Radio Communication

The Journal of the Radio Society of Great Britain

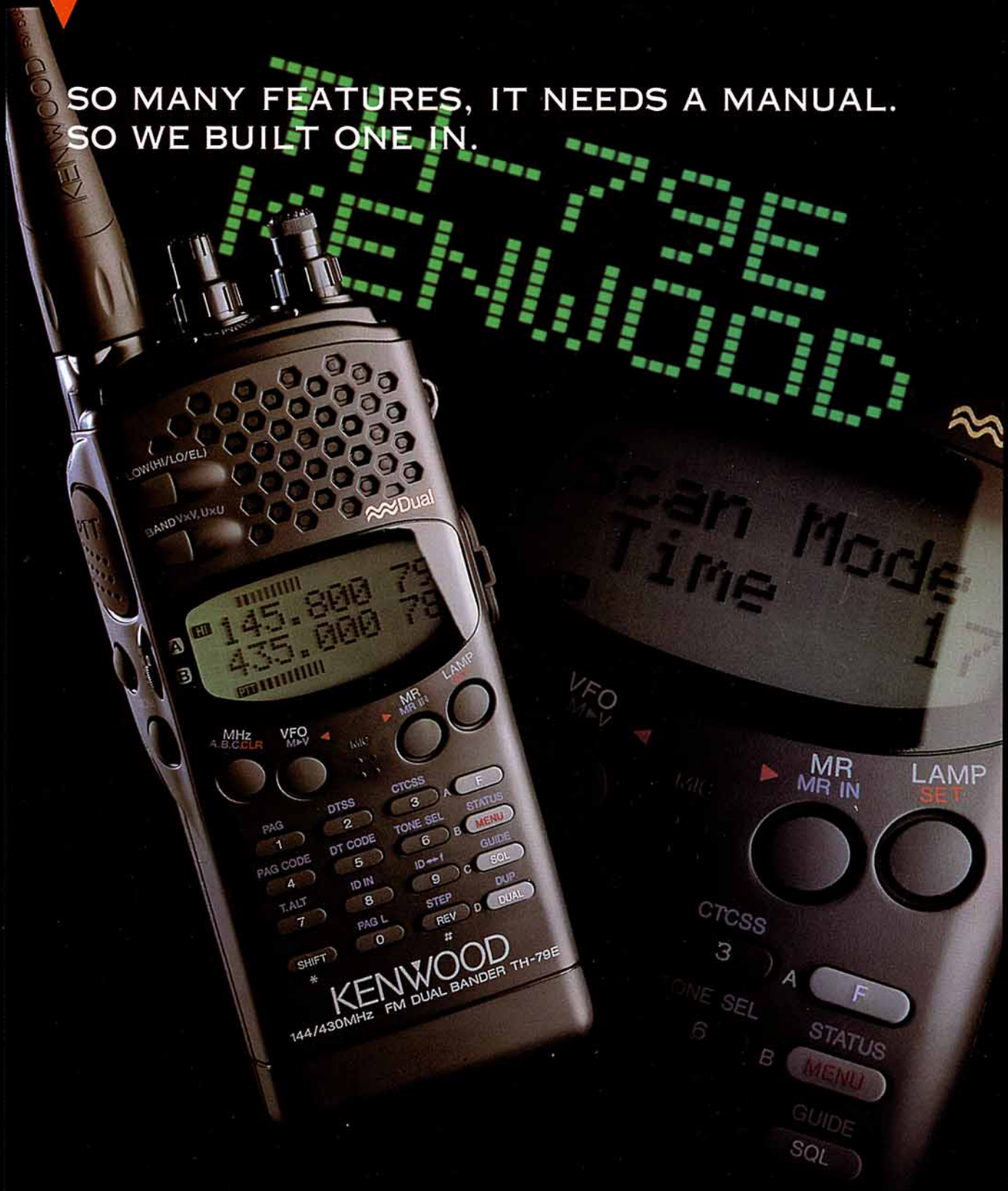
September 1994 Volume 70 No 9

THE VOICE OF AMATEUR RADIO FOR 81 YEARS

Five DSP 'Brick Wall' Audio Filters Compared: Page 13

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

SO MANY FEATURES, IT NEEDS A MANUAL. SO WE BUILT ONE IN.



Kenwood's TH-79E marks a new high in user-friendly handheld tranceivers. This slim-line FM dual-bander features a dot matrix LCD menu, which helps you to access the many class-leading features of this stylish unit.

Features that include an FET power module for longer battery life, 82 memory channels with ID, DTSS and pager functions, Automatic Band Change and DTMF memory function for auto-dial operation. Confused? You won't be. Just call up the menu. Or ring 0923 816444 for a full information pack.

KENWOOD

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Radio Communication

COVER PICTURE:
DSP Audio Filters use digital signal processing to eliminate noise and control audio frequency response. How effective are they? Five such filters are examined and compared. See *Radcom's* lead feature on page 13.

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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UK associate member under 18: £16.00. Family member: £14.00
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

The Future of GB2SM

FOR OVER FORTY YEARS the famous 'Window to the World' amateur radio station, GB2SM, has been on the air from the Science Museum in London.

So it is with some sadness that I must confirm rumours of its impending closure. The Society has been informed by the Museum that the exhibit will close down finally on 7 November 1994.

This announcement came as some surprise to the Society as discussions had taken place with a view to relocating the station within the Museum and carrying out a complete refurbishment of equipment to bring it up to date with current technology. Due to a change of Museum policy to produce more interactive exhibits, a decision was made reluctantly to close the station.

The Museum has indicated that it would wish the station to be relocated to an alternative site to enable it to remain on air. Representatives of both the Society and the Museum are currently engaged in discussions in an effort to save GB2SM. I am optimistic that a compromise can be reached to enable GB2SM to remain on air and to continue to introduce the mysteries and exciting world of amateur radio to future generations of children and adults alike.

Peter A Kirby, G0TWW
General Manager

NOTICE BOARD

Twelve Hour Opening

WE ARE PLEASED TO ANNOUNCE a further membership service. **From Monday, 12 September 1994** the Society is introducing a direct telephone line to enable you to place orders quickly with RSGB Sales. This new line will also bring the added advantage of extending our sales opening hours from 8.15am to 8.15pm, Mondays to Fridays, and from 9.15 to 12.15 on Saturdays. The line will be for book sales *only* but it is hoped to introduce further help lines in the near future. The new Sales number will be:

0856 70 73 73

NEWS & REPORTS

● A SMALL group of amateurs is trying to re-establish the South Tyneside Amateur Radio Society. Anyone interested is asked to come along to South Tyneside College during their enrolment week, 5 – 7 September. More details from Albert McCabe, G7PZY, on 091 427 0219.

● UHF REPEATER, GB3DV, came into service on 14 July from Clifton, nr Doncaster. The channel is RB1. Reports and donations would be welcomed by Ernie Bailey, G4LUE, 8 Hild Avenue, Cudworth, Barnsley, S Yorks.

● MEMBERS OF The Dundee ARC will operate GB0DIS on 7, 14, 21 and 144MHz on 25/26 September. The shack will be the radio cabin on board Captain Scott's ship *RSS Discovery*, berthed in Dundee.

● THE INTERNATIONAL Caravanning Association celebrates its 25th anniversary with a rally in Tecklenburg, Germany. DL/GB4ICA will operate from 31 Aug to 6 Sept on 3.5 and 7MHz.

● GB2VK, OPERATIONAL on 22 September, celebrates the 76th anniversary of the first UK to Australia wireless message (see *News & Reports*, March 94).

● TRANSMISSION 94 involves radio clubs throughout the UK raising money for the British Wireless for the Blind Fund. It takes place 24/25 September.

● STATIONS IN Monaco will use the prefix 3A50 on 3 September *only*, commemorating the liberation of Monaco fifty years ago.

● THE LATEST Callsigns issued by SSL at 10 August were in the G0VD, G7TH, 20AI and 21DG series.

1995 President

AT ITS MEETING on 23 July, the Council elected Clive Trotman, GW4YKL, as RSGB President for 1995. His term of office will start on 1 January 1995. Meantime, he continues to represent Zone E, Wales.

Amateurs help to expose "Britain's Best kept Secret"

Duke of Kent Opens Codebreakers Museum

MONDAY 18 JULY saw the opening of the Bletchley Park Trust Museum by HRH the Duke of Kent. The museum, located at Bletchley Park near Milton Keynes, commemorates the work of the codebreakers and intelligence specialists who made a vital contribution to the allied war effort. Nearly a thousand people were invited to attend the opening, including ambassadors and Service chiefs.

Almost 12,000 worked at Bletchley, yet the Germans never realised that their highly secret 'Enigma-coded' messages were being intercepted and decoded at the centre which became known as "Britain's best kept secret".

Two groups of amateurs have provided static and working exhibits which show the important role of radio operators during the war.

PHOTOGRAPH: G3KPO

Standing beside some Piccolo receivers, the Duke of Kent meets Communications and Electronics Museum Trust Curator Doug Byrne, G3KPO (centre), and Rod Burman, G4RSN.

Y Service

MEMBERS OF the Milton Keynes Amateur Radio Society (MKARS) were responsible for creating a working replica of the wartime Y service station. These stations were at various locations throughout the country and the signals they heard were passed by teleprinter to Bletchley Park.

Club members present at the opening included: Warren Blackhouse, G4HZI; John James, G4MXO; Dave White, G3ZPA and Dave McQue, G4NJU. The MKARS now has a permanent club room in the Park from where they ran GB50DDX over the D-Day fortnight. The club would welcome any donations of wartime receivers to enhance their exhibit.

PHOTOGRAPH G4NJU

Demonstrating the replica Y station at Bletchley park are: (l to r) Verdun, G0RKV; Dave, G3ZPA; John, G4MXO and Dave G4NJU.

Computer

A LARGE exhibition of radio and radar equipment has been created with the help of amateurs, all of whom are officers of the Communications and Electronics Museum Trust: Doug Byrne, G3KPO; Fred Robins, G3GVM, Vernon Scambell, G3FWE and Rob Burman, G4RSN. The Trust is also responsible for re-building Colossus, the first electronic computer in the world. Its inventor, Tom Flowers, now aged 88, was present at the opening and was able to meet the Duke of Kent. The re-build is truly mind-boggling as the computer contained over 2,000 valves. The Trust Curator, Doug Byrne, G3KPO (0983 567665) would like to hear from anyone who worked at Bletchley Park. The museum, which is open every other weekend, covers not only the code-breaking but also a history of computers. Call 0908 640404 for details.

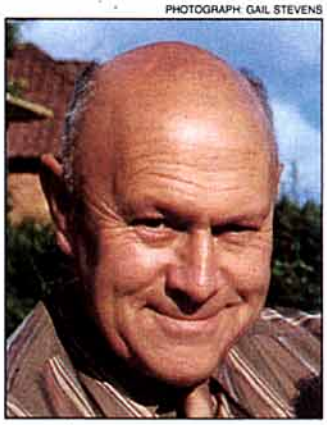
Ron's Radio Lifeline

WHEN THE YACHT *Aida* lost its rudder on Sunday 17 July, the crew put out a Mayday call. It was picked up by Raynet member Ron Oswald, G7PIP, who immediately alerted the coastguard at Dover, some 30 miles away. The coastguard discovered that Ron, who lives in Hastings, was the only one who could hear the yacht so he spent the morning relaying messages from the Aida via the telephone.

He was eventually joined by a local coastguard who was then able to communicate with the stricken vessel. The yacht was spotted by a rescue helicopter at the exact location given and was observed until it arrived safely at Newhaven.

