the current through the diodes and a 220Ω resistor gives a reasonable brilliance.

This little unit that has proved its worth time and time again in the couple of months since I built it. The peace of mind this unit gives when plugging the supply into a valuable piece of equipment is astounding!



The PSU Polarity checker: Can you spot my deliberate mistake?

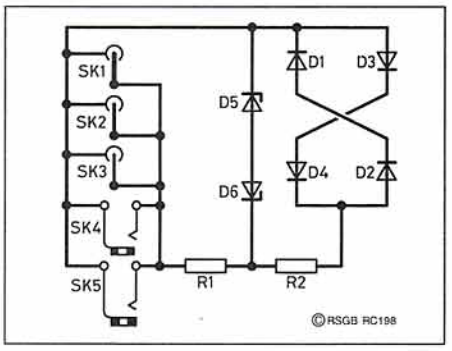


Fig 1: Polarity checker circuit diagram.

UNDERVALUED ITEMS

THE CLOTHES PEG!

This is a much maligned but very useful thing to have in the drawer. It's good for holding things in place while trying to solder them, holding the book open at the correct page, and so on . . . .

A PIECE OF DOUBLE SIDED PCB

Inserted between two cells in a battery box this will enable you easily to measure the current consumption of a piece of equipment!

A PAPER CLIP

Straighten the larger of the two loops and then bend a small hook in the end. It makes an ideal tool for getting hold of wires in awkward places.

PLASTIC HOSE PIPE

SMALL BUNDLES OF coax cables can be fastened together by enclosing them in a plastic hose pipe. The plastic hose is split along its length and the cable inserted into the hose and then held together with plastic tape. This protects the cables from the effects of weather and wear.

COMPONENT LIST

Resistors

R1	220R 0.25W, 5%
R2	220R 0.25W, 5%

Semiconductors

D1, 3	LED Red
D2, 4	LED Green
D5, 6	Zener Diode, 3V3

Additional Items

SK1, 2, 3, 4, 5, 6	Sockets as required.
Box as required.	

RADCOM TECHNICAL FEATURE

How to Use AX25 Packet Radio Nodes

by P N Lewis, G4APL

THIS ARTICLE WAS written because there is relatively little published information on how to use the AX25 Packet Network in the United Kingdom. The following assumes that the reader is familiar with the use of his/her Terminal Node Controller (TNC).

I came across packet radio in 1984 when there was a BBC computer program known as Cambridge packet, which gave me a very good start [1]. In 1986, when it appeared that AX25 was starting to take off, I joined the throng and have been heavily involved in this aspect of the hobby since.

CATERHAM NODES

TWO MEMBERS OF THE Caterham Radio Group (CatRad), G8DTQ (now G0SYR) and myself set up 'TheNet' nodes to improve the links for our main interest – having *live* packet contacts up and down the country via the 'network'. These nodes are privately supported by ourselves, the System Operators (SysOps).

The CatRad nodes (**Fig 1**) encourage radio amateurs to have live contacts with different parts of the country and assist access to the DX Clusters, TCP/IP routing, movement of the BBS mail forwarding and any other type of network traffic.

They are located on the North Downs about 1km apart with back-bone linking on 70cm at 9600 Baud. Access to the network for Novices on 6m is via two 50MHz, 1200Bd nodes. Node designation is in the form Caterham A(CATAnn), Caterham B(CATBnn). Full station details are shown in **Table 1** and **Fig 2**.

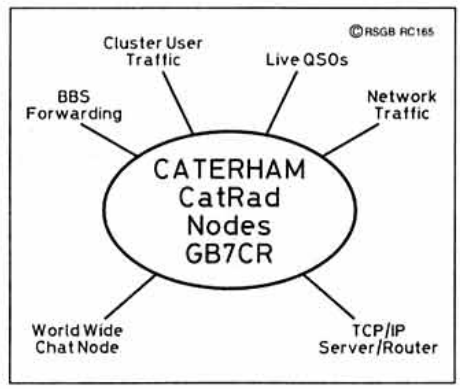


Fig 1: The Caterham packet radio node provides a wide range of facilities.

FROM THE USER'S VIEW

THERE ARE VARIOUS TYPES of node software using the 'NetRom' protocol, for example TheNet, TheNet Plus, NETROM, TheNode etc. The following applies to any of these.

A user, with a simple terminal or computer, a TNC and a transceiver can log onto a node and have a live packet radio contact with stations on the other side of the English Channel or even acrossd the Atlantic.

So how do we use the nodes? First of all, connect to a node which will respond with something in the following format:

Connected to CATA72:GB7CR-7

This is not very helpful. Enter a ? (type a question mark followed by the Enter key) to get a list of node commands; the node will respond with a list which may include:

Bye Connect CQ Heard Nodes Info Routes Users

Enter U (for Users) to list the circuits in use and the node will give the response shown in **Table 2**.

This tells us the software in use is TheNet Plus version 2.06; G4APL has logged on to this node locally; there is a forwarding session in progress between GB3KP and GB7HSN; a circuit is in the process of being set up (illustrated by the two dots <..>) between GB3KP and another node HW72; G3GKF has logged locally and used the CQ facility waiting for someone to connect in response.and GB7HSN BBS is forwarding to G8DTQ-5.

We need to know where the node is located and (we hope) find something useful entered by the SysOp in the Information field on the node.

Enter I (for Info), the node will respond with something similar to:

```
CAT
A72:GB7CR-7 } 432.675MHz
Caterham on the Hill Surrey IO91 wh
SysOp G4APL at GB7SRC
```

You may find additional information displayed to assist your journey around the network.

The Node command (N) lists the nodes that have propagated through from adjacent nodes. Entering N will result in something like:

```
CATA61:GB7CR-6 CATB22:G8DTQ-
2 CATB62:G8DTQ-6
CRCHAT:G4APL-8
```

We may want to gain further details, such as which adjacent local node is used to reach one of these remote nodes; it could be at four nodule hops away. Enter N GB7DXK. The node responds:

```
CATA72:GB7CR-7 } Routes to:
DXKCLS:GB7DXK
> 74 5 1 CATA61
```

This informs us that the best path the system will take is via CATA61 with a Path value of 74 and obsolescent count of 5 (you would normally expect to see 4, 5 or 6 here; anything lower will show you that the path has probably failed during the previous hour).

The Route command R will list the paths to the adjacent nodes. Enter R. The node responds with:

```
CATA72:GB7CR-7} Routes
>   1 CATA61      240 74  !
    0 HARROW      120 4   !
>   0 KUT         100 8   !
```

All TNCs are PacCom Tiny 2s running TheNet Plus 2.08, 2.10 or X1J (at the time of writing).

GB7CR-9	(CATA)	9600Bd	432.625MHz	Surrey < > Bucks point to point link (no user access)
GB7CR-7	(CATA72)	1200Bd	432.675MHz	Local user access and BBS forwarding
GB7CR-6	(CATA61)	1200Bd	50.650MHz	Vertical beam SSW for Novice user access
G4APL-1	(CATA81)	9600Bd	70cm	Back bone point to point link (no user access)
G4APL-8	(CRCHAT)			TCP/IP Multi-QSO CatRad Chat Node
G4APL-7	(CATA73)	1200Bd	433.625MHz	TCP/IP switch, beam SSW, TCP/IP local uplinks
G4APL-4	(CATA40)	1200Bd	70.3125MHz	Surrey < > London < > New York link (no user access)
G8DTQ-10	(CATB81)	9600Bd	70cm	Back bone point to point link (no user access)
G8DTQ-6	(CATB62)	1200Bd	50.670MHz	Horizontal beam NE Surrey < > Kent point to point link (Novice user access and BBS forwarding)
G8DTQ-2	(CATB22)	1200Bd	144.675MHz	Local user access

Table 1: Technical details.

CATA72:GB7CR-7 } TheNet Plus 2.06 (577)		
Uplink (G4APL)		
Circuit (KUTBBS:GB3KP GB3KP)	<—>	Circuit (HSNBBS:GB7HSN GB3KP)
Circuit (KUTBBS:GB3KP GB3KP)	<..>	Circuit (HW72:G6MTQ-7 GB3KP)
Uplink (G3GKF)	<..>	CQ(G3GKF-15)
Circuit (HSNBBS:GB7HSN GB7HSN)	<—>	Downlink (G8DTQ-5)

Table 2: Typical response to the Users (U) command.

The 'I' shows the routes that are locked in by the SysOp, active nodes are shown by the '>', the 1 is an RS232 port link to an adjacent TNC and the 0 is the radio port. Also shown are the identification of the node (or callsign depending on the software in use), the path quality (the higher values locked in are the more reliable paths set up by the SysOp) and the number of paths available.

Armed with the above information you are now ready for your great adventure around the network. It is very useful to have a map and an *RSGB Call Book* to plot your progress and to help decode the node identifications.

THE REMOTE NODE

YOU CONNECT TO ANOTHER node in the same way you would connect to another station, for example:

C MLO

Once you get the remote node at the other end of the country or even abroad, the problem you are next faced with is how to find someone 'live on the keys'.

Using the information already gained as described above from the User List (look for Uplink stations which may be other amateurs accessing the network) and list of parameters, the Heard and CQ commands will become useful.

The Heard command

Enter H and the node will list the last 20 stations heard in the last 15 minutes.

CQ Command

Judging by the lack of response I get from using this facility, I can only assume that no-one knows how to respond or that there are only machines talking to each other.

The CQ command is used to broadcast a short text message from the node. Other users, who see the broadcast, can connect to the callsign retransmitted from the remote node; the type of nodes described here will automatically handle the routing back to the originating station.

In the User list example above you will notice CQ(G3GKF-15) waiting for a response to the CQ call:

format

CQ text

CQ CQ from Caterham Surrey anyone LIVE on the keys about Pse k.

The CQ stays primed at the remote node for about 15 minutes or until another command is issued by the originating station. Sometimes the circuits are so busy that it may take 5 minutes for the data to get to the far end.

CHAT NODES

THERE ARE VARIOUS Chat Nodes around. This is how to run the version run on the CatRad Caterham Nodes, CRCHAT(G4APL-8), affectionately known by the locals as 'CatRadChat'. The software is one of the many flavours of NOS (network operating system).

Connect to the Chat Node from your local Node if one is listed. In our case type: C CRCHAT. The system will respond: CONNECTED TO CRCHAT(G4APL-8).

You will then need to issue a further command C to join the converse server, then /W to show who is logged onto the system. The system will announce you to all the other stations that are currently logged on to the node's channel zero.

Once you have logged on, anything you type will be transmitted to everybody else on the same channel.

The system supports in excess of 32000 software channels. In theory 32000+ separate contacts could be in progress at the same time. Using this facility you could run multi club packet nets, meet up with your friends at a half way Chat Node, or just log on for a chat. **Table 3** shows the commands available.

CHAT COMMANDS

/B	terminate link
/C n	change to channel n (0 – 255)
/H	request help screen
/I callsign	issue an invitation to another station to join you on the current channel
/M callsign	to send a one-line private message to another station
/W	to display who is logged onto the system
/W Q	display who is logged on in a short format. This is the preferred option when there are a lot of stations on the system.

Table 3: Use these commands once logged onto a Chat Node.

WHERE NOW?

ARMED WITH THIS NODE and Chat Node information you now know enough to get even more fun out of amateur radio, meeting and seeking out others who wish to have a *live* packet radio contact. I look forward to chatting with some of you who manage to logon to the 'CatRad Chat' Node.

REFERENCE

[1] 'Amateur Packet Radio', Peter Robinson, G3MRX and Alan Jones, G8WJL, *Radio Communication*, March 1985.

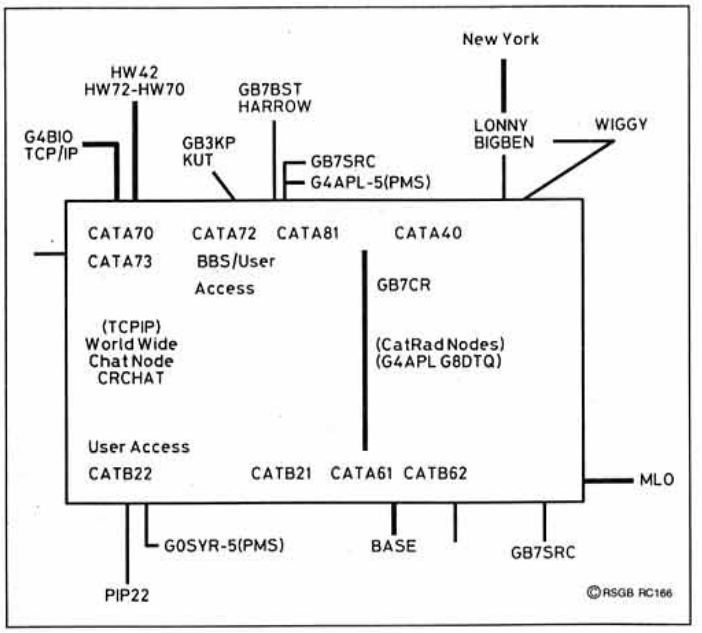


Fig 2: Details of the network connections.

RSGB – at Your Service

SOME OF THE RSGB'S TEAM OF VOLUNTEER EXPERTS — AVAILABLE TO HELP YOU

Zonal Council members

Zone A (North of England): Peter Sheppard, G4EJP, 89 St Catherines Drive, Leconfield, Beverley, North Humberside HU17 7NY. Tel: 0964 550397.

Zone B (Midlands): Dave Gourley, G0MJY, 4 The Serpentine, Kidderminster, Worcs DY11 6NX. Tel: 0562 862374.

Zone C (SE England and East Anglia): Neil Lasher, G6HIU, 8 Highwood Grove, Mill Hill, London NW7 3LY. Tel: 081 201 1578.

Zone D (SW England): Julian Gannaway, G3YGF, Dean Hill Barn, East Dean, Salisbury, Wiltshire SP5 1HJ. Tel: 0794 40008.

Zone E (Wales): Clive N Trotman, GW4YKL, 19 Park View, Dolau, Llanharen, Pontyclun, Mid Glamorgan CF7 9RZ. Tel: 0443 226198.

Zone F (Northern Ireland): Ian Kyle, GI8AYZ, 1 Portulla Drive, Pond Park Road, Lisburn, Co Antrim BT28 3JS.

Zone G (Scotland): Frank Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR. Tel: 0307 467565.

For general advice and details on local clubs, or if you don't know who to contact:-

Your **RSGB Liaison Officer** see January and February *RadComs*, page 91.

Specialists

Antenna Planning: Booklet free to members from RSGB HQ. Planning application refused - RSGB Planning Panel, via RSGB HQ. Planning Advisory Committee Chairman - Geoff Bond, G4GJB, QTHR.

Audio Visual: Library Coordinator - David Simmonds, G3JKB.

Awards: For contest awards, refer to the appropriate contest committee. For other awards, enquiries and applications go to either the: HF Awards Manager - Fred Hanscombe, G4BWP; IOTA (Islands on the Air) Awards Manager - Roger Ballister, G3KMA or VHF (and Microwave) Awards Manager - Ian L Cornes, G4OUT. Trophies Manager - Bob Harrison, G4UJS.

Band Plans and operating practices: See the *RSGB Call Book* or January 94 *RadCom* for latest bandplans. For policy, contact the appropriate spectrum manager or committee chairman: HF Committee Chairman - David Evans, G3OUF, QTHR; VHF Committee Chairman - Peter Burden, G3UBX, QTHR; Microwave Committee Chairman - Steve Davies, G4KNZ; HF Manager - Post vacan; VHF Manager - Dave Butler, G4ASR; Microwave Manager - Mike Dixon, G3PFR.

Beacons: HF Beacon Coordinator - Prof Martin Harrison, G3USF, QTHR. VHF Beacon Coordinator - John Wilson, G3UUT, QTHR. Microwave Beacon Coordinator - Graham Murchie, G4FSG, QTHR.

RSGB Contests: First contact the appropriate contest adjudicator (see the contest rules). For policy, contact the respective Committee Chairman: HF Contest Committee - Chris Burbanks, G3SJJ; VHF Contest Committee - Bryn Llewellyn, G4DEZ, QTHR; ARDF (direction finding) Committee - Brian Bristow, G4KBB, QTHR.

EMC: Advice on solving breakthrough and other electromagnetic compatibility matters: Committee Chairman - Robin Page-Jones, G3JWI, QTHR.

Emergency: Emergency Communications Officer - Greg Reilly-Cooper, G0MAM.

Exhibition & Rally Committee: Chairman - Norman Miller, G3MVV, QTHR.

History: Society Historian - George Jessop, G6JP.

IEE: Liaison Officer - Peter Saul, G8EUX.

Licensing: LAC Chairman - Peter Chadwick, G3RZP, QTHR. Licence Renewals - SSL, PO Box 885, Bristol BS2 8RH. New Licence Applications - SSL, PO Box 884, Bristol BS2 8RH. SSL Help Desk - 0272 258333.

Membership Liaison: MLC Chairman - Peter Sheppard, G4EJP, see zone A (above).

Morse: Morse Practice Transmissions Coordinator - David Pratt, G4DMP. Chief Morse Test Examiner - Roy Clayton, G4SSH.

Packet Radio: Datacomms Committee Chairman - Tom Lilley, G1YAA, QTHR.

President: Ian Suart, GM4AUP, QTHR. Executive Vice President: Clive Trotman, GW4YKL, (see zone E above).

Propagation: Propagation Studies Committee Chairman - Charlie Newton, G2FKZ, QTHR.

QSL Bureau: Outgoing cards - PO Box 1773, Potters Bar, Herts, EN6 3EP. Incoming cards - your QSL sub-manager (see RSGB Call Book or send to RSGB HQ for a list). QSL Bureau Liaison Officer - John Hall, G3KVA.

Repeaters: Repeater Management Group Chairman - Geoff Dover, G4AFJ, 31 Newbold Rd, Kirkby Mallory, Leicestershire, LE9 7QG.

Spectrum Abuse: Packet - Via Datacomms Committee. Repeaters - Via the Repeater Management group. Other - Via Licensing Advisory Committee. Intruder Watch Coordinator - Chris Cummings, G4BOH.

Technical & Publications: Committee Chairman - Dick Biddulph, G8DPS, QTHR.

Training and Education: Committee Chairman - John Case, GW4HWR, QTHR. Radio Amateur's Examination - George Benbow, G3HB, QTHR. Novice RAE - Hilary Claytonsmith, G4JKS, QTHR. Project YEAR Coordinator - G4JKS.

The Society has a large number of volunteer experts available to help and advise members on a wide variety of subjects. Each month we will be focussing on a different section of the volunteer workforce, whilst still giving brief details of the main office-holders. See also the Information Directory section of the *RSGB Call Book*.

RSGB QSL Bureau Sub-Managers

G0AAA-AZZ	Mr K Plumridge, GW4BYY, QTHR
G0BAA-BZZ	Mr T Bruin, G0PRN, QTHR
G0CAA-CZZ	Mr P Jobson, G3HLF, QTHR
G0DAA-DZZ	Mr J F Purvess, G0FWP, QTHR
G0EAA-EZZ	Mr G W Jenner, G3KIW, QTHR
G0FAA-FZZ	Mrs A Burchmore, G0ARQ, QTHR
G0GAA-GZZ	Mr N P Roberts, G4KZZ, QTHR
G0HAA-HZZ	Mr J T Macrae, G4DXI, QTHR
G0IAA-IZZ	Mr C J Webb, G4JFF, QTHR
G0JAA-JZZ	Mr J A Towle, G4PJZ, QTHR
G0KAA-KZZ	Mr K Draycott, G3UQT, QTHR
G0LAA-LZZ	Mr C Lennox, G4LXU, QTHR
G0MAA-MZZ	Mr H C Foster, G4EZS, QTHR
G0NAA-NZZ	Mr E G Allen, G3DRN, QTHR
G0OAA-OZZ	Mr D Bloomfield, G0KUC, QTHR
G0PAA-PZZ	Mr A Spence 2M1AGP, QTHR
G0RAA-RZZ	Mr G P Greatrix, G7HNM, QTHR
G0SAA-SZZ	Mr S, G Bryan, G0SGB, QTHR
G0TAA-TZZ	Mr J Taylor, G0RFN, 19 Fairview, Burnhope, Durham DH7 0AW
G0UAA-UZZ	Mr A J Adams, G3DXQ QTHR
G1 Series	Mr R Kingstone, G4HHB, QTHR
G2 Series	Mr C H Adams RS10906, 4 Park Gate Gdns, London SW14 8BQ
G3AA - ZZ	Mr R Pasquet, G4RRA QTHR
G3AAA-DZZ	Mr E, G Allen, G3DRN, QTHR
G3EAA-HZZ	Mr E L Simpson, G3GRX, QTHR
G3IAA-KZZ	Mr N J Entwistle, G0BRM, QTHR
G3LAA-NZZ	Mr A, Giles, G4OJH, QTHR
G3OAA-PZZ	Mr J H Brazzill, G3WP, QTHR
G3RAA-TZZ	Mr D Buckley, G3VLX, QTHR
G3UAA-VZZ	Mr M Newton, G3UKW, QTHR
G3WAA-XZZ	Mr I Batley, G0IID, QTHR
G3YAA-ZZZ	Mr I Batley, G0IID, QTHR
G4AA - ZZ	Mr R Pasquet, G4RRA, QTHR
G4AAA-AZZ	Mr D Roebuck, G0LJM, 44 Parkside Grove, Bradford BD9 5LL.
G4BAA-BZZ	Ms L Harper, G4FNC, QTHR
G4CAA-CZZ	Mr P Jobson, G3HLF, QTHR
G4DAA-DZZ	Mr D Buckley, G3VLX, QTHR
G4EAA-EZZ	Mr G W Jenner, G3KIW, QTHR
G4FAA-FZZ	Mrs A Burchmore, G0ARQ, QTHR
G4GAA-GZZ	Mr J C Terry, G4GEU, QTHR
G4HAA-HZZ	Mr D Roebuck, G0LJM, (see G4AAA-AZZ)
G4IAA-IZZ	Mr C J Webb, G4JFF, QTHR
G4JAA-JZZ	Mr J A Towle, G4PJZ, QTHR
G4KAA-KZZ	Mr K Draycott, G3UQT, QTHR
G4LAA-LZZ	Mr C Lennox, G4LXU, QTHR
G4MAA-MZZ	Mrs C Wilding, G4SQP, QTHR
G4NAA-NZZ	Mr M Musgrave, G4NVT, QTHR
G4OAA-OZZ	Mr W Dykes, G1UKE, 9 Severnmead, Hemel Hempstd HP2 6DX
G4PAA-PZZ	Mr R Colvin, G0BXQ, QTHR
G4RAA-RZZ	Mr D Buckley, G3VLX, QTHR
G4SAA-SZZ	Mr J M Payne, G7NCJ, 1 St Huberts Drive, Skegness PE25 2LS
G4TAA-TZZ	Mr J Porter, G3YZR, QTHR
G4UAA-UZZ	Mr D Lavis, G0DMT, 48 Gilda Crescent, Polegate BN26 6AW
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G4WAA-WZZ	Mr L, Gaunt, G4MLV, QTHR
G4XAA-XZZ	Mr S R Tyler, G4UDZ, QTHR
G4YAA-YZZ	Mr D J Newbury, G0ENR, QTHR
G4ZAA-ZZZ	Mr J Densem, G4KJV, QTHR
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G6AA-ZZ	Mr F Harris, G4IEY, QTHR
G6AAA-ZZZ	Mr D & J Brooks, G4IAQ &, G4IAR, QTHR
G7AAA-ZZZ	Mr D J Hudson, G6OVO, QTHR
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G1 class B	Mr J M Bruce, GI4SJB, 56 Ardmore Rd, Holywood BT18 0PJ
GJ series	Mr R Allenet, GJ3XZE, QTHR
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GM0MAA-ZZZ	Mr J E Clough, GM0MDD, QTHR
GM4AAA-ZZZ	Mr E Bell, GM4LKJ, QTHR
GM1,6,7,8	Mr E Bell, GM4LKJ, QTHR
GM2AA-3ZZ	Mr J Johnston, GM3LYY, QTHR
GM2AAA-3ZZZ	Mr J Johnston, GM3LYY, QTHR
GU series	Mr S T Henry, GU4GNS, QTHR
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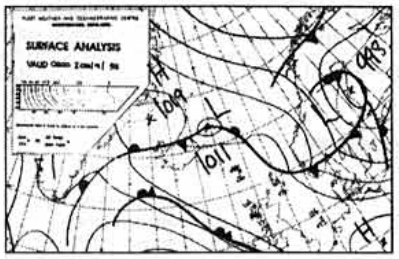

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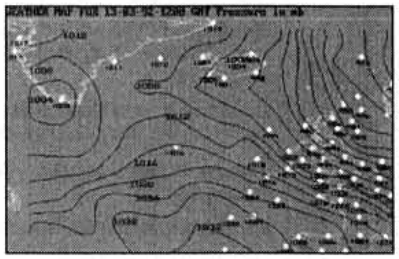

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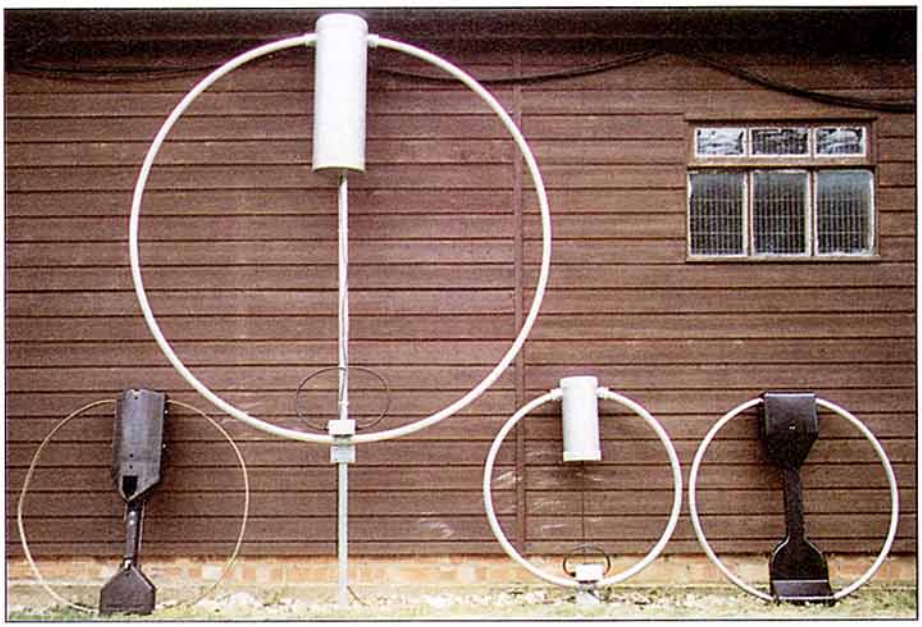
THE PETER HART REVIEW

Loop Antennas For the HF Bands

TO SOME, THE PROSPECT of installing an effective HF station seems impossible. For those with zero space, restrictions governing all visible antennas, flat dwellers etc the compact HF transmitting loops now available on the market may be the answer. Although there have been a number of experimental designs published over the years, it has only been in the last few years that commercially available loops have appeared on the amateur market. In other fields, such as military and diplomatic communications, these antennas have been used for some time.

This article reviews the loop antennas manufactured by AA & A (Advanced Antennas and Ancillaries Ltd), AEA (Advanced Electronic Applications Inc) and MFJ Enterprises Inc.



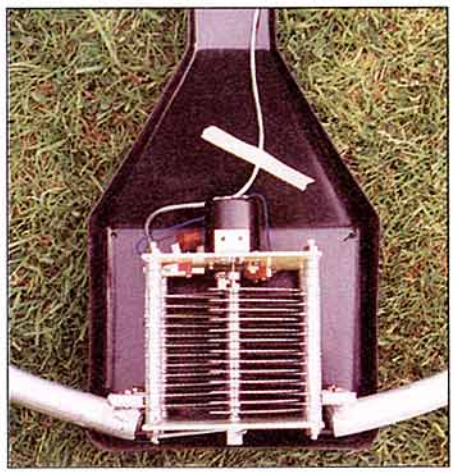
The loop antennas under review: From left – Isoloop, AMA-5, AMA-3, MFJ-1786.

GENERAL PRINCIPLES

ALL THE LOOPS REVIEWED adopt a similar principle. The radiator comprises a circular loop conductor which is brought into parallel resonance by a capacitor connected across the open ends. Energy is coupled into the main loop by a small subsidiary loop connected to the transmitter/receiver and this is located half way round the loop at the opposite side to the capacitor. The fundamental problem with any antenna which is electrically very small compared with the wavelength, is that the radiation resistance is very low (well under 1 ohm). The impedance of the antenna may be regarded as a series combination of the radiation resistance, loss resistance and a reactance. The reactive part is removed by bringing the antenna into resonance with the added capacitor and the efficiency of the antenna is then the ratio of the radiation resistance to the total resistance.

As the radiation resistance is so small compared with the reactance of the loop, the Q of the loop is extremely high and the bandwidth very narrow. Even very small changes in operating frequency will require retuning. In all cases, the capacitor is motorised and tuned from a remote control unit located next to the radio. With such a high Q system, both the currents in the loop and the voltage developed across the capacitor are very high (many amps and kV respectively). This places stringent demands on the components in the system to keep losses to an absolute minimum. The loop must be constructed from large diameter tubing or strip, the capacitor must be able to withstand the voltages and currents involved, and welded connections used for lowest loss.

Loop antennas may be mounted in the vertical plane or horizontal depending on the required polarisation and radiation pattern. If mounted in the vertical plane, the radiation pattern will be figure-of-eight with maximum radiation in the plane of the loop and nulls perpendicular to the loop. When horizontally mounted, the antenna is essentially omnidirectional with nulls straight up and straight down. Vertically mounted antennas will function close to the ground but horizontally mounted antennas should be elevated 20' or so above ground level. At these heights, AEA claim a lower radiation angle than a dipole mounted at the same height. Note that these loop antennas do not require any form of ground plane or radials.



Tuning capacitor in the MFJ loop.

The chances are that anyone contemplating a small loop antenna has very little choice in where it can be mounted. Ideally this should be well clear of metal objects, trees and as far as possible from the house environment to reduce RFI and noise pick-up. For specific cases of TVI or noise, the loop can be simply orientated to place the null in the desired direction and reduce the problem. It is also most important that the antenna is mounted safely and where it cannot be touched in use as there are very high voltages generated on transmit. For those who cannot consider an outside antenna, the loop dimensions are small enough to allow it to fit into many loft openings. The AEA Isoloop is particularly good in this respect as the main loop is relatively flexible and can be compressed.

AA & A AMA-3 AND AMA-5

ADVANCED ANTENNAS and Ancillaries are a British company who manufacture a range of loop antennas covering four different frequency ranges. Two loops were obtained for this review, the AMA-3 covering 13.6 to 30MHz and the AMA-5 covering 3.4 to 12.6MHz. Both loops are rated for a transmit power up to 200W. The AMA-3 uses a one-piece loop 87cm in diameter and the larger AMA-5, which is 1.75m in diameter, splits the loop into two for easier transportation. Both loops use

The AA & A control unit.

1.25" diameter heavy duty aluminium tubing and are very solidly constructed. The AMA-3 weighs about 5kg and the AMA-5 about 8kg. The loops are simple to construct and assembly time was 30 to 40 minutes.

The resonating capacitor is a motor-driven large transmitting type housed inside a watertight plastic tub at the top of the loop. The capacitor uses sliding contacts and bolted terminations which may degrade performance with time. The coupling loop is located at the bottom. It is a shielded loop constructed from heavy duty coax and connects to the SO239 RF feed. Both loops are intended for vertical mounting only with a mounting bracket for poles up to 2" diameter at the bottom. The larger AMA-5 loop is supplied with an integral 2m mounting pole which also takes the weight of the capacitor.

The control box is a very simple arrangement and connects to the antenna via a two core cable. About 30' of cable is provided but this can be easily extended if required. An external 6V (200mA) supply is needed to power the motor via the control box and push buttons route the polarity to provide forward or reverse rotation. A potentiometer allows the speed to be varied. Tuning must be done on transmit by setting the VSWR to a minimum. The resonance point is extremely critical. The documentation provided is somewhat basic but adequately describes the assembly and use of the antenna.

MFJ-1786 SUPER HI-Q LOOP

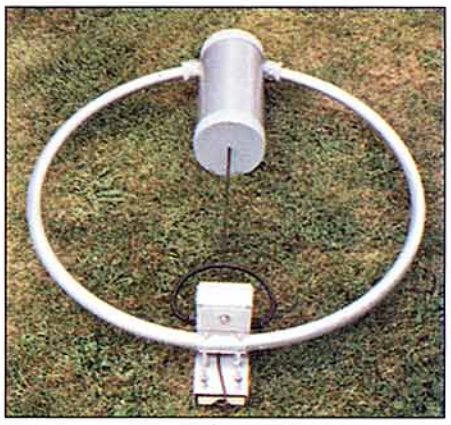
THIS COVERS THE frequency range 10 to 30MHz and has a power rating of 150W. It comes fully assembled and may be mounted either horizontally or vertically on masts from 1 to 1.5" diameter. The loop is 36" diameter (91cm) and is constructed from heavy duty 1" diameter aluminium tuning. The resonating capacitor and coupling loop assembly are housed inside a moulded watertight plastic box which mounts across the loop. The resonating capacitor is a heavy duty split stator butterfly-type which eliminates any sliding contacts, and the connections between this and the loop are welded to keep resistive losses to an absolute minimum. The coupling loop is made from stiff wire and the power for the motor is fed along the RF feedline. Hence no separate control cable is needed.

The control unit for the MFJ-1786 is powered from an isolated 9-15V supply and the MFJ-1315X plug top supply is provided for 240V AC mains. According to the manual, it is important that neither side of the power supply is grounded. The control unit contains a cross needle SWR-wattmeter which simultaneously reads forward and reflected power in two full scale ranges; 300W forward/60W reflected and 30W forward/6W reflected. Tuning must be done on transmit and there are four push buttons involved in the process.

A 14-page manual is included which fully describes the installation, theory of operation and tuning procedure. This is a very helpful manual.

AEA ISOLOOP

THE AEA ISOLOOP ALSO covers the frequency range of 10 to 30MHz with a power rating of 150W. Like the MFJ it also comes fully assembled with mounting hardware which will allow it to be oriented in the vertical or horizontal planes. It can be attached to masts up to 2" diameter. The loop is constructed from a stiff iridized aluminium band 1.5" wide and 1/16" thick which is nominally about 35" (89cm) diameter. The antenna is packed with the loop compressed to about 25" across to be more compact and this needs 'teasing' into the round during the installation process. In its compressed state, it should fit through the tightest of loft openings. As with the MFJ, the resonating capacitor and coupling loop assembly are housed inside a moulded watertight plastic box which mounts across the loop. The weight of the entire assembly is about 6.3kg. The tuning capacitor is a heavy duty transmitting type which is rated at 10kV. The split stator design eliminates any sliding contacts and the loop band is welded to the tuning capacitor for minimum loss. A stepper motor controls the position of the capacitor and this is connected to the control unit by 50' of 4-way cable. The coupling loop is shielded and also provides a balun action.

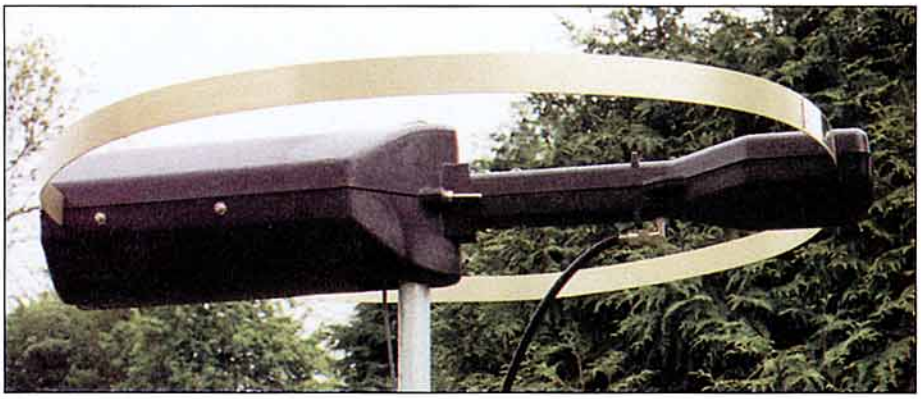


AMA-3 loop

The Isoloop antenna is provided with the LC-2 controller. This unit is powered from a 12V DC supply which is included and contains up/down keys and a speed control for the stepper motor controlling the tuning capacitor. A second stepper motor in the control unit rotates in synchronism with that in the antenna unit and turns a disc carrying frequency markings. Hence the coarse tuning may be set very rapidly. There are two ways of fine tuning the antenna. The tuning may be set for minimum VSWR on transmit or alternatively for an increase in noise or signals on receive. To assist in tuning on receive, the speaker output of the radio is connected to the LC-2 controller and the level is indicated on a simple bargraph arrangement of four LEDs. This is particularly sensitive to small changes in noise or signal levels. With most transceivers, this simple connection to the loudspeaker output will mute the internal speaker and require an external speaker to be connected to a second speaker jack on the rear panel of the LC-2 controller.

An automatic microprocessor controlled tuning controller is also available for the Isoloop, the IT-1 Isotuner. This unit provides the following functions – large thumbwheel knob for manual tuning; automatic tuning on either received noise or minimum VSWR; numeric keypad for direct frequency entry for coarse steering; eight memories for often used frequencies; numeric display for frequency in MHz and ten segment bargraph to monitor the tuning process. The unit may even be controlled from a PC via a 9600 baud RS232 link and a disk of PC software is included with the package. The Isotuner is supplied with an external directional coupler to monitor antenna match on transmit. This is connected in series with the antenna feed and connected to the Isotuner with a cable supplied.

The Isoloop is provided with an 18-page informative operating manual which includes the circuit of the LC-2 control unit as well as full operating and installation instructions. The IT-1 Isotuner is provided with a 36-page manual which fully covers the operation of this unit and the software for computer control. A circuit diagram is also included.



Isoloop horizontally mounted

ELECTRICAL PERFORMANCE

THE PERFORMANCE OF EACH antenna was assessed on transmit when vertically mounted and with the bottom of each loop about 6' above ground level. The minimum VSWR was to a certain extent affected by the orientation of the cables.

Note that the bandwidth of the AMA-5 on 10MHz is significantly greater than the other two antennas covering this band due to the greater size of the loop.

ON-THE-AIR

THE MOUNTING LOCATION was chosen to be well in the clear and away from any other antennas. Each antenna was compared with the performance of a ground mounted Butternut HF6V multiband vertical antenna on both transmit and receive and spanning different times of the day, different propagation conditions and frequencies.

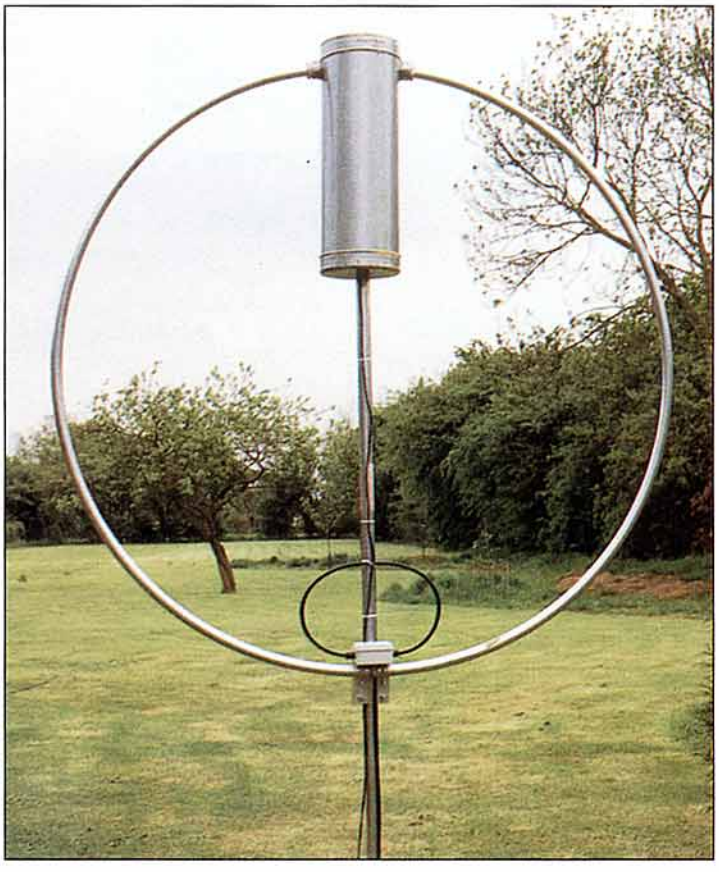
After many comparisons, I could really find very little difference between any of the loop antennas in terms of received or transmitted signals on any band. Comparing with the Butternut vertical, signals were generally very similar and never differed by more than half an S-unit.

The larger AMA-5 loop gave the same signal levels as the smaller loops on 10MHz but the bandwidth was much greater making tuning easier. On 80m, although the AMA-5 has a narrow bandwidth, so has the Butternut vertical. At least the AMA-5 can be tuned from the shack whereas the Butternut requires a trip down the garden.

I also compared the loop antennas mounted in the horizontal plane, again 6' above ground level. Signals on the loops dropped by 2 S-units or more compared with the Butternut vertical and clearly show that for horizontal use, it is important to mount the loop at a reasonable height. Unfortunately, poor weather conditions during the review period curtailed further tests at more suitable heights.

Although the electrical performance of the loop antennas was very similar, there was a big difference in the ease of use. Due to the very narrow bandwidth of the loop, retuning is needed whenever the frequency is changed by even a very small amount and hence ease of tuning is an important criteria. For small changes in frequency, a little nudge up or down of the fine tuning controls is all that is needed. At first this seems cumbersome but speed rapidly improves with skill and practice. The most accurate tuning is done on transmit for minimum VSWR but rough tuning can be done on receive for best signals.

The motor in the MFJ and AA & A loops generate a certain amount of 'high' on receive. This can be annoying when peaking on signals but, on the other hand, it does provide a signal for peaking on the quieter bands. The AA & A and Isoloop antennas seemed to exhibit backlash on tuning, presumably in the mechanical drive between motor and capacitor. This made fine tuning a bit more tricky than perhaps it needed to be.



The controller units provided with the Isoloop were the easiest to use. The combination of direct frequency readout, variable speed and ability to tune on receive as well as transmit VSWR made the LC-2 fastest of the standard units to set on frequency. Even faster was the Isotuner. With its automatic modes, it would achieve complete tuning for frequency changes from 14 to 28MHz in 15s, 5 – 10s if coarse steered by entering the MHz first or 2 – 5s by selecting from memory. Tuning on receive took somewhat longer, up to 30s and was a little critical on audio level. As a comparison, typical manual tuning times for the other controllers for a similar frequency change were 20s for the LC-2, 30s for the AMA-3 and 30s for the MFJ. With a little skill in use, it is possible to improve considerably on these times for the purely manual controllers, the AMA-3 or 5 and LC-2.

Although the Isotuner is the deluxe controller, it has two annoying aspects. The power turns off automatically after 8s (adjustable 1-15s) needing an extra key press to turn it on every time it is used, and the calibration and memory contents are lost if the power supply is unplugged for more than an hour. Considering the cost, I would have expected this unit to contain non-volatile memory.

CONCLUSIONS

I WAS REALLY QUITE SURPRISED at how effective these small loops could be. Being roughly equivalent in performance to a dipole or a multiband vertical, effective performance on the HF bands is still feasible when space for other antennas is not possible. There was really very little difference in electrical performance between the loops tested although the welded terminations and non-sliding capacitor contacts of the Isoloop and MFJ units could give a longer lasting performance with time if the unit is used outdoors.