Said Ron: "I couldn't believe I was the only one who could hear him. It really made my day!"

PHOTOGRAPH: GAIL STEVENS



Hero Ron, G7PIP, whose vigilance helped a yacht get safely to port.

● *QST* REPORTS that Bishop Samuel Ruiz, XE3AXS, has been nominated for the Nobel Peace Prize.

PHOTOGRAPH: MINISTRY OF DEFENCE

The 30th anniversary of RAF Fylingdales will be celebrated by Scarborough Special Events Group on 17/18 September. GB30FYD will be located inside this 120ft high Phased Array Radar Pyramid which houses no less than 2560 folded dipoles. This array replaces those in the famous 'giant golf balls'. Operation will be around 3.725 and 7.055MHz, plus 2m. Further details from Roy Clayton, G4SSH, QTHR.

Radio Remembered

AN EXHIBITION to celebrate the 60th anniversary of the opening of the BBC Droitwich transmitting station is open 27 August to 8 October. In addition to the radio station exhibits, early wireless studio and recording equipment is featured as well as a display by the Droitwich Amateur Radio Society. The venue is Droitwich Heritage Centre (tel: 0905 774312) and admission is free.

Rainfall Result

THE COMPETITION to win an R&D Weather Station in July's *RadCom* proved very popular with 157 entries guessing anything between less than 1mm to over 350mm. The result of a record dry July was a rainfall in Potters Bar of 19.52mm. Two entrants guessed 19mm but the winner - closest with 20mm - was 15-year-old **Robert Dilley, 2E1ARU**.

Welcome from GB2QE

TO MARK the visit of the cruise liner *RMS Queen Elizabeth 2* to Merseyside, the Wirral and District Amateur Radio Club will be operating special event station GB2QE from the 90ft high Perch Rock Lighthouse (see *RadCom's* May 93 cover) situated at the mouth of the River Mersey. It is hoped that Dr Andrew Eardley, G3UXO/MM, will be able to contact GB2QE from the liner itself.

The station (Loc IO83LK, WAB SJ39) will be operational 27 – 31 August, 24 hours a day, on 80, 40, 20, 15 and 10m SSB and CW, plus 2m SSB and FM.

● FOR DESIGN reasons, it was necessary to pad out one of our QE2 photo captions (August, p15), so I wrote a seemingly innocuous comment about a radar dome. Such is the power of *RadCom* that I've received *three* letters pointing out that the dome contains a satellite TV system, not radar. I stand corrected – *Ed.*

Operation Market Garden

NINE DUTCH SPECIAL event stations will be on 7070kHz from 0800UTC on 18 September to commemorate Operation Market Garden, the liberation of the southern part of Holland, fifty years ago. The calls are all PA6LIB with a suffix ranging from /9 in the south-west to /1 in the north-east. Locations are: (/9) Valkenswaard, (/8) Eindhoven, (/7) Best, (/6) Son, (/5) Sint-Oedenrode, (/4) Veghel, (/3) Uden, (/2) Grave, and (/1) Groesbeek nr Nijmegen. The nine QSL cards together form a map of the area.

Also celebrating this event will be PA6OMG, manned by members of the Nijmegen Amateur Radio Club. Operation will be from 15 to 20 September on all HF bands, CW and phone, from the Liberation Museum in Groesbeek-Nijmegen. For local visitors, talk-in is available on 2m and 70cm.

PA6AMA will use a 19-set on 3,600kHz as part of its commemoration of the airborne landings at Renkum. Other frequencies will be used with more modern gear from 10 to 18 September. An award is available for working amateurs in the Renkum area before 31 December; the proceeds of the award go towards helping families visit the graves of airmen killed in action. Details of the award can be obtained from F A Looijen, PA3CGJ, De Hoge Kamp 9, NL 6881 CX RHEDEN, Netherlands; or via packet: PA3CGJ @DK0MWX.NRW.DEU.EU.

● GB50OMG will be active over the weekend 17/18 September from Fullbeck Hall where Operation Market Garden was coordinated.

Operation Maquis 94

FOLLOWING AN ORIGINAL idea by F5SMR, a net was activated on 12 June to honour the men and women who operated R/T links between Europe and England during WW2. GB2IWM, the station of the Imperial War Museum at Duxford, near Cambridge, acted as base station. Contacts were made with stations at the Musee de L'Armee in Paris, TM5HNI, and the Museum of Denmark's Fight for Freedom, OZ5MAY, both using B2 spy suitcase radios.

Support the Future

THE RSGB MasterCard was successfully introduced as a membership benefit in 1991. Its aim was not only to provide our members with a high quality financial service but also to raise much needed funds to support the future of amateur radio.

For every Card issued and used the RSGB receives a financial contribution from the Bank of Scotland. Subsequent use of the Card also results in a longer term income that we can count on.

Many of our members already show their active support by carrying our MasterCard. To date, the RSGB has earned in excess of £16,000 from members using the RSGB MasterCard. These funds help us to maintain and develop our activities.

This month you will be receiving a letter outlining the benefits of this credit card. Please take some time to read it.

For more information and an application form, there is a free phone number that you can call: 0800 716097

Phoneday is Coming

FROM 16 APRIL 1995, *all* UK telephone codes will change. In most cases, this means the addition of a '1' after the '0', eg 0707 becomes 01707. In Leeds, Leicester, Nottingham, Sheffield and Bristol, completely new codes will be introduced.

The international code prefix is also changing, from 010 to just 00. We'll be reminding you nearer the date but if you're printing any new stationery, now is the time to add your new code.

PM Supports Club's Charity Work

THE PRIME Minister has endorsed the work done by the Hoddesdon Radio Club in raising money for various charities and in promoting amateur radio to the young as part of the RSGB's Project YEAR. His letter reads:

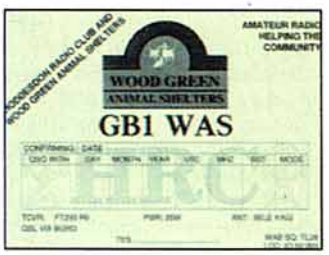
I am pleased to be able to send my best wishes to the Hoddesdon Radio Club for their Special Event Amateur Radio Station at the Wood Green Animal Shelter.

The Club does a lot of valuable work for charities and community groups and I am particularly pleased to hear of their support for Project YEAR - Youth into Electronics via Amateur Radio.

The Government has long supported YEAR's aim of encouraging young people into amateur radio. I am well aware that the hobby provides an invaluable training ground for future careers in radio and electronics and the Radiocommunications Agency has worked closely with the Radio Society of Great Britain in developing this initiative.

This close partnership has already led to the development of the Young Amateur of the Year Award and the Novice licence scheme and I would like to offer the members of the Hoddesdon Radio Club my congratulations on the work they do to encourage a greater interest in electronics.

Rt Hon John Major MP
August 1994



Animal Shelters

TO SUPPORT Wood Green Animal Shelters, described as Europe's leading animal charity, the club will be running GB1WAS (VHF) and GB2WAS (80 - 10m) on 27, 28 and 29 August. Over 10,000 people are expected to attend the three Fun Days at Godmanchester, Cambridgeshire. Sponsorship and a 'guess the furthest distance contacted' competition will raise money for the charity. Further details can be obtained from event coordinator (and Herts RLO) John Rudd, G7OCI, on 0920 466639.

The new clubhouse and shack of the North Wakefield Radio Club was opened by RSGB Council Member Peter Sheppard, G4EJP, in May. Peter presented an RSGB shield to club Chairman John Muzyka, G4RCG.

Novices on Top

AS PART of its programme to encourage Novice operation on the HF bands, the RSGB's HF Committee is suggesting a Novice calling frequency on Top Band.

The idea of a calling frequency is not a new one but they work well and help get people together on the air. CQ calls and calls to particular stations are made on an agreed calling frequency. As soon as two-way communication is established the stations involved move off the calling frequency to conduct their contact. This leaves the calling frequency just for calling and establishing a contact.

Once a calling frequency is established lots of stations start to listen on it and many contacts can be made more easily. It is suggested that the frequency be for both CW and SSB calling and that SSB contacts take place higher in the band and CW contacts lower in the band. The frequency suggested is 1.970MHz.

The HF Committee invites both Novices and full licensees to comment on this idea. Comments should be received no later than 1 October and should be addressed to the HF Committee at PO Box 599, Hemel Hempstead, Herts HP3 0SR.

RAE May 94

LAST MAY'S RAE was sat by 1833 candidates. According to the City and Guilds reports 69.9% passed Part One and 66.8% passed Part Two. The detailed reports are available to members on request from the Amateur Radio Dept at RSGB HQ.

RSGB Council Vacancies

THE FOLLOWING RSGB Council vacancies exist for the term 1995 – 1997:

Ordinary Members

E J Allaway, G3FKM, retires and is eligible and willing to stand for re-election.

G L Benbow, G3HB, retires but is not eligible for re-election (Article 26).

M H Claytonsmith, G4JKS, retires but is not eligible for re-election (Article 26).

N Roberts, G4IJF, retires and is eligible and willing to stand for re-election.

Zone Members

P R Sheppard, G4EJP (Zone A), retires and is eligible and willing to stand for re-election.

I J Kyle, GI8AYZ (Zone F), retires and is eligible and willing to stand for re-election.

C N Trotman, GW4YKL, is elected President of the Society for 1995, thereby creating a vacancy in Zone E.

Full details of how to nominate someone for these vacancies, and of the extent of the Zones, can be found on page 6 of the August *RadCom*.

RAE & Morse Courses

● From October there's an **RAE** course held in **Canterbury** on Thursday evenings for the May 95 examination. Practical projects are offered as well as theory. Details from G3TAJ on 0304 812723.

● The Sandwell Amateur Radio Club, in conjunction with the Evening Study Association, is running an **RAE** course on Thursday evenings from 15 September at **Oldbury, Birmingham**. Enrol any Thursday evening before the start of the course. Details from Gordon Adams, G3LEQ, on 021 544 0771.

● The North Cheshire Radio Club, in conjunction with the Evening Study Association, runs an **RAE** course on Sunday evenings from 11 September in **Wilmslow**, Cheshire. Enrol any Sunday evening before the start of the course. Contact Jill on 061 485 5036 for more info.

● **Epping Forest** Raynet is running an **RAE** course near North Weald Airfield from Monday 5 September. Call Mike, G7BNF, on 0279 722569 for more information.

● A 30-week **RAE** course commences 22 September at Farnborough College of Technology, Highfield Avenue, **Aldershot**. At the same venue are two 16-week courses: Maths for Radio and Electronics and **Morse** Code for Radio Amateurs. Details from Gayle Jones on 0252 317228.

● On Monday evenings from late September is an **RAE** course, for the May 95 exam, at Balwearie High School in **Kirkcaldy**. A **Morse** course is at the same place on Tuesdays. For enrolment details, contact Ken Horne, GM3YBQ on 0592 265789 (evenings).

● At **Brentford** College, a **Morse** class commences on 26 September at 7pm. An RAE class starts at 7pm on the 28th. Enrol 15 September at 6pm. Information from Frank Coles, G3PZC, on 081 977 5343.

● Commencing 21 September is an **RAE** course at Beech Hill Community Centre, **Luton**, Beds. For further info call 0582 507781.

● An evening 12WPM **Morse** course is to be held at **Telford** College of Arts and Technology from 22 September. Enrolment is on 5 Sept (2am – 8pm) and 6 Sept (10am – 8pm). Details from John Christophers, G0ISI, on 0902 372179.