The automatic tuning controllers for the MFJ and Isotuner are easy to use, but with skill,

AA & A AMA-5 LOOP

Band	Min VSWR	Bandwidth 2:1 VSWR	Bandwidth 3:1 VSWR
3.5MHz	1.0	6kHz	9.5kHz
7MHz	1.0	18kHz	29kHz
10MHz	1.0	32kHz	50kHz

AA & A AMA-3 LOOP

Band	Min VSWR	Bandwidth 2:1 VSWR	Bandwidth 3:1 VSWR
14MHz	1.8	11kHz	35kHz
18MHz	1.5	34kHz	65kHz
21MHz	1.0	50kHz	79kHz
24MHz	1.0	78kHz	129kHz
28MHz	1.0	121kHz	206kHz

MFJ-1786 LOOP

Band	Min VSWR	Bandwidth 2:1 VSWR	Bandwidth 3:1 VSWR
10MHz	1.7	4.4kHz	8.8kHz
14MHz	1.7	6.8kHz	16kHz
18MHz	1.3	18kHz	32kHz
21MHz	1.3	27kHz	47kHz
24MHz	1.5	33kHz	67kHz
28MHz	1.1	94kHz	154kHz

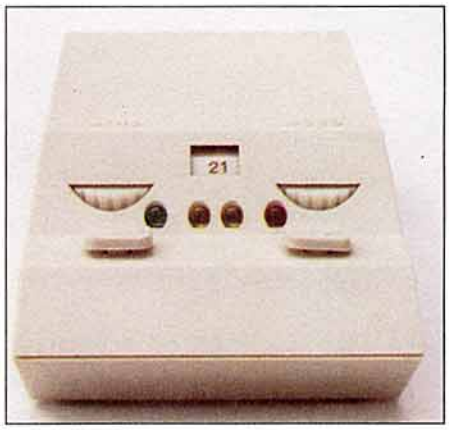
AEA ISOLOOP

Band	Min VSWR	Bandwidth 2:1 VSWR	Bandwidth 3:1 VSWR
10MHz	1.5	8.2kHz	18kHz
14MHz	1.5	16kHz	34kHz
18MHz	1.6	30kHz	54kHz
21MHz	1.0	39kHz	64kHz
24MHz	1.1	64kHz	104kHz
28MHz	1.0	114kHz	197kHz

the manual controllers for the AA & A loops and the LC-2 for the Isoloop are just as quick, if not quicker to set on frequency.

The MFJ and Isotuner controllers have built-in VSWR monitors; the other units require a VSWR monitor to be available, in the radio for instance.

For short wave listening purposes, the Isoloop is the only loop with specific features designed in for tuning on receive.



LC-2 control unit

HOW MUCH?

CURRENT APPROXIMATE PRICES (inc VAT) are as follows: AMA-3 £250; AMA-5 £300; MFJ-1786 £329; Isoloop 10-30 £340; and IT1 Isotuner £270.

ACKNOWLEDGEMENTS

I WOULD LIKE TO THANK the following suppliers for the loan of these loops for review purposes: Advanced Antennas and Ancillaries Ltd of Wem, Shropshire, for the loan of the AMA-3 and AMA-5; Waters and Stanton of Hockley, Essex, for the loan of the MFJ-1786; and ICS Electronics Ltd of Arundel, West Sussex, for the loan of the AEA Isoloop.

G3SJX

Simply Silicon

by Paul Lovell, G3YMP

PHILIPS TDA7052 AUDIO AMPLIFIER

- Good overall stability
- No switch-on or switch-off clicks
- Low power consumption
- No external heat sink required
- Short circuit proof
- Wide supply voltage range

THIS REMARKABLY SIMPLE audio amplifier must have the lowest external component count of any such device. The specified supply voltage range extends down to 3V, although I have personally had the IC working quite happily with a supply of just 2 volts. A decoupling capacitor of at least 220µF between pins 1 and 6 normally ensures complete stability and low noise operation.

Pin connections are shown in **Fig 1**, and really they couldn't be simpler. No special precautions are necessary for using this device, but care should be taken to ensure that neither of the speaker output leads is connected to either ground or the supply. **Fig 2** shows a resistor between pins 2 and 3 of the IC. This can be the volume control, and is needed to ensure correct internal biasing for the amplifier.

A pre-set voltage gain of 40dB means that a signal input voltage of less than 10mV RMS is required for 100mW output into an 8Ω load.

MANUFACTURER'S DATA

THE TDA7052-N1 is a single channel amplifier designed for battery-fed portable applications, such as tape recorders and radios. The gain is fixed internally at 40dB. A large number of tape recorders and radios are following a space-saving trend by reducing the number of battery cells. This means a decrease in supply voltage which means a reduction in output power. To compensate for this reduction, the TDA7052 uses the Bridge Tied Load principle (BTL) which can deliver an output power of 1.2W (THD = 10%) into an 8W load with a six volt power supply.

The table below shows the operating characteristics of the TDA7052, at a supply voltage of 6V and a load impedance of 8Ω unless otherwise specified. Also, the input frequency is 1kHz for these measurements and ambient temperature 25°C.

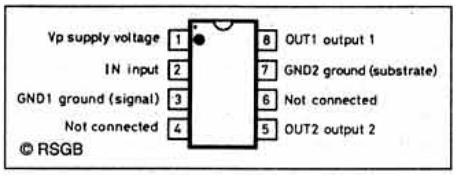


Fig 1: Pin connections for the TDA7052

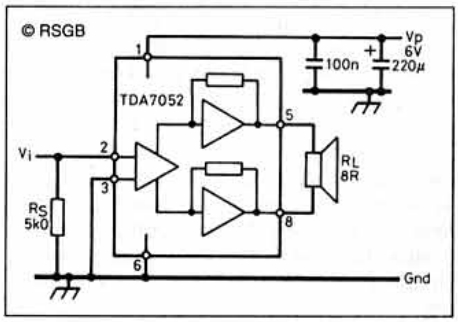


Fig 2: A simple audio amplifier.

Parameter	conditions	symbol	min	typ	max	unit
Supply voltage		Vp	3	6	15	V
Total quiescent current	R_L = infinity	I_{TOT}	–	4	8	mA
Voltage gain		G_v	39	40	41	dB
Output power	THD = 10%	P_O	*	1.2	–	W
Noise O/P (RMS)	15kHz BW	V_{no}	–	150	300	µV
Frequency response		f_r	20Hz	–	20kHz	(typ)
Supply voltage ripple rejection	10kHz BW	SVRR	40	50	–	dB
Harmonic distortion	P_o = 0.1W	THD	–	0.2	1.0	%
Input impedance		Z_{in}	–	100	–	kΩ
Input bias current		I_{bias}	–	100	300	nA

Note: Ripple rejection parameter assumes 200mV ripple on the positive supply line.

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

AVAILABILITY

READERS MAY obtain the TDA7052 from a number of sources including JAB Electronic Components, Electromail and Maplin Components. The price from Maplin is £1.68 each and there is a charge of £1.40 per order for P&P. Their order code for this item is UK79L.

[*Simply Silicon* is taking a break for the next few months – *Ed.*]

RADCOM HELPLINES FOR MEMBERS

● Mr T R Keats, G4CCN, is seeking a Handbook for a Yaesu or Sommerkamp **FT-4800R** Transceiver. All expenses will be reimbursed. Contact G4CCN by telephoning 0394 386529 or write to him QTHR.

● Rob, G0HJR, is looking for the manual for a **CT501 Wobbulator**, Army Reference for Manual: EMER T+M I801-I809 and RAF Reference number for Manual AP 117E-0601-1. Any information to Rob on 0526 378685.

● Phil, G0KKL, wants a circuit diagrams and/or manuals for **Wayne-Kerr** Universal Bridge **Type B221** and Advance AF Generator Model H1. Anything supplied will be returned or cost of copying refunded. Contact Phil, G0KKL (not QTHR) on 0202 700903.

● Godfrey, G4GLM, has advised us that manuals for any **Marconi signal generators** etc can still be obtained. For more information write to the Service Division, Marconi Instruments Ltd, Luton Airport, Luton, Beds, LU2 9NS or tel 0582 33866.

● Art Smyth, G3XNE, needs any circuit diagrams, handbooks or conversion data to modify the **Motorola CD100** FM Tcvr to 4 metres. Handbooks, buy, photocopy or borrow. Contact Art by telephoning 0288 354564.

● Harold, G3WR, is tring to obtain the service manuals for a **Burndept** Cat No BE526 type 2080A /**Dymar** 2080A mid-band synthesized AM PMR, and for a **Solartron** 7040 Digital Meter. He will copy and return your manuals if required. All expenses reimbursed. Please send any information to G3WR, QTHR, tel: 0273 501100.

● Mr R E Jones, GW4FCV, needs any information or advice from anyone who has successfully modified the tuning control of a **Yaesu FT747GX** Transceiver to improve its reliability and/or to increase the tuning rate. His tuning control needs to be replaced every 12 months. If anyone can help contact GW4FCV who is QTHR.

● Chris, G8FHN, needs a circuit diagram, and any service information for a **Yaesu FTDX 401** Transceiver. Photocopies, etc expenses will be reimbursed. Any help would be much appreciated. Please contact Chris by telephoning 0634 849112.

● Don, G3WDY, would like to obtain a photocopy of the manual for a **Racal-Dana** 9915 UHF Frequency Meter. If anyone can send him a manual he can get it copied. All expenses paid and a guarantee return within two weeks. Contact Don by tel: 081 653 4738 or write QTHR.

● Andrew, GM0NWI, needs information about possible modifications suitable for a **K2 Logikey** Electronic Keyer Unit, made by the Logikey Company of America. Particularly with reference to an increase in the units memory capacity. If anyone can help please contact GM0NWI on tel: 0786 815916 or write to him QTHR.

● John, G3EAY, is seeking a circuit diagram/handbook for a **Pye Westminster W15** AM, (xtalled for 106MHz Tx, 139MHz Rx) and any modifications to convert this to 144MHz or Airband Receive. All costs will be reimbursed. Please get in touch with John, QTHR, if you can help.

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

THIS MONTH'S COLUMN and part of next month's will answer a variety of questions about **antenna rotators**. Thanks to everyone whose advice and experience I've been able to borrow.

MOTOR AND GEARS

WHAT MAKES MY rotator go round?

ALMOST ALL ROTATORS use a two-phase AC motor, running at about 28V for safety reasons. The motor has two windings, joined to a common lead. One winding is fed directly from 28V AC, and the other one via a capacitor which introduces a phase shift (**Fig 1a**). The phase difference between the alternating voltages on the two windings makes the motor spindle rotate.

If you reverse the phase difference, by inserting the capacitor in series with the other winding, the motor turns the opposite way. This is done very easily using a single-pole two-way switch (**Fig 1b**), and you will find this basic circuit in almost every rotator.

The capacitor is a special non-polar (reversible) electrolytic, typically 130-200µF. It is a common source of problems in older rotators – especially those designs that had the capacitor mounted up in the rotator itself, although it's usually in the control box nowadays.

If the rotator becomes very sluggish, as distinct from failing altogether, try replacing the phase-shift capacitor. Replacements are available from the rotator dealers, or for obsolete models you can make up the correct value using components available from Maplin Electronics (coded 'Reverso Radial').

Most rotators have internal limit switches which open when the rotator has reached either end of its travel (**Figs 1c, d**). Because the phase-shift capacitor requires an indoor environment for reliability, this requires at least one extra control wire.

The reduction-gear train is fairly straightforward, and usually ends in a large final drive gear in the form of a diecast ring which slides around in a groove in the main body casting. It is this component which takes most of the hammering from unbalanced loads in high winds, but fortunately it isn't too difficult to replace – see later.

To cut costs, some very light-duty rotators have the final drive gear cast inside the rotating part of the body. Most light- to medium-duty rotators are braked only by the friction in the gear train, and can be driven backwards by a steady rotational force. This can be beneficial in preventing wind damage, though it will not guard against the shock loading of a sudden gust.

Some medium-duty rotators have a disk brake, and the large heavy-duty CDE rotators have a brake wedge that engages in teeth cast inside the rotating part, the wedge being retracted by a solenoid magnet when the rotator is turning.

Unfortunately both the drive and the braking systems of most rotators ultimately rely on the rather dubious strength of diecast alloy teeth, which are prone to failure. Also we tend to ignore our rotators until they fail, and seldom upgrade them when we install bigger and better beams. Sooner or later, almost every rotator will need repairs.

MECHANICAL MAINTENANCE

HOW DO I DISASSEMBLE and maintain my rotator?

IF YOU HAVE A full service manual, follow the instructions in there. Obviously it isn't possible to give full instructions on every type of rotator here, but most of them are sufficiently similar that you should be able to manage. The level of mechanical skill required is about the same as in servicing or repairing a bicycle. These hints apply only to conventional in-line rotators where the main mast and the stub mast are directly in line. Side-mounting rotators tend to be constructed rather differently, though some of the points may still apply.

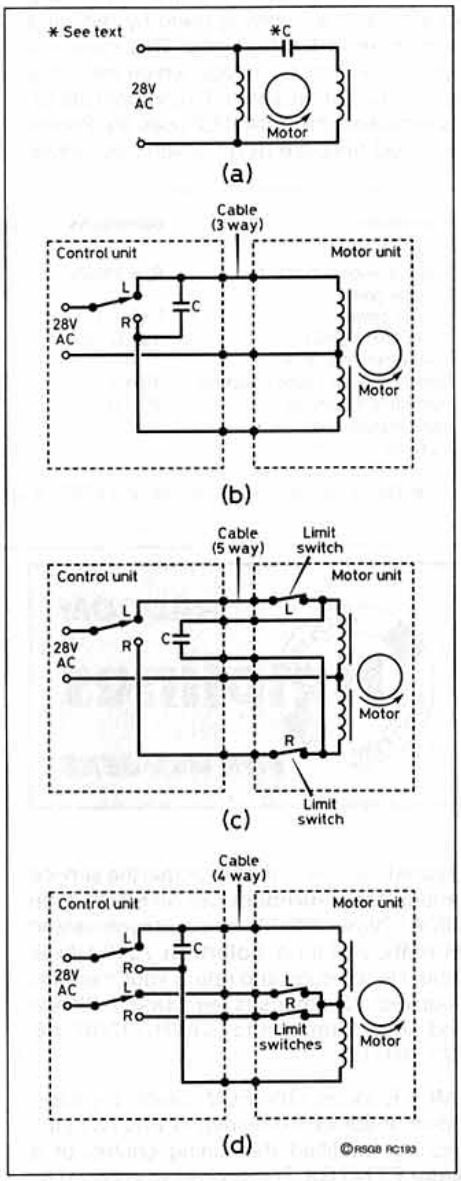


Fig 1: (a) Two-phase AC motor; capacitor produces a phase-shift in the second winding. (b) Redrawn to show normal reversing arrangement, requiring three wires. (c) Limit switches require four or five wires in all.

Most in-line rotators of worthwhile size have a removable mast clamp at the bottom, so that the rotator can be bolted down inside a tower head unit. When this is removed, you're left with three alloy castings: the fixed bottom part and the two upper parts which rotate together. To dismantle the rotator you have to separate the two rotating parts. **Fig 2** shows the common configurations; for reasons which you'll see in a few moments, the two rotating parts are always joined where the diameter of the rotator is largest. The smaller models from CDE/Hy-Gain/Telex (AR22, AR40 and CD45, **Fig 2a**) have a rotating top which looks like a bell, covering almost all the way down to the base and retained by a ring around the bottom. The larger models from this company (HAM-M, HAM-IV, T2X etc, **Fig 2b**) are split around the middle, having a rotating 'skirt' which again reaches almost to the bottom of the rotator. In all the CDE/Hy-Gain/Telex models the upper mast clamp is cast as part of the upper bell-housing. Designs from other companies tend to have a flat top and bottom, with movable clamps on the top which allow stub-masts of various diameters to be centred accurately below a tower head bearing; these rotators are almost invariably split half-way up and have a narrow retaining ring (**Fig 2c**). The retaining ring forms part of a double ball-race, running around the largest diameter of the unit to maximise its strength against 'rocking' loads. **Fig 3** shows a typical configuration, though obviously the details will vary.

It is absolutely essential that you reassemble the rotator exactly as you found it – otherwise you won't be able to obtain rotation and indication over the full 360°, and you may well do some damage. So before you even start, use a felt-tipped waterproof marker to draw a line down the bell-housing, over the retaining ring and on to the fixed part of the body. If the rotator is working at all, it's best to turn it away from the region near the end-stops before you mark it; this helps to avoid possible complications in reassembly.

Your next task is to loosen the four or six screws which joint the retaining ring to the upper bell-housing. No, don't remove them yet, just **loosen** them. This can be the worst single part of the whole operation, because the steel screws have been exposed to the weather and are almost invariably corroded into the alloy. If the screws move easily, well and good. If not, and they are heavily corroded, there is a serious risk of stripping the relatively soft threads in the bell-housing. **STOP** – as it says in *Zen and the Art of Motorcycle Maintenance*, you have to revise your whole opinion about that little 2p screw, and think very carefully about what to do next. It isn't worth just 2p any more: it may be worth the price of a new rotator! Possible options include spanners that really fit properly, penetrating fluids, heat on the bell-housing, and various kinds of carefully-applied force. If you don't feel confident, don't try it; take the rotator to a specialist repairer (most major dealers can help) or find someone locally with

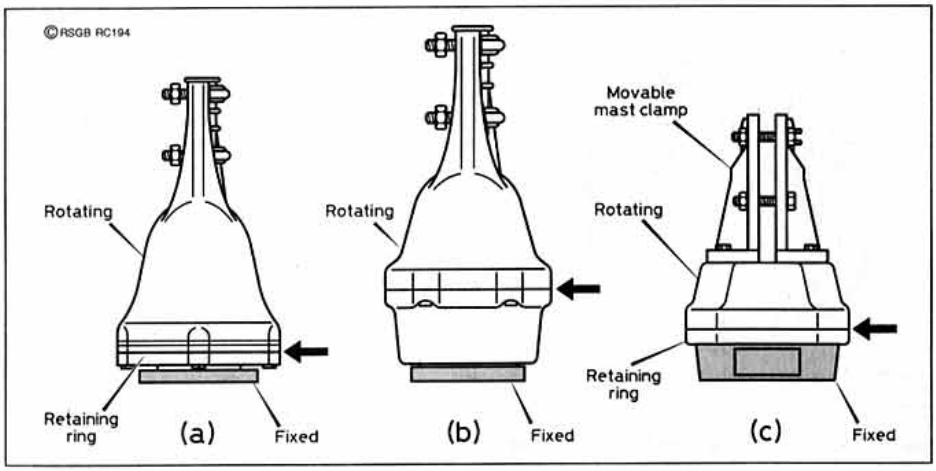


Fig 2: Three types of rotators: the non-rotating part is shaded, and the arrowhead shows where the rotating part is joined. (a) Smaller CDE, (b) Larger CDE, (c) Most other makes.

experience of extracting studs from alloy motor-bike engines.

TIP – If these screws persist in giving trouble, fit stainless steel studs to the bell-housing using permanent thread-locking compound, and use external stainless steel nuts instead.

Assuming you have been able to loosen those screws, transfer the whole assembly to a large tray, because you're shortly going to have a shower of ball-bearings. I use an old photographic developing dish for this kind of job. Continue to loosen the four bolts that hold the central ring, but be sure you don't unscrew them completely until the rotator is right-way-up.

When the ring comes free, so too will the lower set of ball-bearings; remove these and count them, and put them in a safe place together with the ring. Next remove the top bell: rock it gently to unstick the grease and then lift it straight up. Always working over the tray, recover the upper set of ball-bearings; as before, count them and put them aside safely. Almost certainly there will be the same number of balls in each set, so make sure that you haven't lost any on the tray or inside the rotator body. The heavier-duty rotators use cages to retain the ball-bearings, making the whole task much easier.

What can you see inside the rotator? Probably you'll see the large diecast final drive gear that I mentioned earlier. This is almost the diameter of the housing, with internal teeth which engage in a smaller spur gear driven from the motor, and it has lugs on the top that engage with the bell-housing to drive it around. A common problem is that one or more teeth shear off this gear in a high wind. If a tooth breaks off and sticks in the spur gear, the symptom is that the rotator will turn a little way in either direction but then jams solid. If the broken-off teeth fall out, the rotator will work perfectly except that it has to be helped by hand past the place where teeth are missing. In either case you'll have to replace the final drive gear, though the spur gear will probably be all right. If you have to remove or replace the final drive gear, scribe a reference mark across the gear and the rotator body, to be sure that it goes back in exactly the same location.

The other item that needs to be replaced in exactly the same position is the direction indicator potentiometer (leaving aside the old-fashioned 'clunk-clunk' models that use a pulsing switch in the rotator). In the CDE/Hy-Gain/Telex models, the potentiometer is at the very top of the unit and is driven around by a lug inside the rotating bell. When you replace the bell, that lug must engage correctly with the wiper arm of the potentiometer; apart from that, there are no reassembly difficulties. Most other models have gear-driven potentiometers, so if you need to change the pot the replacement must go back in exactly the same position. The best way to do this is to unsolder the old unit, and measure the resistance from each end of the track to the wiper. Then remove the old unit, and re-fit the new one with its spindle in exactly the same position, as near as you can judge it using the ohmmeter.

Obviously you must not run the rotator in the meantime. Do not touch the main gear-train unless you have to, because this is the most fiddly part to reassemble. If you have to replace a burnt-out motor, temporarily fix all the other gears in place using tape and Blu-Tack to prevent them from moving.

While everything is taken apart, wipe off any old grease and make sure that nothing is working loose. Some rotators can develop rotational 'play' because the plate that holds the whole drive assembly has worked loose from the body. Although the entire rotational force is transmitted through this plate, in some models (e.g. my own KR600) the plate is only held down by a few small screws. While you have the rotator apart, you may wish to remove these screws and replace them using shakeproof washers and thread-locking compound. Re-tighten the screws as firmly as you dare.

Reassembly is easy, provided you've carefully marked the positions of everything you removed. Re-grease the groove for the final drive ring, and also the sliding surfaces on the ring itself, and replace the ring in the same position as you found it. Wipe off any surplus grease. Lightly re-grease all the shallow ball-bearing grooves on the body, rotating bell and retaining ring. Then lightly grease the ball-bearings themselves – don't overdo it. With the rotator upright, refit all the ball-bearings in the upward-facing groove on the body. If you've lost count, the right number will leave sufficient space for about one more ball. Now **very gently** replace the bell-housing, making sure that it sits down level in the correct position, engaging with the lugs on the main drive gear (and also the potentiometer if applicable).

Make absolutely certain that your locating marks line up correctly. Refit the ball-bearings to the retaining ring, and carefully reassemble it to the rotator, once gain making certain that the marks line up. Replace the four or six retaining screws using a lubricant or thread-locking compound to help deter corrosion.

There – it's done. Give yourself a greasy-handed round of applause! But also be sure to test-run the rotator thoroughly on the bench before you put it back up in the air . . . .

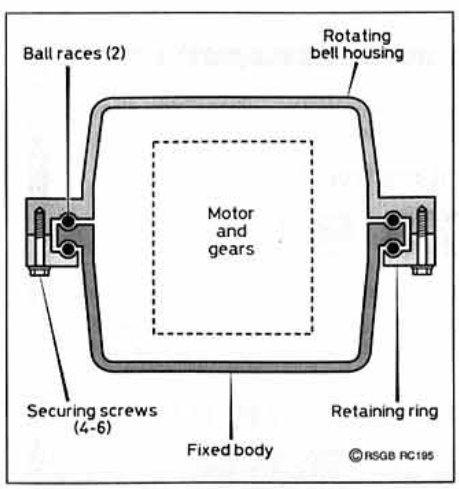


Fig 3: Typical dual ball-race configuration, showing retaining ring.

WHERE CAN I GET rotator spares?

THE PRESENT SITUATION appears to be as follows. Rotator units by Yaesu, Kenpro and Daiwa have most parts in common with equivalent models that share the same number suffix. Although electromechanical spare parts for Yaesu/Kenpro/Daiwa control units are not necessarily interchangeable between the different makes, complete units may be – consult the dealers.

- **Lowe** (0629 580800): All Emotator models (UK main agents) and most Daiwa rotators. CDE/Hy-Gain/Telex (new UK main agents).
- **SMC** (0703 255111): All Yaesu models (UK main agents) and thus most parts for corresponding Kenpro and Daiwa rotators. Some CDE spares still left.
- **Waters & Stanton** (0702 206835): Altai, Yaesu.

Also well-recommended on the DXcluster is a very helpful US firm called **C.A.T.S.** (7368 SR 105, Pemberville, OH 43450; 0101 419 352 4465) which specialises in CDE/Hy-Gain/Telex rotator spares and upgrades.

IF YOU HAVE NEW QUESTIONS, or any comments to add to this month's column, I'd be very pleased to hear from you by mail or by packet (see head of column). But please remember that I can only answer questions through this column, so they need to be on topics of general interest.

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

Controlling a computer from a remote DTMF (dual tone multi-frequency) keypad is becoming popular with European amateurs. There is an encoder in many hand-held transceivers. **Hervé Epp, F5FYU** described an easy-to-build DTMF decoder in *Radio-REF* 1/94.

TELEPHONE-TYPE DIALLING has been used for the remote control of transmitters and receivers for half a century; the use of microprocessors in radios proper and especially the presence of personal computers in shacks and repeaters, however, has opened up a host of new applications.

In Germany, there are 'Voice Mailboxes' which store and forward spoken messages, which can be filed or retrieved via a hand-held with a touch-tone™ key pad (see *Eurotek* in *RadCom* of April and May 1992). In the UK, all can use DTMF for the remote control of their main station from a low-power hand-held under para. 2.4.b of the amateur licence.

SENDING NUMBERS

THE INTRODUCTION OF DIGITAL techniques has made rotary telephone dials obsolete. The key pads on modern telephones, or transceivers, send pairs of audio tones down wires or radio links to remote computers. These pairs consist of one of four 'low' frequencies and one of four 'high' frequencies, which makes for the 16 possible combinations shown in **Table 1**. Hexadecimal numbers are very compatible with binary computer logic. In decimal usage, ie telephone numbers, the 1633Hz frequency and hence the right-hand column of Table 1 is not used, leaving 12 combinations: numbers 0 – 9, * and #.

All eight frequencies can be generated from one oscillator at 3,579,545Hz, the American TV colourburst frequency, for which very inexpensive crystals are available.

RECEIVING DTMF NUMBERS

AT THE RECEIVING END early systems used bulky passive filters and many discrete components to detect the presence of a two-tone combination; in today's third-generation decoders, one single IC*, **Fig 1**, does it all; Mass production keeps the price down. As soon as a combination of one 'high' and one 'low' tone appears at its input, the chip lights a 'data valid' LED and sends the appropriate hexadecimal number to the 4-wire parallel output.

The decoder is fed into a parallel port, eg a printer port, where it takes the place of the data returned from a printer. Pins 10, 11, 12 & 13 for data and 18 or 19 for earth are correct both on a 25-pin D or on a 36-contact Centronics connector. The address of the (first if more than one) parallel port in hex is: 379.

To display, on your screen, a number keyed on an encoder which is connected (wired or via radio!) to the input of the decoder, use the following little program; (the second line tells the computer to display the character on the parallel port):

```
10  REM DTMF RECEIVE
20  PRINT INP(&H379)
30  GOTO 20
```

* Silicon Systems Inc. model 202, distributed in the UK by: Pronto Electronics, Ilford, Essex, 081-554 6222. Unit price £4.90 + VAT.

Low frequencies	697	1	2	3	A
	770	4	5	6	B
	852	7	8	9	C
	941	*	0	#	D
	Hz	1209	1336	1477	1633
					High frequencies

©RSGB RC173

Table 1: Each of the 16 keys sends one of four 'high' and one of four 'low' audio frequencies. In 12-key pads the 1633Hz column is omitted.

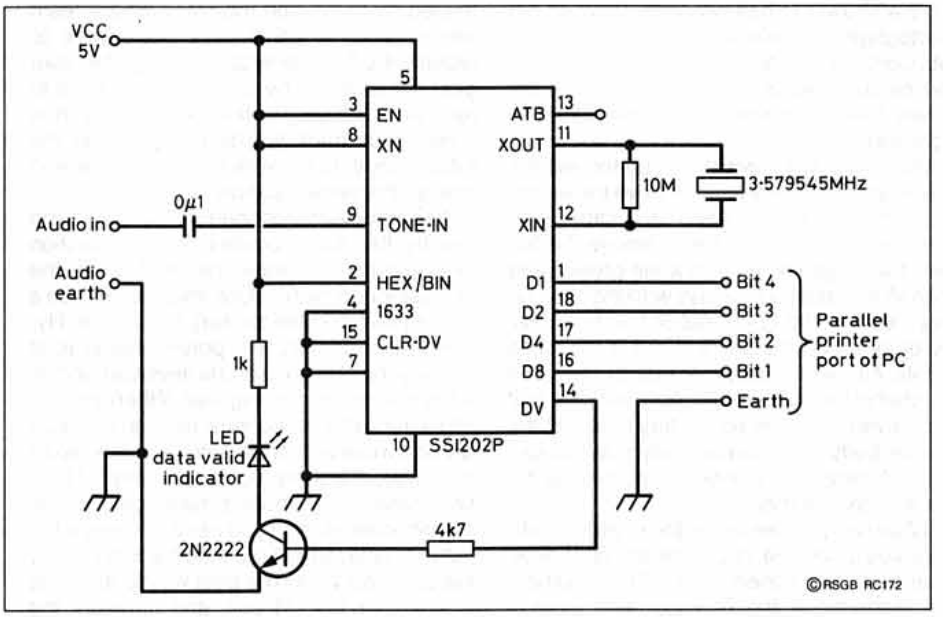


Fig 1: F5FYU's DTMF decoder with a single SSI-202 IC

ALINCO More Radio Less Cost

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Expandable Memory
Function Memory
Odd Offsets
Auto Power Off
Superior Receive Audio
Expanded Receive
Ni-Cad Pack & Charger
Low Battery Indicator
Scanning Features
Rotary Frequency Control
Programmable Steps

"A wolf in sheep's clothing," a fitting way to describe the ALINCO DJ-180E and DJ-480E transceivers. Probably the most economical and easy to use handhelds ever produced. When funds are limited, yet performance is critical, there's nothing to match their value. And they're packed with features that will make your operation more enjoyable and more fun. Each model is built for reliability and performance. The tough plastic case and advanced circuitry make them a "go anywhere" rig and the low price makes them popular as second rigs for holiday trips. What's more, the 2 Watt signal can be boosted to 5 Watts simply by connecting 12 Volts via the special adaptor. In an instant you have a mobile rig.

DJ-180E receives 130 - 170MHz DJ-480E receives 420 - 460MHz

DJ-480E 70cm FM £249

DJ-580E 2M FM £419

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True AM Airband Receive
Full Duplex Dual Watch
Dual squelch/volume
42 Memories
Programmable Scanning
Low Voltage Operation
Function memory
Hod Ni-cad Charger

The DJ-580E handheld is ALINCO's most advanced design ever. You get all the standard features you'd expect such as dual watch, dual controls, scanning, search, priority etc. You also get the superb engineering from ALINCO that is making its competitors envious. The DJ-580E is now being widely used for emergency purposes and its patented low voltage circuit allows it to be used with dry cells when the voltage has fallen by 50%. You also get programmable auto power off, battery saver, digital telephone dialler, and three output power levels. But we've only just started! Key in a special code and your radio turns into a cross-band repeater. Another code gives you AM receive. Little wonder the DJ-580E is ALINCO's best seller.

DJ-580E Receives AM 108 - 143MHz & FM 130 - 170 / 400 - 470 / 810 - 950MHz

Available from all good dealers - or direct

Waters & Stanton Tel: 0702 206835

22, Main Road, Hockley, Essex. SS5 4QS

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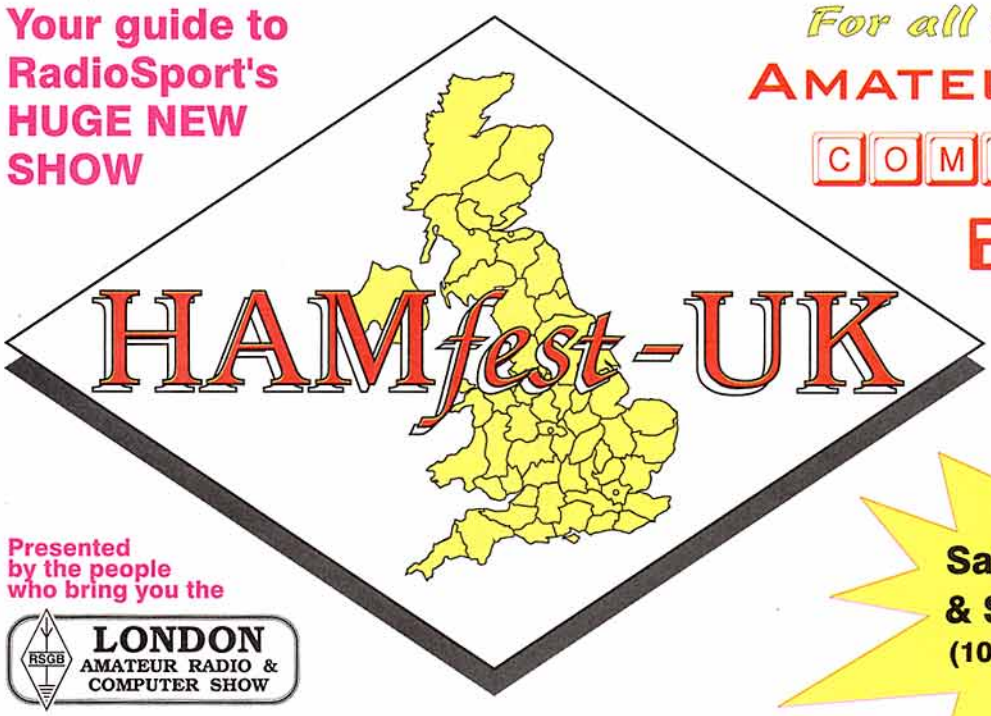

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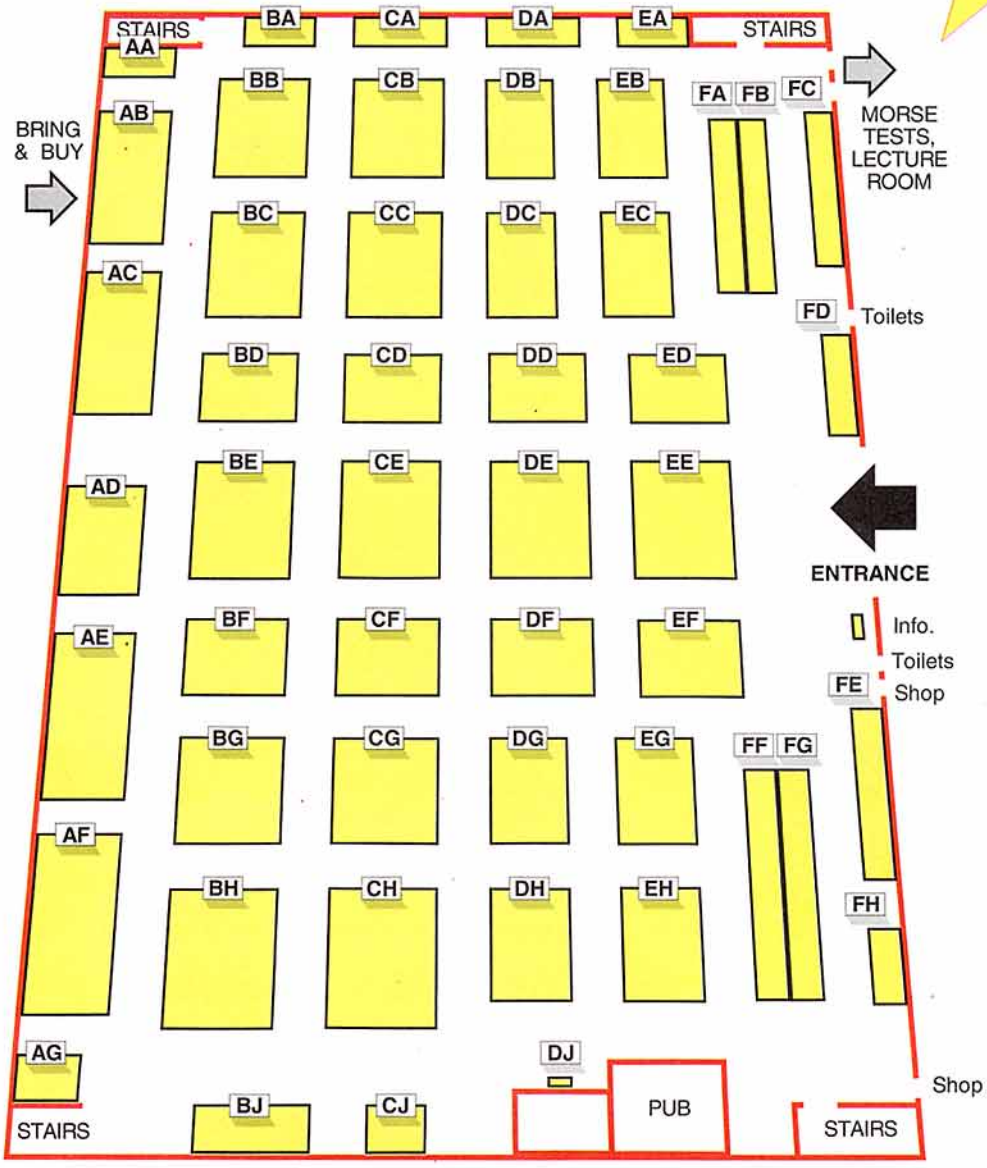

LECTURE PROGRAMME

Saturday July 2nd,
12.00 - 2.00pm
The History and Development of QRP in Britain, by Norman Field, G4LQF of the G-QRP Club.

Saturday July 2nd,
2.00 - 4.00pm
Amateur Radio Satellites, by Richard Limebear, G3RWL of Amsat UK.

Sunday July 3rd,
12.00 - 2.00pm
The World of CW and All it Embraces, by Ron Ray, G3NCL and Jim Lycett, G0MSZ.

All the Major Importers, Major Distributors, all the latest products, Special Interest Groups, lectures and a Bring & Buy sale. ALL UNDER ONE ROOF!

On-demand Morse Tests!
(please bring two passport-sized photos)

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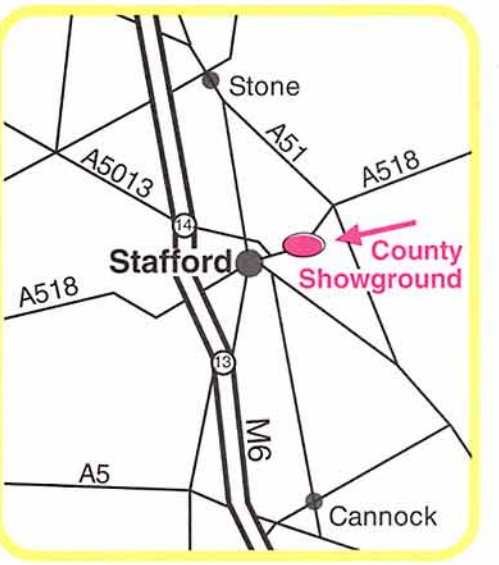

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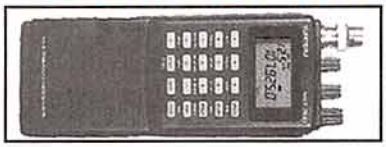

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Pat Hawker's Technical Topics

TOWARDS THE SUPER-LINEAR RECEIVER: LOW NOISE OSCILLATORS

IT WAS EMPHASISED in the January TT (p39) that if full advantage is to be taken for high-dynamic range receivers of the latest super-linear mixers such as G3SBI's H-mode FET-array mixer there remains a need to produce free-running or preferably synthesized oscillators having an extremely low phase noise of the order of 150dBc/Hz or better, a few kHz off the tuned frequency.

Colin Horrabin, G3SBI has progressed significantly towards this target for a free-running oscillator although he recognises that to design and build a complete digitally synthesized local oscillator based on his preliminary results is still a major undertaking. However he feels that information at an early stage may encourage some readers to take these developments further and faster than his own other commitments permit.

He writes: "These present notes cover an oscillator suitable for use as a VCO (voltage-controlled oscillator) or as an overtone crystal oscillator that has low inherent phase noise. The initial measurements were made on an oscillator operating over 20 to 80MHz using conventionally wound inductors, but subsequently it has been found that a version using stripline inductors against a groundplane shows the most promise. This form of construction has been found to cut dramatically the sensitivity to stray capacitance fields.

"The prototype stripline version operates in the 36 to 150MHz region (capacitance 0 – 180pF) or 82 to 146MHz (0 – 27pF) but changes to the length of the line could give a 3.5:1 operating frequency range anywhere between 20 and 450MHz. The stripline artworks were produced by my SERC colleague, Alex Macdonald, on an Apple PC using MacDraw software with output onto a laser printer.

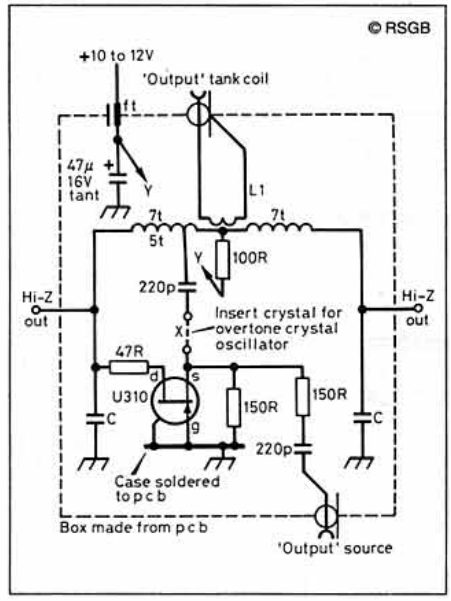

Fig 1. The initial prototype grounded-gate, low-phase-noise oscillator using lumped wound coils.

"**Fig 1** shows the original design using coils. It was constructed inside a box made from double-sided PCB material. Output at 50ohms impedance and 0dBm signal level for a spectrum analyser can be taken either from the FET source or via a two-turn link winding on the main tank coil L1. These are terminated in SMA connectors. The oscillator comprises a U310 junction FET in grounded-gate configuration.

The two capacitors marked C must be of the same value. Components: C Suflex or plate-ceramic capacitors between 15 and 220pF (Cirkit Components). L1 7 + 7 turns 6mm dia enam for about 20 to 80MHz. When used as a crystal oscillator, the oscillator is first used free running on the crystal frequency. One of the capacitors C is made variable the frequency can be tuned. The crystal is inserted after breaking line X and on the C adjusted for oscillation. Output from the source has slightly improved sidebands. For VXO use the 220pF capacitor can be varied to give about 5kHz variation at 53MHz. As a crystal or free running oscillator outputs of about 0dBm are available from source or tank. A high-impedance output of about 10V peak-to-peak can be taken as shown. The two Hi-Z outputs are 180° out of phase.

SIMPLE RF SNIFFER

THE ABILITY TO DETECT the presence of RF energy that has made its way to either desired or undesired hot spots is useful in the shack. Emmerson Hoyt, WX7E in the 'Hinks and Kinks' column of *QST* (April 1994, p82) provides information on a simple RF sniffer meter that has served him well for almost 50 years, proving nearly indispensable in the lab and radio shack for sniffing out the presence of RF (or even high audio) energy. It can show if RF is present on the outside of coax cable shields, or in regulated power supplies or audio amplifiers, as well as confirm its presence in those places where it should be, such as oscillators and RF or IF amplifiers, see **Fig 2**. Sensitivity depends on that of the meter, preferably a low-range microammeter with a full scale deflection of 100µA or less. WX7E writes:

"The circuit consists of a sensitive meter, two germanium diodes, a short piece of bus wire for a probe, and some suitable support hardware. The bus wire acts as antenna, and the diodes rectify the RF, feeding DC through the meter . . . . Germanium diodes (eg 1N34A) are better than silicon diodes because of the much lower turn-on voltage.

"With a microammeter, the device is quite sensitive. In many applications, the probe tip need not directly contact the circuit under investigation. In any case, circuit loading by direct contact is minimal for RF (in the HF region) or IFs. The diode leads can be soldered directly to meters with terminals that allow this: solder lugs can be used for connections to threaded-stud meter terminals. In either case, be sure to provide adequate physical support for the junction between the diodes and probe wire . . . . Cover the probe wire with insulating sleeving, leaving only a very short length of the tip exposed. When working with valve-type circuits or other high-voltage devices, be careful if the probe is close to or in contact with the higher voltages."