● On Tuesday evenings from 20 September is an **RAE** course at Audley and Halmerend Adult Centre, near **Newcastle-U-Lyme**. Enrol on 13 Sept at 1900 at Audley Adult Centre, or 15 Sept at 1900 at Sir Thomas Boughley School, Halmerend. For further details contact Doug, G8BAA on 0782 717347.

● If there's sufficient interest, David Wright, GW1MVL, will run a **Novice** course at **Wrexham** College of Further Education starting in September. Call David on 0978 845858.

● **RAE** courses in North-West Kent: **Strood/Rochester**, call 0634 845359. **Gravesend**, call 0474 352049. For personal tuition in the **Gravesend/Dartford** areas call Ray Petri, G0OAT, on 0474 812682.

● The Hillcrest School and Community College AR Society runs **RAE** and **Novice** classes at Netherton, **Dudley**. For further information contact Arthur, G0IZF, on 0384 256581.

● Starting Friday 2 September, the Widnes and Runcorn ARS will be holding an **RAE** course at the Edgerton Arms, **Runcorn**. For details call Dave Wilson, G7OBW, on 0270 761608.

● Three evening courses are available in **Leeds**: **RAE** and **Novice** classes are at Joseph Priestley College; RAE, Tuesdays from 13 September and Novice on Thursdays from the 29th. A **Morse** class is on Wednesdays at the Alec Beevers Centre in Hunslet. Details on 0532 711994.

● Pensioners or those on benefits can claim a waived fee at Merton College, **Morden**, Surrey. The **RAE** course, which is open to all, is on Wednesday evenings. Call the tutor, David Bowman, G0MRF, for details: 081 640 3001.

● **Reading** and District ARC will be running an **RAE** course again this year. The venue is **Woodley**. Non-members of the club welcome. To join the class, write to: Stephen Coleman, G4YFB, 263 Wykeham Road, Reading RG6 1PL.

● From Monday 19 September, there's an **RAE** course at Twyford House, Shirehampton, **Bristol**. Discounts are available for pensioners and those on benefit. Call the tutor for more information: Chris Budd, G0LOJ, on 0454 616267.

● For the May 95 **RAE**, a course will be run at **Meopham**, Kent from Thursday 29 September. This is an evening class but provision can be made for those who find evenings difficult. Call the tutor Len Buck, G0DLR, on 0732 823483.

● Peter Buchan, G3INR, is the tutor for an **RAE** course at Sawston Village College, near **Cambridge**, from September. Further information can be obtained from Senior Tutor Mr Cupit on 0223 834492.

See *RadCom*, July (p7) and August (p8), for more courses. Some of the above also run their own examination centres and welcome external students. For details of **Novice RAE** courses near you, contact the Amateur Radio Administration Department at RSGB HQ, on 0707 659015.

Free Rig Check

THE RAF AMATEUR Radio Society will operate GB0RAF during the Lincoln Hamfest on 10/11 September. They will use SSB and CW on 80 and 40m, and 2m on the 10th only.

During the event, members of the RAFARS and the Lincoln Short Wave Club will be on hand to provide, where possible, a free functional check of radio equipment brought to the rally.

JOTA '94

THIS YEAR'S Jamboree On The Air is on 15/16 October. Anyone taking part is urged to register as soon as possible with the Scout Association so that information sheets can be sent to all participants. Send an SASE to: UK JOTA Team, The Scout Association, Gilwell Park, Chingford, London E4 7QW.

Senior Instructor

THE SENIOR Novice Instructor for Hereford and Worcester is Mike Butler, G4UXC, 16 Clevedon Green, South Littleton, Evesham, Worcs WR11 5TY. Tel: 0386 831508.

● THE ORKNEYS 2m repeater, GB3OC, is currently off air for a complete overhaul. Further information from the keeper Bill Wright, GM3IBU, QTHR.

Waters & Stanton celebrated their 21st Anniversary with balloons, banners, a street musician and a marquee full of bargains. The shop attracts many local customers by selling hi-fi and televisions as well as carrying an extensive range of amateur radio rigs and accessories. The business supports 20 staff.

CEPT List

LAST MONTH, we carried the full text of the recent licence changes, including a revised list of countries which are members of CEPT. It is extremely important to distinguish between this comprehensive CEPT list, and those countries which have signed the CEPT TR61-01 agreement.

TR61-01 permits temporary operation in other countries without additional paperwork and the signatories are listed in abbreviated form on your annual Licence Validation Document. The full list of CEPT countries should be used *only* to translate these abbreviations.

Trophies Manager Wanted

The RSGB is looking for someone to carry out the important volunteer task of Trophies Manager. Applications and enquiries should go to the Company Secretary, John Hall, G3KVA, Corfe Lodge, Ipswich Road, Long Stratton, Norfolk NR15 2TA.

● THE 6th IEE International Conference on Radio Receivers and Associated Systems takes place at the University of Bath, 26 – 28 September.

More News & Reports on page 11

NEWS & REPORTS

continued from page 8

RSGB VHF/UHF Awards News

TWO SUPREME transmitting awards have recently been issued. One to David Bullock, G6UWO, in recognition of his senior certificates on 144MHz, 432MHz and 1296MHz. Roger Betts, G0TRB/G1EHJ received the second for senior certificates on 144MHz, 432MHz and 50MHz.

The RSGB transmitting (or receiving) certificates which involve confirmed contacts with a combination of counties and countries require a lot of dedicated operation. The following have been achieved:

Standard: 50MHz G3KPT, G1RST; **144MHz** G1SDO, G0GRI/P; **432MHz** G1SDO. **Senior: 50MHz** G1RST; **70MHz** G3NKS.

Congratulations to all award recipients who include:

50MHz: 10 countries G7KAO, GW1MVL, 2E1AYR; 20c G7GYS, G0SOO, GJ7LJJ; 30c G6XFC; 40c G4BAL; 50c PA1AED, G0TRB, G1UGH; 60c G0HVQ; 80c G8BQX; 140c NL213. 25 squares G1LMZ, G7KAO, GW1MVL; 50sq G1HXH; 75sq G7GYS; 150sq G3KPT; 175sq G0TRB; 200sq BRS32525; 275sq G8BQX; 300sq GW6VZW. DX Award 25 countries G6XFC; 50c PA1AED, G0TRB.

70MHz: 35squares / 8 countries G4FRE; 40sq/8c G3NKS.

144MHz: 40 squares / 10 countries DL1ASR/P; 60sq/15c G7GYS, G4NPH; 100sq/20c G7LIJ; 150sq/20c GW6TEO; 225sq/30c G6HKM.

432MHz: 120 squares / 18 countries G4NPH.

1.3GHz: 600km award G7BZD. 5 squares G7BZD; 45sq G6HKM; 65sq G8PNN.

10GHz: 15 squares G3JMB.

The Standard transmitting certificate awarded to Robert Tweddell, G1RST, was endorsed "All Auroral Contacts". Potential award applicants are reminded that endorsements for mode, such as "All CW Contacts", "All SSB Contacts" or "All FM Contacts" may be made on application. Another endorsement which has been made is "All contacts made during the first year of being licensed". Details of the RSGB VHF/UHF awards may be obtained from the VHF/UHF Awards Manager, Ian L Cornes, G4OUT, 6 Haywood Heights, Little Haywood, Stafford, ST18 0UR. Tel: 0889 882262.

12.5kHz Channel Spacing: A Discussion Document

THE SUBJECT of 12.5kHz channel spacing has come up several times at Repeater Management Group meetings over the past three years. We feel it is now time to seek the views of the band users.

Whilst there is no requirement in the terms of the amateur licence for a minimum bandwidth to be used for a given mode of transmission there is a need to ensure that the frequency stability is: "Stable and free from Unwanted Emissions as the state of technical development for amateur radio apparatus reasonably permits".

Before the advent of repeaters the dominant mobile mode on 2m was AM. This requires only about 6kHz bandwidth, although the receivers in use 20 years ago had a somewhat wider passband in order to cope with the frequency stability of the transmitters of the day.

When the first repeaters were installed, 20 years ago, it was decided to use FM in line with commercial practice as it provided a better signal for mobiles, the intended repeater users. The standards then were for 25kHz channel spacing and readily available surplus PMR rigs could be used. At the same time there was an influx of cheap FM rigs from Japan. Separate crystals were used, a Tx/Rx pair for each channel. Any frequency drift required adjustment of the individual channel trimmers.

Today, commercial practice is to use 12.5kHz channels on both VHF and UHF. In the near future digital modes will be introduced which can be used at this spacing using constant amplitude carrier (FM or PM). They also have the possibility of going to 6.25kHz channelling when linear amplifiers of adequate performance become available at low cost, while using the same digital mode.

Nowadays frequency synthesis is used for greater convenience, even for single channel rigs; the single reference crystal providing greater frequency stability and ease of readjustment. This applies to rigs supplied to both professional and amateur users, many manufacturers being involved in both markets.

One argument against reducing the channel spacing and hence the maximum deviation to 2.5kHz is that there would be a loss of range. However FM is not a DX mode *per se*. It could be argued that, in fact, modern receivers are somewhat better than 20 years ago!

Introduction of the reduced spacing will have to be made in an orderly fashion with adequate notice. A start has been made by allocating some 12.5kHz channels for packet. For voice however it is the repeaters that will have to show the way. The carrot will be the availability of additional channels. Hopefully this will lead to the installation of more urban units and hence greater choice for users, a reduction of abuse and a better service for the majority of users.

The choice of a changeover date requires careful consideration. Recognising that some repeaters are on pretty remote and cheerless sites a midwinter date would be most unpopular! I suggest 1 June 1996, or does it really need so much notice?

Implementation

First, the Repeater end: For the transmitter a simple adjustment to the Tx deviation control is all that is needed plus a check to see that the frequency control is up to standard. At the Rx a change of filter and again a check on frequency control and through audio gain level.

For the user the most important thing is the reduction of transmitter deviation and microphone gain. In the absence of deviation meters most of us 20 years ago used the repeater and another listening amateur to ensure that our deviation was correctly set. If you didn't get chopped you weren't overdeviating!

For the Rx it would be desirable to change the IF filter to one for 12.5kHz, but initially a 6dB increase in audio gain setting should suffice.

Those planning to use the rigs coming onto the surplus market these days will find most VHF ones already equipped with the narrower filters. No doubt the black box suppliers will respond to the change with alacrity.

As regards following the commercials into digital modes. We shall be well advised to wait and see what standard prevails. Who remembers the alternative packet modes before AX25? In any case, for DXing we already have SSB which only requires 2.5kHz and is the narrowest possible for analogue speech. How many are aware of the Sheffield pilot-SSB repeater?

The problem with any change is that older equipments become obsolete and some may say that use is falling off so there is no need to change. On the other hand newcomers wishing to enter the hobby using the cheap ex PMR synthesized rigs will be at a disadvantage because of their narrower filters.

Anyway what do *you* think? Address your thoughts to the Repeater Management Group via RSGB HQ and we will let you know the result of the extent and content of your input.

Dave McQue, G4NJU, Special Projects RMG.

New EMC Coordinator

EMC ADVICE and assistance is available to members from local EMC Coordinators. A full list was published in February's *RadCom*, p91.

A new Coordinator is: Mr S Lloyd Hughes, GW0NVN, 4 Blenheim Close, Highlight Park, Barry, S Glamorgan CF62 8AN. Tel: 0446 743370.

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TA-33-M	3 EL 10/15/20M
TA-33-M-WARC	4 EL 10/12/15/17/20M
TA-34-M	4 EL 10/15/20M
TA-34-XL-WARC	5 EL 10/12/15/17/20M
TA-53-M-WARC	4 EL 10/12/15/17/20M
PRO-57-B	7 EL 10/12/15/17/20M
PRO-67-B	7 EL 10/12/15/17/20/40M
PRO-77-A	7 EL 10/12/15/17/20/30/40M
PRO-95	9 EL 10/12/15/17/20M
PRO-96	9 EL 10/12/15/17/20/40M
TW-33-M	3 EL 12/17/30M

VERTICALS

RV-7-30-C-WARC	10/12/15/17/20/30/40M
RV-7-80-C-WARC	10/12/15/17/20/40/80M
RV-8-C-WARC	10/12/15/17/20/30/40/80M

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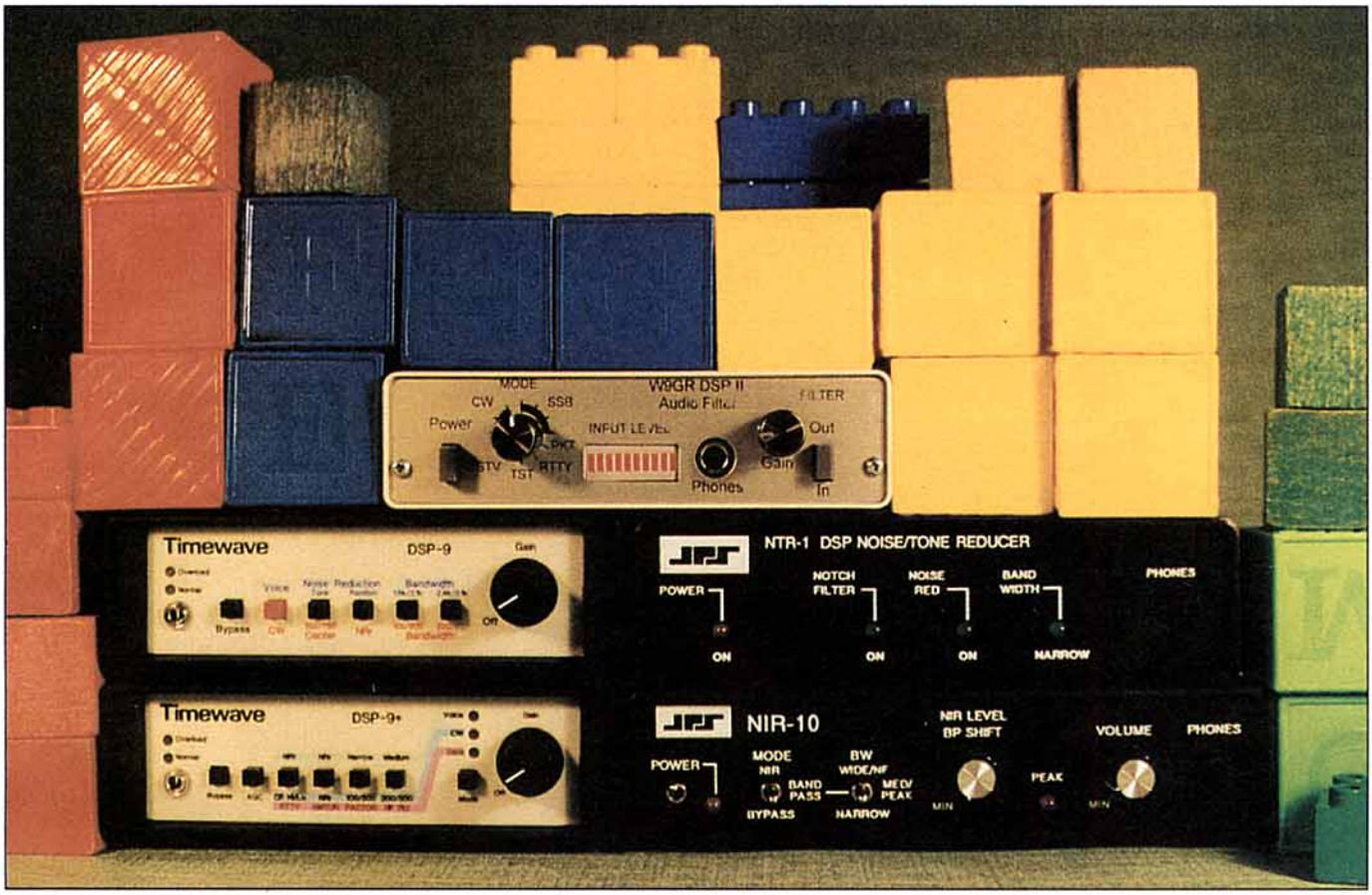
THIS MONTH'S LEADING FEATURE

An In-depth Look at DSP Audio Filters

by John Bazley, G3HCT, and Ian White, G3SEK



DIGITAL SIGNAL Processing – DSP – is the latest development in audio filtering, with several filters appearing recently on the UK amateur market. We have compared five of them from the viewpoints of the HF DXer and of the VHF/UHF DXer.

Although some our criteria were different, we reached very similar conclusions in independent tests. We have also compared and contrasted DSP filters with one of the best analogue audio filters, the Datong FL3.

> This is not strictly a technical review. We have taken the published specifications at face value, and opted instead for an in-depth review of how these filters perform in real-life use on the bands. The comparisons are limited to the primary DX modes of SSB and CW. A summary of the facilities is shown in **Table 1**.

JPS NTR-1

THIS IS THE SIMPLEST of the units tested. With its voice-only bandwidths of over 6kHz and 3.4kHz with a deep bass response, the NTR-1 is clearly aimed at HF broadcast listeners. It is also the easiest unit to use, with four separate push-buttons for power, notch filter, noise reduction and bandwidth. The noise reduction has three internal settings, described as position 1 for "wideband SSB or Amateur AM broadcasts", 2 for AM or FM voice broadcasts (the factory installed position) or 3 for programmes including "some music". We used position 1 for these tests.

The noise reduction was very effective on both SSB and CW, making it possible to copy signals easily that were marginally above the noise floor (on the HF bands – this unit was not tested on extremely weak VHF/UHF CW). Even so, the noise reduction was not so pronounced as with some of the other units, perhaps because of the wider audio bandwidths offered by the NTR-1.

J-COM W9GR DSP II

THE NOTABLE FEATURE of this unit is its LED bargraph to ensure that the audio input level is set correctly. The filters are excellent as also are the noise and heterodyne reduction on HF signals. On SSB these facilities are available either separately or in combination, and there is also a notch filter optimised for weak-signal SSB. The reduction in noise while tuning the HF bands was a real pleasure; the best general-purpose position seemed to be the 'SSB optimised denoiser'.

The CW filters were excellent on strong signals. The processed note was always clear and clean, with no noticeable ringing, but on very weak CW the narrower bandwidths

Features	JPS NTR-1	J-Com W9GR DSP II	JPS NIR-10	Timewave DSP-9	Timewave DSP-9+
Separate signal-mode settings	no	yes	no	yes	yes
Voice bandwidths	160-6600Hz 90-3400Hz	1	1800Hz tunable within 300-3200Hz	3.1 / 2.4 / 1.8kHz or 2.4 / 2.0 / 1.6kHz	3.1 / 2.4 / 1.8kHz or 2.4 / 2.0 / 1.6kHz
CW bandwidths and centre frequencies	none	200 / 100 / 30Hz centred at 800Hz. 100Hz centred at 400Hz	600 / 250Hz, fully tunable within 300-3200Hz	500 / 200 / 100Hz, centred at 600 / 750Hz or 400 / 500Hz	500 / 200 / 100Hz, centred at any two of 400 / 500 / 600 / 800Hz
Number of front-panel selectable CW centre frequencies	none	2	Fully tunable -see above	2	2
Data modes	none	3	none	none	4
HF packet RTTY SSTV AMTOR PACTOR		1550-1850Hz 2075-2345Hz 1150-2350Hz no no			540Hz 250Hz no 340Hz 440Hz
Alternative data tone centre frequencies	none	none	Fully tunable within 300 - 3200Hz	none	Jumpers for 1360 / 1300 / 1530 / 2200Hz
Noise filtering	yes	yes	yes	yes	yes
Notch filtering	yes	yes	yes	yes	yes
Independent bandwidth, noise and notch filter selection	yes	no	no	yes	yes
Front-panel controls (+ Volume and On/off)	Three buttons	Rotary switch	Three 3-way toggle switches, 1 variable pot	Five buttons	Six buttons
Switch combinations (+ Bypass/Test)	8	11	8	24	56
Input level indication	none	LED bargraph	Overload LED	Normal and Overload LEDs	Normal and Overload LEDs
AF gain control	no	yes	yes	yes	yes
Power-off bypass	yes	no	yes	no	yes
Tx / Rx remote bypass	no	no	yes	no	yes
UK main dealer	Lowe	Waters & Stanton	Lowe	Nevada	Nevada
List price (June 1994)	£199	£299	£399	£189	£239

Table 1: Summary of the facilities available on the five DSP audio filters tested.

seemed to add some high-frequency audio noise (according to the manual this is due to "a dithering technique used to reduce quantization noise", and was the only noticeable effect of the W9GR's 8-bit digitization; all the other filters tested use 16-bit processing.) Although the 30Hz bandwidth is suggested as "ideal for EME and weak signal work", the 800Hz centre frequency is not well chosen – most weak-signal operators prefer a markedly lower frequency such as 400Hz, but the DSP II provides only 100Hz bandwidth at this frequency. We did not test the HF packet, RTTY or SSTV filters.

The W9GR was one of the first commercial DSP filters, and has fewer facilities than some of its successors. The manufacturer might include in the next generation a wider choice of CW tones, controls that are self-explanatory from the front panel, a better location for the headphone jack socket, and the facility to by pass the unit automatically on transmit and when switched off.

JPS NIR-10

THIS UNIT HAS UNIQUE facilities, especially the continuously variable bandpass tuning or noise reduction threshold (one control serves either purpose, but not both). Both reviewers had to read several times the explanation of the functioning of the two 3-way toggle switches that together select the operating modes, and then had to keep referring to the separately printed crib-sheet.

The NIR-10 has only three bandwidth settings – wide, medium and narrow. As Table 1 shows, these are reasonably well-suited to 'narrow SSB', 'wide CW' and 'narrow CW' respectively. JPS also offer an alternative model for voice SWL use with bandwidths of 3000 / 2400 / 1800Hz, and for an additional

WHAT IS DSP?

THE TERM "DSP' covers a wide variety of signal-processing methods. What they all have in common is that the signal is sampled at regular intervals by an analogue-to-digital converter, storing successive snapshots of input waveform as a stream of numbers. In audio filters, the interval between samples is about 100µs or less. The signal is processed by doing computations on these numbers: this is completely different from conventional 'analogue' filters which manipulate the waveform itself. The output of the digital filtering process is a different stream of numbers, which is fed into a digital-to-analogue converter to reconstruct an output waveform. The difference between the input and output waveforms is determined by the types of computations carried out – the signal-processing 'algorithms'.

DSP algorithms work by comparing data samples representing the signal waveform at different moments in time. A repetitive signal which makes the same contribution from one sample to the next is said to be 'highly correlated', for example a sine-wave CW tone or a heterodyne. Noise, on the other hand, differs almost randomly from sample to sample and is said to be 'uncorrelated'. Speech signals are moderately correlated – quite similar in nearby samples, but varying significantly over timescales longer than a few tens of milliseconds. These differences in the degree and timescale of correlation are what DSP filtering uses to separate wanted signals from unwanted ones. Unlike an analogue filter, which works with the frequency-related properties of the input signal, a DSP filter uses its **time**-related properties.