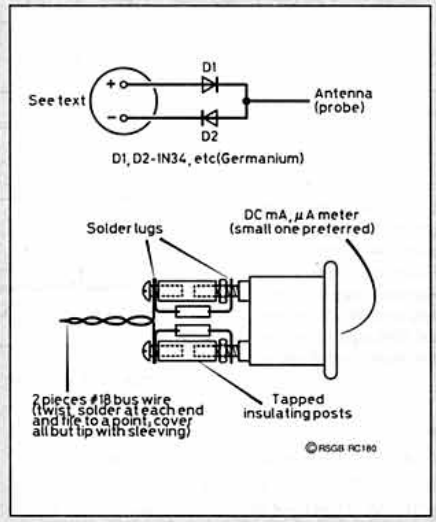

Fig 2: WX7E uses this simple RF sniffer arrangement to indicate the presence of RF energy in circuits etc. The germanium diodes rectify the RF, the meter displays the resulting DC. Sensitivity depends on the sensitivity of the meter.

An alternative, less sensitive, form of RF detector has been in use for several years at G3VA. An American reader kindly sent along a 'MicroChek' device marketed in the USA for checking possibly hazardous leakage of RF energy from microwave ovens. I found that it could also be used to indicate RF energy at HF or VHF. This handy device has no meter but two LEDs, one green and one red together with a button switch. When the button is depressed, the green light should come on to indicate that the two 1.5V cells forming the battery are in good condition. Then, to use as an oven checker, the microwave oven is turned on to high power, and with the button depressed, the device is run around all door openings etc. A 'blinking' red light indicates moderate 'impending' leakage whereas a constant red light indicates potentially dangerous leakage requiring the attention of a qualified technician.

Checked on my daughter's microwave oven, it proved possible to get some red light flashes with the device held close to the door hinges, but in the shack, HF energy showed up in both expected and unexpected places. Unlike WX7E's meter sniffer, there is no exposed probe and the sensitivity is insufficient to detect receiver oscillators etc. I imagine similar oven testers are marketed in the UK.

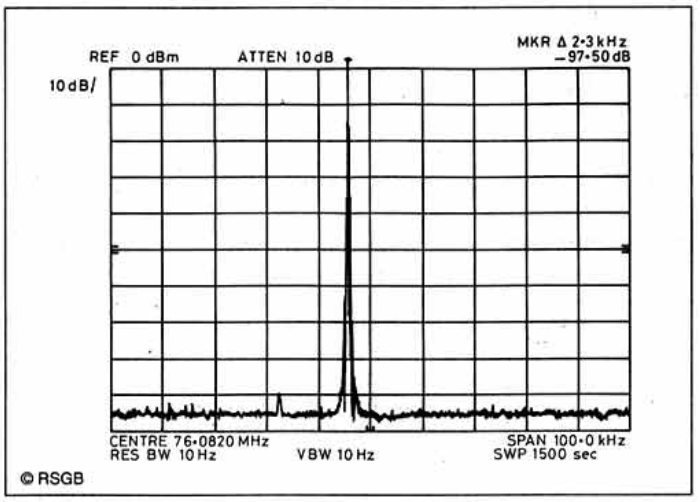

Fig 3. Typical free running spectra of the original oscillator at 76MHz.

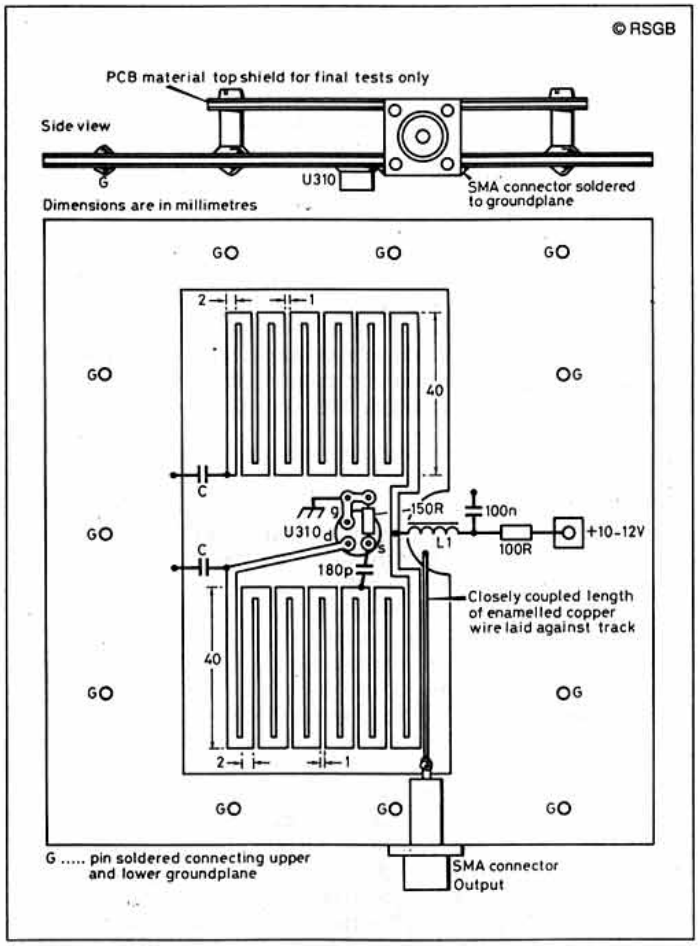

Fig 4: Prototype strip-line oscillator capable of providing an operating range of about 3.5:1 before oscillation ceases. length 'a' 40mm, width 'b' 2mm, width 'c' 1mm. To change the frequency range alter the length 'a' and the length of the output coupling wire. Typical frequencies with C 0pf about 145MHz, 27pF about 80MHz, 56pF about 60MHz and 150pF about 36MHz (plate-ceramic capacitors). 1/16in double-sided PCB note that the bottom ground plane covers the whole of the PCB. Output about 0dBm. The U310 FET is pushed through from the bottom side of the PCB until it touches the ground plane and soldered directly to the ground plane.

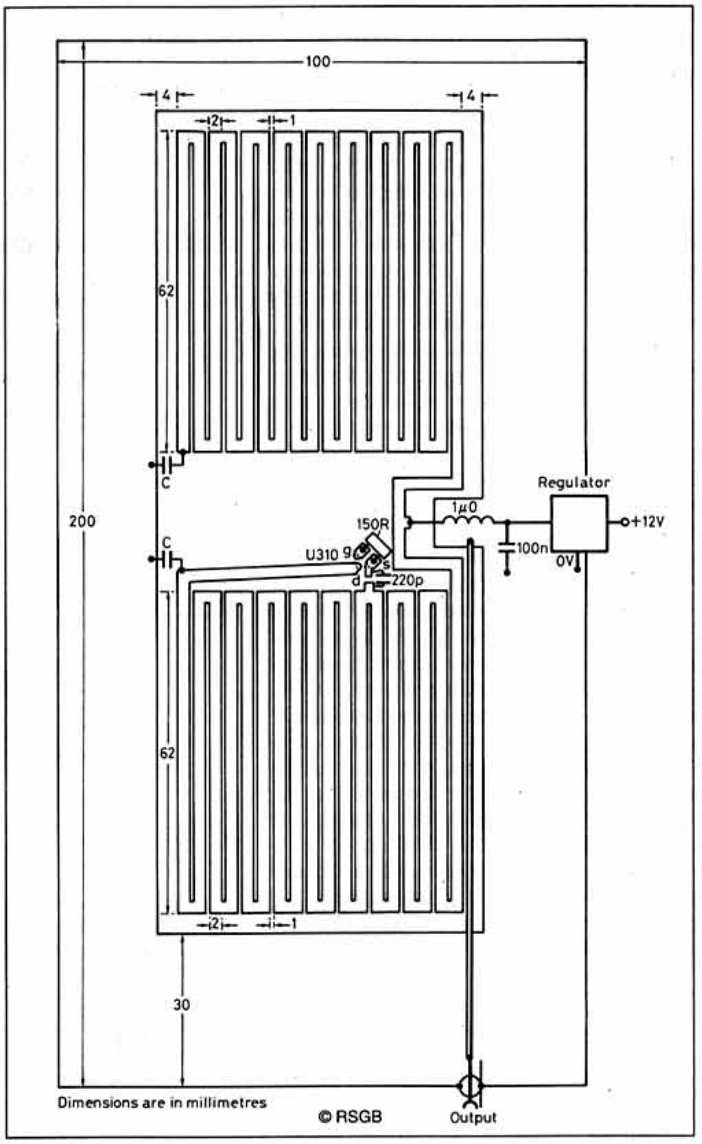

Fig 5: Later version of the stripline PCB artwork.

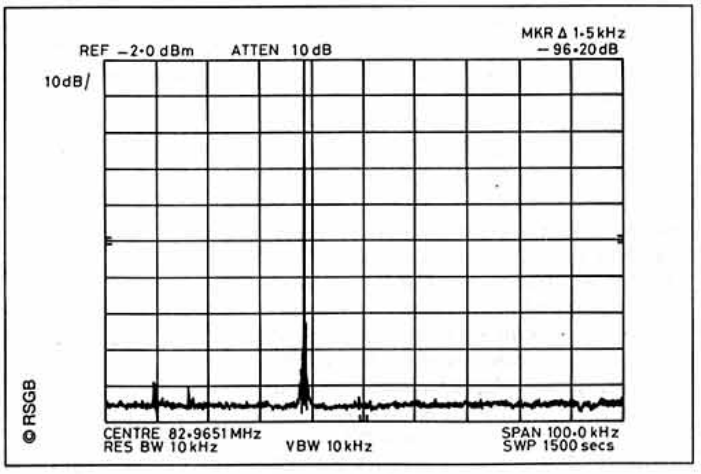

Fig 6: Spectra of stripline oscillator at 82.9MHz.

The grounded-gate happens to be the case of the FET so a hole is drilled in the groundplane and the FET pushed through with the case soldered to ground. A 47Ω resistor is necessary in series with the drain lead (but not in the stripline version) to control a 500MHz parasitic oscillation.

"L1 is a split coil; this is fundamental to the design in order to avoid the use of a by-passing capacitor to ground at its centre. The other half of this coil acts as a series tuned circuit and therefore presents a low impedance at resonance to ground at the DC feedpoint. If necessary, push-pull signals at a high impedance can be taken between the ends of L1 to ground; C1 and C2 are identical values and must be changed together. Varicap diodes, if used, must be matched, since any significant difference in value of C1 and C2 will inhibit oscillation.

"Some tests were made using a 53MHz third-overtone crystal inserted between points. Noise sidebands were down 98dB at 200Hz from centre frequency.

"Typical free-running spectra of the original oscillator at 76MHz are shown in **Fig 3**, about 98dB down at 2kHz. Contrast this with the superior stripline circuit (**Figs 4 and 5**) at 82.9MHz (**Fig 6**) and 201MHz (**Fig 7**). Most of the close-in phase noise noted in a run at

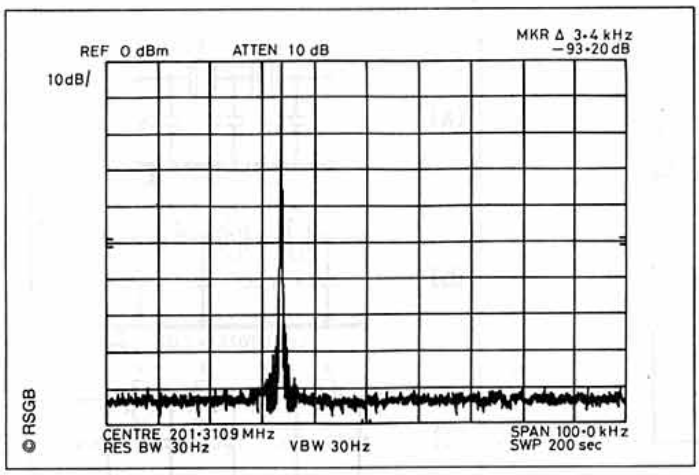

Fig 7: Spectra of stripline oscillator at 201MHz.

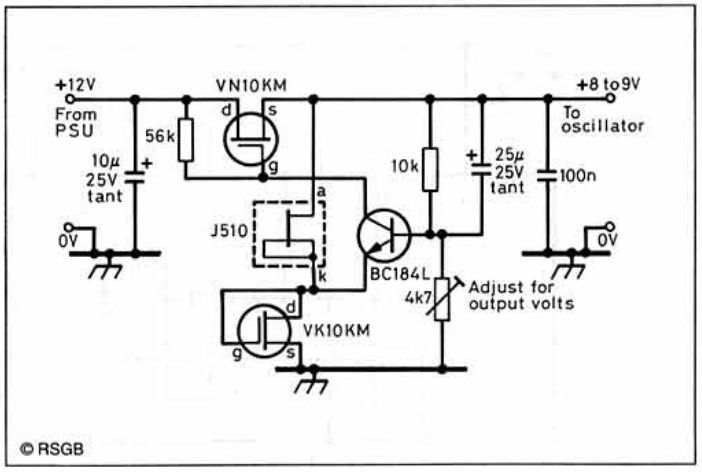

Fig 8: Low-noise voltage regulator as use for the G3SBI low-noise oscillator.

62MHz is due to FM at 50Hz presumably due to AC mains inducing fields in the tank coil causing low-level AM and FM modulation of the FET. In a closed loop of any useful bandwidth, these would be suppressed.

"So how good is the oscillator phase noise? It is visually superior to two of our professional high-grade synthesized signal generators, but without access to a Hewlett Packard phase-noise measuring system or other methods of measurement more suited to home construction, exact figures can not yet be given. Nevertheless, it is clear that the oscillator shows great promise. It is intended to use one or more stripline oscillators in the design of a low-phase-noise synthesized local oscillator system when time permits.

"Two further stripline oscillator layouts have been implemented for the frequency range 20 to 50MHz and are being tested. One of these uses thinner and closer tracks with the object of reducing the physical size of the PCB. A practical PCB layout for the local oscillator of a receiver would probably have the two striplines back-to-back on two separate PCBs so that a band-change wafer switch (perhaps driven by a stepper motor) would be simple to accommodate.

"Finally, it needs to be stressed that the design of the voltage regulator is important in order to obtain results as good as, or better than, a 9V battery as the oscillator power source. The best spectrum results have been achieved with a regulator output of 8 to 9V. Conventional IC regulators slightly degrade the oscillator noise floor, particularly close-in. The simple regulator circuit shown in **Fig 8** gives good results and was used during the measurements shown but could probably be improved with a little more loop gain. In this design the regulator voltage reference is a high gm FET type 10KM driven by a J510 JFET current source and has low-noise characteristics.

ORIGINS OF THE 'ULTRA-LINEAR' AUDIO AMPLIFIER

IN THE 1950s, MUCH USE was made in 'high-fidelity' audio systems of the so-called 'ultra-linear' amplifier circuit in which the screen-grid (G2) of the output pentode or beam-tetrode valve(s) is connected to a tapping (or tappings) on the primary of the audio output transformer as shown in **Fig 9**. Rather surprisingly I cannot recall any attempt to utilise this configuration (sometimes termed the 'triode-tetrode' circuit) to improve the linearity of push-pull or single-ended RF power amplifiers although logically there seems no reason why this should not be effective in Class A designs.

Dr Tom Going (58 Cambridge Road, Southend, Essex SS1 1ES) has been trying to trace the origins of this 'ultra-linear' technique. He points out that it is well known that the famous Alan Blumlein of EMI took out a patent on this circuit in 1937 (British Patent 496 883) but his stated purpose was reduction of the output impedance of the valve and to prevent damage if the load became disconnected (Keith Thrower, 1993). An exhaustive study of the circuit by F Langford Smith and R R Chilton in 1955 reported that the earliest reference to the circuit they had traced was in student notes written in 1933 by R Lackey and R R Chilton of the Australian Radio College.

However, L Williams of Solihull has drawn Tom Going's attention to the Ekco RS3 broadcast receiver (four valve 'straight' receiver plus valve rectifier) as reviewed in *Wireless World* (August 26, 1931) in which it was specifically stated "down the primary of the output transformer there is a potential drop of some 25V, and into this primary is tapped the screening grid of the pentode, *an arrangement which produces the necessary tone correction required with the pentode output valve.*"

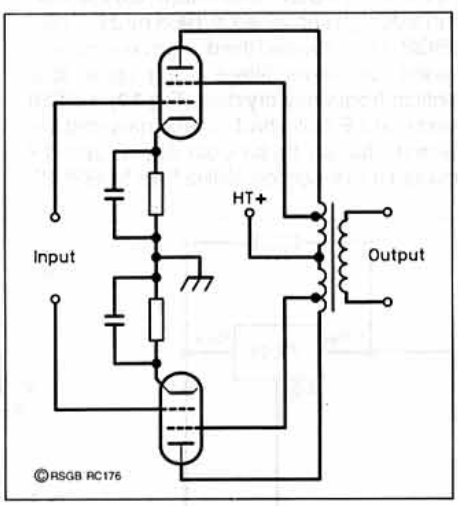

Fig 9: A typical push-pull 'Ultra-Linear' Class A audio amplifier used in the 1950s and 1960s. The tetrode or pentode screen-grids are connected to tappings on the output transformer resulting in a mode of operation intermediate between tetrodes/pentodes and triodes. This form of distributed load offered the following advantages: less overall negative feedback required for a given result, thus giving a better margin of stability; reduction of harmonic distortion; greater efficiency, 36% against 27% for triodes or triode-connected tetrodes; much lower peak variations in current than inherent with triode output stages, placing less stringent requirements on the power supply.

This seems to indicate that the Ekco design team (possibly Anthony W Martin, then Assistant Chief Engineer and/or Harold Hunt, Senior Radio Design Engineer) should be credited with originating the ultra-linear configuration as early as 1931. Dr Going would be interested to hear from anyone who can contribute any further information on the origins of this means of reducing distortion (improving linearity) of pentode and tetrode valves. It would also be interesting to discover whether anyone has investigated the use of this load-tapping technique for RF linear amplifiers.

EXPANDED ANALOGUE VOLTMETERS

THE TRADITIONAL METHOD of checking the state of a lead-acid battery is to use a hydrometer to measure the specific gravity. It may be more convenient simply to measure accurately its voltage under load or charge.

John Grebenkemper, KI6WX in introducing 'An inexpensive, expanded-range analogue voltmeter' (*QST*, December 1992, pp52-54 with correction to Fig 1 in *QST*, February 1993, p78) writes: "When discharging a battery, the potential across the battery terminals depends on the charge left in the battery and how fast you're discharging it. When charging a battery, the terminal voltage and the charging current can tell you how much the battery has been recharged. The charging voltage of a float charger must be set precisely, or the battery can be over- or under-charged. For a 12V, lead-acid battery, all of these voltages should be known to within 100mV to make a meaningful interpretation of a battery's condition.

"An inexpensive digital voltmeter can be used, but I prefer to use an analogue meter. Why? Because it gives me a better intrinsic feel for the actual state of the battery's charge. Unfortunately, conventional analogue voltmeters don't have sufficient precision for such measurements. However, by expanding the

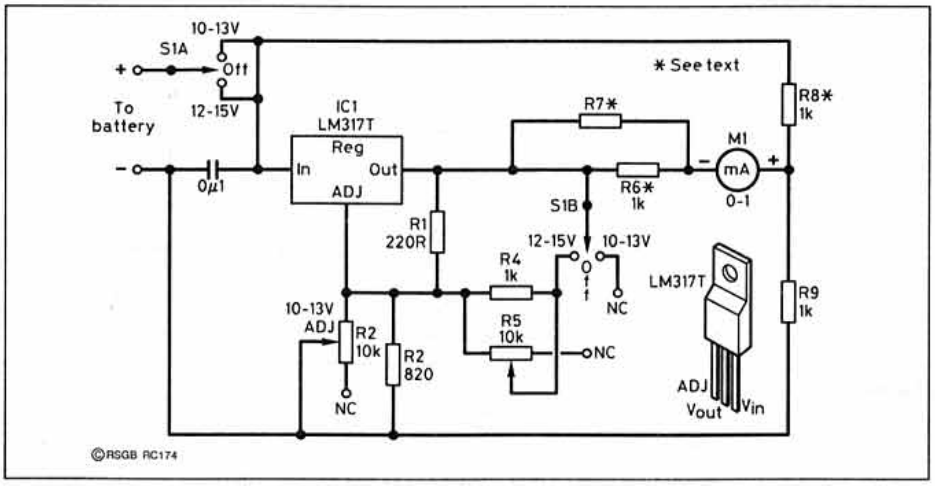

FIG 10: Expanded-range analogue voltmeter as described by KI6WX in the December 1992 issue of QST. Intended for checking the state of 12V lead-acid batteries it provides two expanded voltage ranges, 10 to 13 volts and 12 to 15 volts. Unless otherwise specified, resistors are 0.25W, 5% tolerance carbon-composition or film units. Use of 1% tolerance resistors for R6, R8 and R9 is desirable but not essential since variations are removed during calibration. Value of R7 depends on meter, KI6WX used 8.2K.

range of the voltmeter around the measurement range of interest, you'll significantly improve that accuracy."

KI6WX provided details of an arrangement whereby a 0-1mA meter could provide a voltmeter range of 10-13V for measuring the discharge voltage and 12-15V for the charging voltage. Expanded-range voltmeters are formed by connecting one end of the meter to a reference voltage instead of to ground. Most simple expanded voltmeters use a Zener diode to provide the reference voltage but this has the disadvantage of a reference voltage that varies between different Zener diodes, and temperatures. Instead, KI6WX uses a three-terminal adjustable voltage regulator such as the LM317T to provide the reference voltage since this varies only slightly over time and temperature variations.

Fig 10 shows the circuit diagram of the expanded-range voltmeter as described by KI6WX in his article. Subsequently, in the May 1993 issue, he presented a modified arrangement and also showed how the same principles could be applied to an expanded-range AC voltmeter (95-140V) using a voltage detector that approximately measures the average of the voltage. The average value tracks the RMS value more accurately for complex (non-sinusoidal) waveforms than the more commonly used peak detector, making the meter's accuracy less dependent on the purity of the waveform.

P K S Rosenbeck, OZ5PZ (*OZ*, 3/94, pp140-142) draws on some but not all of KI6WX's ideas in presenting a single-range (10-15V) DC meter that can also be used with an adapter to provide a 200-250V expanded-range AC meter: **Fig 11(a)** and **(b)**.

LADDER FILTERS

THE JANUARY 1994 *TT* (pp37-39) described recent work by Colin Horrabin, G3SBI, on developing crystal ladder filters for use in high-performance receiver front-ends. The starting point was the information given in *ART7* (pp66-69) which drew on a 1976 article by J Pochet, F6BQP, who in turn had summarised a design published in 1968 by J E Colin, F6BQP. This provided the design co-efficients needed for ladder filters using up to four identical frequency crystals (**Fig 12**). G3SBI found that J E Colin had, in fact, provided co-efficients for up to six-pole filters. Jan *TT* included a five-section 9MHz filter by G3SBI.

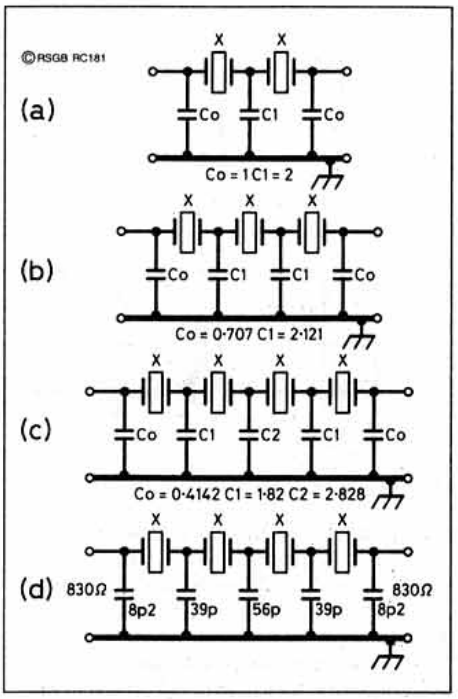

Fig 12: Crystal ladder filters as investigated by F6BQP in 1976 based on the earlier work by J E Colin. All crystals (X) are of the same resonant frequency. To calculate values for the capacitors multiply the coefficients by $1/2\pi fR$ where f is frequency of crystal in Hertz, R is input and output termination impedance, and 2π is roughly 6.28. Coefficients for 2, 3 and 4 crystal units are shown in (a), (b) and (c) respectively, while (d) shows a practical realization of a four-pole filter using 8314kHz crystals, 10% preferred-value capacitors and termination impedance of 820Ω. For crystals between 8 and 10MHz the termination impedance should be between about 800 and 1000Ω for SSB filters, lower frequency crystals require higher design impedances to obtain sufficient bandwidth. For CW filters use lower impedance and/or lower frequency crystals.

While four and five-pole crystal ladder designs can produce effective SSB or CW filters, their shape factors tend to be inferior to the best half-lattice crystal filters, broadening out around the –50 to –60dB level. More sections can be expected to improve the shape of ladder filters provided that this can be done without unduly increasing the insertion loss.

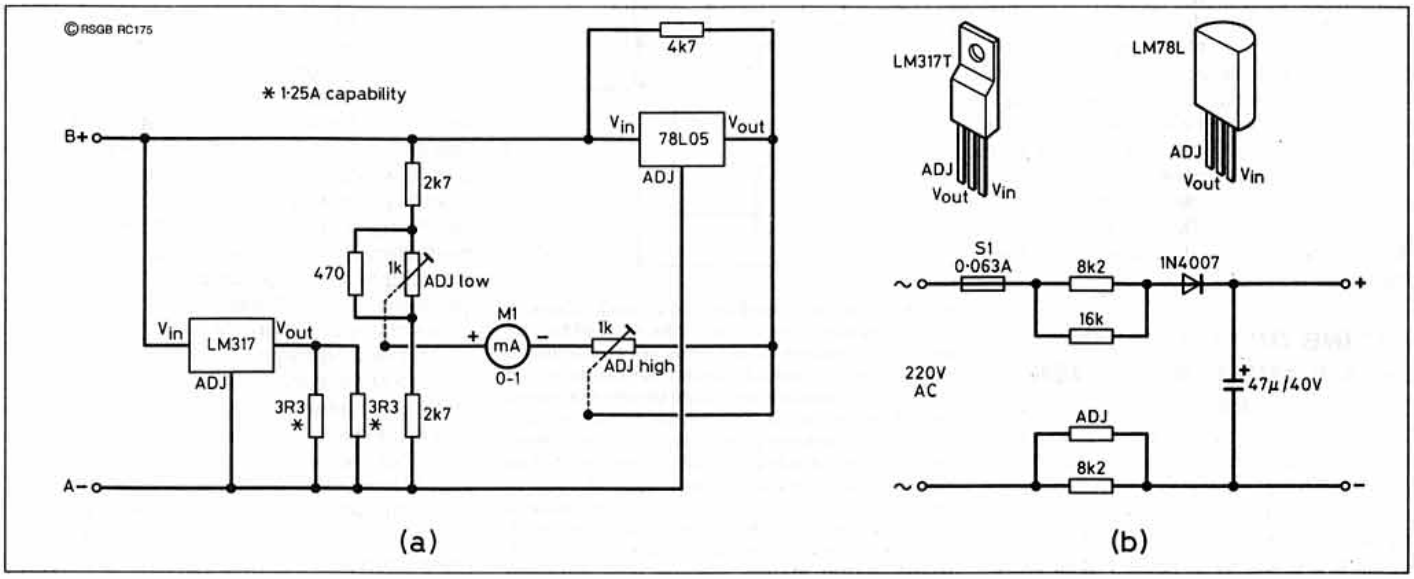

Fig 11: (a) OZ5PZ's battery tester with expanded range meter; (b) An adaptor for 220V AC mains voltages.

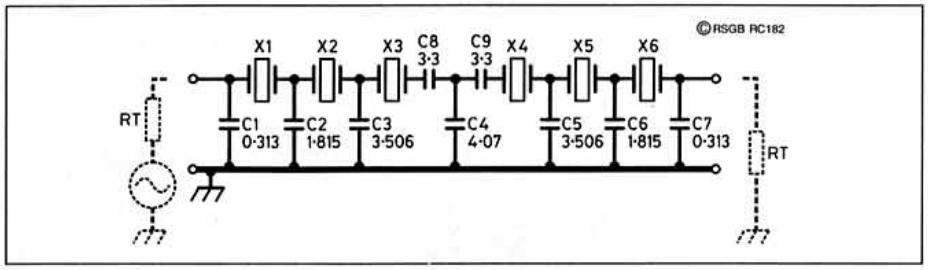

Fig 13: Coefficients for 6-pole filter as investigated by G3SBI. X1 to X6 are crystal of similar resonant frequency fr. Then F = 1(/2π x fr x RT). Cn = coefficient x F.

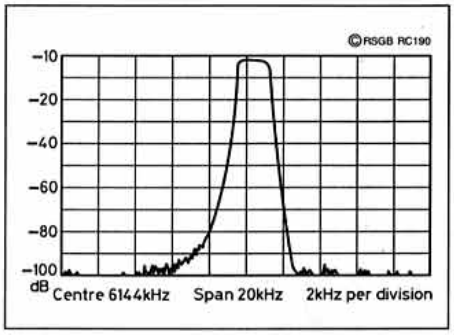

Fig 16: Measured performance of the 10-pole filter.

G3SBI draws attention to two useful articles on ladder filter design: (1) 'High-performance crystal filter design' by Bill Carver, K60LG (*Communications Quarterly*, Winter 1993, pp11-18) which features 8-pole and 14-pole filters designed with the aid of LADPAC software; and (2) 'A unified approach to the design of crystal ladder filters' by Wes Hayward, W7ZOI (*QST*, May 1982).

G3SBI, has continued his investigation of ladder-filters using Microcap software and then verified on further practical designs. As a result, he has found that the J E Colin article appears to have an error in the centre coefficient given for the six-pole filter. G3SBI has also provided design coefficients for 8-pole and 10-pole filters together with practical capacitor values for 8-pole, and 10-pole (optionally 9-pole) filter designs, both using 6.144MHz crystal. He suggests that an optimum frequency for ladder filters for totally home-constructed receivers might well be around 6MHz.

His 6, 8 and 10-pole filters (see **Figs 13, 14** and **15**) have been constructed from IQD crystals (stock No A133A at 6.144MHz, HC49, 30pF). Nominal crystal parameters: Ls 36.3003mH, Cs 18.4952F-15, Rs 14Ω, Cp 4.5pF. going from 6 to 8 or more poles significantly improves the shape factor and symmetry: see **Fig 16** for the measured response of the 10-pole filter. The choice of 6.144MHz is the design impedance level for SSB bandwidths is then 1500Ω. For CW, a 225Ω design with 6-poles would give a –6dB bandwidth of 400Hz, a –60dB bandwidth of 1.2kHz and an insertion loss of 4dB. ***G3VA***

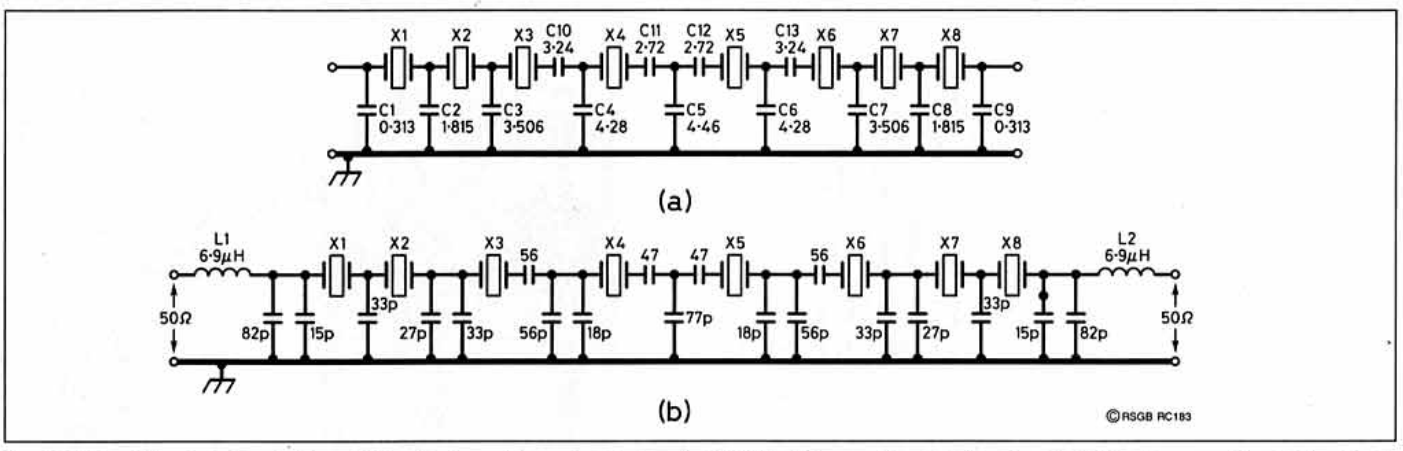

Fig 14(a): Coefficients for 8-pole filter. (b) Practical capacitor values for 8-pole 6.144MHz filter providing SSB bandwidth of 2kHz. All capacitors Suflex 2.50%, X1-X8 IQD Stock A133A, L2, L2 6.9μH comprising 39 turns of 0.314mm diameter bicezflux enamel on Micrometals T50-6 toroids (Cirkit). Measured performance: 2kHz at –6dB, 4.4kHz at –60dB, insertion loss 1.7dB. Stopband better than 100dB down. Note that the filter design impedance is 1500Ω. The 500Ω matching section capacitor includes 5.6pF capacitance due to C2.

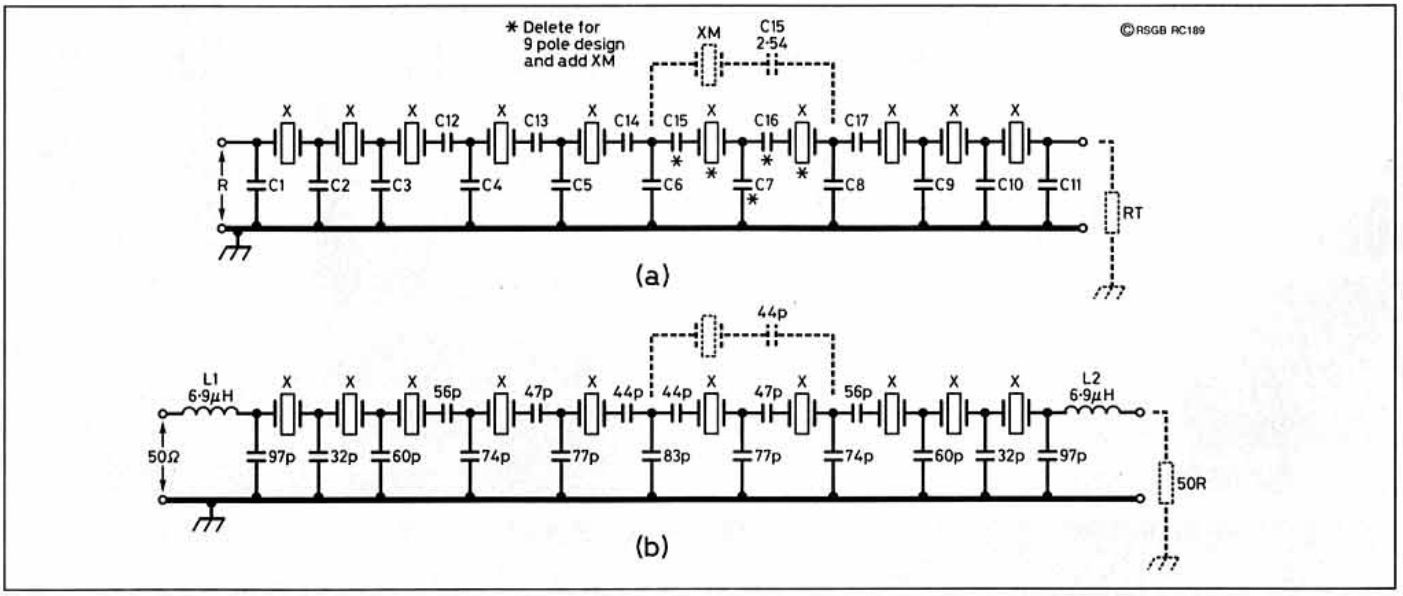

Fig 15(a): Coefficients for 10-pole design (variations for 9-pole design indicated) C1, C11 0.313. C2, C10 1.815. CV3, C9 3.47. C4, C8 4.28. C5, C7 4.46. C6 5.09. C12, C17 3.24. C13, C16 2.72. C14, C15 2.54. At 6.144MHz RT 2000Ω gives –6dB bandwidth of 2250Hz; with RT 1500Ω gives 1850Hz. –6 to –60dB shape factor 1.8:1. (b) Practical realisation of ten pole 6.144MHz filter with a design impedance of 1500Ω showing 50Ω matching networks. Insertion loss –2.1dB. –6dB bandwidth 1850Hz, –60dB bandwidth 3300Hz giving shape factor of 1.8:1. L1, L2 are 39 turns of Of 0.314 dia enamel on Micrometals T50-6 toroids (Cirkit). All capacitors made up from 2.50% Suflex.

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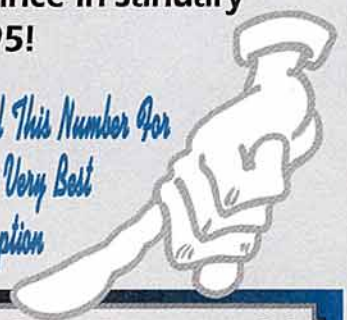

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Kenwood TS50S	£999	£889	only £40.50	£930.50
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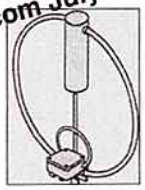

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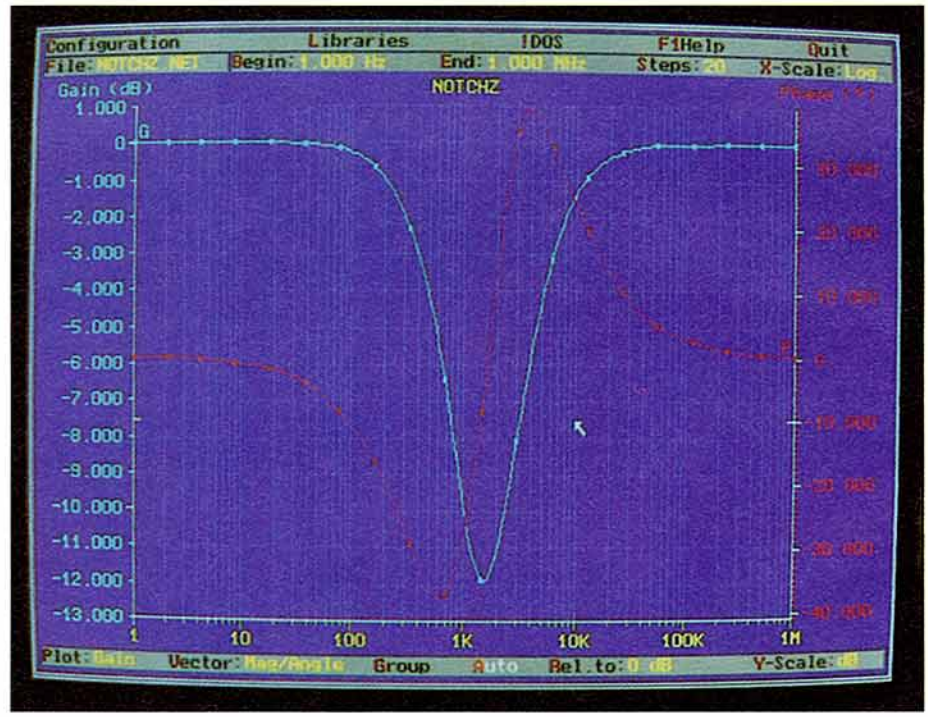
RADCOM TECHNICAL REVIEW

The Analyser III Linear Circuit Simulator

Paul Lovell, G3YMP, investigates a PC-based simulator

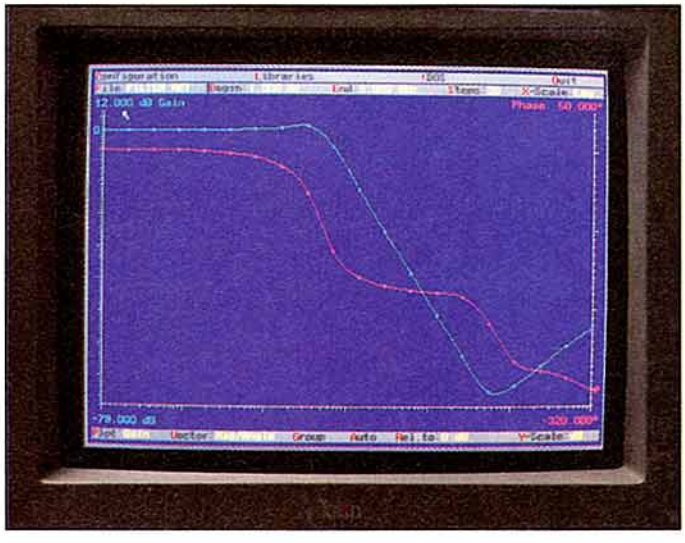
WHILE MANY constructors derive much pleasure from a 'try-it-and-see' approach to circuit design, there are times when most of us would like to adopt a more scientific approach. I was therefore pleased to have the opportunity of evaluating the latest version of a comprehensive software package from the Huntingdon-based company Number One Systems Ltd, run by RSGB member, Roger Wareham, G0GXS.



LET'S GET STARTED

MOST SOFTWARE-BASED analogue circuit simulators require a fast computer with considerable memory capacity, so it came of something of a relief to know that this one had relatively modest hardware requirements. Analyser III is a linear circuit analysis program running on industry-standard IBM-PC compatible computers, with MS-DOS version 3.0 or later. An EGA or VGA screen (preferably colour) is also necessary.

Other requirements are at least 640kbytes of RAM, and a hard disk drive. Although most features of the program can be accessed via the keyboard, a mouse is necessary to obtain full benefits from the many facilities. Most of my tests were done on an Amstrad 2086 (XT) PC, but ANALYSER III was also put through it's paces on a Hewlett Packard Vectra 486 machine. As was to be expected, the program ran much faster on the 486, although the Amstrad XT performance was quite usable. Typical screen displays are shown in the photographs.



The Analyser III will run on most types of PC.

Some readers may find the methods used to simulate circuits a little strange, but in fact they are quite easy to use after a little practice. First a 'netlist' is created, which describes the components in the circuit together with the interconnections between them. This may be directly entered from the program, or used with a separate text editor if desired. An example of how this is done given in **Table 1**.

VISITING THE LIBRARY

ONCE A CIRCUIT HAS BEEN designed, and proven to operate satisfactorily, it may be used as a 'building block' in a much larger design such as a receiver or multi-stage amplifier. For instance, a band-pass filter may be constructed from a high-pass filter followed by a low-pass one, and component values entered from the computer keyboard until the required response is obtained.

Simple or complex circuits may be entered into a library and stored in memory so that they're available for use at a later date. In this way, it's a simple matter to enter the characteristics of a different transistor or integrated circuit by simply referring to the manufacturer's data sheet. ANALYSER III already contains a selection of components such as resistors, capacitors and transistors (known as 'primitives') for use in simpler circuits.

Once the circuit has been entered, the frequency range of interest is specified. This can be any sector between 0.001Hz and 999GHz, which covers most of the amateur bands in common use! The frequency display

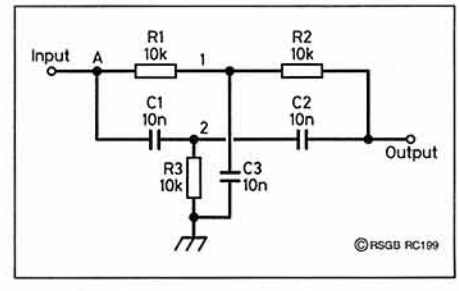


Fig 1: Circuit used to determine the response of a simple notch filter (see photograph above).

```
/R1[R]
[A=IN]
[B=1]
R:10K

#

/R2[R]
[A=1]
[B=OUT]
R:10K

#

/R3[R]
[A=2]
[B=GROUND]
R:10K

#

/C1[C]
[A=IN]
[B=2]
C:10n

#

/C2[C]
[A=2]
[B=OUT]
C:10n

#

/C3[C]
[A=1]
[B=GROUND]
C:10n

#
```

Table 1: Netlist of component values for the simple notch filter.

can be either log or linear, unless the range is less than 2:1 (eg 3.5 to 3.8MHz for 80m). In cases such as these the frequency display will be linear.