As the algorithm looks at one digital sample after another, any out-of-bandwidth signals are discarded, and signals that appear correlated from one sample to the next are assumed to be CW or speech and are passed through to the output. If noise reduction has been selected, any non-correlated components coming from white noise, 'crud' and 'monkey-chatter' are also discarded, at least to some extent. The ability to reduce unwanted noise is the novel feature of DSP audio filters, and there are several ways of doing this. One is called Adaptive Peaking or Dynamic Peaking; this is a form of adaptive filtering in which the bandwidth is continuously varied to fit filters around the wanted signal components, which are recognised by virtue of being correlated. All the filters reviewed offer this mode. In addition the JPS NIR-10 offers an alternative noise reduction mode called Spectral Subtraction, which works by converting the incoming signal back into the frequency domain (still in digital form), digitally subtracting out the noise, and then reconverting the signal into its previous form as a digital time-sample. Spectral Subtraction has the advantage that the bandwidth of the signal is not reduced during the process, but it does involve some substantial number-crunching which introduces a significant time delay of about 100ms between input and output.

The DSP algorithm also controls the passband and impulse responses of the bandwidth filter, simulating a classic 'brick-wall' filter with a flat passband, near-vertical sides and excellent stop-band rejection. However, unlike almost any analogue filter with similar band pass performance, DSP filters can be designed with a linear phase response which almost totally prevents 'ringing' on noise pulses.

In heterodyne-suppression mode the algorithm is looking for any long-term correlated signals and subtracting their contributions from the unprocessed signal data. The big difference from an analogue notch filter is that a DSP notch filter can handle several heterodynes simultaneously (subject to limitations of sampling rate and computing power) and has no problem with tones that drift in frequency. For a dramatic demonstration you can tune through an HF CW contest in a 2.5kHz IF bandwidth and hear nothing but a collection of 'clicks', as each tone is suppressed within a few cycles of its appearance. However, too aggressive a filtering algorithm can also attack speech waveforms, and the same is true of noise-suppression. In other words the skill of the programmer has a large effect on how useful a DSP audio filter is in practice.

$35 the factory can program in any three bandwidths requested. Although the widest bandwidth of the model under review was only 1.8kHz, the variable tuning facility allows this to be deployed in the best possible way to deal with a particular interference problem. Alternatively this potentiometer control can be used to set a variable noise reduction threshold using the Spectral Subtraction mode, which is presently unique to the NIR-10 in the amateur radio market. Some users preferred the NIR-10 in this respect, although on many kinds of interference the difference between the NIR-10 and other DSP filters tested was not marked.

On CW the tuning facility allows you to set your preferred tone for listening, or alternatively to tune the filter to the incoming signal – very good for UHF and above, where there are still a few stations that begin to drift as soon as they start transmitting! The NIR-10 can be automatically bypassed on transmit to let your CW sidetone come through, and also has facilities for routeing the microphone signal through the filter to process the audio bandwidth of the transmitted signal. The CW note from the NIR-10 in the 'narrow' setting did not appear as 'clean' as that from the W9GR, and with very weak signals there was a noticeable 'ticking' noise, sounding rather like ignition interference.

TIMEWAVE DSP-9

THE TIMEWAVE FILTERS are notable for their very clear push-button controls. A 'Voice/CW' switch determines the functions of four further buttons, and there is also a separate 'bypass' switch. On 'Voice', two buttons provide a selection of three SSB bandwidths (see Table 1), while the two remaining buttons can independently switch in the random-noise filter and/or the notch filter. On 'CW' the same pair of bandwidth buttons now offer three narrower bandwidths, the random-noise filter button functions as before, and what had been the notch-filter button now offers a choice of two CW centre frequencies. Both reviewers were very impressed with the simplicity and clarity of this system, and we never even needed to consult the manual.

The five filters tested by G3HCT and G3SEK. Seen here from the front . . . .

The DSP-9 is the 'basic' unit and has no automatic bypass on power-off or on transmit. Internal jumpers offer a simple choice of two sets of SSB bandwidths and two pairs of CW centre frequencies – see Table 1.

On both SSB and CW we appreciated the facility to control the bandwidth, tone notch filter and random-noise filter independently rather than only being offered certain limited combinations. There were circumstances in which one combination definitely worked better than the others – and it was just a matter of prodding a few buttons to find the best. The SSB quality sounded rather more 'reconstituted' than the other filters and the CW note at times sounded 'ringy', but neither of these was objectionable compared with the benefits in readability. On very weak CW the random-noise filter function helped to reduce the ringing. We should add that every one of the units reviewed helped to reduce the ringing of the narrow crystal filters in our transceivers.

TIMEWAVE DSP-9+

THE DSP-9+ IS the more 'refined' version of the DSP-9. In addition to the facilities of the DSP-9, the 'Plus' model includes an additional 'Data' mode with four different filters, automatic bypass on transmit and power-off, an AGC facility to help maintain a steady signal input, and a much wider range of internally-selectable filter bandwidths and centre frequencies (see Table 1). As with the DSP-9, the push-button controls are very well thought out: all appropriate combinations of facilities are independently selectable.

SSB and CW performance were essentially the same as the DSP-9 (again we did not test the data modes) but for weak-signal CW the selection of three bandwidths centred on 400 or 500Hz gave the DSP-9+ the edge over all the other units reviewed. One press of a button returns the centre frequencies to a more comfortable 600 or 800Hz for normal-strength signals.

CHOICES

ALL THE UNITS TESTED were very impressive. The first time you hear a DSP filter at work, you'll be astonished too. Both reviewers were very impressed by what all of these DSP filters can do. Neither of us had previously had much use for audio filters . . . . which we now realise was because we'd never heard a really good one!

We each reviewed the same set of filters 'blind', neither of us knowing what the other one thought. Also our criteria were quite different: G3HCT is a dedicated HF DXer and contester, while G3SEK's activity is mostly VHF/UHF DX (including moonbounce) with only casual operation on HF. Even so, we each came to the same conclusion: we liked the Timewave DSP-9+ best of all, for its good performance, its versatility and above all its well-designed controls. By no means the most expensive of the units tested, it also takes the prize for 'best value'.

ANALOGUE VERSUS DSP

IF YOU ALREADY HAVE an analogue audio filter, you may be wondering whether it's time to trade-up to DSP. Even leaving aside the cost, that decision isn't as obvious as it might seem. There are some things an analogue filter just can't do, including random-noise reduction and multiple simultaneous filtering of heterodynes. On the other hand, existing analogue filters can provide extremely sharp bandpass filtering for both CW and SSB, and some units can also notch out heterodynes.

For comparison we chose the Datong FL3, an analogue audio filter which has won the respect of HF and VHF/UHF DXers alike. In its SSB modes, the FL3 has independently adjustable high pass and low pass filters, combined with a manual notch filter and also a unique automatic notch filter. In CW mode, the FL3 has independently adjustable bandwidth and centre frequency, with either a flat-topped or a peaked passband.

Our basis for comparing these filters is what they do for the *readability* of signals, because impressive bench-test figures are far from the whole story. Direct comparisons are not possible because the filters in the FL3 are fully tunable whereas most of the DSP filters are fixed in frequency. In most circumstances a choice of fixed filters will be fastest to use, provided they are logically laid out and easy to select; but a fully-tunable passband will be better in extremely difficult cases, especially if your transceiver doesn't have IF Shift.

It took each of us some hours to get used to these filters, and you should expect the same. You'll need to practise how to use the filter, and it may take an extended operating session to realise the full benefits. Be realistic: don't expect miracles straight out of the box, but be prepared to balance the advantages against the drawbacks.

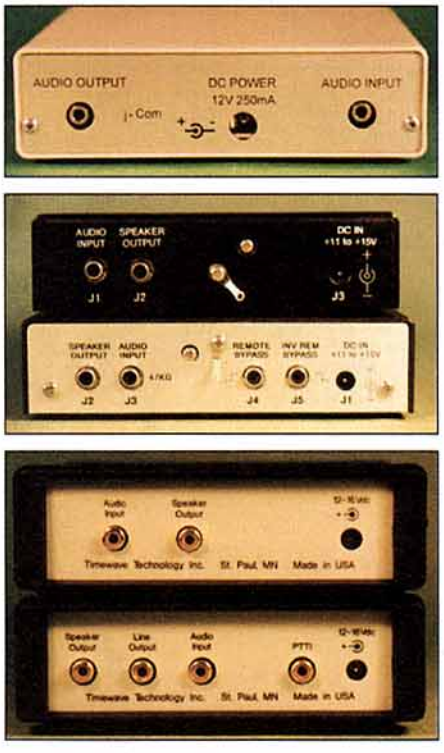
On SSB, we found that the audio quality from DSP is not as good as from the FL3, which is hardly surprising since the signal waveform has been literally taken to bits, processed and then reconstituted. Degradation in quality is particularly noticeable if the signal is off-tune, making speech sound 'hollow' and unpleasant. However, we have learned how to read off-tune SSB, so maybe in time we can manage the same for digitally processed signals. Balanced against this is the remarkable reduction in 'crud' and 'monkey-chatter' that DSP can bring to SSB, even in the pauses between syllables. With heterodynes from tuners-up also completely suppressed, this adds greatly to ease of listening.

Notch filtering is where DSP really scores over analogue, because it can deal very quickly with several heterodynes at once. Although the automatic notch filter in the FL3 works well with a steady tone of reasonable strength, and will quite successfully track any changes in frequency, it will lose lock if the interference is keyed CW. And of course it can only deal with one heterodyne at once – or two if you use the manual notch filter as well.

On medium to strong CW, the almost complete absence of ringing in the DSP filters gives them the edge over analogue filters, which can never achieve quite the same combination of flat top, steep sides and minimal ringing. A DSP audio filter can help reduce ringing from the IF CW filter, provided of course that the audio filter is set to a narrower bandwidth, and the absence of ringing can greatly reduce operator fatigue. With a DSP filter, a CW signal is either somewhere within the flat-topped passband or it isn't there at all. However, in contests and pile-ups there can be good reasons to prefer a distinctly peaked response with a less steep-sided passband, like that of the FL3, because it provides an important sense of what's happening nearby and in the background. The ideal solution with a DSP filter might be an adjustable level of 'background', which could equally well be achieved by an external audio mixer.

The results on very weak CW were rather surprising. Considering the potential problems in digital processing when signals are so weak that they are hardly different from the noise, the DSP filters performed much better than we expected. On moonbounce signals that were as weak as any you'll hear, most of the filters reviewed came within a hair's-breadth of equalling the FL3 for readability. Switching rapidly between the FL3 and the DSP-9+ at 100Hz bandwidths, the audio sounded different but there was very little difference in readability – at least to G3SEK's ears. We were unable to test or compare the performance of DSP filters on VHF aurora, where the signals are almost totally degraded into noise, or on other forms of scatter in which phase coherence is partly destroyed. One cannot have great hopes of DSP in these circumstances, unless the processing is completely confined to passband shaping. Another VHF mode we were unable to evaluate in the timescale of this review was high-speed CW for meteor scatter.

All audio filters suffer from the disadvantage that the wanted signal can be affected by another strong signal which falls within the wider IF passband of the receiver and thus takes control of the AGC. This applies particularly when receiving CW in an SSB-width IF filter. For that reason, we would still recommend that you use a 500Hz IF filter for CW. However, a DSP audio filter might well be a better investment than a second and possibly narrower CW IF filter.



. . . . and here from the back. All require an external 12V power supply.

DSP filtering involves some time delay, and you are normally listening to signals 10-30ms behind real time. This is usually of no consequence, although when tuning-in a CW or SSB signal it does introduce a perceptible lag in the feedback loop from your fingers to your ears. However, the 100ms delay in the NIR-10's Spectral Subtraction mode of noise reduction is more serious, and may affect the transmit-receive changeover timing for break-in CW and data modes.

A potential difficulty with DSP filters is their relatively low dynamic range. Overdriving the analogue-to-digital converter will clip the peaks of the input waveform, while very low-level input signals will suffer significant quantization errors. Both of these effects will lead to distortion before you even consider the effects of the DSP algorithms. Your receiver's AGC circuit will protect the filter to some extent, and the DSP-9+ has a further internal AGC circuit which is sometimes helpful. However, a well-designed analogue filter is much more tolerant of variable input signal levels.

Another limitation is the performance of the audio output stage. These external filters all take over the task of driving a loudspeaker and require a stable high-current power supply. DSP requires considerable computing power, which will consume the best part of 1A. Add to this the peaks of demand when driving a loudspeaker, and the filter can quite easily overload a nominal '12V 1A' power supply. If you notice severely distorted audio at higher volume settings, don't blame this on the filter! Many DSP filter manufacturers recommend you to avoid any kind of 'plug-top' DC power unit, and to power the filter from the high-current transceiver supply.

CONCLUSIONS

DSP AUDIO FILTERS are impressive in all departments: bandpass filtering, noise reduction and heterodyne suppression. However, the technology is still in its infancy, especially as regards the human/machine interface. As with many digital products when first introduced, some present-day DSP audio filters tend to offer you technology rather than convenience. The situation is changing rapidly – just look at the evolution in operating convenience among the filters reviewed in this article – but there is still some way to go. The same applies to the DSP programming: what makes one filter sound different from another, and how can audio quality be improved?

It will also be interesting to see how successfully DSP filtering is incorporated into new transceivers. Built-in DSP is presently a premium feature, and may take some time to appear in the mid-range transceivers that most of us buy. In the meantime, an external DSP audio filter for your existing transceiver may be a cost-effective alternative to an early trade-in.

Our thanks to Datong, Lowe Electronics, Nevada Communications and Waters & Stanton for the loan of the review products.

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

FIRST A REMINDER – in the July column I suggested that we begin another 28MHz table – to start counting from 1 August. This one will run until the end of 1995. I wonder who will be the first to reach 100 countries?

BEACONS

JACK TROSTER, W6ISQ, IARU Coordinator for the IBP (International Beacon Project) programme reports that W6WX/B, the prototype of the beacons to be used in the new multi-band network, has been rebuilt to incorporate new design ideas, and put in operation on the top of a 3500ft mountain immediately west of San Jose. The transmitter is a Kenwood TS-140 transceiver controlled by a unit built by Bob Fabry, N6EK, of the NCDXF. The antenna is a Cushcraft R-5 vertical. It transmits for one minute in its regular time slot (00:01 Z) on 14.100MHz every ten minutes, then flips to 21.150MHz and transmits a 10s message, then to 28.200 for another 10s transmission. The 21 and 28MHz transmissions are repeated every two minutes. The artwork for the controller unit boards has been completed and sent to a board manufacturer. The first two test boards were expected to be completed at the end of July and the first beacon built very soon afterwards. This will most probably be KH6O/B because it is close and it is already licensed by the FCC to operate on the same frequencies as W6WX/B. Following a successful KH6O/B test the network will be constructed and distributed – first to the existing network and then to the new locations. It is hoped to have all operative before the beginning of the next sunspot cycle. Seven beacons in the existing 14.1MHz chain are working well but CT3B seems to be intermittent and LU4AA/B has not been heard for more than a year.

Radio clubs in Peru, Venezuela, New Zealand, and Sri Lanka have accepted invitations to join the multi-beacon network and possibly there might be suitable locations available in W Australia and in Kenya. This would mean a total of 15 beacons and these would take 2.5 minutes for all to be keyed. 30s would then be able to accommodate three more – ideally two of these will be situated somewhere in Russia and China.

DX NEWS

THE MOST recent *DXCC News Release* received from ARRL dated 1 July 1994 said that the number of unprocessed applications at the end of June was 334 (representing 40,564 QSLs). The DXCC desk had received 704 applications (62,500 QSLs) for endorsements and new awards during the month. Applications being sent out at the end of the month had been received less than two weeks previously. Applications and QSLs received continue to run ahead of last year's rate and in the first five months of 1994 applications were up by 13% and QSLs by 25% compared with 1993.

Mady (KA6ZYF) and Terry (W6/G3MHV) have recently returned from a five weeks trip though Russia. They were able to operate as R3/G3MHV and R3/KA6ZYF from Nizhny Novgorod and Moscow, R9/G3MHV and R9/KA6ZYF from Ufa, UE9WTL/9 and UE9WML/9 from Tomsk, R0/G3MHV and R0/KA6ZYF from Kyzyl (Tuva – zone 23), and UE9WTL/0 and UE9WML/0 from Irkutsk and Vladivostock. These were the first reciprocal calls ever issued to foreigners to operate from Tuva.

RSGB DX News Sheet says that Portuguese Telecom has made changes to the prefix system for Portuguese licensees. However, regular callsigns will still be CT1 and CT4 for Portugal and CU for Azores and CT3 for Madeira. Special event callsigns in Portugal will use CT2, CT5, CT6, CT7, CT8, CQ1, CQ2, CQ4, CQ5, CQ6, CQ7, CQ8, CS1, CS2, CS4, CS5, CS6, CS7 and CS8. In Azores CU with any number and in Madeira CT3, CT9, CQ3, CQ9, CS3, CS9 and XX with any number *excluding XX9*. CR prefixes are reserved for the National Civil Protection Service. Prefixes using the number 0 will be used for repeaters. Single letter prefixes will be issued to multi-operator contest and expedition stations. Single operator stations will be issued with special callsigns but will use the same suffix as the applicant's normal call. Foreign amateurs applying for reciprocal licences will use a regular prefix/own call.

QTH CORNER

BS7H	W6CF, James Maxwell, Box 473, Redwood Estates, CA 95044-0473, USA.
CN2VA	Antonio Valentini, IK4JQO, Via Polenta Nuova 1614, 47032 Bertinoro (Forli), Italy.
D2TT	via ON5NT, Ghis Penny, Linderstr.46, B-9880 Aalter OV, Belgium.
HS0AC	PO Box 1300/NANA, Bangkok 11112, Thailand.
SU1KR	OK2EC, Stepan Martinek, Zizkova 14, CS-69501 Hodonin, Czech Republic.
TN0CW	DK7PE, Rudi Klos, Klein Untergasse 25, D-55268 Nieder-Olm, Germany.
YW0RCV	Radio Club Venezolano, Box 2285, Caracas, Venezuela.
8Q7AE	G0PBV, Flat 3, Shoreham Court, The Close, Shoreham-by-Sea, W.Sussex, BN43 5AR.
9U/F5FHI	Jean-Pierre Maidon, La Hee, F-44120 Vertou, France.

9 BAND TABLE NO 11

CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL
G3KMA	182	277	320	269	326	302	326	290	320	2612
G4BWP	151	274	307	257	325	297	321	265	310	2507
G4GIR	133	262	303	233	326	280	322	248	310	2417
G3XTT	187	245	295	217	323	269	318	244	294	2392
G3GIQ	77	221	285	140	326	267	326	232	313	2187
G4OBK	133	178	229	179	301	249	277	204	251	2001
G3TXF	96	198	257	168	307	193	306	142	273	1940
G3WGV	84	152	211	218	254	242	255	196	228	1840 (CW)
GM3PPE	68	172	212	212	277	235	255	183	221	1835
G3SXW	79	177	220	172	288	172	278	134	238	1758 (CW)
G3IGW	124	182	301	176	271	214	229	43	199	1739
G3NOF	5	114	113	–	325	236	325	221	299	1638
G4ODV	88	184	306	157	253	119	241	69	200	1617
G3VJP	17	135	212	80	311	114	289	43	238	1439
GW3JXN	57	138	180	124	229	191	229	132	156	1436
G3IAR	69	102	130	133	244	166	217	122	147	1330
G4XRX	3	48	91	105	260	147	283	149	228	1314
G4CMZ	14	42	101	67	142	29	125	3	101	624
AVERAGE	**91**	**180**	**234**	**167**	**291**	**217**	**282**	**172**	**249**	**1882**

Next deadline – to reach G3GIQ no later than **8 October 1994.**
Please note entry level is 600 total and there is no need to work all bands.

Please note that **Karelia**, UN1N, has now been deleted from the WAE countries list.

I1RB and I1RBJ operated from "the Principality of Seborga" recently and used the callsigns "0S1A" and "0S1B". The area is near Monaco and is on the Italian-French border – at the moment the likelihood of DXCC status being granted is now known. I had a telephone message from Paul himself, I1RBJ, and he told me that there was to be an agreement between Italy, the ITU, and the Principality and that any future activity would use the callsign I01A/0S1A which is more in line with the correct procedure.

XE1BEF has written about his operation as XF4C from Clarion Is which took place between 19 February and 5 March this year. He made 5,000 QSOs using CW, SSB, and RTTY, but found conditions during his 15 day stay to be very poor to Europe. This was his fourth visit – he was XF0C for two operations in 1991 and XF0C in 1992. QSLs were being sent out during June. CG7G was a special event station located in Victoria, BC, **Canada**, It was in operation from 1 July until 31 August. WA3YVN (who was one of the VP8SSI operators) and WA4VQD recently formed the SGI DXpeditions group with the aim of activating many high-demand DX locations and many of the low latitude Antarctic islands. They are at an advanced stage of planning a three weeks expedition to **South Georgia** in early January 1995. All gear for four complete stations was put aboard the research vessel which transported the VP8SSI expedition in June at Fairhaven, Massachusetts. Operation will mostly be on 1.826, 1.845, 3.504, 3.522, 3.785, 7.004, 7.065, 10.104, 14.024, 14.195, 18.074, 18.145, 21.024, 21.295, 24.894, 28.024 and 28.475. RTTY frequencies will be 3.580, 7.040, 14.080, 21.080 and 28.080MHz. More information will be available later and if you wish to contribute to the cost of the expedition send

1994 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G4OBK	**112**	**170**	**119**	**401**
EA5GQI	–	124	77	201
EA5DQE	–	92	49	141
G0MHC	40	64	36	140
GJ4GG	36	54	37	127
G3ING	62	46	15	123
G0MHC	37	58	26	121
G2AFV	50	51	9	110
G3KKJ	17	53	39	109
G4CMZ	43	32	3	78
G0TMZ	25	32	11	68
G4FVK	18	16	10	44
G3IAR	26	11	1	38

a cheque (payable to SGI Expeditions) to SGI Expeditions, PO Box 2235, Melbourne, FL 32902, USA.