A most impressive feature of ANALYSER III is the way in which the horizontal and vertical scales of the graphical display are automatically adjusted to give an accurate readout of phase and amplitude - a professional feature for such low-priced software. Unfortunately, the range of printer drivers is limited to Hewlett Packard laser or dot matrix types - the increasingly popular inkjet printers are not supported in all respects. However I found that an adequate screen printout was possible in most cases.

Several examples are included in the manual to make sure you get the best from the program. These are especially interesting for amateurs, and it doesn't matter whether your speciality is HF, VHF, UHF or microwaves! Stripline techniques are fully supported, and you can evaluate the performance of your circuit by entering the substrate parameters and stripline dimensions. Open and short-circuit stubs are also catered for - this program is a boon for those attempting to match antennas to 50ohm transceiver outputs. Or how about a selective IF amplifier? Just see page A-6 of the manual and off you go!

A PRACTICAL APPLICATION

I THOUGHT IT WOULD BE interesting to try out a practical application - in this case a simple 1.5kHz notch filter, with the phase and amplitude response shown in the photograph. Incidentally, this example along with many others can be accurately simulated from the library software. **Fig 1** gives the circuit diagram for the notch filter. Study this carefully, and compare it with the net list given in Table 1. HF types might like to try the circuit of **Fig 2**, but if the response isn't quite what you need then you can easily enter the parameters of a different RF transistor.

Note how the inputs, outputs and nodes (signal points) are detailed, along with the values of the components such as resistors and capacitors. Should you require a slightly different frequency or phase response, then this is easily incorporated by changing the value of one or more components in the netlist and running the program again. In just a few seconds (depending on the speed of your PC), you will have a new set of response curves.

HAPPY CONCLUSIONS

FOR FIRST-TIME USERS OF this type of program, a comprehensive but easily understood manual is a must - and Analyser III leaves little to be desired in this respect. Users are first given an overview of it's capabilities, and then taken on a 'grand tour' of the many high-performance features.

Although there is not enough space to mention all of the many useful features of Analyser III, I hope that this review will give an insight into the vast range of possibilities that software simulation has made possible. For those of you who wish to progress further, Number One Systems Ltd can also supply Smith Charts and a PCB design program (EASY-PC).

There's really no need to 'run before you can walk' with this software. Start with, say, a simple RF amplifier and you'll soon get a feel for something more advanced! For electronic engineers and constructors alike, Analyser III provides a fascinating insight into cost-effective circuit design for the 1990s.

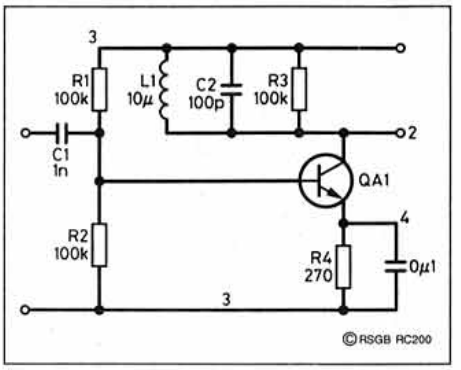


Fig 2: This amplifier exhibits a peaked band pass response centred at about 5MHz.

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RADCOM TECHNICAL FEATURE

RX84 Advanced HF Receiver

The third of a five part project by Tommy E Bay, OZ5KG

AS STATED IN Part 1 this is an advanced project incorporating the latest developments in HF receiver technology. It takes information and inspiration from many sources, any one or more of which could be included in your receiver or transceiver design. The article concentrates on the signal handling aspects of the design and gives detailed circuit details and working descriptions.

The synthesizer and control microprocessor used in the described design are commercial products so are described at block diagram level only.

The switched mode power supply used in the original design will not be described because of the safety aspect regarding this type of circuit but the DC power requirements will be given.

In the first part of this article we considered the design of the RX84 as a whole and in the second part we looked at the front end of the receiver in detail. Now for the IF stages.

THE THIRD IF AMPLIFIER AND AGC AMPLIFIER

THE THIRD 1MHz AMPLIFIER characteristics are shown in **Figs 10 and 11**. The use of a third IF after the selectivity determining filter IF might be questioned. It is used for two reasons. The first is to prevent the product detector beat-oscillator IF-leakage into the amplifier ahead of the filters. Also it is easier to construct detectors at lower frequencies.

The 9MHz signal from the second IF is converted to 1MHz in the SBL-1 balanced mixer with an 8MHz signal from the second synthesizer.

The two MC1590 amplifiers, feed a CA3001 driving a small power-amplifier. This circuit provides three low-distortion outputs of up to several volts, reasonably well isolated from each other by the very low internal impedance of the amplifier.

One of the outputs drives the product detector, which is a normal diode ring mixer. Another output feeds the FM-detector and the third one drives the AGC-detector.

The AGC circuit is shown in **Fig 12**. The signal level performance (Fig 10) and was measured using a signal generator at 10MHz, AM, 30% modulation. The AGC has a fast attack-time of about 15 milliseconds, a hold-time, which can be chosen to be either 0.5 to 1 second or about 2.5 seconds. The decay time is about 2 – 300 milliseconds. This AGC-circuit has been in operation for many years in our old receiver, and operates very well.

An AGC test is shown in Fig 11(a) with the AGC control switched to SHORT HOLD. An input signal is made jump from about 20dB/µV to about 75dB/µV and back again after one second. In Fig 11(b) the AGC control is switched to LONG HOLD and a 75dBµV signal is applied and removed again after about two seconds. The 'knees' at the bottom of the curves are a function of correcting the AGC circuit non-linearity. This changes the linearity errors into time constant errors.

Recently developments in AGC design (not yet tried in this design) use diode-switched banks of fixed attenuators (for instance 1, 2, 4, 8 and 16dB), placed at suitable positions along the receiver path, and controlled by a window discriminator. This way of obtaining perfect gain distribution, and a very exact S-meter reading can be obtained simply by summing up the amount of attenuation switched in.

THE IF FILTER MODULE

THIS MODULE (**FIG 13** overpage) contains the main selectivity determining circuits of the receiver. This 9MHz second IF stage uses four, eight-poled KVG-filters, which are switched in cascade depending on the required selectivity. At maximum bandwidth (7.5kHz), all the filters in this module are switched out and the selectivity dependent on the only filter active in this mode, namely the 41MHz filter in the input module.

When the CW-mode is selected, the incoming signal goes through all four filters.

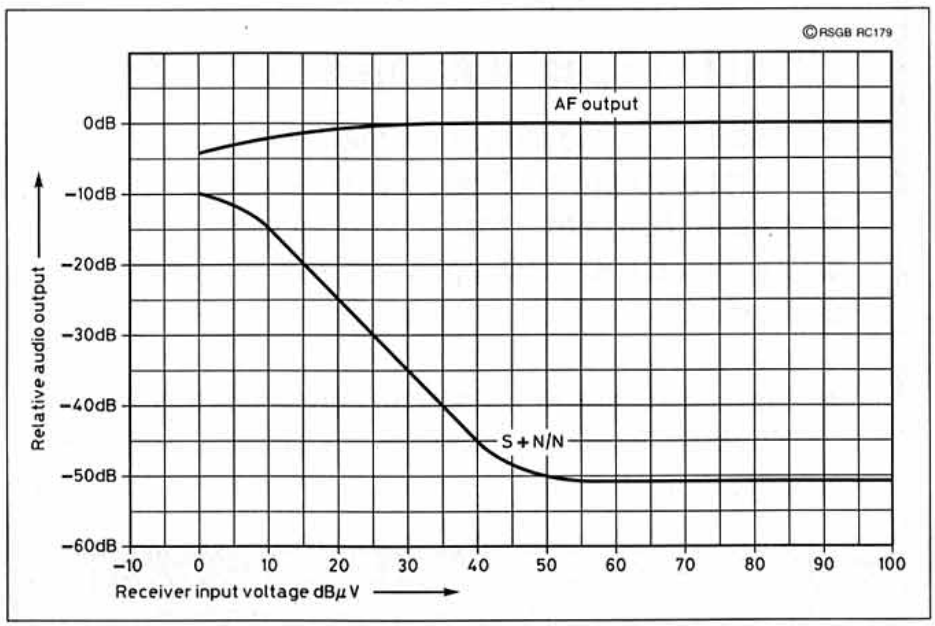


Fig 10: AGC signal level characteristics.

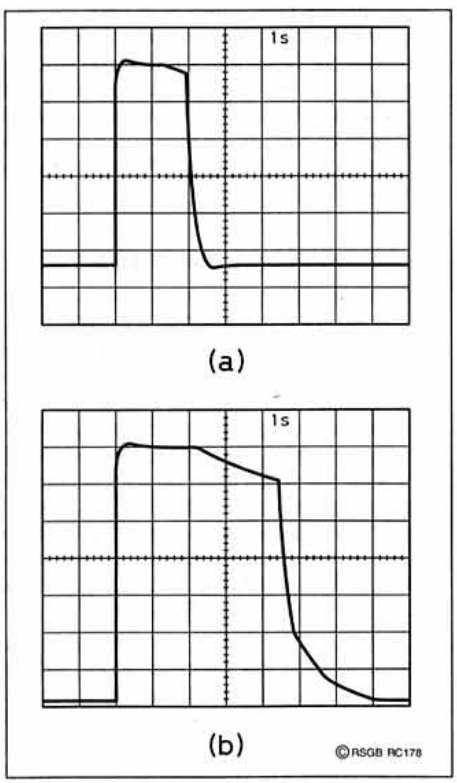


Fig 11: The AGC attack, holding and decaying characteristics.

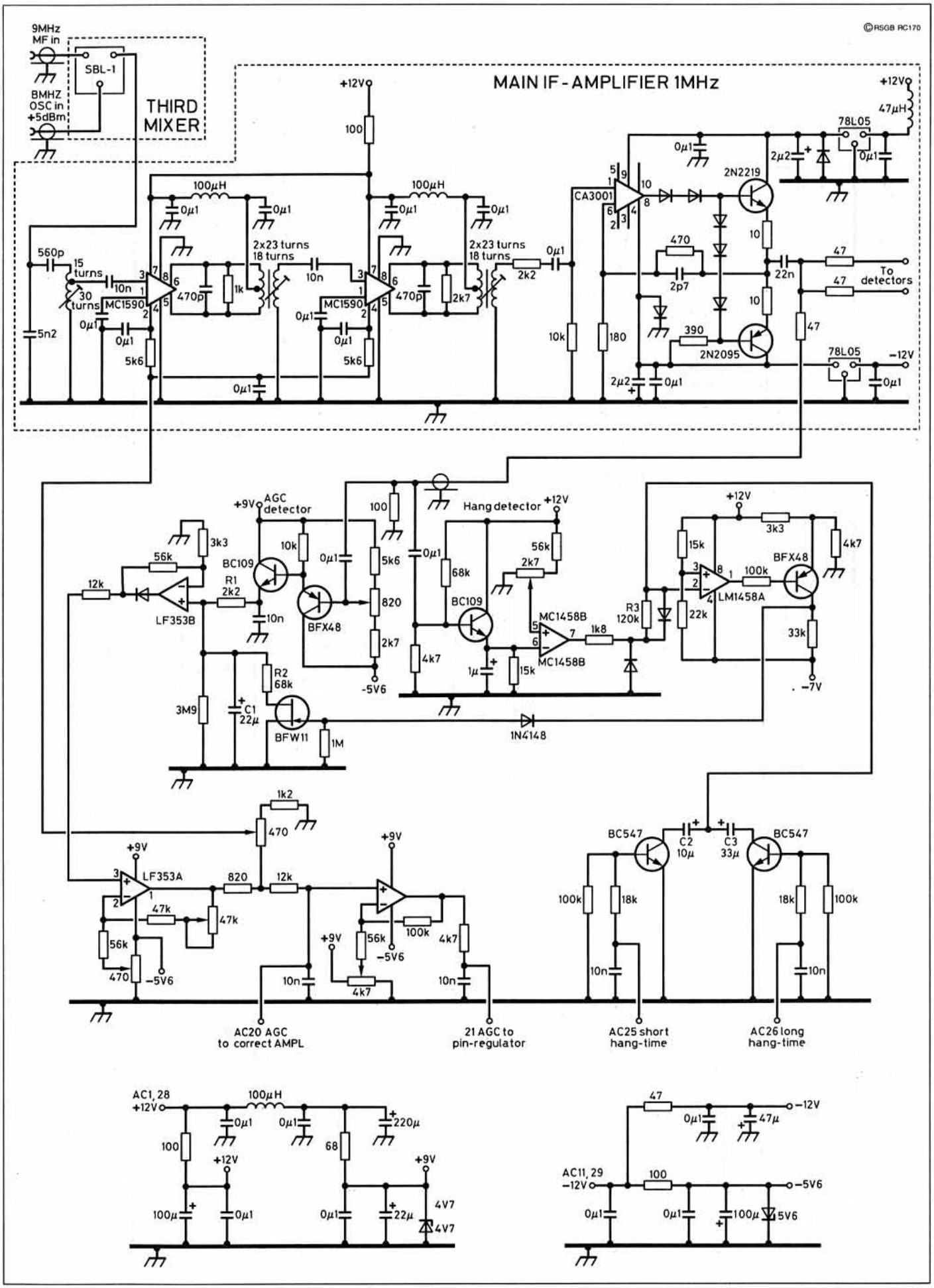


Fig 12: IF amplifier & AGC, circuit diagram.

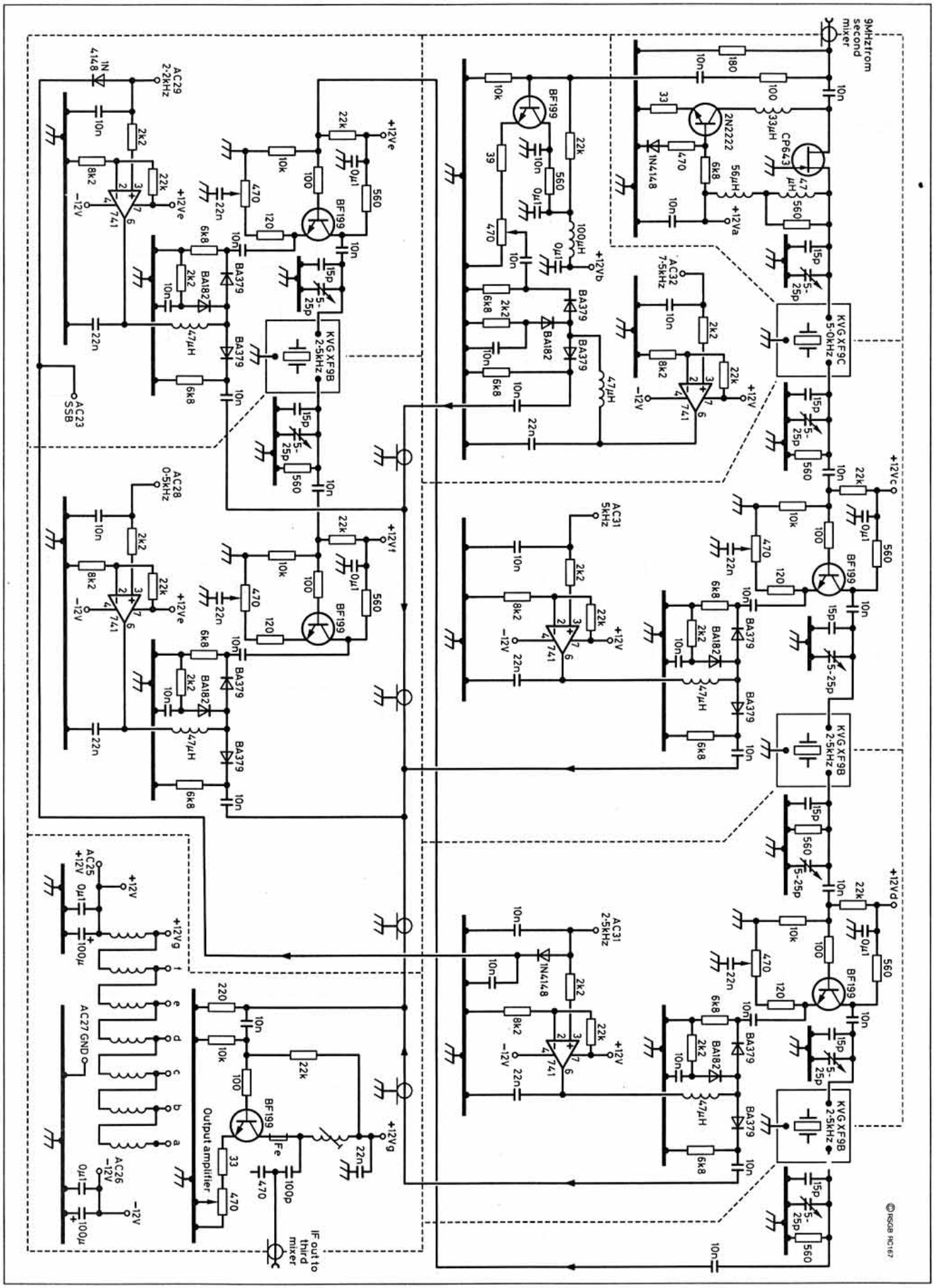
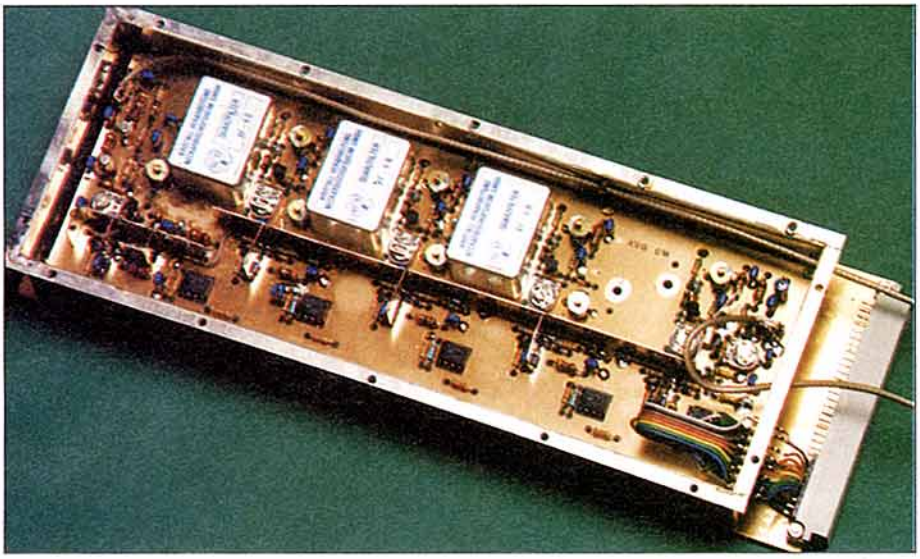


Fig 13: IF filter unit, circuit diagram.



The filter module. Some of the screening has been removed to show the component layout.

The first three filters have 100dB stop-band characteristics. Cascading the filters, tends to make the preceding, wider filter, suppress the side lobes of the following, narrower filter. (see **Fig 14**).

Selecting the various filter bandwidths is performed by PIN-diode switches which route the signal from the emitter of the buffer of the filter to be selected. Quite obviously a major problem is IF-signals leaking through the switches and wiring. Extensive shielding, partly visible in the photograph, was found to be necessary to overcome this problem.

The device used in the first amplifier of the filter module is a CP643, because of its fine IMD-performance and also because its input impedance is close to 50Ω over a very large bandwidth. We did find some small impedance variations at the CP643 input caused by interaction from the impedance variations of the succeeding filter. The 7.5kHz filter must be correctly terminated otherwise the group delay distortion across the 7.5kHz filter pass band would be unacceptable. This is important when all the second IF filters are switched out in the 7.5kHz bandwidth position.

Buffer stages are provided to separate the filters. These serve to compensate for filter losses while at the same time providing correct matching of the filter impedances. Compensation gains of the individual filter buffers are achieved using variable emitter resistors.

Ideally, the two 2.5kHz SSB-filters, which are connected together to operate as one 16-poled filter, should be obtained from the same production line. Differences in the filters will make it impossible to adjust the ripple in the pass-band to a sufficiently low level.

The module noise figure, is only about 15dB. This is another reason for the high gain in the input module (19dB). The gain is adjusted for 0dB regardless of the chosen bandwidth, using the variable emitter resistors.

NOTE

THE RX84 IS AN ADVANCED project incorporating the latest developments in HF receiver technology. It takes information and inspiration from many sources, any one or more of which could be included in your receiver or transceiver design.

Although this is a complete receiver project it is not a detailed construction article and does not have designed printed circuit boards component lists.

With this design there is space in the cabinet sufficient for the transmitter modules so that the receiver can be changed into a transceiver at some future date.

. . . to be continued

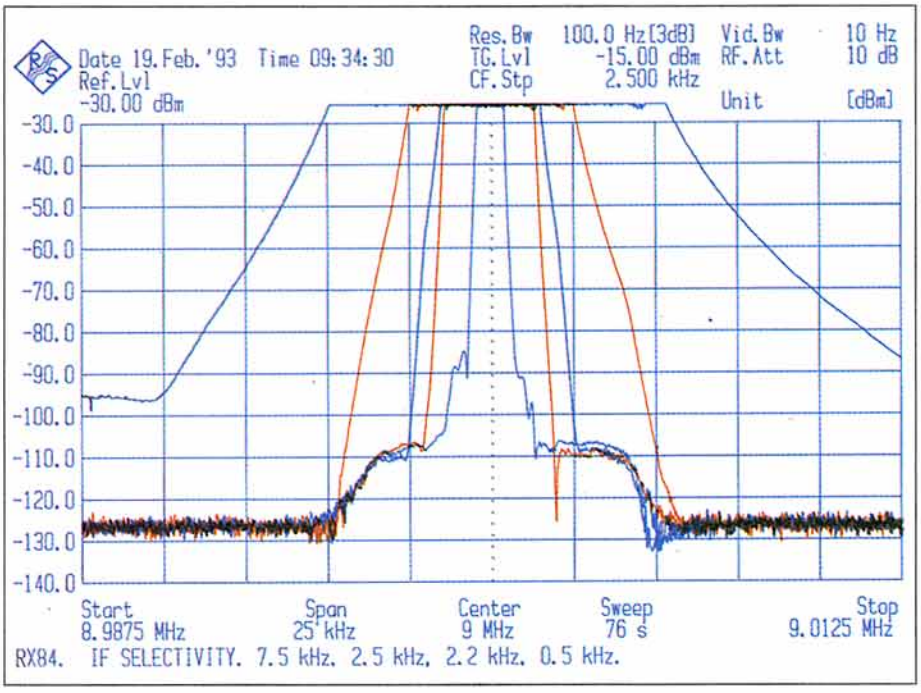


Fig 14: 9MHz filter characteristics. The 7.5kHz, 2.5kHz, 2.2kHz and 0.5kHz filters are cascaded.

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PRODUCT NEWS

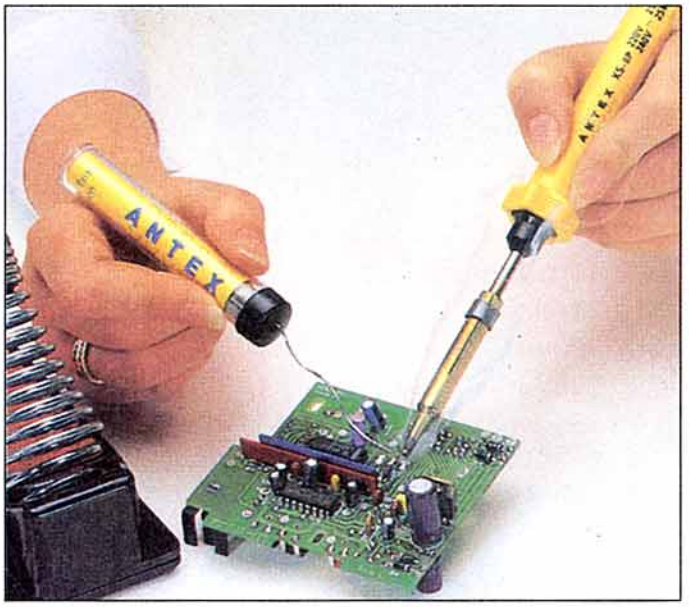
Note: Product news is compiled from press releases sent in by the manufacturers and distributors concerned. Details are published in good faith but *Radio Communication* cannot be held responsible for false or exaggerated claims made in the source material.

THE INTERNATIONAL Short Wave League has published the *Guide to English Language Short Wave Broadcasts to Europe - Summer Schedules 1994*. The 33-page booklet costs £1.30 or 2 IRCs, post paid.

ISWL, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

LAST RESORT Records are releasing a CD entitled *ICQ*. One of the tracks, *Monday Evening Grayline*, tells the sad story of a radio amateur whose marriage is breaking up - just because he took part in a 48-hour contest! Other tracks include: *I'm Not Climbing up the Tower Any More,* and *He's Always on the Air*. The songs are written by Andrew John Huddleston, (G3WZZ, OZ1XJ) were recorded in Nashville by him and XYL, Lissa.

Last Resort Records, Moellestien 53, DK-8000 Aarhus, Denmark. Tel: 011 45 86 130632.



IF YOU ARE interested in home construction, then you know how important it is to be able to solder properly. **Antex (Electronics) Ltd** produce an excellent leaflet entitled *An Introduction to Soldering* which includes sound advice on the practice of soldering, and some very good illustrations explaining about solder and the various bits for your iron. If you would like one of these leaflets, or any other information about soldering irons, contact them direct at:

Antex (Electronics) Ltd, 2 Westbridge Industrial Estate, Tavistock, Devon PL19 8DE. Tel: 0822 613565; Fax: 0822 617598.

THE NEW **TEN TEC ARGO** TRANSCEIVER, is a low power (5W) version of the popular Ten Tec 50W Scout reviewed in RadCom Nov 93. It looks identical to the Scout, but the original specification has been improved. The Argo is priced at £539 inc VAT – £60 cheaper than the earlier Scout – and this includes the 40m module. Modules are available as optional extras covering every band from 160m to 10m at £39.95 each. Definitely a rig to check out for the QRP enthusiast and the Novice. The Argo is available from Waters & Stanton who have just been appointed the sole UK distributor by the Cushcraft Corporation, so will now be stocking their highly successful range of VHF and HF vertical antennas and beams.

Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: 0702 206835.

A DEVELOPMENT which may interest readers is a new teletext system being tested by the Norwegian Broadcasting Corporation. Developed by Teltex AS, ConCept3 is a high definition text system based on a new standard CEPT3 (the present system, CEPT1, was pioneered by British Telecom in the 1970s).

Compared to what is presently available on European TV, ConCept3 has twenty times the resolution (480 x 230 picture elements) and 600 times as many colours, allowing designers greater scope with complex graphics and different languages. Teltex market the CEPT3 decoder required for the new system.

Enquiries to: Thomas Groth, Teltex AS, PO Box 9166 Grønland, 0134 Oslo, Norway. Tel: +47 22 171190; Fax: +47 22 171620.

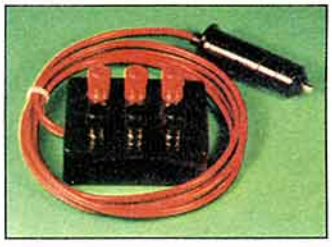
THE **TIM BOX** is a super gadget for connecting all your mobile communications equipment to your vehicle's power supply. Designed specifically to power handhelds and linear amplifiers up to 40W, it is also ideal for most mobile rigs.

All you do is plug the box into your vehicle's cigar lighter socket, then connect your equipment to the Tim Box terminals direct or by using four-millimetre banana plugs.

The cigar lighter plug has a built-in fuse to protect against accidents but, of course, all power leads should still be fused.

The unit is available by mail order only and costs just £13 including postage and packing. Cheques should be made payable to T R Bridgland-Taylor.

Tim Box, J P Micro Services, Unit 5, Churchward Trading Estate, Barrs Court Road, Hereford HR1 1EN. Tel: 0432 355155; Fax: 0432 354154.



RADCOM TECHNICAL FEATURE

Tone Modulated HF Impedance Bridge

Concluding a project by E Chicken, MBE, G3BIK

A SELECTION OF LOW-VALUE capacitors is required, (10, 33, 47, 100, 150, 220, 330, 390, 470pF) preferably close-tolerance silver-mica or polystyrene, but low-voltage metallised ceramic would suffice in the interests of economy at a slightly reduced overall accuracy. Also required is a selection of low-value resistors, (10, 33, 51, 75, 100, 150, 200, 240, 270Ω carbon film 1/3 watt). The photograph shows, for guidance only, typical calibrated R and C dials.

Calibration is simple, and requires no specialist test equipment.

1 Set frequency-compensation trimmer capacitor VC2 to its minimum mesh.
2 Set all four trimmer sections of VC1 to minimum mesh.
3 Connect an AM/SSB receiver to the bridge Rx terminals.
4 Switch on receiver and tune to about 3.5MHz, AM or SSB.
5 Switch bridge to NOISE. This also switches the bridge ON. The random-noise sound will be heard from the receiver audio.
6 Switch bridge from NOISE to TONE. A 1kHz tone will be heard on AM, but may not be pronounced on SSB unless the receiver has a variable BFO. The random-noise will still be audible.

Calibration of Variable Resistor RV1 for the Resistive Component R of the Unknown Impedance.

7 Connect the 51Ω resistor to Z terminals.
8 Adjust RV1 and VC1 controls to obtain the sharpest null in audio-noise.
9 Draw a short radial-line on the VC1 dial-label at the Null position. This will be at or about mid-way of the control's movement.
10 Write 51 on the RV1 dial at the Null position.
11 With the VC1 dial still at its mid-mark, replace 51Ω external resistor by 10Ω and readjust RV1 for Null.
12 Write 10 on RV1 dial at the new Null position.
13 Repeat steps 12, 13 with resistors 33, 75, 100, 150, 200, 240 and 270Ω, writing the resistor value on RV1 dial at each new Null position.
14 Write the letter R in bold print on the RV1 dial.

Calibration of Variable Capacitor VC1 for the Capacitive Reactance Xc component of the Unknown Impedance

15 Connect one wire of the 51Ω resistor to the earthy Z terminal.
16 Connect 100pF capacitor between the 51Ω free-wire and the other Z terminal (ie in series with C6).
17 Adjust RV1 and VC1 controls for sharpest Null. RV1 dial should still read 51.
18 Write 100 on VC1 dial at its new Null position.
19 With RV1 knob still at its 51 dial-mark, repeat steps 16-18 using capacitors 10, 33, 47, 150, 220, 330, 390, 470pF. Write pF value ie 10,33 etc on VC1 at each new Null position.
20 Write XC in bold letters on the now calibrated Capacitive Reactance sector of the VC1 dial.

Calibration of Variable Capacitor VC1 for the Inductive Reactance XL component of the Unknown Impedance.

21 Connect 51Ω resistor across Z terminals.
22 Solder 100pF capacitor across C6.
23 Adjust VC1 and RV1 for sharpest Null in audio. RV1 dial should still indicate 51.
24 Write 100 on VC1 dial at the Null position, in the clean sector.
25 Repeat steps 22-24 using capacitors 10, 33, 47, 150, 220, 330, 390, 470pF. Write the pF value ie 10, 33 etc on VC1 dial at each new Null position.
26 Remove final test capacitor from across C6.
27 Leave 51Ω resistor connected across Z terminals.
28 Write XL in bold letters on the now calibrated Inductive Reactance sector of the VC1 dial.

Adjustment of frequency-compensation trimmer capacitor VC2.

29 Adjust RV1 and VC1 for sharpest Null. RV1 dial should read 51. VC1 dial should be at its mid-mark.
30 Re-tune receiver to about 28MHz.
31 Re-adjust RV1 and VC1 for sharpest Null.
32 If VC1 Null is still at or about mid-mark, calibration is complete.
33 If VC1 Null does not acceptably coincide with mid-mark, frequency compensating trimmer capacitor VC2 needs to be adjusted. Trimmer VC2 was initially at its minimum-mesh position of circa 2pF.
34 Set VC1 dial to mid-mark. RV1 dial is still at 51.
35 Adjust VC2 trimmer capacitor for Null with dial at mid-mark. VC2 will now be partly or fully meshed ie at about 5-10pF. It will never need to be touched again.

Calibration is now complete. The bridge is ready for use.

USE OF THE BRIDGE

THE RECEIVER IS SET to AM or SSB and tuned to the frequency of interest, with the bridge switched to NOISE or TONE. With the unknown impedance connected to the Z terminals of the bridge, RV1 and VC1 are simultaneously adjusted until a sharp null is obtained in the receiver audio level of noise or tone-modulated noise.

The value of the unknown impedance is then derived from the dial readings of RV1 and VC1. The RV1 dial reading is the value in ohms of the resistive component R, but the reactive component XΩ must be calculated using the VC1 dial reading in pF and a knowledge of the frequency in use.

Readings on the XC side of the VC1 mid-mark mean that the reactance component of the unknown impedance is Capacitive, and the dial pF reading at null is the actual value of the Capacitance component of the unknown impedance. Capacitive Reactance Xc is then calculated using the standard formula:

$$Xc \text{ ohms} = 10^6 / 2\pi f C_d$$

where C_d is the dial reading in pF in the X_c sector = 10 – 470

and f is the frequency in MHz

Dial readings on the XL side of the mid-mark mean that the reactance component of the unknown impedance is Inductive. Its value can be calculated using a formula which is based on two capacitance values, ie the pF value given by the X_L sector of VC1 dial, and the fixed value of C6. This formula is derived from a knowledge that:-

1 The inductive reactance X_L of the unknown impedance is effectively in series with the capacitive reactance X_{C6} of the fixed capacitor C6.
2 Inductive and Capacitive reactances in series are arithmetically additive
3 At balance, the combined Reactance of $X_L + X_{C6}$ is equal to the total capacitive reactance that was in the unknown impedance section of the bridge during calibration ie (C6 + C_d) where:

C_d = capacitor across C6 during calibration

= the value in pf on X_L dial indicated by Null

Therefore, at balance

$$X_L + X_{c6} = X\,(C6 + C_d)$$

$$X_L = X\,(C6 + C_d) - X_{C6}$$

$$= (1/2\pi f(C_6 + C_d) - 1/2\pi f(C_6)$$

$$= (1/2\pi f) \times \left[\frac{1}{(C6 + C_d)} - \frac{1}{(C6)}\right]$$

Hence Inductive Reactance = X_L ohms

$$= \frac{10^6}{2\pi f} \times \frac{-C_d}{C6\,(C6 + C_d)}$$

where C_d is the dial reading in pF

in the X_L sector	= 10 – 150
C6 in pF	= 150
π	= 3.142
f = frequency in MHz	= 1 – 30

The negative sign in the numerator can be ignored because only the magnitude of the calculated reactance is used. It gives the ohmic value of the Inductance Reactance X_L.

And as the usual formula for Inductive Reactance is:

$$X_L = 2\pi f L$$

it follows that the actual value of series inductance in the Unknown Impedance circuit is:

$$L\mu H = X_L / 2\pi f$$

where X_L is the value calculated from above

and f is the frequency in MHz

The impedance bridge can be used to measure the Resistance and Reactance components of impedance in circuits such as those formed by low-value R, C and/or L in series, at any frequency in the HF band 1 – 30MHz. It can also be used to measure capacitance and inductance in the pF and μH range, but its most popular application is the measurement of feed-point impedance of balanced antenna systems such as dipoles or beams.

More specifically, it is used as an aid to impedance matching of such an antenna to the characteristic impedance of its feeder cable, by adjusting the antenna to resonance. In that application, the impedance at resonance is purely resistive so the VC1 dial is set to its zero-reactance mid-way mark and RV1 is set to the value of characteristic impedance of the feeder cable, typically 50Ω or 75Ω. The antenna is then adjusted by its gamma-matching stub, or by its length, or element spacing, or maybe even by its height above ground, until the Null occurs at the chosen setting of RV1. The bridge can be used with either balanced or unbalanced antenna-fed systems.

But the bridge can only measure the impedance of a circuit at the point of connection to its Z terminals. It therefore cannot measure the feed-point of an antenna which is at the remote end of a feeder-cable, because the cable itself modifies the impedance as seen from the bottom end of the feeder. Except in the one very special case when the feeder-cable is exactly one or more electrical half-wavelengths long, the effect of which is that the impedance at the remote end is reflected faithfully back to the input end of the feeder. So to measure the feed-point impedance of a dipole or beam antenna it would be necessary to connect the bridge to the antenna by a length of feeder-cable of the appropriate characteristic impedance (eg 50 or 75Ω) and of length equal to one or more electrical half-wavelengths at the frequency concerned.

As far as the bridge is concerned, it then behaves as if connected directly to the feed-point of the antenna, and so measures antenna impedance as though the feeder-cable did not exist.

From a practical standpoint, it would be better to extend the length of an existing feeder cable using suitable plugs and in-line coupling adaptors, rather than shorten the cable.

The electrical wavelength of a transmission line such as coaxial or balanced-twin feeder is different from the free-space radio half-wavelength. It depends upon the velocity factor of the particular cable, which is typically about 0.66 (say 0.7) for solid dielectric coax, 0.8 for foam-dielectric and 0.9 for twin feeder. The electrical half-wavelength is given by (150/fMHz) x velocity factor. For example, the electrical half-wavelength at 10MHz of a typical coaxial cable would be about (150/10) x 0.7 = 10.5m as compared with the free-space wavelength of 15m.

With the receiver tuned to the frequency of interest, RV1 and VC1 are then adjusted for sharpest null. The dial-reading of RV1 is the ohmic value of resistive component R in the antenna impedance.

The dial-reading in pF of VC1 on either side of its mid-mark is used to calculate the reactive component X_c or X_L of the antenna impedance at the frequency in use, using the formulae given earlier in this section. A null in the XC sector of VC1 dial means that the reactance component of the impedance is Capacitive, and the pF reading on the dial is the actual series capacitance of the antenna. Capacitive reactance means that the antenna is too short and both arms need to be lengthened by equal amounts until the null is moved to the zero reactance mid-way mark on the CV1 dial.

Similarly, an Inductive reactance means that the antenna is too long, so its arms must be shortened by equal amounts until the null moves to mid-mark on the VC1 dial. Unlike the antenna Capacitance which is read direct from the dial, the antenna Inductance LμH has to be calculated from the value of Inductive Reactance X_L previously derived.

FOOTNOTE

For those members contemplating making *accurate* measurements of complex impedances, such as those required to construct close-spaced phased arrays, the following articles from the US are strongly recommended – particularly the last two.

[1] 'Improvements to the Rx Noise Bridge', *Ham Radio*, Feb 1977.

[2] 'An Accurate RF Impedance Bridge', W N Caron, *ARRL Antenna Handbook* (***15th edition***).

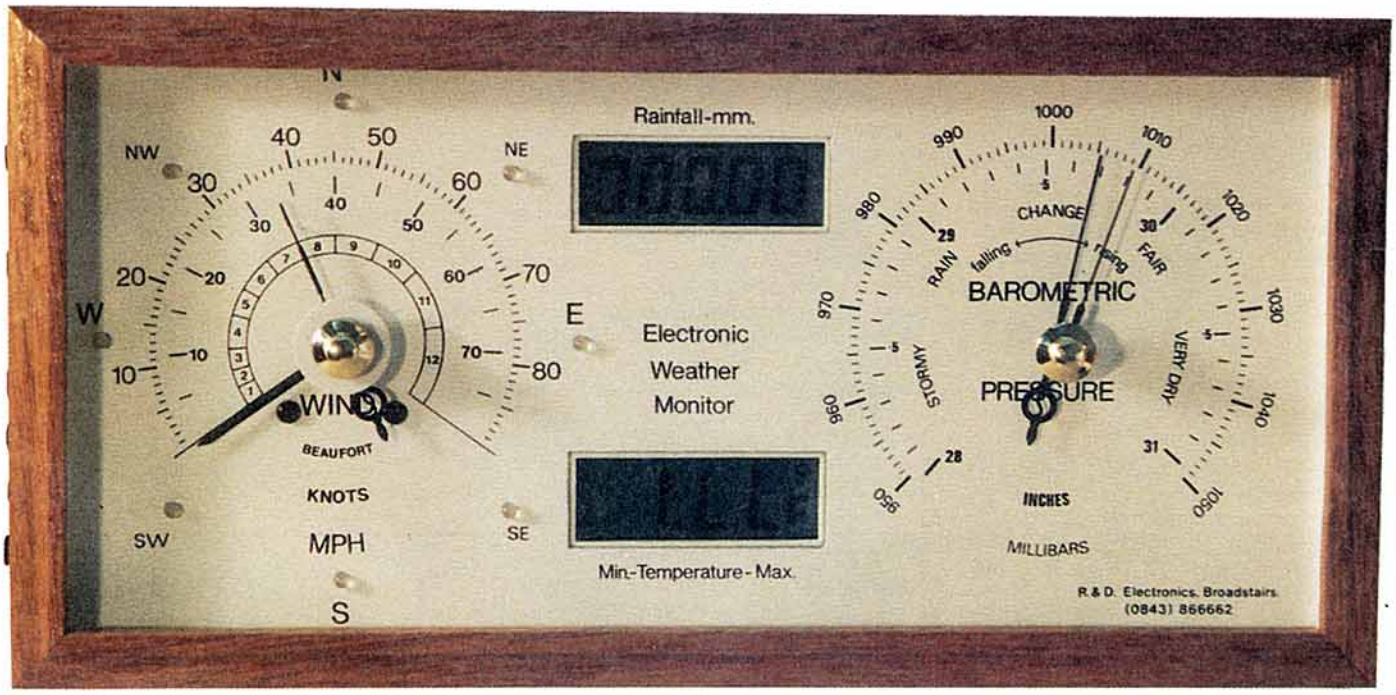
[3] 'A Simple and Accurate Admittance Bridge', W N Caron, *Communications Quarterly*, Summer 1992.

Also, at this year's RSGB International HF & IOTA Convention (see page 44) Bob Whelan, G3PJT, will be talking about phased arrays and the construction of equipment to measure complex impedances accurately – essential for close-spaced arrays.

RADCOM USER REVIEW

Electronic Weather Monitor

reviewed by RSGB HQ Staff



THE MOST COMMON VHF/UHF long range DX propagation occurs due to changes of refractive index within the troposphere. This refractive index does not does not always vary smoothly with height; discontinuities occasionally occur, forming a layer in which refraction is much greater than elsewhere.

One or more of these refractive layers will give rise to enhanced VHF/UHF propagation and their presence can be indicated by weather patterns. Forecasting tropo openings is no easier than forecasting the weather itself and good VHF/UHF conditions require a large, stable high-pressure area with light winds.

CATCH THE TROPO

AS AN AID TO catching these tropo openings some type of weather monitoring equipment is very useful. R & D Electronics manufacture a range of monitors which provide the necessary data to keep a weather eye open for good VHF/UHF conditions. They can also help anyone with a large aerial system to be prepared for potentially damaging winds.

The monitors comprise two parts: a display unit housed in a small mahogany and glass cabinet, and sensors which are mounted externally.

At RSGB HQ we have been using the BDSTR Weather Monitor for over three weeks to check the weather conditions. Those of you who visited RSGB HQ on Open Day may have noticed it in the corner of the *RadCom* production office. You may also have noticed that we had over 3mm of rain that day even though the barometric pressure was over 1010 millibars.

SIMPLE INSTALLATION

THE DISPLAY UNIT and the sensors were simple to install and the instructions clear and easy to follow. The power requirement is an AC or DC supply of between 12 and 24 volts. Our unit was supplied with a 240/12 volt mains transformer.

At first glance, the four-page A5 *Installation and Operating Instructions* seemed somewhat inadequate. However, it included all that is needed to install and use the monitor, explained in very simple terms and with several helpful illustrations. No knowledge of meteorology is required.