According to *DXPRESS* Stephane, F5OWB, should remain in **Burundi** for a few more months. He is active on all bands and modes as 9U/F5OWB. Rafik, F5CQ (ex-FT5XA), is now on **Mayotte** and should be there for two years. The *RSGB DX News Sheet* says that DK7PE may be on the air from **Ghana** for several months but this has not been confirmed. 4X4MS will also be in Ghana for a prolonged spell and hopes to get a licence. 3XY0A is the present callsign of the former 3X0YU. SU1KR is Pavel, OK2FUN, who is a member of staff at the Czech Embassy in Cairo. He is on all bands except 1.8MHz. According to *RSGB DX News Sheet* FT5XJ, on **Kerguelen Is**, was to go on three months leave in July after which he is expected to return for a further year. From the same publication comes news that 9K2CS is said to have permission to operate from **Tunisia**. However, he wishes to take an American with him and the authorities will not allow the W to operate. Hence – stalemate. The first operation from **Scarborough Reef** took place during the last weekend of June. It was organised by the China Radio Sports Association together with JA1BK and OH2BH and was manned by BZ1HAM, DL5VJ, DU1RAA, DU1IOG, JF1IST, KJ4VH, OH2BH, and OH2MAK. The primary goal was to collect information so that a full-scale expedition can be manned after the typhoon season and the group feels that this can take place. During thirteen hours on the air more than 2,000 QSOs were made – all on SSB – and using an FT-990 with a Cushcraft R5 and 3.5MHz dipole. The Chinese Taipei ARL has announced that the Ministry of Posts and Telecommunications authorised the use of the following frequencies in **Taiwan** from 1 July: 3.500 – 3.512.5, 3.550 – 3.562.5, 18.068 – 18.080.5, 18.110 – 18.122.5, 24.890 – 24902.5, 24.930 – 24.942.5, 50.000 – 50.0125 and 50.110 – 50.1225MHz.

IOTA FREQUENCIES

AT ITS MEETING on 4 June the IOTA Committee decided that the IOTA meeting frequencies on CW should be as follows: 3.530, 7.030, 10.115, 14.040, 18.098, 21.040, 24.920 and 28.040MHz. The SSB frequencies will be 3.775, 7.055, 14.260, 24.950, 28.460 and 28.560MHz. The 14, 21 and 28MHz SSB frequencies have been in existence for some time but the others are new. The 3.5 and 7MHz CW frequencies have been changed from those previously proposed to take account of USA general and advanced classes as well as the extra class. (In my opinion the IOTA Committee gets full marks for pointing out the fact that *these frequencies will in no way be "reserved" exclusively for IOTA contacts but will be shared with others on a normal non-interference basis*).

ETHIOPIA

VERY GOOD news from Sid, ET3SID, this month. At last approval has been granted for the Ethiopian Amateur Radio Society club call sign ET3AA and the first transmission went out on 5 July. The President of EARS, Mr Admasse Zeleke, ET3AZ, and Mr Tensai, ET3BT, have received their licences – the first issued to Ethiopians in more than twenty years.

The society now has about 30 members and eight more candidates have undergone practical and theory training in line with the City and Guilds of London radio exam. Sid says that one way of assisting EARS is to ensure that your QSLs are accompanied by 'green stamps' – this covers not only the cost of postage but also contributes towards the cost of running the club. Sid thanks – amongst others – RSGB for morse tapes, leaflets, and posters supplied by HQ.

CONTESTS

ALL ASIAN DX CONTEST (SSB)

0000 3 September – 2400 4 September

1.8 – 28MHz (except WARC). Single-operator single or multi-band, and multi-multi classes. Work Asian stations and give RS plus age (ladies are excused – they send '00'). QSOs on 1.9MHz count three points, on 3.5MHz two, and on others one. Multipliers are the number of *Asian prefixes* worked on each band. Copies of the rules/summary sheet/log sheet available (SASE please).

WAE DX CONTEST (SSB)

0000 10 September – 2400 11 September

(See August issue).

SCANDINAVIAN ACTIVITY CONTEST

1500 17 September – 1800 18 September (CW)

1500 24 September – 1800 25 September (SSB)

3.5 – 28MHz (no WARC). IARU 'contest free' segments should be observed (3.560 – 3.600, 3.650 – 3.700, 14.060 – 14.125 and 14.300 – 14.350MHz). Work Scandinavians only (LA/LB/LG/LJ, JW, JX, OF/OG/OH/OI, OF0/OG0/OH0, OJ0, OX, OY, OZ, SI/SJ/SK/SL/SM/7S/8S and TF). Single operator all band, single-operator QRP, multi-operator and listener classes. Exchange RS/T plus serial QSO number (from 001). Each QSO counts one point. The multipliers are *Scandinavian call-number areas (0 – 9)* worked on each band

This year's contest is being organised by EDR (Denmark). Unfortunately 1994 rules had not arrived when I was writing this.

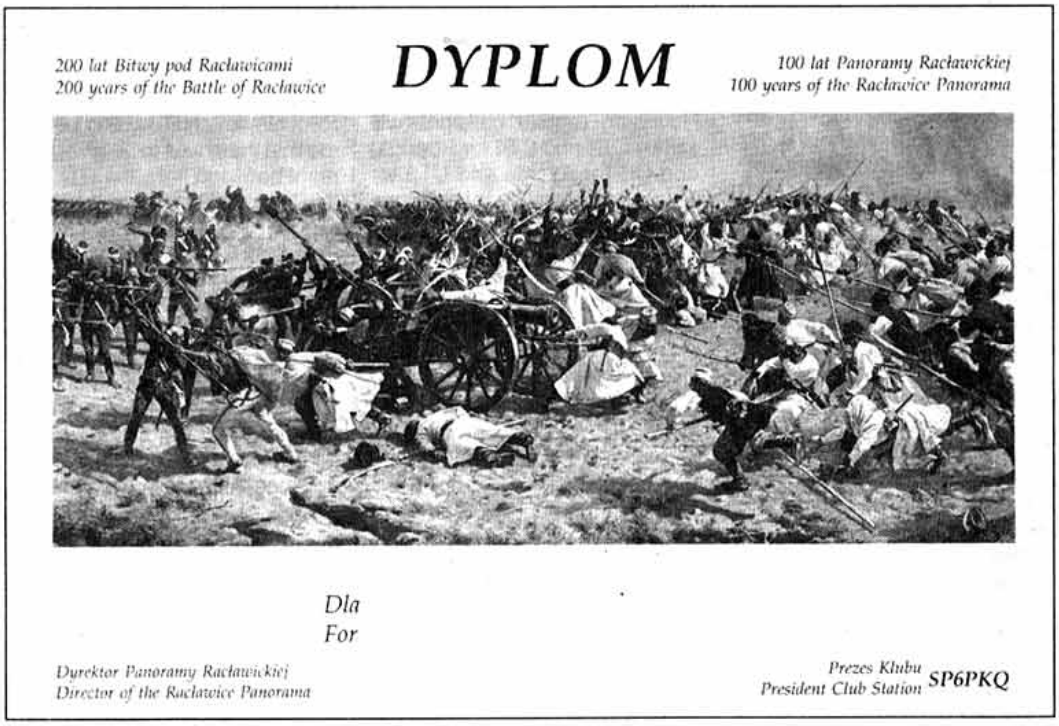
VK/ZL/OCEANIA CONTEST

1000 1 October – 1000 2 October (SSB)

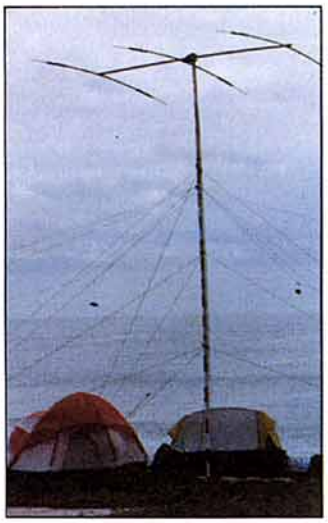
1000 8 October – 1000 9 October (CW)

1.8 – 28MHz (no WARC). Listeners may enter and in this case the two sections are combined. Work VK/ZL/Oceania stations – each QSO counts two points. Exchange RS/T plus serial number from 001.

The Wroclaw Award (see the July 1994 *HF News*).



The stunning "Two Hundred Years of the Battle of Raclawice" Award.



The set-up on Clarion Island when XF4C was operated by XE1BEF earlier in 1994.

The multipliers are the VK/ZL/Oceania prefixes worked on all bands added together. No rules received at press time but when NZART last ran this contest in 1992 logs were to be sent to John Litten, 146 Sandspit Rd, Howick 1705, New Zealand, to arrive before the following 1 February.

CQ WW RTTY DX CONTEST

0000 24 September – 2400 25 September

3.5 – 28MHz (no WARC bands). Now 48h operation is allowed and the compulsory time off periods no longer apply. Same basic rules as the other *CQ* contests. I can supply photocopies of the rules (SASE please).

In the **1993 ARRL 10 Meter Contest, G0AEV** scored 160,460 points in the mixed-mode category, followed by G4IQM (52,598), and G3TMA (72,718). In the CW listing were G0TDX (28,200), G5MY (39,712), G3RSD (9,984), and G4ZME (4,576) and the multi-operator class was represented by G3OZF with 261,616 points. G3TMA was in the 'more than 150W output' group and G0TDX was in the 'less than 5W output' category.

AWARDS

100 YEARS OF RACLAWICE PANORAMA

Issued by the 'Ikar' club in Wroclaw, Poland. Europeans need 15 points from working/hearing stations in Wroclaw province during 1994 and DX stations ten. QSOs with ordinary 'WR' stations count two points, with SP0PKQ five points, and with SN0PR between 15 March and 30 April and 1 June and 31 July seven points. QSOs may be repeated on all bands/modes. Send applications together with 10 IRCs to: Klub Krotkofalowcow, SP6PKQ–'Ikar', PO Box 2190, 5-985 Wroclaw 47, Poland.

PROPAGATION

SMITHY'S PROPAGATION report for September is rather short. It says: "There was little change is solar and geomagnetic indices in the second half of June and the first half of July except that the upward trend in average geomagnetic activity seems to have halted, at least for the time being, the provisional mean A index for June being some 30% down on previous months. At the same time solar activity has remained uniformly low, the average solar flux for June at 77sfu being the lowest since early in 1987. HF band conditions can only be described as typical for summer months at the low end of a cycle, which is informative only if one has already experienced this situation !"

THANKS . . .

. . . . GO TO ALL those who sent in information and to the authors of the *Lynx DX Bulletin* (EA2KL), the *Long Island DX Bulletin* (VP2ML), the *RSGB DX News Sheet* (G4DYO), and *DXPRESS* (PA3FQA). Please send everything for the **November** column to reach me at the above address by **17 September.**

Nao, NX1L, operating FO0AKI on Rurutu Island in June 1994.

VHF/UHF NEWS

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

TROPO CONDITIONS in National Field Day weekend were good with some excellent contacts completed. How about Scotland to the Ukraine on 70cm? The tropo path from southwest England and Wales to the Canaries has also been open. An important event was the lifting of all restrictions on the 50-51MHz part of 6m from 18 July – see page 24 in the August *RadCom* for the full text of the *Gazette* notice.

PUBLICATIONS

IN HIS JUNE editorial in *The VHF-UHF DXer*, Dave Hardy, G8ROU, wrote: "Putting the DXer together on time is becoming a more and more difficult task." He appeals for more articles, a perennial cry from all newsletter editors. Sam Jewell's, G4DDK, 'Tech Slot' deals with the choice of local oscillator frequencies in double conversion transverters. There is a reprint of a WA2OMY article on commercial microwave power meters. The remaining pages are devoted to band reports from 50MHz up. Dave is QTHR (address in current *RSGB Call Book*) if you want subscription information.