The main sensor unit, containing the windspeeed indicator, wind direction and temperature sensors, was mounted on a short pole at the corner of the building. This placed it away from any obstructions which may have caused local wind turbulence.

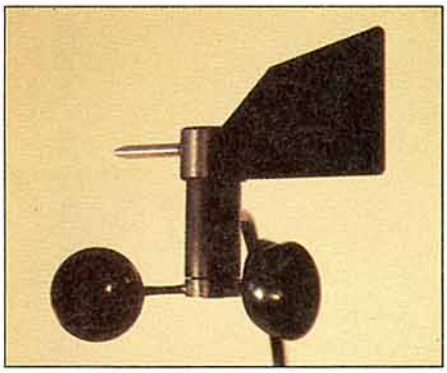
Two 25m lengths of cable are supplied with the Monitor, one for the wind sensor and the other for the rain gauge. The cables were run from the sensors on the roof to the display unit indoors. No difficulty was experienced making the connections as the wires are colour coded and fit into convenient screw connectors. The rain sensor was placed in the centre of the flat roof of the HQ building, some distance from other obstructions.

INDICATORS

THE DISPLAY UNIT indicators were found to be clear and simple to understand, with wind speed, gust speed and barometric pressure indicated by pointers. The wind speed is calibrated in MPH, knots and Beaufort scale up to a maximum of 90MPH. A carry-up gust pointer records maximum wind speeds and is reset by hand.

Wind direction is displayed by eight yellow LEDs positioned around the wind speed dial. The electronic circuit eliminates rapid fluctuations due to local wind turbulence. When the wind direction is between two points adjacent lamps light together, thus giving a 16 point resolution.

The barometric pressure is indicated by an aneroid barometer calibrated in inches of mercury and Millibars. A handset pointer is



The wind speed and direction sensors.

provided so that small pressure changes and trends may be observed.

External temperature is shown on a LCD display, giving a resolution of 0.1 degree, with maximum, minimum, centigrade and Fahrenheit, being selected by push buttons on the side of the unit.

Rainfall is recorded by an LCD display counter in 0.01mm steps from a highly sensitive, self emptying rainfall sensor (it actually counts rain flow).

INTEREST

THE WEATHER Monitor is very attractively housed and it would look good on the shack wall, or even in the lounge. Although useful for a number of amateur radio purposes as indicated earlier, we found that in the short time the Monitor was installed at HQ our interest in the weather itself increased which we found to be a bonus.

Prices range from £199.00 for the DS Weather Monitor (wind monitor only) to £699.00 for the WS-PLUS Weather Station which has three dials and four LCD displays. In all there are six models available and each can be customised, for instance to display in metric or imperial units. A 'fiddle-proof' version is also available for schools. The review model is priced at £269.00.

A wind gust alarm can be added as an optional extra. This is a relay with a pair of contacts that close when the wind speed exceeds a pre-set value. It can be used for sounding an alarm or, for the ambitious, lowering the antenna mast when the weather gets a bit too exciting.

All enquiries should go to: R & D Electronics, Beaufort House, Percy Avenue, Kingsgate, Broadstairs, Kent CT10 3LB; Tel: 0843 866662, Fax: 0843 866663.

WIN THIS MONITOR

THE BDSTR Weather Monitor described above is worth £269.00 and you can win the review model simply by estimating the amount of rain which will fall on the roof of RSGB HQ during July. Send your estimate (in millimetres please) to: RadCom Weather Competition, RSGB, Lambda House, Potters Bar, Herts EN6 3JE, arrive **before Friday, 15 July**. The winner will be notified by post and will be announced in September's *RadCom*.

MANUFACTURER'S SPECIFICATION

General

Power requirements	12-24VAC (12V AC mains transformer supplied with some models)

Wind Direction

Typical accuracy	± 20°
Resolution	16 points (22.5°)
Threshold	1.5ms, 3 Knot, 3.5MPH or 5km/h
Damping delay	1 second

Wind Speed

Max speed indicated	80 Knots, 90MPH or 145km/h
Typical accuracy	± 7.5% or 3 Knots (whichever the greater)
Resolution	better than 1 Knot
Indicator response time	>300ms (to 60% of final reading)

Temperature

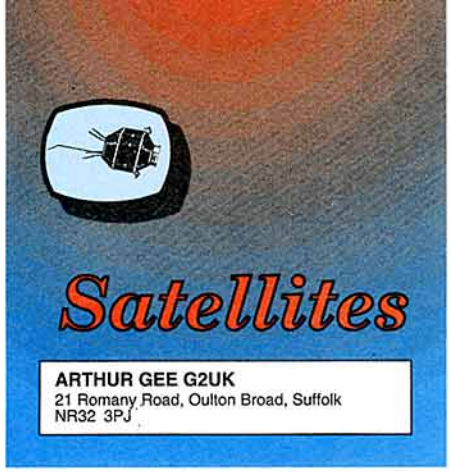
Range	–40 to +50°C (–40 to 120°F)
Resolution	0.1°C or F
Accuracy	± 0.5°C (1°F)

Barometer

Range	950 – 1050mB

Rainfall

Typical accuracy	± 5% (5ml water = 1mm rainfall)
Resolution	0.01mm



Satellites

ARTHUR GEE G2UK
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NR32 3PJ

WHEN COMPILING this column, I have tried to interest those readers who have not 'got into satellites' as they say, rather than concentrate on the 'top end' of satellite activities; viz the MicroSats and all the high technology which has now been made possible. There is, however, one complex project which deserves attention.

As amateur radio satellites developed from simple beginnings to today's ever more complex 'birds', plans for future development became more and more ambitious. After the successful satellites, known as the Phase 3 series, a most sophisticated concept known as Phase 3-D was conceived, and planning and early constructional features were formalised. This was to be a satellite which would initiate 'A New Era of Amateur Radio'. It was planned to be a world-wide joint effort of amateur radio, due for launch in 1990.

The initiative for this project came from AMSAT-DL, the German equivalent of AMSAT-UK. AMSAT-DL was founded in 1973, following the setting up of the North American satellite organisation AMSAT. After the success of low-flying satellites OSCAR 6, 7 and 8, a new series designated Phase C was built. These were designed to give world-wide amateur radio communication. The first of these was lost in 1980, through a launch failure. The second was successfully launched in 1983 when it was designated OSCAR 10 proving very successful. The Phase 3-D project then came on to the scene, to be the first of a new class of larger satellites which would be accessible by low powered amateur radio ground stations throughout the world.

It was appreciated from the start that this project would be a high cost one necessitating fund raising efforts throughout the world.

FINDING THE FUNDS

Of the various ideas for getting the necessary funds for this project so far, most seem to have fallen short of their targets. It was unfortunate that the recession both here and in America began to make itself felt at the same time that the Phase 3-D fund-raising schemes were launched. However, like many such schemes, Phase 3-D has got off to a good start, with large sums of money being donated or promised. Unfortunately, as the project has progressed and innumerable difficulties have arisen due to the magnitude of the project, enthusiasm has waned somewhat. Furthermore, the concept of Phase 3-D has become rather overshadowed by the MicroSat concept in which smaller and less expensive satellites have arrived on the scene and become the trend for the future.

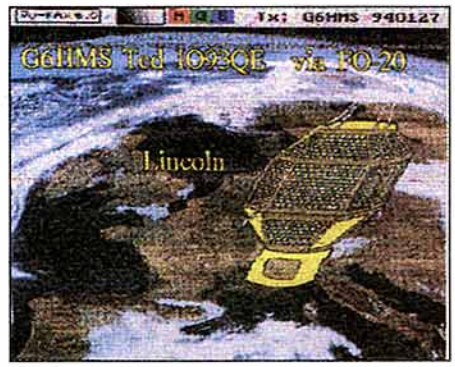
CURRENT PROGRESS

Good progress is now being made in agreeing concepts and in the construction. During the week of 10–16 February, Dr Karl Meinzer, DJ4ZC (AMSAT-DL President and Project Leader for the International Phase 3-D satellite) and Werner Haas, DJ5KQ (Vice-President of AMSAT-DL), hosted a working meeting in Marburg, Germany, to discuss recent progress on the project. Agenda items centred primarily around the spacecraft's electronic systems, including the on-board computer (IHU) and the RUDAK systems, as well as the progress now being made by team members on the spacecraft's other electronic modules.

Dick Jansson, WD4FAB, AMSAT-NA Vice-President for Engineering, also attended the meeting, principally to discuss various aspects of the satellite's structure with Dr Meinzer and Konrad Mueller, DG7FDQ. He reported on the good progress of the flight model structure's construction, currently under way at Weber State University in Utah.

In a host of other issues, Daniel Orban, ON4AOD, discussed details of the 24GHz transmitter; Konrad Hupfer, DJ1EE, reported his progress in building the 150 watt U-Band (70cm) final amplifier; Werner Haas displayed his first flight hardware consisting of two command receivers, a digital section, and the 70cm exciter that will drive Konrad's 70cm final amplifier; Freddy De Guchteneire, ON6UG, reported his progress on the construction of dual V-Band and U-Band receiver 'front-ends', and Dr Matjaz Vidmar, S51MV, reported that he has now begun construction of the HF-Band, C-Band and S-Band receivers.

So, good progress is now being made. What is now required is a final big push to resurrect the enthusiasm for this project which it enjoyed at first. If you are running radio club rallies during the summer season, then include some event specially dedicated to Phase 3-D funds. If you are planning your winter club programme, then include a fund-raising event – anything you can do to get this fund-raising activity going again. Ron Broadbent, G3AAJ, has been working tirelessly to make AMSAT-UK's Phase 3-D Fund Raising Project a success – encourage him still further by sending a contribution to him at 94 Herongate Road, Wanstead Park, London E12 5EQ. This satellite is planned for launch in April 1996, there's not a lot of time left, so let's see that the project is not lost through lack of funds!



This fax transmission was designed by Ian, G0NKA, and transmitted by Ted, G6HMS.

The colour-fax transmitted by F1LPT and received by G6HMS.

SATELLITE COLOUR FAX

IN THE MARCH SATELLITE column, I reported on the first colour-fax satellite pictures via the Japanese FO-20 satellite by G6HMS and G0NKA. I have now received further colour pictures from Ted and Ian, this time the pictures are of a two way colour-fax QSO they had with F1LPT, Patrick Skibinshi, of 67 rue Valenciennes, 59530 Villers-Pol, France.

Ian, G0NKA, reports that, unfortunately, Ted, G0HMS, has had to move his QTH so it will be some time before he is able to continue working the satellites, due to the need for planning permission to re-erect his antennas at the new location. However he intends being back again as soon as possible.

DOVE

OSCAR 17 IS STILL VERY ACTIVE and putting out a very good signal. Telemetry is still the main mode, but it has been giving the callsigns or names of those who have been sending in reports. There was a short period when these ceased and were replaced by requests for more reports to be sent in. At the time of writing more names are appearing, so keep sending in the reports as they are very welcome. Reports should be sent to Dr Junior Torres DeCastro, BRAMSAT, 119 Rua Macaubal, Sao Paulo, Brazil 01256-150.

If you have not yet heard DOVE, then tune in to 145.825MHz FM. The easiest way of finding out the best time to listen is to send for a copy of the *Orbital Calendar* of predictions and the *Orbital Calculator* from AMSAT-UK. For further details of these publications contact Ron Broadbent at 94 Herongate Road, Wanstead Park, London E12 5EQ.

HELEN SHARMAN'S AUTOBIOGRAPHY

SEIZE THE MOMENT

A 'MUST' READING, for all who took part in the JUNO Project and everyone else who so greatly admired Britain's first Astronaut, *Seize the Moment* is now available in most good bookshops. You'll learn how many facets of this remarkable project were successfully carried through in spite of so many difficulties. Helen's experiences on MIR are fully recounted in this book. Written in an easy, personal style it makes quite compulsive reading. And you'll find out the answer to one of the questions everyone wants to ask – but is a little embarrassed to do so! Illustrated with a good selection of colour photos. Price: £14.99. Publisher: Gollancz. ISBN 0 575 05628 2.

Data Stream

RICHARD STERRY G4BLT
1 Wavell Garth, Sandal Magna, Wakefield,
West Yorkshire WF2 6JP

FURTHER TO THE NEWS report in June issue of *RadCom*, I would like to thank Martin, GW6HVA, and Tony, GW4VEQ, for the following additional information.

"The future GB7ADX Cluster Sysop Tony Jones, GW4VEQ, and Martin Vernon, GW6HVA, Chairman of the Gogledd Cymru (North Wales) Packet Group (Sysop GB7OS/GB7OSP) [This was wrongly attributed to G4PGO in our news item – *Ed.*], recently attended the Irish Radio Transmitters Society AGM at Balleybofey in Co Donegal, hosted by the Tir Conaill Amateur Radio Society." The IRTS is the RSGB's sister organisation in the Irish Republic.

"At the AGM, Paul Healy EI9GL, IRTS packet co-ordinator, chaired a packet liaison meeting between representatives from GI, EI and GW. The meeting proved productive in strengthening present links and future proposals for inter G-GW-EI-GI routes."

"During the AGM awards ceremony, the Pat Conway Trophy was awarded to GW4VEQ, GW6HVA and G4PGO, (Sysop of GB7LDX DXcluster and GB7LI/G0TCB at Hugh Baird College, Bootle), by the IRTS President Jim Ryan, EI3DP."

"Over a 12 month period, the award's recipients, along with Declan Craig, EI6FR, Tony Stack, EI2GX, Alan Dean, EI5ENB, and other dedicated members of the Dublin Digital Radio Group (DDRG), planned, designed and constructed a DX-Cluster and TCP/IP route from Liverpool and North Wales to Dublin. This strategic link, which has now been operational for nearly a year, has allowed Amateurs in EI and GI to link into the European DX-Cluster network. The TCP/IP side of the link has also proved popular and both these facets of digital communications have undoubtedly strengthened cultural links across the Irish Sea."

"This was the first time the Pat Conway Cup has been awarded to non Irish Nationals. Projects such as this, prove beyond doubt that the spirit of Ham Radio, and International liaison and co-operation, is still prevalent."

BOOKS

THERE ARE A FEW NEW BOOKS to bring to your attention this month, mostly about packet radio.

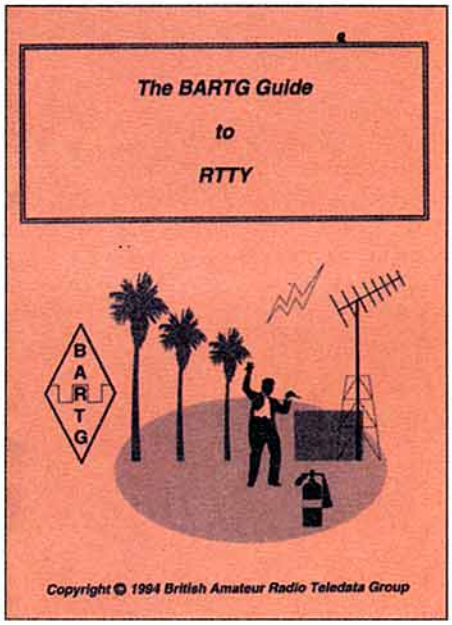
Packet BBS Survival for the Beginner, is self-published by the author, Roger Cook, G3LDI, who is the SysOp of the GB7LDI BBS. As the title suggests, it is not a guide to packet radio as a whole but is, in effect, a complete users' manual for BBSs running the F6FBB software. Not only does it explain all the mailbox commands clearly, with examples, but it also goes into details of all the various servers available.

It is clearly set out, with a proper index at the beginning, and I think many users, not just beginners, would find it very useful indeed. If I have one criticism, it is that the layout of the command syntax can be slightly misleading to the raw beginner. I see this identical failing in most packet guides, so I cannot say that this one is any more guilty than the rest. My review copy came from Siskin Electronics near Southampton, who sell the guide at £4.50 plus P&P, of which £1 is donated to AMSAT-UK, a worthy cause.

Mike Mansfield, G6AWD, has collected all the transceiver modifications for use with 9600Bd packet modems, and published them as a book called *High Speed Packet Radio Transceiver Connections*. This is published by Compaid Graphics, ISBN 0-9517965-4-2. Although primarily concerned with 9600 baud operation, some benefit may be gained at 1200 baud in some cases. Modifications are given for a wide range of commercial amateur radio transceivers, and some of the better PMR sets. Interfacing and setting-up details for TNCs and 9600 modems are given, and some of the modifications are complemented by schematics. This book costs £4.95 plus P&P from Siskin Electronics.

Another interesting new packet radio book is *What is your TNC Doing?* by Gloria Medcalf, KA5ZTX, published by ZM Xpressions. This book will definitely appeal to anyone who wants to acquire a slightly deeper understanding of packet radio, without getting overfaced by an excess of intimidating technical detail. It explains the function of the various RS232 serial port connections, the purpose and optimum settings of the common TNC parameters, the meaning of all the mysterious <RR3>, <REJ6>, <DM> codes in packet headers, and many other things that you may have wondered about.

There is a sample QSO, illustrating exactly what happens when packets are exchanged, or missed, or when they collide, when they are rejected, and so on. This is especially interesting, and explained very clearly without unnecessary jargon.



This handy booklet is a snip at just 75 pence (including postage) direct from BARTG's Publications Manager, Mark Ashby, G6WRB.

There is also a section explaining the composition of a packet frame, and the inevitable but very useful troubleshooting section. The book isn't particularly cheap at £10.95 plus P&P, but I think many packet users will consider this as money well spent. Copies may be obtained from Siskin Electronics.

The only new book not about packet is *The BARTG Guide to RTTY*, by John Barber, G4SKA. This is a new guide to replace rather outdated information, and so is now biased towards the use of computers and other electronics terminals rather than mechanical teleprinters. It's only a brief introductory guide, with nice illustrations, but the price is a very modest 75p inclusive of postage, even to non-members of BARTG. Send your cheques or POs, (payable to BARTG), to the Publications Manager, Mark Ashby, G6WRB, 47 Ryton Close, LUTON, Bedfordshire LU1 5SR.

There is a similar guide called The *BARTG Guide to PACKET*, costing £1.00, whilst the *Guide to AMTOR* is currently being rewritten. I wonder if guides to PACTOR and G-TOR will follow?

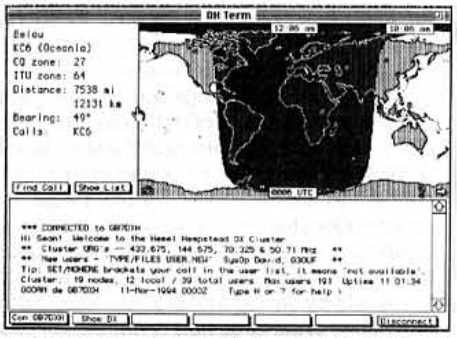
IN PRAISE OF THE APPLE MAC

SEAN SHARKEY, G0OAN, has noticed scarce mention of the Apple Mac (Macintosh) computers in connection with amateur radio. He points out that they are very powerful machines, "with the best user interface in the world". Now, as an avid user of the Acorn RISC OS desktop, I would enjoy debating that latter point with Sean! However, it must be acknowledged that Apple are credited with introducing the desktop WIMP (Windows, Icons, Mouse, Pointers) environment to the mass user market; a very bold and visionary move. (They tend to be referred to as GUIs these days; Graphical User Interfaces). My wife uses a modest Apple Mac LC2, and I used to enjoy teasing her about how slow it is, until I saw MS Windows 3.1 running on a 386 IBM compatible! In fairness, the LC2 has been superseded by much faster machines, even before the release of the Power Mac range (See May *Datastream*). Here is what Sean has to say:

"You may not have noticed but the Mac has been with us now for a whole ten years. To a Sunday-morning car-boot sale junkie this spells one thing; bargains! Whether you like combing through the stalls, local classified or perhaps a full colour glossy magazine, they're there, calling your name; you just have to look.

"For example, at the moment I have two advertisements in front of me. One has a Macintosh Classic II, (that's a 16MHz 68030, 4Mb of RAM, 40Mb hard drive and a mono display, all built into one neat little box), for £399 + VAT. You can have the colour version for £499 + VAT, and that's brand new from a main dealer.

"Next is a Mac Plus which has a display fault, going to a good home for free in the local paper. This is not a problem when you have a copy of *The Dead Mac Scrolls* by Larry Pina to hand. This book lists lots of Mac stock faults, fixes and parts suppliers. One local amateur changed a capacitor causing a screen



A monochrome 'snapshot' of part of the screen of an Apple Mac, running DXTerm.

fault, and for the outlay of 50p he now has a fully functioning machine. Another came across a Mac SE30 which wouldn't boot-up. He re-installed the system software and gained a fully functioning computer at a total cost of £0! The *Dead Mac Scrolls* costs £29.90 and is published by Peachpit Press, ISBN 0-940235-25-0.

"If, like me you don't really want to know what the insides do, then have a look at the Performa range. The hardware is the same as their standard Mac brothers and sisters but they come boxed and ready to go, complete with a plug on the end of the mains lead. The Performa 475 has a 25MHz 68040, 8Mb of RAM, 160Mb hard drive, 14" high-res colour monitor, and comes with pre-installed software (ClarisWorks and At Ease), one year's free telephone help-line, all for around £800 + VAT in a high street store near you (eg Tempo, Dixons). It will even read and write IBM files, as well as format IBM PC floppies."

"So, now you've got the computer, here are a few idea of what you, as a radio amateur, can do with it:

NET/Mac: A packet radio program that will run TCP/IP, AX25 and NET/ROM. It comes packaged with IM/Mac, which is the mailer program for dealing with mail on TCP/IP. It works very well, and is easy to install and run.

SoftKISS: A serial driver for the Mac which will allow it to use dumb modems, like the Baycom series. It comes with a circuit diagram to build your own modem if you want. It can be used either with NET/Mac, or if your interest is plain vanilla AX25, try a program called Savant.

Virtuoso: This was written by the same author as Savant, and will work with most TNC2 clones. It has a built-in script/macro language and spelling checker, and is very nice.

OrbiTrack: This tracks up to 200 satellites, from 200 different ground stations, will show a start chart with the satellite path across the sky, plus sat-to-sat, plane crossing, rotor interface; need I say more?

RadFax: This is one for the newer Macs that have a microphone input. Simply feed the audio from your HF receiver into the mic socket on the computer, and it will decode and display the incoming picture.

Morse: This is a very nice Morse code training program. It helped me to get my G0 callsign, which is the best recommendation I can make.

TalkTerm: This one is for use with your local DX cluster. When used with MacinTalk it will allow your computer to speak incoming DX spots. It will also quite happily run in the background when using MultiFinder.

DXTerm: Based on a HyperCard stack, DXTerm will allow you to connect to your local DX cluster while at the same time providing you with an on-screen Greyline map, DXCC callsign database, bearing, distance, local time information and the location of the DX station on a world map; all the things you need in one place. In auto mode, DXTerm will take the callsign from an incoming DX spot and update the screen display to show all of the above information without you doing a thing. Additionally, your choice of cluster commands can also be scripted onto buttons, so once set up all you have to do is Click in the right place.

"I hope this list will give you a flavour of what's available for the Mac and better still, all those programs listed above are either free or shareware. There are of course a number of commercial programs available, like those which will give you full control over your PK-232 or KAM TNCs in host mode, try asking your local dealer."

"Now imagine this; you're running TCP/IP, receiving a WEFAX picture, tracking OSCAR 21, having someone speak incoming DX spots from the local DX cluster, and you're using your word processor all at the same time. This isn't fantasy; I'm doing it at this very moment! It takes 1Mb of system software and doesn't use 15Mb of my hard drive space to do it. Yes I'm doing it on an Apple Macintosh and proud of it!

"If you need more information on using Apple Macs, or you would like a full listing of my Mac amateur radio software library you can reach me via packet radio as G0OAN @ GB7HSN. The only cost is postage at your end."

NB: If anyone else would like to champion the cause of their (non IBM-compatible) machine, then I would be happy to oblige! Anyone interested in exchanging information, ideas and software concerning the Apple MAC range, contact Tom, G7MMM @ GB7OAR.

NEW ACORN RISC MACHINES

ACORN COMPUTERS of Cambridge launched their new range of RISC-powered personal computers in May 1994. The name Archimedes, used for the Acorn 32-bit machines until now, has been dropped in favour of Risc PC. The machines will run most existing RISC OS software, but considerably faster, and with far more colours available, at much higher screen resolutions. Although not IBM compatible in 'bare' form, a plug-in 486 processor card will be available later in the year, with a Pentium board expected to follow from third-party suppliers. This will bring IBM compatibility, enabling software under MS Windows to be run at impressive speeds; even at the same time as 'native' RISC OS software!

Acorn have adopted an interesting design for the case, and light-hearted references have been made to the ever-popular children's toy LEGO. The main PCB, PSU and hard disk are located on a baseplate assembly, and the first two floppy drives, (or floppy plus CD ROM drive), are located in the first 'slice' of the case. If you need more space for extra drives or expansion slots, then you just add another slice. The case comes with special mounting feet so that it can be positioned horizontally or vertically as desired. All this is accomplished without any screws, as clips are used throughout, enabling the entire machine to be stripped down and upgraded with astonishing speed. Lugs are provided for a small padlock, to discourage expensive components from sprouting legs and 'walking' when the owner is looking the other way!

Standard monitors are a 14" multisync made by Microvitec of Bradford, and a 17" Brilliance multisync made by Philips, and the clarity and colour rendering are superb on both. The use of multisync monitors may seem rather extravagant to users of other machines, but it does mean that a very wide range of screen modes may be selected according to requirements. New modes can be 'designed' very quickly and easily, with just the right trade-off between available colours, resolution, and screen refresh rate, to suit the user.

The current ARM610 CPU clock speed is a modest 30MHz, yet this gives performance akin to an Intel Pentium, so the later ARM700 and ARM800 CPUs with clock speeds up to 80MHz should be very impressive when they become available. Anyone wishing to upgrade to a faster CPU merely has to plug in a new small PCB, and the upgrade costs have already been published.

Acorn use the phrase "future proofing" in relation to the new range, and I predict that very soon it will appear in most computer adverts, and we will rapidly become heartily sick of it!

SPRINTING TNCS

PACCOMM HAVE released their SPRINT-2 high performance TNC with G3RUH-designed modem for 9.6kbps (what most people refer to as 9600 baud) and above. It comes in four versions; the standard 9.6kbps model for shack and BBS use, the 9.6/38.4kbps model for satellite working, a similar model for Node use, and a 38.4/57.6kbps Backbone model with a 19.6MHz clock for very high-speed linking. One thing none of them has is a 1200 baud option! The standard version has all the usual TNC bells and whistles, including 128k RAM (upgradeable to 512k) and a PMS, plus quite a few extra features. Prices start at around £199 inclusive of VAT.

GB7PLY BREAK-IN

I WAS VERY SORRY TO HEAR from Alan Baker, G3KFN, SysOp of the GB7PLY BBS in Plymouth, that a lot of equipment was stolen on 11 April, by thieves who made a forced entry. Only TNCs and radios were taken; computers and other equipment were not touched. However, Alan has been very cheered by offers of equipment loans and donations, and full service is slowly being restored.

THE ONES THAT GOT AWAY

I WAS INTENDING TO INCLUDE items on packet CHAT nodes, and also the JVFAX program, this month, but they'll have to wait until another time.

AR SK 'Rick' G4BLT @ GB7WRG.#19.GBR.EU

Microwaves

MIKE DIXON G3PFR
'Woodstock', Gazebank, Norley, Warrington, Cheshire WA6 8LL

MIKE SCOTT, G3LYP, sent comprehensive minutes of the Southern Group Round Table held on 13 March at the Rutherford-Appleton Laboratory. I can only summarise these. About 40 amateurs attended the meeting which opened at 10am with an 'Open Forum and Bring and Buy'. Jon Eastment, GW4LXO, ran a calibration and alignment service and was kept very busy throughout the day measuring receiver noise figures, transmitter outputs and various microwave component parameters.

Three talks entitled, respectively, 'A review of the current state of the art on 47GHz' (Lehane Kellett, G8KMH), 'Using the sun as a noise source on 10GHz' (Geoff Grayer, G3NAQ) and 'Calibration of a noise amplifier' (Mike Scott, G3LYP) were given in the hour before lunch. The first of these talks covered propagation, equipment parameters, availability of components, power generation and receivers. The general conclusion was that amateur development of this band was still being hampered by either the high cost, non-availability of components or the difficulty in using the 'leadless' components, the very small waveguide or very thin and fragile (0.125mm) PCB materials.

In his talk on the sun as a noise source, G3NAQ described the characteristics of the sun as a signal source at 10GHz, the attenuation caused by the atmosphere as the angle of elevation of the sun varies throughout the day, the effect of clouds and the polarisation of the sun's radiation. For the purposes of amateur measurements, the average temperature of the sun can be taken as 10,000°K – the moon, by comparison, is about 208°K. Solar flares, arising from coronal holes, can greatly increase the level of 10GHz radiation for periods varying from a few seconds to many minutes, so that results need careful interpretation, especially at times of high solar activity (not at the moment!).

G3LYP's talk described the calibration of a broadband noise amplifier, such as that described in the February 1994 RSGB *Microwave Newsletter* by G4JNT. Such an amplifier can be used to measure sun noise or, indeed, used as part of a receiver used to track moon noise as a means of steering an EME antenna.

Topics discussed in the ensuing 'Round Table' included the 1994 Microwave Cumulatives, VHF talkback arrangements, WB/NB frequencies on 24GHz and a Microwave Committee report, given by Ted Jewell, G4ELM, the Committee Secretary. This report outlined work being carried out by the Committee in the following fields: defence of the amateur allocations above 1GHz, CEPT bandplanning for the future, development of equipment designs for the lesser used bands (part of our 'defence strategy'), the establishment of databases covering software, component suppliers, operator's directory, PCB library and site data were amongst those topics currently being discussed or actioned. Some of these developments have, of course, already been discussed in this column! We welcome several new Members or Corresponding Members to the Microwave Committee: Andy Talbot, G4JNT; Lehane Kellett, G8KMH; Mike Scott, G3LYP and Martyn Kinder, G0CZD.

BEACONS

IN THE OBITUARY TRIBUTE to Cyril James, G3VVB (*Microwaves*, May, 94), the Cornish beacon GB3MCB, on 1296.860MHz, was inadvertently given as GB3MWB.

GB3SWH, located at Bushey Heath, Herts, on 10368.200MHz and GB3CMS at Chelmsford, Essex on 10368.965MHz have both recently returned to service.

Mixed feelings have been expressed about the performance of GB3SCX (10368.860MHz) since its move from Bournemouth to Nine Barrow Down on the Isle of Purbeck. Stations along the south coast report much better signals, whilst operators elsewhere report weaker or no signals – you can please some of the people some of the time, but you can't please all of the people all of the time!

OPERATING TABLES

TABLE 1 IS THE FIRST of this year's Operating Ladders: so far there have been a total of only thirteen 10 and 24GHz entries. Disappointingly, last year's closing table contained no entries for any other bands – will it be different this year? There is no All Time 10GHz table this month as there have been no reported changes since the last one. The 1993/4 Winter Cumulative results should appear in the *Contest Classified* column in due course.

TECHNICAL CORNER

DETAILS OF THE G3WDG HEMT LNA were given in the March column. In Fig 2 of that issue, the layout of the PCB showed a number of 'mysterious' extra holes and I made the comment that I would explain what these were for. They are, in fact, needed for the waveguide 16 (WG16) version of the amplifier which was described as more difficult to construct than the SMA-input version. This is because more 'mechanical' work is needed for this version in order to gain those few valuable tenths of a dB noise figure where ultimate performance is needed.

Fig 1(a) shows the engineering work needed to adapt a Type 7750 tin-plate box (Piper Communications) to take both the short length of WG16 (input), the PCB and output SMA connector. Construction should follow the order suggested by G3WDG, which follows: Solder the tin-plate box together in the usual fashion and then cut out the hole needed for the WG16 by drilling a lot of small holes inside the outline of the large hole and then join them and file out to be a tight fit on the WG16. Next cut the piece of WG16 to length, square off the ends and drill/tap all the holes shown in **Fig 1(b)**. Cut a short-circuit plate (thin copper sheet or double sided FR4/G10 PCB material can be used) slightly larger than the waveguide and solder it to the end of the waveguide where shown. File off any excess, especially where the PCB abuts the WG.

Now refer to Fig 2 (March column) and prepare the PCB by very carefully cutting away the copper around the hole P with a Vero cutter, to about 3mm diameter. Trim the PCB to be a neat fit into the box – be sure to leave enough on the input end of the board to allow 2 x 4mm screws to fit inside the box! These screws serve to clamp the PCB to the waveguide (holes S on the PCB to holes A on the WG). Cut off part of the input line, leaving 1mm to the left of the centre line of hole P. Fit and solder all the grounding pins. Fit the Veropin probe and solder it in place in hole P. Cut and fit the PTFE washer, referring to this month's **Fig 2(b)**, on to the pin on the groundplane side of the PCB, pushing it firmly down to the PCB, but taking care not to damage the pin or board.

Fit the piece of WG into the box, through the hole, offer up the PCB, check alignment and loosely fit the 4mm screws. If the board does not align with the probe pin in the centre of the WG probe hole, Fig 2(a), then file the hole in the box as required for proper alignment. Mark the centre of the hole for the SMA output connector (the 17.8mm dimension shown in Fig 1(a) may need to be altered!). Remove the screws and dismantle PCB and WG, drill the holes in the box for the SMA connector and open the centre clearance hole to 3.3mm. Refit the WG, PCB and 4mm screws. Then cut the spill of the SMA connector to 1.5mm and fit it to the box. Fit the PCB into place so that the output track touches the spill and solder it to the spill.

Solder three sides of the WG to the tin-plate box, but not the side to which the PCB

Band	Position	Callsign	Stns Wkd (A)	Best DX (B)	Multiplied score (A x B)
10GHz	1	G3GRO	21	277	5817
	2	G3GNR	19	296	5624
	3	G3JMY	19	290	5510
	4	G4UKV	14	311	4354
	5	G4KNZ	21	168	3528
	6	G4LDR	14	242	3388
	7	G8DKK	14	229	3206
	8	G4BRK	15	156	2340
	9	G3PHO/P	4	123	492
	10	G8KMH	1	135	135
24GHz	1	G4KNZ/P	7	126	504
	2	G3GNR/P	1	143	143
	3	G8KMH/P	1	126	126

Table 1: 1994 Operating Ladder (starting 01/01/94).

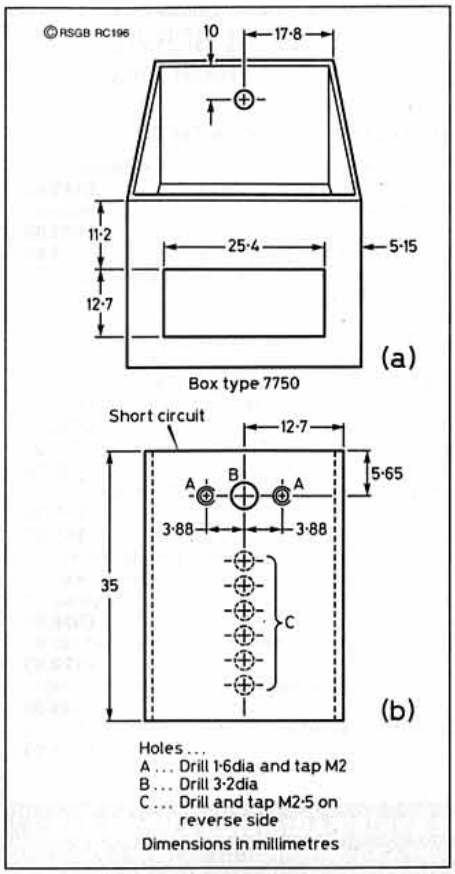


Fig 1: (a) Preparing a tin-plate box for the G3WDG-004 HEMT Amplifier (WG version); (b) Waveguide 16 dimensions and drilling sizes.

mates. Remove the SMA fixing screws, unsolder the spill and remove the connector. Remove the 4mm screws and the PCB. Carefully solder the last face of the waveguide, but do not melt the solder on the WG shorting plate or you'll have to start again! After soldering, make sure the mating surface of both the waveguide and the PCB are clean, bright and free from oxide and flux.

Fit the brass collar, as shown in **Fig 2(b)**, to the probe-pin – the length shown is critical to 0.05mm. Complete the WG assembly by soldering a WG 16 flange to the input end, again being careful not to melt the solder on the rest of the assembly. Apply a *small* amount of conductive epoxy to the waveguide where the PCB mates, especially around the probe hole, but not so much that a short circuit occurs when the PCB and WG are squeezed together! Reassemble the PCB and SMA connector. Solder the output track to the SMA spill and tighten the 4mm screws. Check there is no short between the WG and input probe caused by 'squeezing' of excess epoxy. Cure the epoxy by heating at about 150°C for an hour or so. After curing, recheck for absence of short circuit on the input probe – if there is a short, remove the PCB and try again! This may damage the PCB, so do it with care and try to get it right the first time!

Finally, solder all round the ground-plane/box junction. Finish off the amplifier by mounting all the components as for the SMA version described last month. Incidentally, the holes C on the WG16 are used for matching screws to literally 'screw the last tenth of a dB' out of the amplifier!

FROM ELSEWHERE

THE EDITORIAL OF THE April issue of *QST* was entitled 'Wake-Up Call for 13cm'. It concerned the potential loss of 200MHz of spectrum below 5GHz to 'private and public' use; half of this is below 3GHz and 50MHz must be 'available immediately'. It looks as if 2300 to 2310MHz and 2390 to 2450MHz are under threat in IARU Region 2, just as in Region 1. The finale was 'Use it or Lose it' – a message often echoed in the RSGB, IARU Region 1 and this column!

DUBUS 1993 contains much information

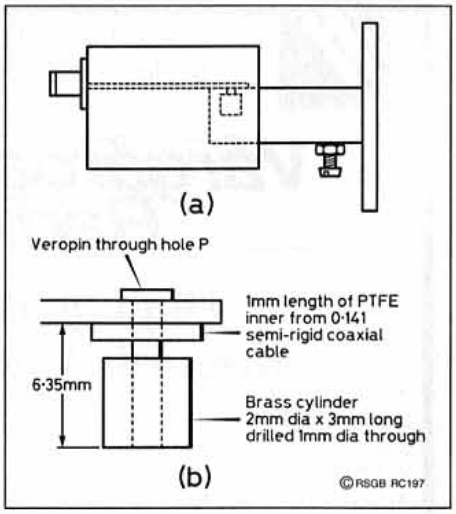


Fig 2: (a) General side view of G3WDG-004 WG16 HEMT amplifier assembly; (b) Detail of WG to PCB transition probe.

of use to the microwave amateur: in brief, information on 24GHz equipment designs, HEMT power amplifiers for 23cm, 10GHz articles by 'our own designer', Charlie Suckling, G3WDG, and a linear transverter for 2.3GHz. This is a very abbreviated list!

The most important articles were reprinted in the form of the (almost 400 page) *DUBUS Technik III*. My thanks are due to the publishers, DUBUS Verlag, Hamburg 500368, for a copy of this excellent information source.

Volume 23 (1994) includes further articles on 10GHz equipment by G3WDG, an article on 24GHz by HB9MIN, and 47 and 76GHz mixers by DB9NT. For back-dated copies or forthcoming issues contact the UK agent, Dr Roger Blackwell, G4PMK, at 57, Station Road, Scholes, Leeds LS15 4BY. Perhaps I should stress that *DUBUS* deals also with VHF/UHF matters – as low as 50MHz – as well as with the microwave bands.

At this year's VHF Convention, the G6ZR Memorial Trophy was presented to the HADRABS and Windbreakers, overall winners of the 2.3GHz Trophy Contest.

This Month's Book Choice

Reviewed by Pat Hawker, G3VA

THE EARLY HISTORY OF RADIO: FROM FARADAY TO MARCONI

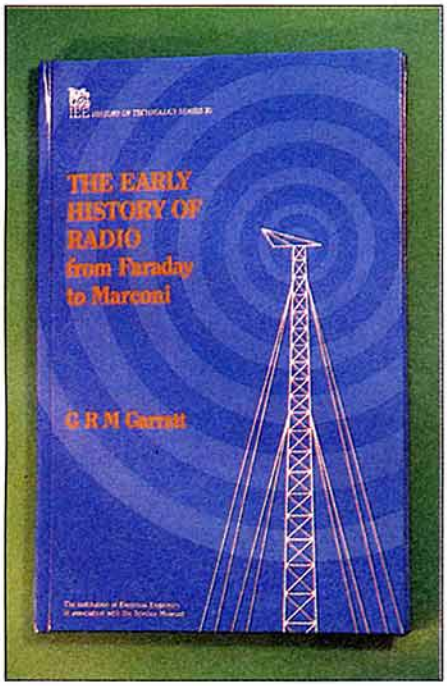
Gerald R M Garratt, G5CS.

Published December 1993 by the 'IEE History of Technology Series'. 96 + x pages, 234 by 156mm, hard covers, £19. ISBN 0 85296 845 0.

WHILST MOST OF US tend to think of practical radio communication as essentially a 20th Century development (often dating it from Marconi's controversial transatlantic reception of the three spark dots transmitted from Poldhu, Cornwall on 12 December, 1901) it is worth recalling that a 300-page *History of Wireless Telegraphy, 1838-1899* by J J Fahie was published in the UK by William Blackwood & Sons in 1899.

The Fahie book (an autographed copy of which is in the IEE Library, Savoy Place) includes, as a post-script, details of Marconi's first transmissions across the English Channel on 27 March, 1899. The text stands up reasonably well, proving once again that the concept and scientific investigation of electromagnetic radiation had been extensively studied throughout the 19th Century. But Fahie lacked the insight that came from later work.

This new book concentrates on the work of Faraday, Maxwell, Hertz, Lodge, Popov and the early work of Marconi, but does not ignore many other early pioneers. I would have liked to have seen some mention of the efforts in the USA of Alfred Loomis and acknowledgement of the pioneering microwave work in the 1890s by the Indian scientist (Sir) Jagadesh Chandra Bose (1858 - 1938) on wavelengths of the order of 5mm. But in general this is a masterly study of the scientific work that preceded Marconi.



Gerald Garratt (1906 - 1989), an amateur radio enthusiast for more than 60 years, was a convinced and outspoken believer in the truth that very few inventions are the work of single individuals. He readily shouldered personal attacks from the fervent 'Baird-supporters' when he repeatedly pointed out that in fact Baird contributed little or nothing to modern electronic television other than the catalyst of publicity.

He developed a theory that Marconi at Signal Hill may have received not the fundamental but a harmonic of the Poldu transmitter since the possibility of direct daylight propagation at the fundamental frequency remains beset by problems. With R F Pocock he wrote *The Origins of Maritime Radio* (HMSO, 1972) rigorously exploring the role of Captain (later Admiral, Sir) H B Jackson, RN (1922 President of the Wireless Society of London [RSGB]) in introducing W/T to the Royal Navy between 1896 and 1900, without detracting from the superiority of the Marconi system.

For the *RSGB Bulletin* (August 1958) he wrote a short note on 'The Q Code and its Origins', and later 'Why the French R Valve?' (*RadCom*, February 1981) in which he showed how, in August 1914, a former French army deserter, Paul Pichon, acquired samples of the latest Western Electric Audion triode valve whilst working for Telefunken in the USA. Pichon returned to Europe and offered these to the Marconi Company but was advised to offer his services to Colonel Ferrie, commandant of the French Military Telegraphic Service. The French improved the Audion and developed the famous 'R' valve - an outstanding example of freelance industrial espionage!

Gerald Garratt joined the Science Museum in 1934 where he remained until his retirement, apart from war service in the Royal Indian Air Force (he had been commissioned into the RAF Reserve of Officers and was a founder member of the Cambridge University Air Squadron). One of his notable feats for the Science Museum was obtaining a number of the original Hertz manuscripts from Frau Elizabeth Hertz when she and her four daughters settled in Cambridge after leaving Nazi Germany.

But among amateurs, he will long be remembered for organizing and setting up the famous Science Museum amateur-station, GB2SM, in the summer of 1955. The station is still regularly on the amateur bands and introduces many youngsters to the hobby.

In retirement, he brought to the writing of this study of the pre-history of radio, the enthusiasm and diligence of a professional historian combined with the technical knowledge of someone trained in both mechanical and electronic engineering. He shows how Marconi's ultimate successful development of a practical system of wireless telegraphy was "based upon the very sure foundations of such scientists and mathematicians as Michael Faraday, Clerk Maxwell, Oliver Lodge and Heinrich Hertz". He explains how without Faraday, there would have been "no Clerk Maxwell, no Hertz, no Marconi and it is almost certain that the advent of wireless telegraphy would have been delayed by many years". He tells the story of how Faraday (of humble origin and sensitive to the views of peer scientists) hesitated to disclose all of his theories linking electric induction and magnetism to vibrations akin to light. He recorded these perceptive views in a sealed document deposited at the Royal Society on 12 March 1832 where it remained unopened until 24 June 1937.

A full appreciation is also given of the work of Lodge who demonstrated the transmission of Morse signals over short distances in the summer of 1894, before the arrival on the scene of Marconi (see *Technical Topics*, March 1994, p46).

Gerald Garratt, remaining active as G5CS among his many other hobbies, died in April 1989 before writing his final chapter on Marconi. Fortunately, his daughter, Susan Garratt, was able to complete this, based on a lecture her father had given in 1972 at a meeting organised jointly by the IEE and RSGB.

In summary, an admirable, thoroughly researched text that seems destined to become the definitive pre-history of radio. It is however a pity that the high cost of £19 for a hundred-page book (admittedly case bound) seems certain to limit the number of copies sold.

CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest News* January 1993

VHF RULES

70MHZ TROPHY/ SWL

Date: 25 Sept

Time: 0900-1400UTC

General rules apply.

Rule 14a applies (County/Country multipliers)

QRA information including county code or county name to be exchanged, eg JO01IN ESSEX OR ESX, Full QTH information is NOT required.

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

Award: The overall winner will receive the VHF Managers Trophy

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

1.3 & 2.3GHZ CUM

Dates: 4/19 Oct, 3/17 Nov, 5 Dec.

Time: 2030 – 2300 Local time.

General rules apply, including rule 10.

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

One summary sheet including all entries, plus a cover sheet. Best three logs of maximum five days, please send all logs for checking purposes, as normalisation will select the best three.

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

432MHZ CUM

Dates: 12/27 Oct, 11/28 Nov, 13 Dec

Time: 2030 – 2300 Local time.

General rules apply, including rule 10.

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

One summary sheet including all entries, plus a cover sheet. Best three logs of maximum five days, please send all logs for checking purposes, as normalisation will select the best three.

Adjudicator: I Cornes, G4OUT, 6 Haywood Heights, Little Haywood, Stafford ST18 0UR

NOTES FOR CONTESTERS:

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 1 October) then the entry must be postmarked on or before the third Tuesday after that Sunday (17 October). For VHF Field Day an extra week is allowed, ie the fourth 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. However not all 70MHz contests require this information, see individual rules and General Rule 24 (1994).

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

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 final adjudicated list is published.

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).

VHF RESULTS

144MHZ TROPHY - SEPTEMBER 1993

Good DX and plenty of stations to work, what more can one ask? Congratulations to the Northern Lights for breaking the 1000 QSO barrier and for winning the Open section. Congratulations also to G4PIQ, GM4ZUK and PE1EWR for winning their respective sections.

On a more serious note, many logs were not received by the adjudicator until several weeks after the last posting date for entries. The adjudicator had to be changed due to the tragic death of John Pilags, G8HHI. A correction was published in *RadCom* before the contest date. Even so, 30% of entrants still sent their logs to the wrong address, causing additional unnecessary grief to John's widow. Contest adjudicators are appointed up to one year in advance. Changes sometimes have to be made due to circumstances beyond the control of the VHF Contests Committee. It is up to you, the entrants, to ensure that you send your entries to the correct adjudicator. Please read *RadCom* Contest Exchange and the *Contest Classified* columns for notification of changes to adjudicators. *G0FCT*

OPEN

Pos	Callsign	Score	QSO	Pwr	Ant	Best DX	km
1	GU4APA/P	16465	1024	400	148 el	DL4ANT	941
2	G4VIX/P	11713	803	400	2x15+4x9	EA1KV	1308
3	G0RDI/P	10969	771	400	4x9+2x17	EA1BFZ/P	1080
4	G8LNC/P	10804	726	400	4x19	EA1BFZ/P	968
5	G4DSP	7855	622	400	4x16+8el+20el	EA1BFZ/P	1259
6	G4ERG/P	7461	538	350	2x17+2x16	EA3KU	1343
7	GI8TSI/P	5508	325	250	17el	EA3KU/P	1497
8	G7PBI	5260	396	350	2x18	DG1ROD/P	787
9	GM0CCC/P	5180	305	250	2x9	EA2LU/P	1409
10	G3WRS/P	5156	493	400	4x17	F6KEH/P	1315
11	G3EFX/P	4831	438	400	2x16+4x5	EA1BFZ/P	1048
12	GW1VDF/P	4248	419	200	2x19	EA3KU/P	1179
13	GI1CET/P	4172	320	250	4x11	F6FZS/P	1336
14	G6WVG/P	4161	377	300	4x9	EA2LU/P	1170
15	GM0OCG/P	4045	274	400	4x19	F6FZS/P	1477
16	G6BRA/P	3872	386	400	2x17	ED2RCF/P	957
17	G6CTU/P	3617	369	350	2x17	EA1BFZ	1052
18	G2XV/P	3283	339	300	4x17	ED2RCF/P	1036
19	G8DWD/P	2749	200	200	13el	ED2RCF/P	1140
20	G5RS/P	2309	684	400	4x9+4x9		
21	G3WSC	2253	230	400	17el	GM3WOJ	783
22	G7FDC	2188	189	300	2x12	EA3KU	1001
23	G8NJA/P	2028	172	150	17el	EA3KU	1028
24	G6ZTT/P	713	78	25	9el	F6FZS	1144
25	G0JLF/P	346	36	20	9el	GM4ZUK/P	631

FIXED STATION, SINGLE OPERATOR

Pos	Callsign	Score	QSO	Pwr	Ant	Best DX	km
1	G4PIQ	9945	761	400	4x15+2x9+19el	EA1BFZ/P	1132
2	G6HKM	3604	363	160	15el	F6BUL/P	785
3	G0MYE	1479	152	400	10el	EA2LU/P	987
4	G1GEY	1367	114	100	9el	EA2LU/P	1324
5	G8ZRE	1161	125	100	8el	EA2LU/P	1135
6	GM4JJJ	1145	61	400	4x17	EA2LU/P	1457
7	G3RHH	991	113	200	9el	EA2LU/P	1008
8	G1TWS	984	118	25	8/8	F1FNY/P	670
9	G7OWD	920	104	25	9el	HB9S	695
10	G0ADH	760	90	50	13el	DK0BN/P	652
11	G7OZE	729	110	10	12ZL	DF2ZC	637
12	G0SWG	721	94	40	9el	DB3VE/P	
13	G0SYK	717	73	50	12ZL	EA2LU/P	924
14	G1KFB	659	57	20	7el	F6KPQ/P	680
15	G6HXU	508	47	20	6Q	F6HPP/P	599
16	G0HDZ	433	52	50	7el	EA2LU/P	978
17	G7JHZ	396	52	40	9el	GI8TSI/P	513
18	G8CDW	277	38	10	4el	GM4ZUK/P	520
19	G8IFU	159	30	2	2Q	F6KPQ/P	333

PORTABLE STATION, SINGLE OPERATOR

Pos	Callsign	Score	QSO	Pwr	Ant	Best DX	km
1	GM4ZUK/P	8008	418	400	Boomer	EA2LU/P	1549
2	GW4BVY/P	7266	569	400	3x17	EA3KU/P	1132
3	GM4CQR/P	3598	254	400	16el	EA2LU/P	1333
4	GM8ORG/P	2010	140	80	17el	EA2LU	1280
5	G8ZQB/P	1862	211	50	10el	ED2RCF/P	1048
6	G0RSR/P	981	140	100	13el	GM4YXI	700

OVERSEAS STATIONS

Pos	Callsign	Score	QSO	Pwr	Ant	Best DX	km
1	PE1EWR	1060	106	10	10el	EI3GE	677
2	LZ1ZC/P	478	34	35	9el	HA2KRD	1302

CHECKLOGS

Many thanks for checklogs from G3MEH, EA3KU, G8XWA and G0HGA

LATE RESULTS

We apologise for the lateness of the 432MHz Trophy and 432MHz to 24GHz results which was due to the data going astray.

70MHZ FIXED MARCH 1993

It was good to see a reasonable entry for this contest in spite of the poor conditions. Comments were also raised over the event being too long at six hours and very few QSOs being made in the last hour in particular. In the multi-operator section, G4RFR engineered themselves into top place with a station much bigger than everyone else, but the runners-up position was hotly contested by G0GZQ, G7FDC and GD4IOM. All of these logs had errors and the overall result was that all my careful checking was a complete waste of time since nobody's position moved. However, this was not the situation at the top of the single operator section where claimed scores were also very close, but Geoff Grayer, G3NAQ, won by dint of more accurate logging. One comment which is worth making is that in contests such as this where the full location has to be exchanged, make sure that your log makes it plain whether you copied in km or miles - '15 E Colchester' is not good enough when almost, but not quite everyone, is sending distances in km! (Anyone actually entering must define their distance in km though.) *G4PIQ*

SINGLE OPERATOR

Pos	Callsign	Points	QSO	Loc	Pwr	Ant	Best DX	km
1	G3NAQ	306	51	91HL	90	8Y	G8PNN	417
2	G1SWH	280	41	83QO	100	8Y	GJ7AOG/P	483
3	G3UKV	243	47	82RR	100	5Y	G8PNN	284
4	G4FOH	187	31	83QC	25	5Y	G7FDC	313
5	G3WHK	183	29	91VJ	90	4Y	GD4IOM	426
6	G0JBA	145	19	01II	100	5Y	GD4IOM	474
7	G4OUT	103	26	92AT	10	3CV	G7FDC	294
8	G3FIJ	72	8	01KV	25	3Y	GD4IOM	445
9	G3ZJY	35	7	90FR	40	4Y	G3UKV	232

MULTI OPERATOR

Pos	Callsign	Points	QSO	Loc	Pwr	Ant	Best DX	km
1	G4RFR	422	54	90AS	160	2 x 12Y	G8PNN	496
2	G0GZQ	351	49	91VH	90	5Y	G8PNN	446
3	G7FDC	344	46	80FI	25	9Y	G4CAY	496
4	GD4IOM	329	29	74QD	30	5Y	G0JBA	474
5	G0FCT	220	36	91OJ	80	6Y	GD4IOM	400
6	G4EKT	116	14	93VV	40	3Y	G7FDC	456

70MHZ CW - 1993

Entries for the contest were somewhat disappointing given that many more stations appeared in the logs than actually submitted an entry. Perhaps the generally low level of activity was to blame? Even so, most entrants commented on how much they had enjoyed the contest. A fair degree of bewilderment was caused by a station in Cheltenham who sent at least two different Locators. This was picked up by many and no points have been deducted (thanks to G3SKR for the tape recording).

One station lost points for failing to log correctly the full QTH information. Congratulations to both the winners and runners up (*), including G0AEV who again wins a certificate for being the leading station in the Single Operator Section running 25W or less to a single antenna. *G4DHF*

SINGLE OPERATOR FIXED

Posn	Call	Pts	QSO	Loc	Pwr	Ant	Best DX	Km
1 *	G3JYP	136	13	IO84SN	30	8 Quagi	G0PNT	383
2 *	G3SKR	88	18	IO91PS	100	8/8 Y	G3JYP	331
3	G3UKV	76	14	IO82RR	100	5 Y	G3JYP	203
4 *	G0AEV	71	13	IO81WL	10	5 Y	G3JYP	344
5	G4OUT	54	12	IO92AT	10	3 'Bcv	G3JYP	197
6	G5UM	28	8	IO92MP	10	3 Y	G3JYP	196

ALL OTHERS

1 *	G0PNT	98	15	IO91VJ	80	4 Y	G3JYP	383

432MHZ TROPHY - MAY 1993

Conditions were generally poor throughout this event which probably accounted for the distinct lack of UK activity. Even so, the leading stations proved what could be done under flat band conditions by working some excellent continental DX. There was a steady flow of European activity with a good number of logs showing that UK stations were in the minority.

Stations located away from the East coast had a distinctly hard time with continental activity increasingly hard to find: "extremely frustrating! DX all around me but none came my way" (G8FBG). G3CKR/P reported that they had lost their main mast in strong winds only an hour before the event and had to resort to a smaller system for the rest of the contest. Congratulations to the Three Spires Contest Group, G4HRY/P, who won the trophy. Also to G0TDF and GW4BVY/P who won their respective sections. *G4DHF*

OPEN

Posn	Call	Pts	QSO	Loc	Pwr	Ant	Best DX	Km
1 *	G4HRY/P	2359	194	JO01KJ	400	8x21 +48omni	DL4MEA	797
2 *	G4VIX/P	2199	168	JO01PU	400	8x21	DL9NDS/A	758
3	G4GCM/P	2060	182	JO01QX	400	4x21 +2x28	DF0YY	762
4	G4LIP/P	1786	152	JO03BF	400	8x21 +4x21	F8ZW	727
5	G3CKR/P	1622	146	IO93AD	400	6x21	DC8OB/P	758
6	G4DSP/P	780	70	JO03CE	400	8x21 +4x28	DK4VW	640
7	G0GJV/P	331	57	IO91PK	400	4x21	PA3BAS	427
8	G3UHF/P	280	51	IO83WE	250	4x19	GI8AZY	296
9	G6ZTT	96	18	IO83QE	50	16	G4HRY/P	310

SINGLE OPERATOR FIXED

1 *	G0TDF	335	53	IO92CM	100	21	ON5DG	551
2 *	G8FBG	178	36	IO91SG	400	4X33	PL0PLY	393

SINGLE OPERATOR PORTABLE

1 *	GW4BVY/P	1325	121	IO81NV	400	4X21	DK3FB	731

* Certificate winners.

432MHZ TO 24GHZ - MAY 1993

All contestants remarked on the distinct lack of activity, particularly from within the UK, even on 432MHz. Conditions were generally quite poor but the leading stations were able to make regular contacts well into the continent which shows what can be achieved in such circumstances. There was a notable absence of activity, and entries above 2320MHz this year. This is a great shame because G4EZP/P had a remarkable 10GHz score with stations and distances more resembling a 144MHz logbook! Remember, winter is the season to build in time for next year's events! Congratulations to all band winners, runners up and certificate winners (*). *G4DHF*

432MHZ SINGLE OPERATOR FIXED

Pos	Call	Pts	QSO	Loc	Pwr	Ant	Best DX	km
1 *	G8FBG	194	44	IO91SG	400	4x33	PA0PLY	393
2 *	G8ZQB	161	31	IO92JN	25	19	GI0GDP	385
3	G3XDY	67	5	JO02OB	250	21	DL8FM/P	478

432MHZ ALL OTHER

1 *	G4VIX/P	3491	259	JO01PU	400	8X21	DL9NFS	831
2 *	G4GCM/P	3393	284	JO01QX	400	4X21/2X28	DF0YY	762
3	G4LIP/P	2729	218	JO03BF	400	8X21/4X21	DJ9MH/P	747
4	G3CKR/P	2598	218	IO93AD	400	6X21	DF0RB	864
5	G4DSP/P	1345	124	JO03CE	400	8X21/4X28	DL4OL/P	673
6	GW8AWM/P	854	85	IO81KR	100	4x21	DF1VW/P	754
7	G0GJV/P	664	94	IO91PK	400	4X21	DJ9RX	685
8	G3UHF/P	420	80	IO83WE	250	4X19	GU3EJL	384

1296MHZ SINGLE OPERATOR FIXED

1 *	G3XDY	383	33	JO02OB	300	4X23	DL0UL/P	715
2 *	G8FBG	89	21	IO91SG	25	4X55	DF0HS/P	457
3	G8ZQB	67	16	IO92JN	50	27 LY	PE0MAR/P	367

1296MHZ ALL OTHER

1 *	G4XUM/P	1028	84	JO01QX	400	8X23	DL7ZL	817
2 *	G4JAR/P	1005	90	JO01PU	250	2.5m dish	DL0UL/P	698
3	G4HWA/P	609	61	JO03BF	400	16X23	DJ6GK	650
4	G6PHJ/P	419	57	IO93AD	200	8X23	DF0HS/P	595
5	G4SIV/P	289	27	JO03CE	250	2.0m dish	DG5LAE	599
6	G4DDN/P	113	21	IO91PK	10	55 Y	PA0EZ	416
7	G3FVA/P	97	29	IO83WE	82	8X23	G8ACJ	243
8	GW6ZUQ/P	58	6	IO81KR	10	23 Y	G4XUM/P	310

Check log from G3MEH

2320MHZ SINGLE OPERATOR FIXED

1 *	G8ZQB	702	5	IO92JN	8	1.6m dish	G4JAR/P	187

2320MHZ ALL OTHER

1 *	G0EMG/P	7518	27	JO01QX	60	1.5m dish	DF0SSB/P	530
2 *	G4JAR/P	6292	26	JO01PU	55	2.5m dish	DF0CI	618
3	G8NTD/P	1989	11	IO93AD	10	1.2m dish	PE0MAR/P	431
4	G4SIV/P	1283	7	JO03CE	5	2.0m dish	PI4GN	443
5	G4AUC/P	978	5	IO91PK	10	1.0m dish	PE0MAR/P	338
6	G8SMR/P	88	2	IO83WE	4	1.2m dish	G3FNQ	76

3456MHZ ALL OTHER

1 *	G4EZP/P	1128	7	JO01PU	7	1.4m dish	PA3FPQ	308
2 *	G8NTD/P	78	1	IO93AD	1	1.2m dish	G8GDZ	78

5760MHZ ALL OTHER

1 *	G4EZP/P	518	4	JO01PU	0.8	1.4m dish	PA0EZ	270

10GHZ ALL OTHER

1 *	G4EZP/P	7557	26	JO01PU	45	.45m dish	DL0EU	623

24GHZ ALL OTHER

1 *	G4EZP/P	55	1	JO01PU	7mw	.60m dish	G0TJN/P	55

OVERALL POSITIONS SINGLE OPERATOR FIXED

Pos	Group	432	1296	2320	3456	5760	10GHz	24GHz	Norm
1 *	G8ZQB	2	3	1					2005
2 *	G3XDY	3	1						1345
3	G8FBG	1	2						1232

ALL OTHER

Pos	Group	432	1296	2320	3456	5760	10GHz	24GHz	Norm
1 *	Windbreakers CG	1	2	2	1	1	1	1	6815
2 *	Northern Lights	2	1	1					2972
3	Warrington CG	4	4	3	2				1484
4	Parallel Lines	3	3						1374
5	Spalding ARS	5	5	4					844
6	Bracknall ARC	7	6	5					424
7	GW?	6	8						301
8	S Manchester RC	8	7	6					226

432MHZ CUMULATIVES - OCTOBER TO DECEMBER 1993

Once again both sections of this contest were well supported and considerable distances were worked, especially during the second session when the leading stations worked into Sweden and many others worked into Germany, Belgium, and Holland. The fifth session was plagued by very high winds and snow in some areas, which led to activity being reduced. Congratulations to Graham Taylor G4JZF/M, for winning the 'All Other' section ahead of G4DDL/P. These two stations showed that it is possible to win contests with relatively modest stations in terms of antennas and power. Peter Tribe, G8FBG, who won the Single Operator Fixed Station section, was the leading station in four of the five sessions. Congratulations also go to D Millard, G8NEY, for being the runner-up in this section. A certificate is awarded to P Masterman G3RHH, the leading single operator using 25W or less to a single antenna. There were a few reports of wide signals during the contest and the VHFCC asks all stations to check out their equipment before the contests begin. Several stations requested the timing of the sessions to be brought earlier, to start at 1930 or 2000, finishing at 2200 or 2230. [The VHFCC will look at this for 1995, also the station or stations who were wide will be informed by the VHFCC so that they can sort out any problems before the next contest - *G4DEZ*]. On a lighter note it is the first time that I have received a 'petrol sales voucher' dated November 1991, enclosed with a contest entry. I am not sure what the idea was Peter but the voucher will be returned to you along with your winner's certificate! *G4OUT*

SINGLE OPERATOR FIXED STATION SECTION

Pos	Call	Norm	Ant	dB	13 Oct	28 Oct	12 Nov	29 Nov	14 Dec	Best DX	Km
1	G8FBG	3000	4X28	26	321/1K	715/756	274/1K	189/1K	93/1K	SM6AFH	1034
2	G8NEY	2200	2X21	26	141/439	646/683	221/807	117/619	66/710	SM6CEN	1139
3	G0TDF	2049	21	20	133/414	768/812	135/493	122/646	55/591	DL5DVF	1099
4	GD4GNH	1874	4X21	14	138/430	968/1K	92/336	84/444	29/312	DL1DAP	885
5	GM4JJJ	1484	2X19	19	93/290	860/909	78/285	26/138	0/0	DC9KK	910
6	G0MLY	1084	21	19	40/125	261/276	127/464	48/254	32/344	DK5DQ/P	651
7	G8ZQB	886	19	15	97/302	252/266	87/318	0/0	0/0	DK5QP/P	597
8	G3RHH	848	17	14	47/146	38/40	45/164	52/275	38/409	G4VIX	181
9	G3YHF	633	19	7	43/134	82/87	69/252	0/0	23/247	GD4GNH	260
10	G0MYE	552	24	25	0/0	93/98	55/201	42/222	12/129	DC8VJ	574
11	G8ATD	519	15	11	46/143	0/0	59/215	22/116	15/161	G3CKR/P	171
12	G3JJZ	423	19	14	69/215	0/0	57/208	0/0	0/0	G8DQK/P 287	
13	G1COW	228	17	10	13/40	26/27	44/161	0/0	0/0	G3CKR/P 210	
14	2E1BZR	40	CoL	1	0/0	6/6	5/18	3/16	0/0	G0MYE	83

ALL OTHER SECTION

1	G4JZF/M	2367	*	14	59/160	103/367	81/220	71/1K	31/1K	GD4GNH	240
2	G4DDL/P	2168	19	8	0/0	259/922	96/260	70/986	0/0	DL3YEE	653
3	G8OHM	2057	21	25	91/247	281/1K	99/268	56/789	0/0	DJ9RX	739
4	G3CKR/P	2000	2X21	26	369/1K	0/0	369/1K	0/0	0/0	PA3FPS	455
5	2E0AFH	287	17	1	0/0	0/0	23/62	16/225	0/0	G3CKR/P	116

AMATEUR RADIO DIRECTION FINDING

ERIC MOLLART MEMORIAL HF DF COMPETITION

Twelve teams started from Lane End, near High Wycombe to search for the three hidden stations. Approximate bearings were issued to most teams, as Top Band was very busy making identification of the DF transmitters difficult.

The event was planned to give the navigators some work to do and the teams some serious decisions to make on which station to go for first. Station 'A' was hidden along the footpath at Grimms Ditch on the Ridgeway Path near Nuffield, nine miles west of the start. Several teams headed there first with one team taking over two hours to find the transmitter crew hidden by fallen tree branches, under a figure of eight wire aerial strung in the trees and along the footpath.

Station 'B' was placed 20 miles from the start on The Devils Highway, a Roman road near Mortimer, south of Reading. The transmitter was located half way along the muddy footpath making it a one mile approach from either end.

As the theme was to give a long walk/run in to each transmitter, Station 'C' was positioned along the river Thames towpath between Sonning and Reading, giving another mile run-in. The operators were hidden under rhododendron bushes high on a bank overlooking the path. The wire was hung at just over head height along the towpath bushes to a wet bog area, with an earth stake which several teams found after getting wet feet. One team had to explain their antics to three narrow-boat owners who had moored under the end of the wire.

Teams stopped at midnight for supper, prize giving and to relate how they could/should have done better. Thanks go to caterers Doreen, G8NMO, and Judith and transmitter operators Peter, G3UJO; Mark, G7POB; Bill, G4CUE; Paddy, SWL; Ron, G3NCL and Simmon, G6ZTL.

2M CW CONTEST (JANUARY 1994)

Conditions for this contest were flat according to most contesters, (I found them quite reasonable from Essex!), however some interesting DX was worked. I was rather disappointed with the number of entrants compared to the number of stations active. Once again somebody's 'Best DX' was eliminated due to error, this lost over 700 points! Two or more other stations failed to send in a separate Country/County check log as requested in the rules (Rule 14), these stations lost 10% of their scores, it didn't make any difference to the positions, but it could well have done. The rules are there to be read and followed, they are not printed just to waste ink!

It is debatable as to whether the Open section will be retained as it really does not warrant a separate section in view of the lack of entrants. Thanks to all those that entered, especially those that knew that they would make up the lower part of the table, and congratulations to G4DSP winner of the Open section, and to G4RGK winner of the Fixed Station section, to G4WKN runner-up, and to Ian, G4OUT, who gets a certificate for being the highest placed station with 25 watts or less to a single antenna. *G4DEZ*

OPEN SECTION

Pos	Callsign	QSOs	Mult	Pts	Pwr	Ant	Best DX	Km
1	G4DSP	53	29	14065	400	2X9	-	-

FIXED STATION SECTION

1	G4RGK	69	28	12121	225	9	DL3SBH	721
2	G4WKN	60	31	11098	300	4X9	DL0WAE	631
3	G0CUZ	53	36	9936	400	5	F6CBH	465
4	G4DEZ	49	24	8400	400	17	DL3SBH	627
5	G4OUT	33	27	4887	25	12ZL	GI40WA	424
6	G3HYH	28	22	2596	120	QL	G0FIG	205
7	G3FIJ	14	16	1792	10	9	DL0WAE	519
8	G0TLG	10	7	154	25	CLN	G4WKN	155

NOTE – MICROWAVE CUMMULATIVES 1994

The address for entries to the Microwave Cummulative 1994 Contest is as follows: S J Davies, G4KNZ, 14 Herondale, Birch Hill, Bracknell, Berks RG12 7ZT.

RESULTS

Posn	Name	Club	Trx found	Time
1	Brian Bristow	Mid Thames	3	2336
2	Trevor Gage	Mid Thames	3	2354
3	George Whenham	Coventry	3	2354.30
4	Chris Wells	Mid Thames	3	2355
5	Dave Holland	South Manchester	3	2358
6	Alan Simmons	Mid Thames	2	
7	Chris Plummer	South Manchester	2	
8	Bob Gray	Mid Thames	2	
9	Paul Tyler	Mid Thames	1	
10	Ray Goodearl	Mid Thames	1	
11	Bernard Pool	Mid Thames	1	
12	Steve Stone	Mid Thames	1	

VHF/UHF CONTESTS CALENDAR

2/3 Jul	VHF NFD (Apr 94)
3 Jul	3rd Back Packers 144MHz (Jan and Apr)
10 Jul	24GHz Cums (Apr 94)
23 Jul	144MHz Low Power/SWL (Apr 94)
24 Jul	432MHz Low Power/SWL (Apr 94)
31 Jul	10Ghz Cums (Apr 94)
14 Aug	24GHz Cums
21 Aug	432MHz Fixed/SWL (May 94)
28 Aug	10Ghz Cums
30 Aug	144MHz CW Cums (Feb 94)
3/4 Sep	144MHz Trophy/SWL (May 94)
4 Sep	4th Back Packers 144MHz
11 Sep	24GHz Cums
14/29 Sep	144MHz CW Cums
25 Sep	70MHz Trophy/SWL (Jul 94)
25 Sep	10GHz Cums

HF CONTESTS CALENDAR

(Overseas events in italics; rules in parentheses)

1 Jul	*Canada Day Contest* (Jun 94, p19)
2/3 Jul	*Venezuela SSB*
9/10 Jul	RSGB SWL Contest (July 94, p29)
9/10 Jul	*IARU Championship* (Jul 94, p19)
16 Jul	*Columbian Independence* (Jul 94, p19)
16/17 Jul	*SEANET DX CW* (Jul 94, p19)
16/17 Jul	*HK DX CW*
17 Jul	Low Power Field Day (Apr 94)
23/24 Jul	*International Goodwill Games* (Jul 94, p19)
23/24 Jul	*Venezuela CW*
29/30 Jul	*Russian DX* (Jul 94, p19)
30/31 Jul	IOTA (Mar 94)
7 Aug	RoPoCo-2 (Mar 94)
6/7 Aug	*YO DX (CW/SSB)*
13/14 Aug	*WAE (CW)*
20/21 Aug	*SEANET DX SSB* (Jul 94, p19)

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Ads for CB equipment will not be accepted. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*.

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

FOR SALE

AERIAL MAST for Sale. Pneumatic 40ft Telescopic, vgc, fully serviced, complete with adjustable support legs, Base Plate, Yaesu Rotator Mount, etc: £175 ono. G8UKZ. (Nottingham) 0602 615922.

CLEARANCE! All Items must go. Make an offer! Telequipment D83 50MHz D/beam Scope c/w service manuals: £125. Telequipment D66A, 52 and S51B Service Manuals: £5 each. Fully Built Set BATC Test Card PCBs with S100 SPG and Circle PROM: £30. Advance SG63F AF/RF Test Generator to 200MHz c/w manual: £45. CED Mono/Colour CRT Tester/Reactivator: £35. Spectrum +2 Computer c/w PSU, Cassette, Joystick: £25. Phillips 12inch Green Composite Monitor: £25. Vero 19inch 3U Case with Insert: £25. Case with Insert: £25. RS Console/Terminal Case: £30. Pair New 9664B Ph/Mult Tubes: £15. Sharp PC1500A Pocket Computer c/w Cassette, Printer (printer has slight fault): £30. Mono Vidicon Camera (PSU needs rectifier) c/w Lens: £30. Philips PM2454 Professional AC Milli-Volt Meter: £25. Wizard Joy-ROM for BBC B Computer (Use non-joystick games with Joystick): £5. RARE ITEMS! Cossor Valve Multimeter type 1044K, Marconi AF Power Meter type TF893A, Western Professional Watt Meter type S67, Taylor Cap/Res Bridge type 110A, Solartron 4EP7 CRT with MU-Metal shield, new 3WP7 CRT, 5inch P11 E./Mag FSS CRT, Remscope S01 Storage CRT, New 408C CRT for Flying Spot Scanner, Smiths car tacho, fits 4/6/8 cylinder vehicles. Also: S100 5slot Motherboard with FD/HD Controller, 64k Ram and CPU, Shelton Sig-net Multi-User Satellite and engineers Disc, Professional S100 Development System with FD/HD, 64K RAM, HDC, Hi-Res Colour Graphics, Real Time Clock, Speech Board, RAM Disk, D to A and A to D Converters etc. Complete with all diagrams and stacks of S/ware including Pascal, DBase, Wordstar etc, c/w ICL 6402 Terminal and Books galore on CP/M and Utilities. Offers invited on the above!!!, any carriage extra. Wanted: Mint local 2m M/mode. Contact Simon, G8POO, QTHR. (Hexham) 0434 633913.

HEATHKIT SB-220 Linear 2kw, manual: £450. Tektronix Oscilloscope RM504 S/Beam 19inch Rack-mount: £75. Jaybeam C5/2m Colinear: £50. All vgc. Buyer inspects, collects. GM2FHH, QTHR. (Aberdeen) 0224 324495.

ICOM IC-R1: £300. ICOM735 Keyer: £475. IC-AT150: £275. IC-AH2A: £400. IC-202S: £150. IC402: £200. MML144/200S: £175. MML 144/30: £50. MML 70cm/30: £100. MM 6m Transverter 2m IF: £125. SSB Electronics 23cm Transverter 2m IF, coax relay: £250. Datong RF Processor: £75. Datong M/mode Filter FL3: £100. Datong Morse Tutor: £60. Weltz RS3050 Power Supply 30A, 0-18V: £75. Weltz SP-220: £30. MFJ ATU 962B: £150. G0KRK. (London) 081 505 1457.

JAYBEAM TB3 3 ele Beam for 10, 15 and 20 metres. Buyer collects: £120. (Ickley, W Yorks) 0943 609136.

KENWOOD TS530S fitted SSB Narrow Filter, complete with new Vectronics VC3000LP ATU: £450 ono for Both. Delivery arranged. G8MQY. (Brackley) 0280 706325.

KENWOOD TS790E All Mode Base station, 45W VHF, 40w UHF. Dual watch function work the Satellites, superb rig: £1,150. Dressler 2m Linear 4CX250B: £280. Mizuho 40m QRP Hand rig: £120. Tokyo 2m Linear Gasfet Preamp HL180V variable i/p power: £250. Bnos 6m Linear Pre-amp 50-10-50: £70. Kenwood MC60 Desk Mic: £60. All in gd condx. Alec, G0FIG after 6pm. (Nr Brighton) 0273 462696.

KENWOOD TS711E 2m M/mode, mint condx, boxed, manuals: £625. Tom, G7APX. (Stoke on Trent) 0782 311386.

KENWOOD TS790E, vgc, all bands fitted, little use since new: £1,250 ovno. Tonna 23cm 55ele Yagi, boxed and new: £40. FT690 Mk2, 10W Amp, vgc: £380 ovno. 6m Linear Amp Toykyo ML166V: £200 ovno. All plus delivery. G0ORK (day) 0602 59522. (Matlock) 0629 55725.

KENWOOD TS950S DIG as new, original packing, manuals, all Filters to 250C, SP950 Spkr. Demonstrate willingly, real bargain: £2,700. G6RJ, QTHR. Tel: after 8.15pm or 1-2.30pm. (Bedale) 0677 470480.

MFJ931 ARTIFICAL Ground: £40. Star-Masterkey Memory Keyer: £50. Kent Brass Key: £25. Datong FL3 A/filter: £80. All as new. (Llanelli, Dyfed) 0554 820207.

MOBILE SHACK. Land Rover Caravanette. Aluminium bodied coach built on extended chassis. 4 Wheel drive, low milage, gd condx, long MOT and Tax. 4 Berth, elevating roof, toilet compartment, heater, fridge, electrics. 7 Metre Mast, used on Expeditions and Contests: £3,400. (Wolverhampton) 0902 340211.

REALISTIC PRO-43, 200 channel VHF/UHF scanning Rx: £180. Tiny2 TNC: £90. TH28E plus Eartaker: £270. Cannon AF1000F Auto Focus SLR, two Lenses: £300. Psion 3a, PSU, Serial Link(PC): £350. All ono. G4DPZ, QTHR. (Birmingham) 0860 136587.

STAFFORDSHIRE. Four Bed Bungalow, det rural situation. One mile from village. Large Workshop/garage. Beaut garden, unoverlooked, 300ft plot E-W, P60 Tower. Very gd horizon. Six miles north of Stafford and M6: £149,000. G4BUP. (Stafford) 0785 851181.

TRIO TS940S, CW Filter, MC60A Mic, immaculate cond, orig packing with manual: £1,050. G4OGJ. (Doncaster) 0302 851371.

VALVES, brand new. All £1 each. EL821, EL86, 12BH7, R19, 6F14, 6DB6, 6F33, M8212, 6CB6, 6CH6, 6BJ6, 6L17, 6HZ6, 12AY7, 6F17, 6F13, M8081, M8100, 6L7, 6SH7, QN77, QA2407, 6X4, DM70, QU37(A), A1714, PY31, QS75/20, QS150/40, GN5, CV2174, G240/2D, SC1/600, 3TFV4, SC1/800, 3AT2, QV04-7, PL36, A1820, QQV02-6, QQV03-10. Please add £2 postage/packing. Cheques to: K Bailey, 40 Seymour Close, Selly Park, Birmingham B29 7JD.

YAESU FT101ZD, FM, fan, WARC, Mic, Handbook: £300. Can deliver. Alinco ALD-24T D/band Mobile rig: £200. Both rigs in daily use, updating. Ring Roger, GW4BCD, QTHR. (Porthcawl) 0656 788359 after six.

YAESU FT23R 2m H/H with case and accessories, ex cond: £175. Icom P4ET 70cm H/H with Nicads and charger, still under warranty, ex cond: £250. Both ono. Phone John, G0NAJ, QTHR. (Dukinfield) 061 338 8731.

60-FOOT VERSATOWER, Galvanised 3 Sections + Cage for Rotator, 2 winches wires and floor mounted. As new: £475. GW3HOJ. Ring after 10pm. (Swansea) 0792 390122/850094.

AAA CAPCO MAGNETIC Loop Antenna 20 - 10m including WARC bands: £159 ono. (Harrow) 081 951 0676.

ADVANCE PSU 13.8V 50A, new in box: £70. DC to 2.5GHz 50Watt Dummy Load, made by "Bird": £25. (Stoke on Trent) 0782 303745.

AKD 4m-FM and 6m-FM Tcvr's, both boxed as new 5/25W o/p. Ideal Mobile, Base or Packet: £100 each. Pye Europa 70cms Repeater Xtals RB0 and RB3, free to first Novice who calls. Dave, G0OIL. Wanted Low-band FM Pye Westminster. (Retford, Notts) 0777 248080.

ALINCO DJ120-E 2m H/held +extra Sp/Mic, vgc, boxed: £140. Diablo Series-30+/- 15v, 8Amp PSU: £15. Rack-Mount 10/12v, 10 + 4Amp PSU: £20. (Stockport) 061 477 5303.

ALINCO DR112EM 25W 2m Mobile: £150. Racal RA17: £100. 36ft Heavy Duty Tower: £75. All ono. Could deliver G4ADE. (Hornsea) 0964 534365.

ALINCO DR112EM 2m FM Mobile Tcvr 25W: £190. (Kendal) 0539 721068.

AMERITRON 811X HF 600w Amplifier, 15 months old, still like new, little used, with original packing: £550 ono. (Bristol) 0272 642867.

AMSTRAD NOTEPAD Computer, new and unused. Owner suddenly died: £150 ono. G3WGF, QTHR. (Doncaster) 0709 588398.

AMSTRAD PC2286, 90Mb, SVGA Colour Monitor, S/ware suite included, Mouse: £350. Amstrad LQ5000 Wide 24pin Printer: £150. All Boxed, Manuals. (Edgware) 081 905 3170.

AOR AR1500 Wide range Monitor, 1000 mem, AM/SSB/CW/NFM/WFM, 500KHz to 1.3GHz, Nicads, charger, in original box: £170 ovno. Considerable saving on new . Signal R-537S Air Band Rx: £35. Bargain. Dave, G4LQT. (Stafford) 0785 663688/662884.

ATARI STE Designer programme. Make and use catalogue System for complex pictures, PCB design, Graphicc stock Control etc: £40. Also RTTY and Morse Transceive: £10. Write to Mr V McClure, 43 Roman Way, Seaton, Devon, EX12 2NT.

BBB HEATHERLITE HUNTER HF Linear 3.5-30MHz 400W o/p, mint condx, manual: £575 ono. G6FS. (Leiston) 0728 832924.

BBC COMPUTER, two complete with Colour Monitors, several D/drives, Joystick, Landline Modems, loads of S/ware and manuals: £100, buyer collects. G0DLR, QTHR. (Meopham) 0732 823483.

C & W SIGNAL Generator. Heathkit Resistance/Capitance Bridge C3U. Valve Voltmeter V-7A, RF probe. RCA Audio Amplifier. M1 7179-B Command Sets 3-4MHz and 190-550kHz. Crystal Test Set 193. BC221 with P/S. Transformers galore. G4JW, QTHR. (Sheffield) 0742 303686.

CAPCO Magnetic Loop Antenna 13.9 - 30MHz, complete with Tuning Control and Instructions: £150. Also TET 5 Band Vertical Antenna, complete with Radial Kit and Instructions: £75. Alan, G0CPT, QTHR. (High Wycombe) 0494 440865.

COLLINS 75A4 fitted F455J31 Filter, extremely clean: £400. 136B2 Noise Blanker for KWM2/2A: £75. Please tel: Chris, G8JFJ. (Portsmouth) 0705 596836.

COLLINS KWM2A Tx/Rx W/E with 516F2: £400. Watkins Stewart Signal Monitor: £150. Pair 866A Rectifiers: £20. Trio MC43S Microphone: £10. G3GBB. (Suffolk) Day 0284 753049, evenings and weekends 0379 783651.

COLLINS POWER Meter (1KW) complete but unassembled. Kenwood BO9A System Base Unit. Kent Keyer and Paddle, unused. Pair 7MHz IOW Traps. Stranded or solid stainless wire, ideal Antennas. (Derby) 0332 671536.

COMPLETE STATION. All brand new unopened. Boxed guranteed comprising FT747GX, MFJ948 ATU, SP6 Spkr, Manson 25-30A PSU. Tagra 3 ele Beam, 20ft Mast. Nearly new NRD525G Receiver. Computer 386DX33, new SVGA Monitor. Brand new Epsom LQ100 Printer. DOS 6, WIN 3.1, loads of Radio S/ware. Property of OAP whose ill health now prevents him studying and obtaining licence. All bought this year in readiness. (Kettering) 0536 522007.

COMPLETE WEATHER System. Receives Pictures from Meteosat and all orbiting Satellites, comprising timestep receiver VER4.1 Prosat11 S/ware and card Track11 tracking program. Dartcom Downconverter, 37 ele Yagi and Turnstile for Noaas etc. Cabling and documentation, IBM compatible: £500. G3RDG. (NW London) 081 455 8831.

CUCKOO Clearing nest. Mainly USA Parts from WW2. Some only for Collection. Lists, Trier, G8VH, QTHR. (West Horsley) 0483 282226.

DRAKE TR7 HF Tcvr, including Filters, Mic, handbook, Speech Processor: £550 ono. Yaesu FT790R Mk1 70cm M/mode including nicads, rubber duck and Mic with matching FL7010 10W Linear: £290 ono. Heathkit 400Hz CW Crystal Filter for HW Rigs: £60. Phone G4SSX, QTHR. 0895 624361 evenings.

EDDYSTONE 770R Mk 2, c/w spare set new Valves: £85. Icom BP8 Battery, GWO: £18. Airtech M450-5A Duplexer: £20. Ex RIS Radio Receiver 35A with aerial plugs, inst H/book: £35. Pair Philips PF85's, OK 4m as new: £100 pair. (March, Cambs) 0354 741168.

EDDYSTONE 850/2 LF Receiver works but needs Tuning attention: £25. RadComs 1973 - 93, Tech info complete - some 'Ads', front covers missing. (Carlisle) 0228 513227.

EDDYSTONE 880/2 Receiver, vgc with original manual. Collectors item. Buyer collects: £200 Cash. Also see "Wanted" last month. Lepino. Anytime! (Surrey) 0374 128170.

FL2100B LINEAR as new: £380. TH21A/AT 2m H/held: £85. TS930S: £700. Marconi TF995A/5 FM/AM Sig Gen: £85. Many Valves. Various other Parts, Keys, SWR Meters etc. Selling on behalf of Silent Key family. (Lincoln) 0472 398757.

FREQ COUNTER and Function Generator ITT GX240: £235. Easy PCB Design S/ware, run on IBM PC 386/486: £95. Printed Circuit Work Frame, new: £64. Digital IC Tester "Diagnosy": £75. Intel Flash 1Mb Mem Card IBM PC: £75. RF Spectrum Probe 20-100MHz: £125. UV Exposure Unit 8w, new: £105. (Clapton Common) 081 806 4470.

FT101ZD FM, Mic, fan, VFO, manual, box, immaculate: £450. Robot 400, manual, box, immaculate: £350. SM202 Laboratry Timer Counter, manual: £75. (Hereford) 0568 84327.

FT767GX c/w 2m Mod, boxed etc: £950. FL2100Z Lin Amp, boxed etc: £425. KW107 Super Match, SMC Monitorscope 2 Tone: £80. Desk Mic MD-1B8 Dynamic: £50. Ring Roy, G4LJN. (Nr Bournemouth) 0202 877915.

FT767GX with 2m Module c/w Mic, on board ATU, Power Supply: £1,500. Phone between 9am - 9pm (Wallasey) 051 639 6638.

FTDX400, FRDX400, boxed with manuals: £175. PPC640 Amstrad Laptop plus Monitor plus S/ware: £120. Pace Modem for BBC: £30. EPROM Programmer for BBC: £35. 30Mb H/card for PC1512, incl manual: £50. Realistic Scanner: £10. Fluke Digital Multimeter: £30. (Aylesbury) 0296 715526.

FTONE Tx/Rx fitted for SSB, FM and AM, gd condx: £700. Capco Loop Antenna 20-10m: £100. G3LBG, QTHR. (Torquay) 0803 313318.

GELOSO VALVE VFO and Dial, Tech Manual. Heathkit desk calculator, H/book, display fault. 35mm CRT (b/w) Matsushita 40HB4-0-8, wkg. Meccano No1 Clockwork Motor, new, boxed. Some Valves, SAE Lists. D/F Loop base pivot castings. Type 4 D/F Loop, coil only. WANTED: Type 3 D/F loop and staff, remote cables and controls. Mint L or N Tx/Rx and connectors. Terrestial prices please!. (Helston) 0326 280871.

GOING QRT. TS50: £650. Drake MN7 ATU: £135. Packet comprising Tiny2 and Alinco DR: £270. Yaesu FT203R 2m H/h: £90. 80/40/20m Mobile ProAm Whips and matching Unit: £65. Variable Voltage Transformer: £75. Palomar Noise Bridge: £45. Heatherlite Mobile Mic and Control Unit: £20. MC60A Base Mic: £85. CN101 PWR/SWR Meter: £85. Cobwebb: £90. Butternut HF6V: £90. Slim-Jim: £20. All perfect order. Collect or pay postage. (High Wycombe) 0494 534656.

GOULD OS300 D/Trace Scope, 8 X 10cm Tube, 2mV/cm, DC to 20MHz, T/Base 0.2s/cm to 50ns/cm, GWO, full spec available: £200 ono. Buyer collects. Details Jim, G7JQJ, QTHR. (Leeds) 0532 813718.

HEATHERLITE Explorer 1kW HF Linear Amp: £850. KW Monitorscope: £95. Racal RA17 Communications Rx with Datong VLF Converter, manual: £120. IC2E 2m H/held with charger and Magmount: £100. Mizuho 7MHz QRP Tcvr, Ant, spare Crystals, Mic: £140. WPO DBS/CW 80m Trcvr QRP: £30. Buyers inspect and collect. (Northampton) 0604 752601.

HEWLETT PACKARD 100MHz Scope, 182A Mainframe with 1805A and 1825A Plug-ins, Standard 1Meg Ohm Inputs (Dual Beam): £195. Wayne Kerr Automatic LCR Meter 4210, 0.1 per/cent Accuracy: £275. (Watford) 0923 234924.

HONDA EG1200X 230v 50Hz Generator, used less than 50 hours, excl condx: £235. Can deliver 75 miles from Boston, Lincs. G8AAP, QTHR. (Boston) 0205 760409.

HOUSE SEMI, GCH, Three beds, two recep, large kitchen. Paved front, side and rear to back garden. Car-port rear. Three cellars. Extra toilet. Tower Beam Mast dipole, full planning. Easy access Motorway. Vacant poss: £65,000 ono. Photos available. G3RUG, QTHR. (Stockport) 061 491 3814.

HOWES Digital Frequency Counter 0-30MHz, 12v: £20 ono. "The Modern Amateur Electronics Manual", new: £25 ono. G3XHC. (Dartmouth) 0803 833621.

ICOM IC-2KL Linear 500w and IC-2PS Power Supply, manuals, boxed: £765. G3GLL, QTHR. (Tollesbury) 0621 868250.

ICOM IC-R-9000 Communications Receiver, mint condx with external Speaker SP20 also Monitor, excellent performance, like Rolls-Royce, inspect collect: £3,000 ono. (W. London) 081 813 9193.

ICOM IC-R9000 mint condx, excellent performance Rx. External SP-20 also Monitor. Reason for sale: £2,500. Eddystone 1837/2 Digital, excellent: £300. (London) 081 813 9193.

ICOM IC251E 144MHz M/mode, Mutek: £350. Collins MP1 Mobile power supply, new: £100. Collins 136B/2 Noise Blanker, new: £100. Eddystone 940 General coverage with Eddystone Round speaker: £100. Hallycrafters SX17 Rx, lovely example: £85. Feragraph JER 5 Recorder, gd condx: £45. Leak Throughline FM Tuner: £40. Contact Gerry, G0AQH, QTHR. (Brighton) 0273 454108.

JRC NRD 525 fair condx, excellent working order: £400 ono. Also Icom R71E Rx, excellent: £400. Also TINY 2 TNC, leads for Alinco DJ-580, IBM S/ware and books: £110. Spectrum 128+3 Computer with FAX, Morse Tutor and Decode, Log S/ware: £60. Also Yaesu FRG 7 Rx: £120 ono. Phone after 6pm. (Morayshire) 0343 830644.

JRC NRD525 vgc, boxed, optional 1.8KHz Filter CMH530, RTTY Converter still in box: £600. Possible Part exchange Receiver Transceiver. (Derby) 0332 372696.

KENWOOD TH78E D/Band 2/70 H/held, boxed as new with spare Battery, case, Mic: £350. Yaesu FT230 2m 30w Mobile, all fittings, boxed, perfect working order. Yaesu FC707 ATU, as new: £100. Telereader TWR680 Morse Reader: £75. All plus post/packing. G4OFO. (Kingston upon Thames) 081 949 2317.

KENWOOD TL922 Linear, very little use, as new with manual and all leads etc: £850 or Px. G3KLL, QTHR. (Oldham) 0457 874669.

KENWOOD TR751E incorporating VS1 Voice Synthesiser, excl condx, never used mobile: £400 ono. Contact Walker after 7pm. (Slough) 0753 883934.

KENWOOD TRIO 830S gd condx: £550 ono. Phone (Aldridge) 0922 59150.

KENWOOD TS440S with Icom PS55 PSU, YK-88C and YK88SN Filters, all boxed, excellent condx: £725. (Derby) 0332 551945.

KENWOOD TS520S, vgc, handbook: £275. SEM "Z" Match: £100. Revex SWR/Pwr Meter: £40. Standard C58 M/mode with charger, rubber-Duck, manual plus 30w Linear: £260. Please phone evenings, weekends. (Oxford) 0865 772544.

KENWOOD TS520SE, CW Filter, MC35C Mic, vgc, boxed, with manuals: £300 ovno. Microwave Modules 144-28MHz Converter: £25. (Rhondda) 0443 436655.

KENWOOD TS950SD as new, original packing, manuals, little use mainly Rx: £2,500. G4FKR. (Winchester) 0962 880411.

KLM KT34A TRIBANDER, new, never unpacked, prefer buyer collect: £300. G3BII, QTHR. (Beaconsfield) 0494 675528.

KW600 LINEAR Amplifier, 3.5-28MHz, nice condx, spare 572B with circuit and notes: £250. Dentron "Super Tuner Plus" 1.8-28MHz Balanced/unbalanced Outputs, 1KW rating, handbook: £75. Palomar Preselector for older Tcvrs, RF switching 350W transmit through, 1.8-54MHz: £30. G3JFC. (Sleaford) 0529 413547.

LAKE QRP Tcvr DTR7: £100. ATU: £40. G4MPK, QTHR. (Leatherhead) 0372 375514.

MARCONI TF2015: £150. TS700: £165. Dressler D200C: £110. PCB Bubble Etch Tank: £40. HP-141 1200MHz Spectrum Analyser: £1,300. Steve. (Bridgend) 0656 665225.

MITAC 286, 42Mb HD, VGA Monitor, lots of Amateur S/ware: £285. Write to G0FQX, QTHR. (Milton Keynes)

OPTOELECTRONICS Frequency Counter, model 2810, 10Hz to 3GHz, new unused with charger and antenna. Bargain at: £150. Alan. (Royston, Herts) 0763 262443.

PACKET STATION Complete. TR7200G, PK88, Keyboard, Dumb Terminal, Printer, paper, books, leads: £250 cash. Seen working, buyer collects. G4HDP, QTHR. (Derby) 0332 556005.

QRT SALE, Health reasons. Includes FT1000 (new May 93), fitted extra Filters. TM732E 2m/70cms FM D/bander. G600RC H/duty Rotator. Welz D/load. Daiwa 30A PSU. 40ft W/mounted Tennamast. Gem-Quad 10, 15, 17 & 20m. Kent Paddle. AMA5 Magloop. MD1C8 Desk Mic. SP5 Extension Spkr. YH77ST Phones. All superb! Boxes, manuals. Much more!. SASE for List. G0EOL, QTHR or phone (Chester) 0606 554857.

RADCOMS. I've got 1986 Aug - Oct, 1987 complete, 1988 complete, 1989 Jan - Sept, 1990 Oct - Dec, 1992 complete, 1993 complete. All must go, need the space. FREE to good home, buyer pays postage only. Graham, G4XVJ, QTHR. (Oxford) 0865 511314.

SATELLITE DISH 2m Heavy duty "A" Frame. Basic LNB. Buyer collects. Offers. G4UTJ, QTHR. (Colchester) 0206 854392.

SEM QRM Eliminator Mk1: £30. SEM 6m Transmatch: £20. Maplin Notch Filter: £25. Ty-Star 14inch SVGA Monitor 1024 x 768 0.28 pitch: £85 + £10 delivery. Trident TVGA 9000 Graphics Board, no drivers: £30. G0KTN, QTHR. (Melksham, Wilts) 0225 703726.

SHACK CLEARANCE; Sota 70cm 50w Linear Amplifier: £70. Decca Voyager 1.6-4.2MHz Marine Tcvr, 12/24v: £50. Jaybeam C5 2m Colinear: £30. Telebox VHF/UHF TV Tuner: £25. Two AKG K160 Broadcast quality Headphones: £15 each, £25 pair. Buyer collects. G4VZO, NOT QTHR. (Kingswinford) 0384 287454.

SILENT KEY SALE (G3EJA). FT102, FV102DM, SP102: £550 ono. FT902: £400. CPU2550A 2m FM: £85. YD148 Desk Mic, MH1B8 Mic, AVO 40 Meter, Microwave Mod Freq Counter, Telequipt S51A Scope, KW Speaker, spare valves, AR88 etc. Send for List or will be sold at Flight Refuelling Hamfest'94, 14th August. Contact G4BGX on 0258 857019 or (Bournemouth) 0202 590300.

SILENT KEY Sale, GM1GGP. Many items, including Radios, Accessories, Masts. For full List contact John, G0JBW. (Kidderminster) 0562 864771.

SILENT KEY Sale, GW3RVF. NRD 535 Gencov Receiver: £650. JRC JST135 Tcvr: £1,000. Vibroplex Paddle Key: £85. Bencher Paddle Key: £65. RF Indicator FL-30HA 1-250MHz: £40. SEM Transmatch +Easytune: £100. G3PPD CW501 Insect Filter: £100. IC201 VHF Tcvr: £100. Realistic PRO2005 Scanner: £125. Sony ICF7600DS Receiver: £50. LP Filter 1Kw: £30. ASAHI Reflectometer: £25. MFJ ATU: £30. Book HF Ant, Moxon: £8. (Nr Cardiff) 0222 530349.

SILENT KEY SALE. FT747GX: £625. FP700HD: £225. FC700 ATU: £99. FC757 Auto ATU: £225. All excellent condx, not used on Transmitt. 40ft Versatower with Heavy-Duty Top and Non-Slip winding Gear, wall mounting with Rotator. Buyer to dismantle and remove: £450. 2m Tonna with Mutek high grade Pre-Amp: £90. Butternut Vertical 10-80m: £100. Ring Tony after 6.30pm (Rugby) 0788 571066.

SSTV SYSTEM from USA, Pasokon TV as new with PC Card, S/ware, manual: £150. Yaesu FRC7700, good, no manual: £180. (Bournemouth) 0202 557631.

STANDARD C528 D/band H/held, case, Mic/phone, SP/battery, charger, vgc: £280 ono. (London) 071 586 1337.

STRUMECH BP60 UNIT 16MS Series, comprising 1-M3 Mast Assembly. Two heavy duty Winches. Base Plated Post IN2R. Head Unit Rotator Bearing fitted 0.5 H.P Motor, combined reduction gear Unit. Reversible control switch up-down. Fritzel 3 ele 10-15-20, 16 ele 2 metre Beam. All cables Balan: £950 ono. (Leicester) 0533 595310.

TEN TEC TITAN Amp 2k, vgc: £1,850. Ten Tec OMNI 5 all filters, vgc: £1,500. Matching PSU :£120 Prefer sell as Line up deal. (Preston) Tel/Fax 0772 622009.

TOWER ALTRON CM35 with Post Mount, buyer to inspect and collect: £180 ono. G3NKS. (Cheltenham) 0242 241099.

TRIBANDER BEAM full size 10, 15, 20m, inc Coax: £40. Quark SSTV Unit with Digitiser fitted EPROM programed S/ware for Spectrum Computer: £40. (Selston, Notts) 0773 810010.

TRIO R2000 General Coverage Receiver: £475 ono. AT1000 Coupler for Trio R2000: £75 ono. Would prefer no split: £500. Can be seen working. Telelephone Joe, 9am to 9pm. (Macclesfield) 0625 420835.

TRIO TS510, 80-10m 120w, PS510, Mic, gd condx: £250. Hy-Gain 10m 3ele: £25. Wanted AQ620 3 ele, working or Not. Phone Adrian, 5-9pm. (Telford) 0952 261959.

TRIO TS520S immaculate condx with Mic, Mains and DC leads in original packing, little used, working: £350 ono. (Rugeley) 0543 685694.

TRIO TS830S with CW Filter, mint, manual, boxed: £475. Avo TT169 Transistor Tester: £15. Pair 6146B Valves: £15. Avo Model 8 Mk3 with Case: £45. All plus carriage. G3HSL. (Hartlepool) 0429 261632.

TRIO/KENWOOD TS811E 70cm Base Station with DCS, all Modes CW/SSB/FM 25W o/p, 13.8v DC or 240v AC, solid state rig, boxed as new: £675. Yaesu FT203R 2m FM H/held, charger, needs attention (Repeater shift): £60. G3ZJK, QTHR. (Rugby) 0788 810535.

TS830S: £485. VFO230: £125. FC902 ATU: £125. FT690, plus Nevada Amp, plus 12v 6A PSU: £240. FRG7700: £220. TH3jc(needs slight attention) with Rotator: £175. (Collect Cheltenham) All Ex G3OPR. (London) 081 567 6389.

TS930S, Auto ATU, Full Bk in, inc Mic, manual, beautifull condx, original packing: £799 ono. AA + A (Capco) SPC300D ATU includes internal Balun + Ant Switch 1KW PEP, matches anything! Lovely condx: £120. (£299 new). Ron, G4DIY. (ST Helens) 0744 57471.

VALVES. 2 EC52, 15 EF50, 3 EF54, 5 EF55, untested £1 each. 4 12A6, 1 12C8, 2 12SQ7, 1 12SR7, 1 12SK7, 1 12SG7, Tested: £2 each. 5 TT15, 2 6093, 4 QV04-7, 1 6080, untested - Offers?. Wanted HRO Coils, scrap or cheap HRO, + resistors type TR5 and TR6. Write first, will phone back. EFC Owen, 28 Chartfield Road, Reigate, Surrey, RH2 7JZ.

YAESU FL2000B, vgc: £350. Kenwood PFC230 Remote VFO: £75. Yaesu FT202R with Spkr/Mic: £75. AR40 Rotator, complete: £60. (Trowbridge) 0225 763923.

YAESU FRG-770 Receiver 150KHz to 30MHz, 30 bands, Digital Readout, Memory Unit. Frequency Converters FRV-7700(A) 118-150MHz. FRV-7700(D) 70-80MHz, 118-150MHz. FRT-7700 Aerial Tuning Unit. FRA-7700 Active Antenna Unit. LF Filter Unit FF-5. All Leads, Operator Handbook and full maintenance manual: £450. Cossor Oscilloscope 1039M S/beam small lightweight, freq 10Hz to 50KHz, all cables, manual: £25. Phil, G3ZJH. (Bristol) 0272 691025.

YAESU FT101-ZD Mk3 (latest model) WARC bands, FM board, 12v Inverter, fan, CW Filter, Mic, SP101 Ext Spkr, FV101Z Ext VFO. All vgc (NO SPLITS): £500. FL2100Z 160-10m Linear: £450. (upgrading). Kevin, GW4BCB, QTHR. (Cardiff) 0222 842406 A/H.

YAESU FT101ZD SSB and CW only. Mic and fan, no CW filter. Just: £280 + shipping. G7EFE. (Woodbridge) 0728 688123 (evenings).

YAESU FT107M, HF all Bands Tcvr, 100W, with DMS107 Digital Memory and CW Filter: £550. ATU FC107: £100. All mint as new and boxed(Manuals). (Kingston upon Thames) 081 949 2317.

YAESU FT707, 13.8v, Compact HF Tcvr, excellent for Base and Portable use, GWO and condx: £325. BBC - "B" Computer with View W/P, much S/ware including Radio Pragrammes and books, including 80 track DSDD: £59. Quendata DWP1120 Printer: £39. Met 70-3 Beam for 70MHz: £10. G0RAU, QTHR. (Gerrards Cross) 0753 883299.

YAESU FT757GX Tcvr: £400. Yaesu FP707 PSU: £150. Yaesu FC102 Tuner: £125. Trio TR2300 Portable: £100. AOR AR2002 Scanner: £200. All above in gd condx and ono. G4GKD, QTHR. (Swindon) 0793 849896.

YAESU FT757GX2 FC757AT FP700, Mic, manuals, as new: £800. Magloop 10-30m: £100. KAM V5 (Pactor): £225. FT290R: £175. BSX2 TNC: £50. Datong Converter VLF - 10m: £15. Gwhips 20+40m: £25. All manuals, boxes. Other small items. Send SAE. Buyer collects/pays. Property G4XLX. Derek, G0OEW. (Nantwich) 0270 668111.

YAESU FT990/890 Transceiver. FT990DC, mint condx with Auto ATU, narrow CW Filter, Desk Mic and SP6 Spkr, boxed: £1,495. FT890 mint condx, Auto ATU, narrow CW Filter and fist Mic, boxed: £995. The PAIR: £2,375. Ideal Main and standby rigs. FIF232C Interface: £40. (Reading) 0252 844248.

YAESU SP102 Spkr: £50. Alinco 15A PSU with circuit protection: £50. All vgc. Phone (Pontypool) 0495 757221.

WANTED

ANTIQUE WIRELESS Equipment, Crystal Sets, Horn Spkrs, Valves, Pre-war Television, Valve Hi-Fi, Books. G4ERU, 5 Luther Road, Winton, Bournemouth BH9 1LH. (Bournemouth) 0202 510400.

AP1086 Issue 1, (RAF Radio Stores Ref No's). Also Air Publications Relating to Radio, Radar Equipment. Would purchace current to Post-War:- Magnetrons, Klystrons, T/R Cells, Photo - Multipliers, Ignitrons, Thyratrons, Microwave Tubes, BWO's, TWT's, 1 inch CRT's and Special CV Types. Required R1355 10D/13032, IFF Receivers R3002, R3067, R3121, Control Unit type 17. All unmodified. Excellent price offered. Please phone anytime. (London) 071 511 4786 or 071 790 2846.

HEATHKIT HW-30 Twoer 144MHz Valve Xtal Tx, Super-Regen Rx AM Rig circa 1960s. Home brew 12v HT/LT PSU also welcome for Portable use. Good price paid for gd condx rig in GWO. Telephone now Ned, G8GZZ, QTHR anytime. (Woking) 0483 723506.

MCR1 RECEIVER B2 Spares Box, Multitone H/phones and Morse Key for B2. Power Supply for B2. Call anytime, all calls answered, good prices offered. Steve. (Preston) 0772 713370.

CIRCUITS for Marconi Timer TF2414/2M, Rediffusion TV CV513037, Scope BWD Elec Mod 509A,. Jason S/Gen AG10. G0IPT. (London) 081 883 3474.

COLLINS KWM2A, Accessories, Manuals etc. Anything in this Series considered, eveny faulty. Please WHY. Terry, 7 Cavendish Drive, Clowne, Chesterfield, Derbys.

DATONG FL3 Filter wanted, also 70cm and 23cm Linear Amplifiers required. Will pay cash and collect. Please phone Alec, G0FIG. (Brighton) 0273 462696.

DRAKE OR HEATHKIT Linear 2Kw Amplifier, plus suitable Antenna with machine Unit. Send details to D L Davies esq. G8QW, Colbury House, Hill Street, Testwood, Totton, Hants.

GOOD HOME OFFERED for Ham Radio 1981, 1982, 1983, 1984 and 1985. Phone Price required. G3DVV, QTHR. (Chipping Norton) 0608 644371.

H J LEAK Circuit layout, voltage information for Stereo 20 Amplifier and Troughline 3 FM Tuner. Photocopies or all papers returned. G7RGI, QTHR. (Crewkerne, Somerset) 0308 868598.

INFORMATION about Air Ministry Key type B1, Ref No 10F/7839 and Key type PS No 4707G, Ref No 10F/2814. Dave Johnson, 15514 Ensenada Drive, Houston, Texas 77083, USA. Tel: 713 498 8945.

KNOBS for B40/CR100/CR300 Rx's. Valves 211, ECC81 and ECC83. Prefer non-Eastern variety. Circuit for PYE Mozart Tuners HFT111 and HFT 108 Quad 22 Amps. (Edinburgh) 031 447 9979.

LEADS for Hewlett-Packard 431 or 432 Power Meter. (Head to Instrument) or source of suitable Connectors. John, G8BXH. (Watford) 0923 234924.

QUAD, LEAK, Radford, etc, Valve Hi-Fi Equipment, working or not. Will pay cash and collect. (Chelmsford) 0245 266027.

ROUND EKCO'S or other Vintage Domestic Radio's, wanted by Private Collector. Good price paid for good examples. Also station name dials, Bakelite knobs, backs, etc to any old radios. Required to assist enthusiast to renovate vintage Wireless sets. G1CNN, 6 Oxford Court, Queens Drive, Ealing, London W3 0HH. (Ealing) 081 993 4946.

WW2 ALDIS LAMP wanted by Ex-Naval Signalman, now OAP, for sentimental reasons. RS94839. (Hemel Hempstead) 0442 256632.

YAESU FP757HD or FP757GX or any other suitable PSU for use with FT757GX Tcvr. Bill, G0LWV, QTHR. (Orpington) 0689 876733.

YAESU FV101DM VFO, can you help me find this equipment. Must be in excellent condx with manual, leads. Plus need Yaesu Spkr SP901. Clive, G4OPO. (Bristol) 0272 490944.

EXCHANGE

AMSTRAD PPC640 Portable (Integral Modem) with manual, Power Supply and carrying case. Swap for ATU, for TS120 or 30-40ft Mast. Joe. (Chichester) 0243 536586.

ECHO model M23 (1933) Bakelite Cabinet only. Murphy "Baffle" model A122, original Valves. Offers? / Exchange 70cm H/held / sideband. Bill, GW3DGT. (Narberth) 083483 369.

HAVE PAKRATT PK232 with operating manual, will exchange for good 2m Mobile Rig. G3ZYQ, QTHR. (Enfield) 081 363 3363.

CLUB NEWS

DEADLINE - Items for inclusion in the September 1994 issue must be sent to HQ marked 'Club News - DIARY', to be received by 22 July latest. If news is received by the published deadline, it should appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given.

AVON

NORTH BRISTOL ARC - Tuition for RAE and Morse is available at every meeting. Details 0272 513573.

RSGB CITY OF BRISTOL GROUP - 26, RAF Bombers Ops. Now meets at New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol, BS16 1BG. Details 0272 672124.

SHIREHAMPTON ARC - 15, DF Briefing; For Summer Break and DF season, see G4AHG-2 for further information. Details 0272 770504.

SOUTH BRISTOL ARC - 6, 10 metre Activity evening; 13, DIY Crystal Set by George, G0JQW; 20, (tba); 27, Magazine Exchange - or for SBARC Rally table by Brian, G7NQJ. Details 0275 834282.

WESTON-SUPER-MARE - 4, Annual DF Hunt, at the Woodspring, Worle at 7.30 for 8pm start; 18, Workshop night - same venue and a time. Details G8WAR, 0934 415700.

BEDFORDSHIRE

SHEFFORD & DARS - 7, Pedestrian DF Hunt; 14, Barbeque. Details 0462 700618.

BERKSHIRE

BRACKNELL ARC - 13, Mini Talks. Details 0344 420577.

MAIDENHEAD & DARC - 7, Talk 'Mellish Reef DX-Pedition' by John, G3WGV; 17, McMichael Rally. Details 0628 25952.

READING & DARC - 2/3 VHF NFD at Watership Down; 14, Club Junk Sale (part 2); 17, McMichael Rally, members help needed on the day; 28, Talk 'DX-ing from ZD9 (Tristan Da Cunha)' by Roger, G3SXW. 1994 is the 60th year of the Club's existance. A number of activities are planned to celebrate this anniversary. Details 0734 698274 eve.

READING & WEST BERKS Raynet - 24, Berkshire Emergency Services Tournament. Group is urgently seeking new members. Net every Monday at 7.30pm on 144.775MHz. All welcome. Details Denis, G4KWT 0734 698526.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 6, Talk 'RAIBC' by Shirley Ray; 20, Social evening (The Bell, Hardwick); August NO meeting. Details 0296 81097.

CHESHAM & DARS - 6, general meeting; 13, Pedestrian DF Hunt; 20, Discussion evening; 27, CW talk and practice evening. All meetings take place in the Top Floor Meeting Room at The White Hill Centre, White Hill, Chesham, Bucks at 8.15pm. Details 0494 676391.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 1, Preparation for VHF NFD; 8, Club's PCB production equipment by G7PLE; 15, DF event evening; 22, Talk 'PMR used by Electricity Industry' by John, G0GKP; 29, Preparations for IOTA Contest.***NEW SECETARY***. Details G0GKP, 0954 200072.

CENTRAL

DOLLAR ACADEMY ARC - Meets most afternoons at the Academy after 5.15pm. Details GM0LOD 0259 742126.

STIRLING & DARS - Meets every Thursday at 7.30pm in the Clubrooms, Bandeath Industrial Estate, Throsk, Nr Stirling. Morse instruction available when requested. Details 0324 636235.

CHESHIRE

CHESTER & DARS - 12, Barbecue; 19, Construction of a Wefax Demodulator for HF and a Working demonstration by Chris, GW0PJX; 26, Surplus Equipment Sale; August - Closed for Summer. Details 051 608 3229.

STOCKPORT RS - 13, Air Traffic Control; 27, Mechanics of Radiation and Propagation (part 2), by G3LX. Details 061 439 4952.

CLWYD

RHYL & DARC - Meets every 1st and 3rd Monday of each month, WRVS Centre 116, Vale Road, Rhyl at 8pm. Details 0745 351362.

NORTH WALES R Rally C - Novice courses, Morse instruction, City & Guilds Approved Examination Centre. All radio enthusiasts are welcomed to visit. Meets each Thursday at 7.30pm, YMCA Building, Colwyn Bay, Clwyd. Details 0492 513246.

CO ANTRIM

CARRICKFERGUS ARG - Club meets every Tuesday at 7pm in Downshire Secondary School. Details 0960 351807.

CO ARMAGH

ARMAGH & DARC - Meets 2nd and 4th Wednesday of the month at County Armagh Golf Club, Newry Road, Armagh at 8pm. Details 0762 870423.

CO DOWN

BANGOR & DARS - Visitors welcome at all meetings. Details 0247 883315.

CORNWALL

CORNISH RAC - 7, Arrangements for Rally. Details 0209 820118.

NEWQUAY & DARS - Meets alternate Friday. Anyone intersted in Amateur Radio is welcome to attend. Details 0726 882752.

PENZANCE RAC - Hold regular meetings on Mondays, also 2nd Morse Test centre, via RSGB only. Details Brian, 0736 61427.

POLDHU ARC GB2GM, GX0PZE - Hold regular meetings on Tuesdays and Fridays 7.30pm. Visitors welcome to visit. HF net Wednesdays 7.30pm around 3.75MHz. All welcome. Details 0326 290638.

CUMBRIA

WESTMORLAND RS - Club now reformed. Now meets on the 3rd Wednesday of each month at the Kendal Liberal Club. Details 0524 762201.

DERBYSHIRE

BOLSOVER ARS - 20, 5th DF Contest. Details 0246 822856.

BUXTON RA - 12, Bring and Buy Sale & JOTA Discussion; 26, Power supplies. Meets at Lee Wood Hotel, Buxton at 8pm. Details 0298 25506.

DERBY & DARS - 6, Surplus Sale; 13, Visit to Watnall Weather Centre - 7.30pm start; 20, Barbecue at Drum Hill, Little Eaton; 27, Shareware Swap evening; Aug 3, Junk Sale. Details 0773 856904.

NUNSFIELD HOUSE ARG - Meets every Friday at 8pm, at Nunsfield House Community Centre, Bolton Lane, Derby. Details 0332 518256.

DEVON

APPLEDORE & DARC - 18, Treasure Hunt. Meets 3rd Monday of each month at Appledore Football Clubroom at 7.30pm. Details 0237 477301.

EXETER ARS - 11, A Talk by Ians; Aug 8, Haldon Barbecue. Club meets in the Moose International Centre, Blackboy Road, Exeter at 8pm. Details 0392 78710.

EXMOUTH ARC - 8, Fox Hunt; 22, Talk. If you are in the area why not come and see us!!. Meetings held at the Scout Hut, Marpool Road, Exmouth at 7.30pm. Details 0395 279574.

PLYMOUTH RC - Start of Summer program, (1st and 3rd Tuesdays of June, July and August). Details 0752 563222.

TORBAY ARS - Club nights, every Friday at the ECC Social Club, Highweek, Newton Abbot. Details 0803 526762.

DORSET

BLACKMORE VALE ARS - ***NEW VENUE*** Now meets at Shaftesbury School, Dorset on 2nd and 4th Tuesday of each month. Details G7JIF 0963 362766.

DORSET POLICE ARS - 7, Visit to Rampisham; 21, The 1st DPARS annual Fox Hunt; Aug 4, Talk/demo 'ATV' by Bob Knight, SDRS. Club meets at Dorset Police HQ on 1st and 3rd Thursday of each month. Details from Pc 915 Richard Newton, Ferdown Police Station, Dorset on 0202 229351.

FLIGHT REFUELLING ARS - 3, VHF NFD wrap up/natter night; 10, Photo Techniques; 17, Hamfest Planning night; 24, Talk 'Somerset Light Railway'; 31, Bats and Ultrasonics by G3VPF. Details 0425 653404.

SOUTH DORSET RS - 5, meeting. Meets 1st Tuesday of every month. New members and visitors welcome. Details 0305 773860.

DYFED

ABERYSTWYTH & DARS - 2/3, VHF Field Day, Pen-y-Garn, Cwm Ystwyth; 28, GW0ARA On the Air evening. Club meets 2nd Thursday each month at 8pm, Scout Hut, Plascrug Avenue, Aberystwyth. Details 0545 580675.

EAST SUSSEX

CROWBOROUGH & DARS - 21, 'The biggest Aspidistra in the World, BBC overseas broadcasting' part 2, by Les, G3FET; Aug 25, NO FORMAL meeting. Details 0892 661807.

HASTINGS E & RC - 20, Junk Sale. Details 0424 830454.

SOUTHDOWN ARS - 4, Club Barbecue at Polegate Windmill; August - NO MEETING. Please enquire about RAE and Morse Classes. Details 0323 484282 or G0UOI @ GB7HAS.

WORTHING & DARC - Meets at 7.30 for 8pm at Parish Hall, South Street, Lancing. Details 0903 753893.

ESSEX

BRAINTREE & DARS - 4, RAC Rally Car and Video. Club meets every Monday at Bocking Hockey Club at 8pm. Details 0376 327431.

CHELMSFORD ARS - 5, Discussion 'Don't shoot the Messenger' with Malcolm Salmon, RSGB RLO at Marconi College at 7.30pm. Details 0245 256654.

COLCHESTER RA - 14, Top Band Radio DF by Philip, G0NXH. Details 0206 764034.

HODDESDON RC - 2, Ware Carnival SES, followed by VHF NFD; 7, Second visit of 12 members to Control Tower Stanstead Airport, remaining members at club, introduction to club Transceiver; 23, Tolmers Scouts Camp Cuffley, GB2RST from 1400, followed by Star B Q with talk on 'Astronomy' by Brian Bond, then running Barbecue from 7.30pm. Details 0920 466639.

FIFE

DUNFERMLINE & DARC - Every Thursday at 7.30pm at the former RAF Radio station at Outh Muir. Details GM0GNT, QTHR.

GLOUCESTERSHIRE

CHELTENHAM ARA - Meets 1st Friday of each month at Charlton Kings Library. Details 0242 242336.

GRAMPIAN

ABERDEEN ARS - 1, Junk Sale; 8, Building the Yearling-part 4; 15 & 22, Trades Holiday - rag chew; 29, 'Wet String' Listening Competition - round 5; Aug 5, Junk Sale. Meets every Friday at Queen Mother House, Aberdeen. Details 0224 780591.

MORAY FIRTH ARS - Meets every Thursday at 7.30pm. Details 0343 86395.

GREATER LONDON

BROMLEY & DARS - 19, Barbecue and Operating evening. Details 081 777 0420.

COULSDON ATS - 11, Quiz night - Other Societies/Clubs are invited to take part. Details 081 684 0610.

CRAY VALLEY RS - 2, Surplus Sale; 7, Meet the members'94; 21, Talk 'Getting srtarted on Packet' by G6SDO(tbc). Details 081 850 1386.

CRYSTAL PALACE & DRC - 16, Annual Outing - A morning visit to a vineyard/brewery, a picnic lunch and the afternoon at the Kent & East Sussex Railway. Details 081 699 5732 or 0737 552170.

The R S of HARROW - Details 0895 632377(eve, w/end) or 071 251 2700(daytime).

SOUTHGATE ARC - 14, Lecture & demo 'Receiving Weather Satellite Maps at home' by Keith, G3NCD; 28, Tutorial & demo 'Managing CW Pile-ups' by Ron, G3KTZ: Details 081 360 2453.

SURREY RCC - 4, 'Domestic Entertainment' by G0GNA; Aug 1, Club Barbecue at QTH G3ZPB. Details 081 660 7517.

SUTTON & CHEAM RS - 7, Informal meeting; 21, 'Operation from Tristan da Cunha' by Roger Western, G3SXW at 7.30pm. Club meets at Sutton United Football Club, Gander Green Lane, Sutton. Details 081 644 9945.

WIMBLEDON & DARS - 29, Camp Briefing; August **NO MEETING**. Details 081 540 2180.

GREATER MANCHESTER

ECCLES & DARS - 5, Lecture 'Image Intensifiers' by G8PMX; Aug 2, Discussion 'SSB Field Day contest'. Details 061 773 7899.

TAMESIDE ARS - Now meets every Wednesday night at 7.30pm at the ATC Hut, Moorcroft Street, Droylsden, Tameside. Details from: A N Laughlan, 8 Kempton Close, Droylsden, Tameside, M43 7JL.

GWENT

NEWPORT ARS - 4, Talk on PCB Design by John Case, GW4HWR; 11, General meeting; 18, Centre Closed till September. Details from Pat Pearl, GW7MVQ on 0633 250017(work) Fax 0633 840254.

GWYNEDD

DRAGON ARC - 4, Sale of Surplus equipment; 18, An opportunity to Display Home Brew equipment; Aug 1, An evening of Amateur Radio Videos. Details 0248 600963.

PORTHMADOG & DARS - 21, Surplus Equipment Sale; Aug 18, Ladies night. Details 0766 770546.

HAMPSHIRE

ANDOVER RAC - RAE classes each meeting at 7pm. Meets at Wildhearn Village Hall, 1st and 3rd Tuesdays of each month. Details 0264 773547 evenings.

BASINGSTOKE ARC - 4, Talk 'The Secret Listeners'(WW2 Radio Monitoring) by Brian, G8DIU; 31, 2m Direction Finding Competition: OS175, Fox - Dave, G4NIP; Aug 1, Talk 'Radio Tracking of Wildlife'. Details 0256 25517.

HASTINGS E & RC - 20, Junk Sale. Details 0424 830454.

HORNDEAN & DARC - 7, The history of 'The Nab Tower' by Bernard Green; Aug 4, Talk 'Digital Signal Processing' by Nigel, G7CAW. Meets at Horndean Community School, room X5, Barton Cross, (off Catherington Lane), Horndean. Details 0705 472846.

ITCHEN VALLEY ARC - 8, Hospital Broadcasting by Paul, G0TLR; 22, Open Meeting + natter night; August **No Meetings** but weekly Net will run. Details 0703 732997.

WINCHESTER ARC - 15, 'Transmitting Video - continuing ATV' series by Steve, G4JGS. Details G3MCL, QTHR.

HEREFORD AND WORCESTER

BROMSGROVE ARS - 12, 2m DF Hunt; 26, Technical Topics/Talk; Aug 9, EMC Discussion/Problems. Details 0527 542266.

HEREFORD ARS - Club meets on 1st and 3rd Friday of each month. Details G4MET, QTHR.

REDDITCH RC - 14, Uses of Packet Radio by Steve, G4FPV. Club meets 2nd Thursday each month. WRVS Centre, Ludlow Road (opposite Liberal Club) at 8pm. Details 0789 762041.

HERTFORDSHIRE

CHESHUNT & DARC - 6, Natter night and members Forum; 13, tba; 20, natter nite; 27, Open Air Meeting, Bass Hill Common, Broxbourne; Aug 3, Junk Sale. Details 0992 464795.

DACORUM ARTS - 5, Construction of 2m Fox Hunt Antennas, details 0582 766973; 19, 2m Fox Hunt, Details 0442 66787. Meets 1st and 3rd Tuesdays, 8pm at Heath Park, Cotterells, Hemel Hempstead.

HODDESDON RC - 2, Ware Carnival SES, followed by VHF NFD; 7, Second visit to Stanstead Air Traffic Control Centre; 23, Tolmers Scout Camp, Cuffley, GB2RST. Details 0920 466639.

STEVENAGE & DARS - 5, Report on 'VHF NFD' by Paul, G7PPI; 12, Project Night by Simon, G0EVZ; 19, Video evening; 26, General Get Together, project update etc. Details Neil, 2E1ASZ on 0438 350882.

HUMBERSIDE

GOOLE R & ES - 8, Logfill; 15, Discussion; 22, Talk 'ATV', by G8VHL; 29, Social evening. Details 0405 769130.

GRIMSBY ARS - 1, CIBA Treasure Hunt; 7, An Aeronautical Evening by George, G4EBK and Chris, G7BRZ; 8, CIBA Junk Sale, at CIBA Grimsby Sports ground; 14, DF Hunt; 21, A Treasure Hunt, pedestrian variety!. Details 0472 825899.

HORNSEA ARC - 13, Result of Book Review. Details 0964 534283.

ISLE OF MAN

ISLE OF MAN ARS - 24(Sunday), Supporting the Port St Mary Lifeboat Day (Aran Class Lifeboat 'Gough Ritchie') operating GT3FLH on 80, 40 and 20m bands. Contact counts towards the Lifeboat Award of the WAB 25th Anniversary Appeal. Details 0624 832240.

ISLE OF WIGHT

BRICKFIELDS ARS and Vintage Wireless Museum - 1st Monday of every month, Bring & buy nights; Every Tuesday of week Novice Training & Construction evenings by Mike, G0SEB 7.30pm to 10pm. Morse classes to be run as and when required; The Clubs Isle of Wight County Award is now Available, details Dennis, 2E1BND. Details G1VGM at GB7IOW.

KENT

DARENTH VALLEY RS - ***NEW SECRETARY - Ray Rodgers, G1UKH****. Details 0689 826846.

DOVER RC - 6, Novice evening; 13, Natter and operating night. Club will not meet at the Duke of Yorks School from 27th until start of the Autumn term. Meets Wednesday evenings 6.30-10pm during term time. Novice, full RAE and Morse classes. All ages (over 8) welcome. Details 0304 825030.

EAST KENT RS - 2, Annual BBQ at the QTH of Erwin, G4LQI starting at 6.30pm; 27, Talk on Amater Radio by Dennis, G4SOT at Icom starting at 8pm; NO MEETING in August. Details 0227 743070.

MEDWAY AR & TS - 1, Kent IP Group TCP/IP(prov). Meets every Friday, other evenings include construction and Morse as required plus Novice help. Details 0634 710023.

SEVENOAKS & DARS - 18, Shack and natter evening; **August, NO MEETING**. Details from The Secretary, Sevenoaks & DARS, c/o Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.

LANCASHIRE

DARWEN ARC - Club meets every 3rd Wednesday of the month at 8pm at Darwen Catholic Club. Details Bill, G2AKK 0254 703767.

FYLDE ARS - 12, tba; 26, Informal. Meets 2nd and 4th Tuesdays of each month. Details 0772 635464.

ROCHDALE & DARS - Meetings held every Monday, except Bank Hols at The Cemetry Hotel, Bury Road. Details 0706 376204.

THORNTON CLEVELEYS ARS - 4, Two short Talks by G2CBH and G4HWK; 11, Club's 25th Birthday Party; 18, Equipment Night; 28, Barbecue. Details G4BFH, QTHR.

LEICESTERSHIRE

LOUGHBOROUGH & DARC - 5, DF; 12, 'Golf' Competition; 19, Open Forum 'DF-ing'; 26, Wymswold on Air + BBQ. Details 218259.

LINCOLNSHIRE

LINCOLN SHORTWAVE C - Meets every Wednesday at the city Engineers Club, Waterside South at 8pm. Details 0427 788356.

LOUTH & DARS - 11, Junk Sale, British Legion Hall, Louth at 7pm. Details Neil, 0472 388261.

SPILSBY ARS - **Change of date of monthly meeting** Now held at The White Hart Hotel, Spilsby, 1st Thursday in month at 7.45pm. Details 0790 52712.

LOTHIAN

LOTHIANS RS - **JULY and AUGUST - Summer Break**. Details Colin, GM4HWO, QTHR or general enquiries to the club Secretary, Dick, GM4DTH, QTHR.

MERSEYSIDE

LIVERPOOL & DARS - 5, GB0OL SES Preparations; 12, GX3AHD On the Air; 19, Coach Trip Planning; 26, Surplus Sale; Aug 2, Home-brew night. Details Ian, G4WWX, QTHR.

NORTH SEFTON ARC - Club meets 2nd Wednesday of each month. Details 0704 579017 or Fax 0704 570089.

WIRRAL & DARC - 6, D&W, Eastham Ferry Hotel, Eastham; 20, D&W, Magazines Hotel, Wallasey; 30, R DF Hunt, Heswall lay-by 8pm. Details 051 677 0210.

NORFOLK

DEREHAM ARC - 14, BBQ at Joes, G7MPQ. Details 0362 691099.

ARC FAKENHAM - 5, Informal evening - Antennae. Meets on 1st Tuesday of every month at Trinity Church Room, Hempton at 7.30pm. All welcome. Details 0485 528633.

NORTHAMPTON

KETTERING & DARS - Club meets every Tuesday at Electricity Sports & Social Club, Eskdale Street, Kettering at 7.30pm. Details Len, G0RDV 0536 514544.

NOTTINGHAMSHIRE

MANSFIELD ARS - 11, Natter Night; Aug 8, Talk 'Amateur Television' by Barry, G6LIC. Meets at The Polish Catholic Club, Off Windmill Lane, Woodhouse Road, Mansfield at 7.30pm. Details 0623 423697.

NOTTINGHAM RAYNET ARC - Details 0602 400111 9am to 5pm then 0602 260391 after 6.30pm.

SOUTH NOTTINGHAM ARC - 1, Talk 'The Development of RISC Processing & review of current S/ware' by Raymond, G0SOM; 5, Third Fox Hunt - meet at Highbank; 8, Construction +(On Air HF & VHF); 15, Open Forum - members only; 22, Construction +(On Air HF & VHF); 29, Breedon Hill Site Servicing; 30, Barbecue at Breedon +Radio on Air Activity. Details 0509 672734.

NORTH YORKSHIRE

HAMBLETON ARS - 7, Practical / Ops night; 14, Practical / Ops night. Meetings at Allertonshire School, Northallerton. 7.30 to 9.30pm. Details 0609 776608.

OXFORDSHIRE

VALE OF WHITE HORSE ARS - 5, Talk. Club meets 1st Tuesday of every month at The Fox, Steventon at 8pm. Visitors Welcome. Details 0235 531559.

SHROPSHIRE

SALOP ARS - 7, Natter night; 14, Visit to Whittington House, British Telecom Oswestry, 7pm; 21, Foxhunt - chase 4, Oak Hotel car park for 7.30pm start; 28, talk on Antenna Construction by Charlie, GW3JPT (tbc). Details 0743 361935.

TELFORD & DARS - 13, DF Hunt 2/70cm, 7.30 start HQ; 20, Shopping List night; 27, New Club Project. Meets Dawley Bank Community Centre, Telford at 7.30pm. Details 0952 588878.

SOMERSET

TAUNTON & DARC - 31, Proposed Field meeting at Somerton with Yeovil Club members, Barbecue etc. Other Fridays, Station Operating, Morse and class Discussions. Meets every Friday in the Basement County Hall, The Crescent, Taunton at 7.30pm. Details 0823 680778.

SOUTH YORKSHIRE

SHEFFIELD ARC - ***NEW VENUE*** Now meets at The Club 197, Brook Hill, located in the Sheffield University Lecturers Social Club, opposite the main Universaty buildings. 4, Talk 'Contest Working' by Andrew, G0HSA; 11, Talk 'I was Rare DX (S21ZD)' by Bob, G4APV; 18, 3rd Round inter Club contest eliminator; 19, Ten Pin bowling; 25, Organisation of future club events. Details 0742 446282.

STRATHCLYDE

PAISLEY (YMCA) ARC - RAE/Morse classes, run on Tuesdays. Details Stuart, GM0UKD 0505 335195.

SUFFOLK

FELIXSTOWE & DARS - 10, (Sunday 2pm) DF Hunt and BBQ; 25, Visit to Sizewell Nuclear Plant, Names to Neil, G0ORG; Aug 8, ESWR Post Mortem. Detail 0394 273507(evenings).

IPSWICH RC - 6, Club Surplus equipment Sale; 13, Barbecue at Hallowtree Camp site; 18-22, Club Activity Week at Otley; 20, Video: Making and using Kite Antennas. All meetings start at 7.30pm, at The Rose and Crown. Details Sheila, G8HYE 0473 742072.

SUDBURY & DRA - 5, Talk on Propagation by Mike, G4GGC; 14, SES at Woodhall School, details from Dom, G0HXZ; Aug 2, Talk on Aerials by Mike, G4GGC. Details 0787 313212.

SURREY

DORKING & DRS - 26, 'Activity Evening', A portable event at the Devils Dyke, Brighton, W Sussex. Meet at the car park from 7.30pm. Talk-in on S20/S18. Operation to be on 2, 4, 6 metres and 70cms BYO refreshments. Details John on 0306 631236.

REIGATE ATS - 19, Lecture 'Videophones - from techniques to systems'. Club meets at Tilgates, Bletchingley at 8pm. Details 0342 325322.

TAYSIDE

DUNDEE ARC - College closes for summer recess. Details from GM4FSB, QTHR.

STRATHMORE & DARC - ***CHANGE OF VENUE***. Now meets at 2231 (Forfar) Squadron, Air Training Corp, 1 Lochside Road, Forfar, Angus every Wednesday at 7.30pm. Details Alan, GM4JCM, QTHR.

TYNE AND WEAR

HAZELLRIGG ARC - Meets every Monday, Hazellrigg Community Centre at 7pm. Classes for Morse, Novice and talks on various subjects held on last Monday in the month. Details 091 264 4608 after 6pm.

WARWICKSHIRE

STRATFORD U AVON & DARS - 11, Talk 'Electronic Building Blocks' by Bill Mansfield; 25, Annual Construction Competition. **NEW SECRETARY** Martin Rhodes, G3XZO. Meets 2nd and 4th Mondays of each month at the Home Guard Club, Main Street, Tiddington, Stratford upon Avon at 7.30pm. For details phone 0789 740073.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC - Meets 1st & 3rd Mondays in the month. Details G0NOL 0922 36162.

MIDLAND ARS - Every Wednesday, RAE & Morse classes; Every Thursday 'Night on the Air'; 2nd and 4th Monday in month, PC night; Last Friday in month Atari night. Details John, G0LAI 021 628 7632.

SOLIHULL ARS - **New Secretary** Paul Gaskin, G8AYY, QTHR. Details 021 783 2996.

SOUTH BIRMINGHAM RS - 6, Barbecue at Hamstead House, Fairfax Road, West Heath at 8pm. Visitors welcome; Aug 3, Test Equipment evening - bring your gear for testing. Starts at 8pm. Details 021 458 1829.

STOURBRIDGE & DARS - 4, Portable Operating evening at Hob Green Primary School; 18, Final Main Meeting before summer break; **August NO MEETINGS**. Details 0384 374354.

WEST BROMWICH CENTRAL RC - 3, John, G8NZO, talk 'Earth bondage for Terrestrials' by our man from MARS. For details phone Ian Leitch 021 561 2884(home) or 0902 353522 ext 2093(office).

WEST SUSSEX

WORTHING & DARC - 6, DF Hunt; 13, 'Radar/Defences' - Talk and Slide Show; 20, 'Nostalgia' by G8MSQ; 24, HF Portable Competition; 27, 'Map making past and present' - Ordnance Survey talk and Slide Show. Meets every Wednesday at 7.30 for 8pm at Parish Hall, South Street, Lancing. Details 0903 753893.

WEST YORKSHIRE

KEIGHLEY ARS - 7, natter night; 14, Treasure Hunt; 21 natter night, 28, Talk 'History of Radio' by G0BZH. Meets every Thursday at 8pm. Details 0274 496222.

NORTH WAKEFIELD RC - 5, Visit to Holme Moss BBC Transmitter; 7, Talk 'HF Linears' by Perter Rodmell, G3ZRS; 14, Natter night/ On the Air; 21, Talk by Derek, G0RZP, local RLO. Details 0924 362144.

WILTSHIRE

CHIPPENHAM & DARC - Tuesdays 7.45pm, Sea Cadet HQ Chippenham. Details Jon, G4LGZ 0225 743352.

SALISBURY R & ES - 3, RSGB DF Qualifying event (G2FIX). Details 0722 330971.

TROWBRIDGE & DARC - 6, Inter Club skittles and Families night, Southwick VH; 20, Social. Details 0225 864698 (evenings).

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

2/3 JULY

HAMFEST-UK - The County Showground, Weston Road, Stafford. Some five minutes from M6, jun 14. The new event for Amateur Radio, SWL and computer enthusiast. Features a large trade presence, lectures, bring and buy, special interest groups. RSGB Morse Test on demand, bring two passport size photographs. Refreshment available. Talk-in on S22. Details 0923 893929.

3 JULY

YORK Radio Rally - Tattersall Building, York Racecourse, Knavesmire, York. Doors open 10.30am. Amateur radio, electronics and computers, Arts and craft. Admission one pound. Refreshments, licenced bar and Cafe. Talk-in on S22. Details Dave, G7FGA 0904 790079.

NEWPORT ARS Junk Sale - Brynglas Community Centre, Brynglas Road, Newport, Gwent. Open 10am to 2pm. Features junk sale with bring and buy, car boot, refreshments. Talk-in on S22. Details 0633 250017(work).

9 JULY

CORNISH 31st RAC Rally - Penair School, Truro, Cornwall. Doors open 10.30am. Features bring and buy, Official Morse Test(via RSGB). Hot snacks, free parking and talk-in on S22. Details from Ted on 0872 222605 or Ken on 0209 821073.

9/10 JULY

THE VHF/UHF DX Convention - Organised by the Northern Lights. Features Lectures on Saturday and Sunday, VHF/UHF trade stands and computer software, also demonstrations. Refreshments. Details Tony, G4APA 0270 761805.

10 JULY

HORNCASTLE AR Electronics and Computer Fair - Venue is half way between Lincoln and Skegness and signposted on the main roads from Boston, Louth, Skegness and Lincoln. Features many trade stands, a bring and buy. Refreshments available and talk-in on S22. Details from Tony, G6CZV 0507 522482 or G6CZV @ GB7LNX.

SUSSEX AR and Computer Fair - Brighton Racecourse, Sussex. Doors open 10.30am. Trade stands, covering most amateur radio and computer interests, plus a bring and buy stall. Refreshments available. Admission one pound fifty pence. Free car park and free shuttle trips to Brighton beach. Details Ron, G8VEH, QTHR Tel: 0903 763978 or 0273 417756 office hours.

17 JULY

The 11th McMICHAEL Rally and Car Boot Sale - Haymill Youth and Community Centre, Burnham Lane, Slough, near Burnham railway station. Doors open 10.30am. Admission one pound fifty pence. Car boot sale(no advanced booking) is seven pounds per pitch on the day. Trade bookings contact Julian, G7JTV 0734 732059 Fax 0734 733721. General details contact Neil, G0SVN or Roy, G4XYN on 0628 25952.

RAIBC Romsey Picnic - Broadlands, Romsey, Hants. All members, families, friends and supporters welcome. Features a grand draw, junk sale, refreshments. Talk-in on S22. Details John, G4COM 0703 693017.

24 JULY

COLCHESTER Radio & Computer Rally - St Helena School, Sheepen Road, Colchester. Adjacent to the Colchester inner bypass Avenue of Rememberance. Doors open 10am - 4pm. Wide range of radio and computer traders, amateur radio car bot sale and a bring and buy. Refreshments and licensed bar. RSGB Morse Test on Demand, but two passport size photographs must be produced. Admission £1. Ample free car parking and easy access for wheelchairs. Talk-in on S22. Details Frank, G3FIJ On 0206 851189.

FIRST HUMBER BRIDGE AR Rally - The Exhibition Centre, Freightliner Road, off the Clive Sullivan Way, Hull. Easy access one mile from the bridge, on site parking. Doors open 11am, 10.30am for disabled visitors. 2 large halls, with excellent access facilities for disabled visitors. Bring and buy, bar and refreshments. Talk-in on S22. Details & booking contact Roly, G0UKS on 0482 837042.

28-31 JULY (THURSDAY-SUNDAY)

AMSAT-UK Colloquium - The University of Surrey, Guildford. Details from Ron, G3AAJ 081 989 6741.

31 JULY

RUGBY ATS 6th Annual Amateur Radio Rally - BP Truckstop on the A5, 3 miles east of Rugby and just 2.5 miles north-west from jun 18 of the M1. Open from 10am, admission is one pound per car. Pitches are seven pounds pre-booked or ten pounds on the day. Refreshments available. Details Peter on 0455 552449 or Steve (for bookings) on 0788 824214.

7 AUGUST

RSGB WOBURN Rally - Woburn Abbey, Bedfordshire. Open 10am. All under cover. Large trade exhibition, RSGB Bookstall and Enquiries and members mart. Details from Norman Miller, G3MVV, 0277 225563.

14 AUGUST

DERBY & DARS Annual Radio Rally - Littleover Community School, Pastures Hill, Littleover, Derby. Details Martin, G3SEJ 0332 556875.

FLIGHT REFUELLING ARS HAMFEST'94 - Flight Refuelling Sports Ground, Merley, Wimborne. Details Richard, G4VCQ 0202 691021.

21 AUGUST

5th GREAT EASTERN Rally - ***NEW DATE*** (organised by the Kings Lynn ARC) - Cattle Market, Hardwick Narrows, Kings Lynn. Details 0553 765614.

SOUTHEND Rally - Rocheway Centre, Rochford, Essex. Doors open 10am. Features trade stands and weather permitting a bootsale for radio, computer and electronic equipment will also be on site on the sports field. The event is organised the Southend and District Radio Society for the benefit of the local community. To enable the club to put on display at other local events. Talk-in on S22. Details for stands etc from The Rally Organiser, PO Box 88, Rayleigh, Essex, SS6 8NZ.

WEST MANCHESTER Radio Clubs 'RED ROSE RALLY' - Details Dave, G1IOO 0204 24104(evenings only).

27-29 AUGUST (SATURDAY-MONDAY)

COMPUTER FAIR 1994, includes a Radio Rally & Electronic Fair - The Show Grounds, (the site of ex Walsall Airport), Aldridge, West Midlands. Situated off the main A454, Aldridge to Walsall road, some 4 miles from A5, or 5 miles from M6 jn 7. Details 0543 372807(after 5pm or anytime weekends).

28 AUGUST

THE EAST COAST Amateur Radio and Computer Rally - Clacton Leisure Centre, Vista Road, Clacton-on-Sea, Essex. Details 0473 272002 or Fax 0473 272008.

GALASHIELS & District Amateur Radio Society Open Day - Focus Centre, Livingstone Place, Galashiels. Doors open 11am till 4.30pm. All the usual activities trade stands, bring and buy, club stalls, raffle and refreshments. New attraction a bring and sell, have a stand of your own - phone for details. Refreshments available. Details John, GM0AMB, QTHR Tel: 0835 822686.

30th TORBAY Rally - Clenon Valley Leisure Centre, Paignton, Devon. New Larger Venue. Doors open 10am. More trade stands, bring and buy, special interst displays, use of leisure facilities, restaurant and bar. For the family beach, boating lake, steam railway and flume water park only four minutes walk. Details John, G3YCH, QTHR 0803 842178.

29 AUGUST (MONDAY)

HUNTINGDONSHIRE ARS Annual Bank Holiday Monday Rally - Town Centre venue at St Germain Street, Huntingdon, Cambridgeshire. Easy to find, just drive round the ring road! Starts at 10am. All pitches and car parking on hard standing. Pitches five pounds per car, nine for transit van or car & trailer. Hot and cold refreshments available. Talk-in on S22 or via GB3OV on 433.125MHz (Local repeater). Details David, G7DIU 0480 431333.

SCARBOROUGH Radio Electronics and Computer Fair - The Spa, South Foreshore, Scarborough. Details Ross, G4NZ, 0723 514767.

3 SEPTEMBER

ANNUAL WIGHT WIRELESS RALLY - Wireless Museum, Arreton Manor, near Newport, Isle of Wight. Half way between Newport and Sandown on A3056. Doors open 11am to 5pm. Features trade stands and a bring and buy sale. No charge for admission to the Wireless Museum or the extensive gardens, lawns and gardens but there will be a collection for the Radio Invalid and Blind Club. Refreshments will be available. Talk-in on S22. The event to be indoors if its rains. Details G3KPO, QTHR or 0983 567665.

4 SEPTEMBER

BRISTOL Radio Rally (Incorporting Bristol Computer & Electronics Market) - Details G4YZR 0275 834282.

PRESTON Amateur Radio Society 26th Annual Rally - **ANNUAL RALLY CANCELLED**

TELFORD Radio Rally - Details 0743 249943.

EVENTS DIARY

VANGE Amateur Radio Society Rally - Details Stuart, G1VWB 0375 859632.

11 SEPTEMBER

BRITISH AMATEUR Radio Teledata Group Rally (BARTG) - Sandown Exhibition Centre, Sandown Park Racecourse, Esher, Surrey. Easy access from M25, jun 10 and not far from M3, M4 and M40. Doors open 10.30am. Features traders covering radios, computers, peripherals, software, books aerials, kits components, test equipment and with emphasis on Data Communications. Refreshment available. Details Peter, G8VXY 021 453 2676 or write: 38 Mitten Avenue, Rubery, Rednal, Birmingham B45 0JB.

13th LINCOLN Hamfest - Details Sue, (XYL G8VGF) 0522 525760.

17 SEPTEMBER

SCOTTISH AR CONVENTION - Cults Community Centre, Cults, Aberdeen. Doors open 10.30am. Trade, computer and special Interest Group stands, bring and buy and a Lecture programme. Convention dinner and accommodation details on request. Talk-in on S22. Details GM0LNQ, QTHR or Tel: 0358 761385 (eve and wekends)

25 SEPTEMBER

36th HARLOW Amateur Radio and Computer Show - The Harlow Sports Centre, Harlow. Easy access off M11 jn 7, A414, fully signposted route. Doors open 10.30am. This years event has extra floor space and more entrances will be used. Features many trade stands and a bring and buy area. Full catering and lounge bar facilities available in the complex. Talk-in on S22 and SU22 by G6UT. Details Mike, 0850 487863 or Ken 0279 426647(home).

THE THREE COUNTIES Rally - Three Counties Show Ground, Malvern, Worcestershire. Features a large selection of trade stands, usual bring and buy and possibly some lectures on Amateur Radio topics. On site catering facilities and other events at the Show Ground on the day Details G4PQZ 0905 773181.

NORTH WAKEFIELD Radio Club Rally - Details G4RCG 0924 362144 or G0EVT 0924 825443.

PETERBOROUGH Radio & Electronics Society East of England Rally - Bookings and further details contact Ted, G0REM 0733 66471.

2 OCTOBER

BLACKWOOD & District Amateur Radio Society Rally - Details Norman, GW0MAW 0495 227550.

GREAT LUMLEY AR & E S Radio Rally, Co Durham - Details Barry, G1JDP 091 388 5936.

7-9 OCTOBER (FRIDAY-SUNDAY)

RSGB INTERNATIONAL HF & IOTA CONVENTION and IOTA's 30th Birthday Party - Details G3NUG. Tel/fax 0442 62929.

WORLD ASSOCIATION of Christian Radio Amateurs and Listeners Conference - Liverpool. Details and bookings contact G4EZU 0474 533686.

8/9 OCTOBER

THE ALL IRELAND INTERNATIONAL Radio & Hobbies Exhibition - Details GI8RLE 0762 870423 Mobile: 0374 122213.

9 OCTOBER

KIDDERMINSTER & DARS Rally - Details G8JTL 0384 894019, G4HFP 0299 823818 or G0RJP 0299 822206.

THE COMPUTERCATIONS'94 Amateur Radio and Computer Rally - Details Bill, G6ZRM 0803 522216.

21/22 OCTOBER (FRIDAY/SATURDAY)

LEICESTER Amateur Radio Show - Granby Halls, Leicester. Details Frank, G4PDZ 0533 871086.

22 OCTOBER

RSGB OPEN REGIONAL Meeting - Bristol. Details Julian Gannaway, G3YGF, QTHR.

23 OCTOBER

HORNSEA ARC (East Yorkshire) Radio Rally - Details Duncan Heathershaw on 0964 532588.

5/6 NOVEMBER

NORTH WALES Radio Rally - Details Tony, GW0NSR 0492 513246.

6 NOVEMBER

14th NORTH DEVON Rally - Details G8MXI, QTHR.

TYNE AND WEAR REPEATER Group Auction - Details Brian, G8FBQ, QTHR 091 388 2913.

12 NOVEMBER (SATURDAY)

THE ALL MICRO Show - Details 0473 272002.

13 NOVEMBER

MARS-STOCKLAND Radio/Computer Rally - Details Norman, G8BHE 021 422 9787 or Peter, G6DRN 021 443 1189 evenings.

20 NOVEMBER

BISHOP AUCKLAND Radio & Computer Annual Rally - Details G0PRQ 0388 766264.

27 NOVEMBER

BRIDGEND & DARC Radio Rally - Details Mike, GW7NIS 0656 722199 or Don, GW3RVG 0656 860434.

WEST MANCHESTER Radio Clubs 'WINTER RALLY' - Details G1IOO 0204 24104(evenings only).

4 DECEMBER

LEEDS AND DARS Christmas Radio Electronic and Computer Rally - Details Phil, G6HGT 0532 680006.

11 DECEMBER

VERULAM CHRISTMAS Rally - (**NEW VENUE**) Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Herts. Details from Walter, G3PMF on 0923 262180.

5 FEBRUARY 1995

SOUTH ESSEX ARS Radio Rally - Details 0268 693786 or 0268 755350.

19 FEBRUARY

RSGB VHF CONVENTION - Details G3MVV 0277 225563.

14 MAY

MARS/DRAYTON MANOR Radio and Computer Rally - Details Norman, G8BHE 021 422 9787(evenings).

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 8 August. It was taken from the HQ computer on 6 June. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

JULY

1	GB0BC	Bromsgrove Carnival
	GB1MM	Marston Moor
	GB1TMC	Test and Measurement Centre
	GB1WC	Ware Carnival
	GB2GMM	Guglielmo Marconi Memorial
	GB4JUL	July 4th Celebration
	GB4ML	Minehead Lifeboat
	GB4MM	Marston Moor
	GB4NWC	Neale Wade College
	GB2WI	Womens Institute
	GB2WOL	Wings Over Lincolnshire
2	GB0RSB	Royal Signals Brighton
	GB2NHR	Norton Hill Railway
	GB4CMB	Carnaud Metal Boxs
	GB75FC	Forestry Commission 75th Anniversary
3	GB0OL	Oliver Lodge
	GB2CHG	Cupar Highland Games
	GB2FT	AFAL Trans Atlantic
	GB2SUK	Sony United Kingdom
	GB50OMG	Operation Market Garden
4	GB4TAF	Tideway Arts Festival
5	GB2SCF	Southend Centenary Festival
6	GB2SWC	Saffron Walden Crank Up
7	GB0SSS	Springfield Scouts Springaree
	GB2DTS	Dagenham Town Show
8	GB2RCC	Radio and Caravan Club
	GB2RVS	Rettendon Village Show
	GB2SWA	Squirrel Wood Anniversary
	GB4AFS	Air Formation Signals
	GB4DHE	Dundee Hobbies Exhibition
9	GB1RAF	Royal Air Force
	GB4DX	'DX'
	GB4FT	Fordown Tower
14	GB0RIL	Roa Island Lifeboat
	GB0WLS	Whitby Lifeboat Station
	GB1CDS	Cromwell District Scouts
	GB2HLS	Humber Lifeboat Station
	GB2SOL	Spirit of Lowestoft
	GB4ATC	Air Training Cadets
	GB8RT	Royal Tournament
	GB0BLB	Brighton Life Boat
	GB0ELB	Eastbourne Lifeboat
	GB0HLB	Harwich Life Boat
	GB0LBS	Life Boat Southend
	GB0SBS	Shoreham By Sea
	GB2ARC	Arthritis & Rheumatism Council
	GB2CL	Clacton Lifeboat
	GB2LHQ	Lifeboat Headquarters
	GB2WL	Walton Lifeboat
	GB4MIL	Mersea Island Lifeboat
	GB4PCP	Pembrey Country Park
	GB5NLB	Newhaven Life Boat
	GB5YLB	Yarmouth Life Boat
	GB800DON	Doncaster 800 Yrs Festival
18	GB1WSF	Washington School Festival
22	GB0CIJ	Cotswold International Jamboree
	GB0MQ	Medway Queen
23	GB2GAC	Gloshire Aviation Collection
	GB2NHR	Norton Hill Railway
	GB2SR	Stelar Radio
	GB4CHE	Cheshire Scouts
	GB4GLR	George Lee Room
	GB4TD	Tornio Devizes
	GB6CHE	Cheshire Scouts
	GB800DON	Doncaster 800 Yrs Festival
24	GB0VTR	Vintage Tractor Rally
	GB1HBR	1st Humber Bridge Rally
25	GB4GS	Goodwin Sands
28	GB4NIC	Northumbria International Camp
29	GB2RCC	Radio and Caravan Club

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

2E1CIW	Mrs A Cohen	12.02.94
9H1FP	Dr F Polidano	26.03.94
G0AFK	Mr T W Gibson	06.04.94
G0HLE	Mr J Heaton	07.03.94
G0KVL	Mr J Shaw	Nov 93
G0KXO	Mr C A Adams	
G0KZR	Mr E E Colgate	26.03.94
G0MYO	Mr J C Sugden	Nov 93
G1RQW	Mr N Battersby	27.03.94
G1UOO	Mr D C Wright	25.04.94
G2HKZ	Mr K H Dove	28.02.94
G3BZK	Mr C Ullyatt	20.02.94
G3CWO	Mr A J Butcher	31.03.94
G3EJA	Mr R G Nash	09.04.94
G3EMH	Mr T A Morris	
G3JDI	Mr K R Strellis	01.04.94
G3JXE	Mr R S Wilkinson	Apr 94
G3UFR	Mr P G Wells	17.03.94
G3VBM	Mr P J Cox	
G3WJ	Mr L Phillips	13.01.94
G4BCE	Mr C Ellis	05.01.94
G4CFU	Mr R P Churcher	17.05.94
G4CVL	Mr I T Kirby	11.03.94
G4EDO	Mr A D Sleeman	28.02.94
G4JZH	Mr P G Durbin	25.04.94
G4LBZ	Mr F J Rooke	Mar 94
G4OWJ	Mr J J R Large	
G4PRY	Mr A R L Edmunds	
G4UJU	Mr B J Brotherton	24.03.94
G4UTH	Mr P Flint	14.02.94
G4UYH	Mr G Bird	Oct 93
G4VGS	Mr D A Whitbread	10.04.94
G5MD	Mr D Powell	20.04.94
G6NEJ	Mr D Davis	26.01.94
G6RST	Mr H C Davies	25.11.93
G6YIZ	Mr H E Grindrod	
G7FFJ	Mr R Wren	01.04.94
G8PMX	Mr A Ashton	26.02.94
G8PZO	Mr S D Boyd	18.07.93
GM2TW	Mr G Leishman	01.04.94
K8DGK	Mr J L Evans	
RS3129	Mr G Watts	09.05.94
RS39211	Mr G R Styring	18.04.94
RS41730	Mr G N Slack	13.04.94
RS95381	Mr E O P Foote	Feb 94

Correction:

G6UI W T Bassage 14.02.94

We apologise for the error which appeared in May '94 *RadCom*.

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Rates correct at time of going to print (April '93) **(RSGB1)**

The LAST WORD

ICING ON THE CAKE

I was very interested and pleased to see the picture of Eileen and Basil O'Brien (*News & Reports*, June) together with the cake which was consumed on the occasion of their Golden Wedding recently.

The comments that you make in the caption are of course correct in so far as they go. What was not mentioned was the fact that Basil was President of the RSGB in 1981 and that he has spent many years as a member of Council.

You may feel that you would wish to point this out in a future edition of *RadCom*.

Michael Tudor G0LZI

[As someone who has known Basil and Eileen for some years, I'm pleased to do so and to mention that Basil was Honorary Treasurer (1988 - 89) and is one of the few on whom the title Vice President has been bestowed. Eileen has also been a great supporter of the Society and it was in recognition of their joint efforts that space was found in RadCom *to celebrate their anniversary - Ed]*

GIFT HORSE?

The *RadCom User Review* (June, p42) which finally confirms that this section of *RadCom* is a thinly disguised advertisement - in this case for Tandy and the PRO-44. It actually carries a label making an offer of £50 off the product described!

Under the advertising code of conduct advertising matter should be clearly labelled as such, as several other publishers have found to their cost. Should I make a formal complaint?

D F Elkington G0PAN

[Thanks for putting me right about the PRO-44 review - and I thought we were simply bringing members' attention to one of the cheapest three-amateur-band VHF receivers available. The offer? Well, one delighted member called to say "that's paid for my sub for over a year" - ED]

NO SUBSTITUTE

With reference to G0PAN's letter (*The Last Word*, June) I agree with his comments on the 'novel antenna'. In response to your request for opinions on your User Reviews I am afraid that I am not at all impressed with these and I have in mind the review of the FT-840 which in my opinion was far too sketchy.

If one is really interested in a new rig I think that there is no substitute for the full treatment by Peter Hart or an equally competent reviewer.

Simon A Baird GM0FHS

[Therein lies the problem. If an "equally competent reviewer" would care to make himself (or herself) known to me, I could do with an additional writer - Ed]

ALL AMATEURS ARE EQUAL

Gail and I would like to thank your magazine and members for the very warm welcome you have all extended to Gail (*News & Reports*, May). Gail has already made many friends; one of the greatest pleasures to disabled members is that when transmitting on radio everything is accepted as being equal, which is of great importance to them.

As Gail gains confidence she will be able to use all her languages - French, German, Spanish, Italian, Portuguese and Russian - so she interprets her callsign as G0 United Nations Friend. God has indeed blessed Gail.

Pamela and Gail Taylor (G0UNF)

FINAL COURTESY

Regarding the letter 'No Subterfuge' (*The Last Word*, May), it's a great pity that G4BZP and G0CLP have wasted so much time and energy, by not finishing the job. They have not sent me QSLs for contacts made with them, in spite of my requests!

John Ridd G8BQX

SATISFIED CUSTOMER

Count me in for user reviews, I find them useful. And do continue giving us articles on expeditions. They are an essential part of DX hunting and they are also great fun.

J B Roscoe G4QK

GOOD SAMARITANS

I would like to say thank you to two radio amateurs – Tom, G0UTH and Tony, G4XIV.

The story starts at 10.10am on Sunday, 15 May at Goose Wood Caravan Park, near York. My son Marc, who is two-and-a-half years old took a febrile convulsion. An ambulance was needed, so I called through GB3HG repeater and to my horror got no reply. I then tried the news frequency, a reply was instant; Tom, G0UTH in Harrogate answered.

An ambulance was despatched and Tom stayed on frequency till we arrived at York District Hospital. Marc was kept in hospital and I travelled back to Sunderland with my two daughters.

On Monday I got a call from my wife, Marjorie to say that Marc had taken a second fit at 2.15pm. I decided that I should travel down to York. Phil, G7MJN and myself left for York where a call through GB3CY found Tony, G4XIV, who directed us to the hospital the quickest way. When we arrived Marc was sleeping. The nurse suggested take Marjorie for a meal and some fresh air.

This we did with the help of Tony who gave us directions for somewhere to eat. We met Tony and his family after, and their hospitality was over-welcoming. Tom also heard us on frequency when we were leaving York for home, and called us to ask how Marc was.

The good news is that Marc was released from hospital on Tuesday 17 May.

Marjorie and Ian G7MFN

MAD OR DRUNK?

Have you gone mad? You remind us again of the considerable demand on space in *RadCom* (*The Last Word*, April), then devote three pages of the same issue to an elaborate hoax. Nobody minds an April Fool joke, but surely a paragraph would suffice.

You and the General Manager both need your butts kicking for the 'Toroidal Antenna' stunt, not to mention Manuela Groger's toolbox or G3VA's miraculous Israeli batteries. Also, the second review of the same transceiver (Icom 707) in five months.

What's going on? I can only assume that G0TWW is persuading you to drink large amounts of navy rum at lunchtime.

Richard Wakeley G3YEP/DU5

[As you will have read in last month's Technical Topics, *the toroidal aerial is far from being a hoax. As for the IC707, does anyone else take exception to a User Review followed some months later by a full evaluation by Peter Hart? - Ed]*

[If only we were drinking large amounts of Navy rum at lunchtime - G0TWW]

Please note that the views expressed in *The Last Word* are not necessarily those of the RSGB. We reserve the right to edit letters for publication. All letters are acknowledged and may be passed to the relevant department or committee.

MORSE SPACE REACTION

There were once three brothers and two of them, G4SUJ and G8UYZ, (*The Last Word*, June) went to their third brother, Amat Eurradio, with a problem. "Brother", they said "we have a problem and are sore oppressed. We have a speck in our eye that is very annoying and we can see no way round it. Will you remove it for us?"

"Well", said the third brother, "of course I will. But first, tell me, what is the nature of this speck that is so annoying?" The two brothers, pleased to be getting help explained: "Well, every now and then, a bit of 'our' band is being used by the key bashers. About a couple of channels actually, say 50 to 150kHz"

"And is this annoyance there all the time?" asked the third brother, puzzled. "Oh no, only occasionally, but it is very annoying - the key bashers *do* have a 150kHz portion of their own you know?"

Amat now looked at his brethren with sorrow in his eyes and explained to them that he could not help them after all. He explained thus: "My brothers, I cannot help you, for though you have a speck in your eye I have a log in mine own. Whilst you are sore oppressed by the occasional use of a few 25kHz channels every now and then I am blighted by the total and permanent exclusion from *twenty* 25kHz channels, about half a Meg, or a full quarter of my 2 metre allocation!"

The brothers were horrified, what type of QRM or bad practice could be causing this inefficient use of so much of the band near their brother's house and asked him to go on.

"You see brothers, twenty full channels are always occupied by the repeater stations and even where I may only have access to two or three of them, I still can't use the other channels because they do cover the land in great swathes, making a mockery of channel re-utilisation. Sometimes, brothers, the people who do use the repeaters are so bad and wicked that the Authority closes the repeater down for ever - and still I cannot use the channel, 50kHz lost for ever instead of being used for a decent simplex QSO. I fear brothers that this repeater blight is so bad but so insidious and accepted so readily that the log in my eye will never be removed".

So the brothers left Amat, downhearted that they could not see a way round their brother's problem, then one of them said: "What if we moved all the repeaters to 70cm? There's a load of space up there!" But his brother was not listening - he had started a 50kHz wide conversation on his usual repeater about the poor allocation on 2 metres!

David Perry G4YVM

MORSE SPACE REACTION

All this talk about lack of space on 2 metres (*The Last Word*, June) really is a myth perpetuated by those who cannot or will not try to sort the problems out for themselves. To Messrs Smith and Coomber I would say: before you ask for great chunks of the CW section of the band think about ways in which you could minimise the bandwidth that you are currently using. Why do you need 25kHz bandwidth for a signal that should only require 5kHz? You could at least use 12.5kHz spacing, and what about using a beam so that your signal only goes in the direction that you point it. Using a beam would also reduce the amount of interference that you would suffer on any channel.

You talk about a few 12.5kHz channels for Morse instruction. Why so much space? Most of the CW instruction is on A1A a few hundred Hertz wide, and talk-back is normally on SSB at about 3kHz bandwidth. If you took only one 12.5kHz channel from the CW end of the band you would take out at least 37 discrete CW 'channels'. Hardly good band planning.

As for not much activity on 2 Metre CW, you must be joking. Every night I hear newly licensed G0s and many G7s on CW, random Meteor scatter, EME, weak signal DXing. Maybe your problem is lack of receiver gain and selectivity. The CW section of 2 Metres is active not only in this country but across Europe. The other thing to remember is that FM has everlasting residual sidebands (they go on and on ad infinitum, like me), but the outcome is that FM and CW do not mix.

I politely suggest that, first of all, you make efficient use of the space you have without trying to poach the limited space that we, on SSB and CW, already use as efficiently as possible.

Bryn Llewellyn G4DEZ, Chairman VHF Contests Committee

MORE LETTERS ON PAGE 93

MORE LETTERS FROM PAGE 91

GLOUCESTER BOUQUET

It is with pleasure I write to thank the RSGB for the help given to Mr Ray Peart, G0FHK, and myself in successfully arranging the Special Event Station GB300GR at very short notice.

The station was to commemorate the 300th anniversary of the Gloucestershire Regiment - the 'Glorious Glosters' - and this was to be their last anniversary before their amalgamation with other regiments in April 1994. Unfortunately permission to run the event from the Regimental Museum in Gloucester was late being granted due to security arrangements.

In spite of the late application, RSGB staff, and Sylvia Manco in particular, managed to get permission from the Radiocommunications Agency for the call to be activated from the Museum. On the test weekend of 12 March problems occurred with activating the fire alarm and telephone systems and it was not possible to continue from the Museum.

RSGB HQ was contacted by phone on Monday 14 March and on Thursday the 17th they notified us that the RA had given permission to operate from a new venue (the QTH of G0FHK) and the letter of variation arrived the next day. Operation by members of the Gloucester Amateur Radio Society then continued until expiry of the licence on 31 March; some 700 QSOs world-wide resulted.

It is our pleasure on this occasion to congratulate the RSGB and thank them for their great help and cooperation in this matter. The exercise was very much in the heart of Ray, G0FHK, as he was blinded in Northern Ireland whilst serving there with the 'Glosters' in 1973. RSGB, and Sylvia Manco in particular, take a well-earned bow.

E A Perkins G3MA (Co-organiser), on behalf of Mr Ray Peart G0FHK.

FREE FEE FOR ALL YOUTH?

Could you explain to me why it is that my 14-year-old son who has passed his exams and Morse test to become a full Class A amateur (GW0ULC) has to pay £15 for his licence, when a Novice under the age of 21 gets his or her licence free of charge. I think this system of doing things is very unfair indeed. It's not just my son, but countless other youngsters who have worked very hard indeed to obtain their full A or B licence.

My son is not old enough to support himself, so I think that the free licence should be extended to all youngsters under the age of 21. Not just the very privileged Novices. Please don't think I'm anti-Novice or anything like that; in fact I think that it is a great idea and should be encouraged. But moving up the ranks to become a full Class A or B should also be encouraged and this is one way of doing it.

D P Kirby GW0PLP

[It is the RA which sets the licence fee and they would no doubt want to recover the costs of any free licenses from the fee-payers. What do other members think? - Ed]

DIAL OK FOR TEN-TEC

Recently I decided to tackle a long-outstanding job: to refit the cord that controls the slide rule dial on a Ten-Tec Century 22 transceiver. Having removed the front cover I routed the cord as I thought it would be: result - malfunction. I just could not see the solution to my problem.

I wrote to Ten-Tec Inc in the USA asking for help and received in reply four sheets bearing detailed instructions together with the diagram I had sent to Ten-Tec, suitably amended in red. The job was soon done and normal function restored.

I think this excellent service from a big manufacturer even though my problem involved one of their obsolete bottom-of-the-range transceivers. I am absolutely delighted and just had to let you know.

Ray Watson G0FPS

USE YOUR LOAF

G4EIC's two prima-facie disparate activities (*The Last Word*, June) are, in a strange way, extremely complementary. One gets automotive grime so ingrained in one's hands (a pessimist would say it happens just by the simple action of opening the bonnet!) and kneading dough gets them beautifully clean again.

John Ridd G8BQX

GIN AND ANT

The method of guying described in 'Raising the antenna single-handedly' ('Portable 30 Element 2m Antenna', *RadCom*, April) is tantamount to total disaster. It will break a lot of elements and is *very dangerous* in windy weather.

I would suggest that the method used should be as follows:-

1 Select the site you wish to place the mast, an area being big enough to lay the antenna on the ground with sufficient space to clear the height in all directions.

2 Assemble the antenna and mast with the aid of a support to hold the whole structure at an acute angle of approx 20°.

3 Anchor the base of the mast with a right angled scaffold coupler and peg to the ground to give stability; at a right angle to this attach a section of tubing (the same size as the mast) as a gin pole.

4 Having now placed the base, the guying can be set by placing four pegs at 90° to the base at a suitable distance according to the height of the structure.

5 Tie off the side guys to prevent movement to the sides, take the guy that is to be placed on the rear peg to get correct length and tie off on the rear peg making sure this length is correct as this will cause the mast to traverse too far or not far enough to the vertical required position.

[At last, school geometry proves to have a practical use - Ed]

6 The remaining guy should be tied to the gin pole and then, making sure everything is safe and ready, pull up the mast towards the remaining peg in a steady gentle pull. When the gin pole reaches the ground transfer the guy from the gin pole to the peg on the ground. At this point make sure that the mast is vertical in all planes, and adjust each guy in turn accordingly.

Michael G Smith G6UUO, Jack Clark G0NOA, and Eric Tucker G3TXZ

HAMS OR HOGS?

I have just switched off my 70MHz FM equipment, annoyed at the inconsiderate behaviour of yet another pair of unthinking amateurs who were holding a half-hour contact on the FM calling frequency of 70.45MHz, a QSY to a working frequency not even having been suggested at any time by either party. I believe that I had four options in this instance:

1 Ignore them and call CQ over them, thus allowing my standards to sink even lower than theirs.

2 Break in and probably aggravate the situation by causing bad feeling, typically when one finds out that one or both operators has a single-frequency rig and cannot QSY (imagine the reaction of 145MHz FM users to someone holding a QSO on 145.5MHz, for this or indeed any reason!)

3 QSY to another band, allowing the 4m calling-frequency hoggers to carry on, blissfully unaware of, or uncaring about, their poor operating practice and bad manners.

4 Switch off the station and write this letter.

May I ask everyone *please* to respect calling frequencies as such, and make a point of QSYing every time to a working frequency as soon as contact is established, leaving the calling frequency for the next person to call CQ. The excuse of 'only having a single-frequency rig' is quite simply not good enough; such gear should either be reserved strictly for net, packet or similar use, or be modified to allow operation on at least one other frequency. To paraphrase the weekly request on *GB2RS*, 'please remember that even if you cannot hear other stations, you may cause interference to others who can'.

These comments also apply to 6m, where the practice of working on the FM calling frequency of 51.5MHz is just as widespread, and where there is even less excuse, as most 50MHz rigs are multi-frequency.

Andrew Marshall G8BUR

RADCOM WORKS

I must give a belated thank you for publishing details of my log program (Easilog) in the *New Products* column last year. It was most effective and I have had a response from 200 readers. It may interest you to know that I was still getting enquiries six months after publication proving that *RadCom* is still read long after its publication date.

Don Ward G0MDO

PITY THE RTTY USER

May I remind packet users that 144.600MHz is the FSK RTTY calling frequency. I realise that this mode is rarely used these days, but there are a few enthusiasts, like myself, still using it. I am also aware that the 2m band plan is due for review, but until it is changed I think that all users ought to observe it.

This is especially true for packet users who, I assume, are often unaware that they are interfering with my RTTY calls. In my area (South London) there are often packet transmissions on 144.600MHz and some of these have stopped my RTTY QSOs. Certainly in these cases, no attempt was made to see if the frequency was in use in any mode that I could understand (J2B, F2B, J3E, or F3E).

May I also express my hope that the new 2m band plan will still have a defined J2B calling frequency somewhere. If there are any other stations in the London area who can work 2m J2B, please dust off your modems and give me a call.

Adrian Dornford Smith G0NQC

A RASUK-IST

Whilst the Constitution of the Mid Sussex Amateur Radio Society was being revised recently, I noted that the guidelines issued by the RSGB recommended that the word 'Amateur' be included in the title. This was already complied with but it struck me that it does not appear in the RSGB title. Can this possibly mean that the RSGB covers all radio users irrespective of professional/amateur status? Or is it perhaps a case of "do as I say. . . !"

And whilst we're on the subject of titles, why doesn't the RSGB cater for amateurs in Northern Ireland? By definition, Great Britain covers England, Scotland and Wales; Northern Ireland did not come in until 1922 and that was when the term United Kingdom came about.

Therefore may we look for a change of title at the next AGM to RASUK? I have purposely changed the 'AR' to 'RA' because surely it is the amateurs who are the Society, not the radio.

Philip C Baldwin G3LCF

BROKEN X

I designed and erected a beam similar to the one in *Eurotek* (May) in the early seventies at Cheltenham. My idea stemmed from the well-known TV vertical X-beam used in South London after the war for BBC TV from Crystal Palace (42MHz - terrible for TVI!)

The two large side-lobes you mention were present and showed up on local measurement with G2HDU. (This probably detracts from its performance viz a viz a conventional 2-element Yagi).

My version had only four traps, the 10m elements being separate and in parallel with the 14/21 elements to reinforce the mechanical strength. I did not bother to replace my beam after it broke up during bad weather!

D A Bundey G3JQQ

REPEATER USERS PRAISED

Further to your reports regarding the Boxing Day incident (*News & Reports / Emergency!*, May) which involved members of Cheshire Raynet rescuing a 12-year-old mountain biker in North Wales, I would like to express my appreciation of their efforts.

Whilst feeling proud of my members' team-work, I am also very grateful to all radio amateurs who, within the footprint of GB3MP, kept the repeater free of traffic throughout the whole of this two-hour emergency.

Thanks to all for their discipline, without which a difficult job would have been made even more difficult.

D G C Hicks G6IFA, County Controller Cheshire Raynet

A QUESTION OF RADIO

Amateur television took a leap forward in East Yorkshire on 19 May when a quiz contest link between Hornsea ARC and Bridlington ARC was set up. Quiz masters, Geoff, G4IGY, and Brian, G4XBU, effortlessly passed to each other a series of forty technical questions to be answered by the appointed panels. The contest finished with Bridlington ARC as the winners by twelve points to eleven.

The evening was such a success, a series of further contests are now being planned, perhaps, it is hoped, with the participation of other ATV stations.

Edward H Ball G4UOZ, Hon Sec Hornsea ARC

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