The Summer edition, 2/1994, of *VHF Communications* includes a long article on high frequency transformers by Detlef Burchard, a contribution by K1POO on the Extended Double-Zepp (EDZ) antenna concept and a solid state 80W broadband 24cm amplifier by HB9SLV and F1JSR using four Mitsubishi M57762 modules. For subscription details UK residents should contact KM Publications, 5 Ware Orchard, Barby, Rugby, CV23 8UF.

REPEATERS

DAVID REAY, G8UHO, Hon Sec of the Lakeland Fells Repeater Group, wrote about a problem with UHF relay GB3LF on RB14. It was triggered to a 'locked-on' state by RF from a new pager on 137.975MHz getting into the outboard preamp on its receiver. This was quickly resolved. The repeater is on a PMR site east of the M6 near Lancaster. It comprises a Pye T/R 412 set, four cavity filters and a pair of unity gain end-fed antennas at 350ft ASL. The coverage area is north Lancs, north of the Fylde, up to the three counties boundary near Ingleton and over to the Furness area of Cumbria. Dave is QTHR and his CompuServe ID is 70374,1607.

The Aylesbury Vale RG's June *Newsletter* includes status reports on the AVRG's three repeaters, GB3VA (R4), GB3AV (RB2) and GB3BV (RB1). GB3VA was deliberately jammed on 4 March by a QRP signal from ". . . . a car with amateur aerials parked close to the repeater." The car sped off when two members arrived. GB3AV is suffering from bouts of interference possibly due to cross-talk from other transmitters on the site. The GB3BV receiver 'died' on 15 May, but was rejuvenated and put back into service in 30 hours. The group has 154 members and the next 'VA users' get-together' is on 8 September at the Robin Hood pub on the south side of the A422, half way between Buckingham and Brackley. For details of the group contact Mike Marsden, G8BQH (QTHR). Tel Aylesbury (0296) 641783 after 6.00pm.

Brian Davies, GW4KAZ (GDD), chairman of the Arfon Repeater Group, reports that the repeater linking experiment is progressing well. The two repeaters are GB3AN (NGR SH 473 909) on RB8 and GB3AR (SH 475 493) on R4. He has produced an information sheet about this experiment. If you'd like a copy, send him an SASE to 2 Glanllyn, Bethel, Caernarfon, Gwynedd, LL55 1YL.

BEACON NEWS

PETAR MILIČIĆ, 9A2MP, VHF Manager of the Croatian Society HRS, listed two 9A beacons; 9A0BVH on 144.850MHz and 9A0BUH on 432.847MHz. Both are at JN85JO, 489m ASL and run one watt to V-dipoles. They were QRT due to ". . . . some administrative problems . . . ." when he wrote to IARU's *Region 1 News*, the July issue. 9A0BHH on 50.865MHz and 9A0BLH for 23cm are being built for the same site. For JN83HG, three more are being made; 9A0BVB on 144.920MHz, 9A0BUB on 432.920MHz and 9A0BLB on 1296.920MHz.

CONTESTS

THE FIRST LEG of the 144MHz

continued on page 21 ▶

VHF NEWS

continued from page 19

CW Cumulative contest is on 30 August, 2030-2300*local time*. The remaining sessions are on 14 and 29 September and 14 and 31 October. General rules apply, including rule 10. A 4422 Summary Sheet must accompany your entry. (Note: I cannot find the rules for these contests; they were supposed to be in the February *RadCom*).

The RSGB 144MHz Trophy Contest is on 3/4 September, 1400-1400UTC with the 4th Back Packers event on the 4th, 1100-1500. (VHFCC chairman Bryn Llewellyn, G4DEZ, points out that Trophy contesters can work the same operator twice; once from home, then again if he/she goes out back-packing in the last three hours). The IARU event coincides with the RSGB contest. Weather permitting, Theo Köhler, PA3FPS, says his group will be on from JO12 as PA3FPS/MM. If there are high winds, they will be signing PA3FPS/P from JO23.

SOFTWARE

THE PDSL (Public Domain and Shareware Library) sent *PC Shareware Update Reference*, subtitled Issue 18, Supplement 2. This lists the latest additions and updates to its extensive library of disks and CD-ROMS. The Ham Radio section includes logging and QSL, packet radio and BBS systems, propagation and satellite programs. See the PDSL's current adverts in *RadCom*.

Requests for copies of VK3UM's EME Planner and Autotrack PC programs continue to arrive. If you require copies, please read the notes in Moonbounce on page 21 in the August *RadCom*. I've just received (30 July) the first requests for G4JNT's programs – see under Software on page 20 in the August *RadCom*. I still keep, and update, CP/M software for the Amstrad PCW8000 series computers, *on 3in disks only*. Send me an SASE for the current Proglist.

PROPAGATION

THE JUNE REPORT from the *Six and Ten Reporting Club* records only seven disturbed days in the month, compared with 16 in May. No sunspots were reported in the 1-5 period, the maximum SSN was 63 on the 11th and the monthly mean was 28.1 (SIDC figures). The 2.8GHz solar flux (Ottawa) meaned at 77.2.

Geomagnetically June was a much quieter month than might have been expected and Sporadic-E propagation on 50MHz was excellent. No significant auroras were reported by British or even Scandinavian observers. The report is edited by Ray Cracknell, G2AHU (HWR), and printed and circulated by Ian Brotherton, G2BDV. Contact Ian (QTHR) for subscription details.

John Regnault, G4SWX (JO02), wants to correlate information on 144MHz ionospheric forward scatter. To summarize the characteristics of this mode;

1) The signals are continuous, but weak, maximum range being about 2,100km, similar to meteor scatter.
2) Unlike Es, there are not selective, highly ionized regions from which signals are reflected; it's more like a continuous blanket.
3) Slow fading (QSB) of 10-20dB is quite common.
4) Unlike auroral propagation it is not a field-aligned mode; stations aim their antennas at a common ionospheric volume, normally at the mid-path point.
5) Signals are T9 with little trace of multi-path flutter.
6) There appears to be no correlation with weather conditions.

Typical station requirements are 50+kW ERP on CW with a low noise receiver, maximum bandwidth of 500Hz; ie EME station performance. John wonders what are the effects of solar flux and K-index? Is the mode better just prior to an aurora? What is the best time of day? What are the best paths? His Internet address is regnault_j_c@btweb.bt.co.uk and I would appreciate a copy to my CompuServe mailbox – see end of VHF/UHF News.

This mode is not to be confused with the better known troposcatter one, so is an ideal research project in which the better-equipped stations can participate. So, when the Moon is below your horizon, how about setting up some skeds with other QRO partners and record what you hear? As with all such AR research, it is essential that results get published in *RadCom* rather than in an abstruse scientific journal never seen by radio amateurs.

MOONBOUNCE

WE ARE IN the Summer doldrums and the only EME report is from Stewart Cooper, GM4AFF. He and Tim Kirby, G4VXE, operated from Jersey in the 10-25 June period. On 2m they used a TS-790, a PA with a pair of 8874 triodes, an MGF1202 preamp and four 17-ele Yagis. They completed with W5UN, DL3BWW, SM2CEW, DJ9CZ, PA0JMV, I2FAK, GM4JJJ, IK2FJI, OZ9AAR, EA6VQ, HB9JAW, S57TW, W4ZD, VE7BQH, SM5BSZ, WB5LBT and IK1MTZ.

They heard their own echoes every night, once on SSB. On 20 June a gale wrecked the array but they rescued one Yagi. With hindsight, no advance publicity was a mistake. They thought they could use the 20m VHF net for arranging skeds but Stewart wrote: "This is OK for European MS but for world coverage it is a disaster."

In the July issue of *432 and Above EME News* editor Allen Katz, K2UYH, comments that activity seems to be tilting towards the higher bands with 23cm coming close to 70cm. The next sked weekend remains 3/4 September which clashes with major European contests. The first October one is on 1/2. For the November issue, reports on the Gotenburg EME Conference would be most welcome, as would any photos.

50MHZ

NEWS

Geoff Brown, GJ4ICD, has been corresponding with Julio Vera-Cruz, D44BC, about possible 6m operation from the Cape Verde Islands next year. Julio has been QRT on the band for five years so renewed activity would be most welcome. The cost would be considerable but Geoff is very keen to go. Ken Osborne, G4IGO (SOM), wrote that he and G4HBA; ". . . . through personal contact with the operator of HZ1AB, report that 50MHz contacts with the station are still possible." An A4 station in Oman is also QRV.

Ted Collins, G4UPS (DVN), advises: The QTH of George Andonov, Z31DX, is Marsal Tito 134-2/3, 91480 Gevgelija, Macedonia. His square is KN11. Azerbaijan station 4K6D (ex-UD6DE) in LN40VK was worked by SM7AED on 18 July. RA3DQT (KO95) is another new Russian station on the band. French stations in Dept 59 in the Lille area are QRV each Wednesday, 1830-1930UTC on 50.210MHz SSB and would welcome UK callers.

ACTIVITY

Emil Pocock, W3EP, wrote: "Went over the top (DXCC #100) with

ANNUAL VHF/UHF TABLE
JANUARY TO DECEMBER 1994

Callsign	50MHz Cty	50MHz Ctr	70MHz Cty	70MHz Ctr	144MHz Cty	144MHz Ctr	430MHz Cty	430MHz Ctr	1.3GHz Cty	1.3GHz Ctr	Total Points
G6HKM	28	50	–	–	61	18	24	6	4	5	196
G0FIG	–	–	–	–	69	21	42	13	8	6	159
G3FDW	30	17	22	3	46	7	24	3	–	–	152
G1AWF	6	10	–	–	73	18	2	2	–	–	111
GW6VZW	54	56	–	–	–	–	–	–	–	–	110
G3FIJ	6	4	17	2	30	11	21	3	1	1	96
G3UOL	18	4	–	–	47	11	–	–	–	–	80
GW0PZT	–	–	–	–	59	21	–	–	–	–	80
G4MUT	16	6	13	2	24	4	8	3	2	1	79
G4DEZ	3	16	–	–	29	13	5	5	2	2	75
G4OUT	–	–	24	5	32	11	–	–	–	–	72
G1UGH	11	16	–	–	21	10	–	–	–	–	58
G8XTJ	15	3	–	–	30	7	–	–	–	–	55
GI4OWA	1	15	–	–	26	12	–	–	–	–	54
G4OBK	17	30	–	–	1	1	–	–	–	–	49
G3YHF	–	–	–	–	–	–	35	5	–	–	40
G3FPK	–	–	–	–	30	7	–	–	–	–	37
G7CLY	8	11	–	–	9	3	–	–	–	–	31
GU4HUY	–	–	–	–	21	6	–	–	–	–	27
G6ODT	–	–	–	–	–	–	15	3	–	–	18

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 November issue is 22 September.

CY9/K0SN, 5T5JC, HB9SNR and TG9AJR in June." He heard several HB9s at good strength inspite of their valley locations and low power. Dave Hewitt, G8ZRE (CHS), was in Orlando, Florida (EL98) in July. Operating as W4/G8ZRE, using an FT-690R at 2.5W to its whip antenna, his best DX was on the 13th to K1TOL in Maine. Some VEs were heard.

G4UPS's report covered up to 19 July and Es activity was noted on most days. Ted's best DX were; 1st 1345 5B4/G3SDL (KM65FA); 2nd 1713 RU1A (KO48VR), 1718 9A5Y (JN85OO), 1816 ES2RW/2 (KO19); 14th 1255 TK/F5EMT/P (JN42LN); 17th 0816 OM5MX (JN98BH); 18th 1027 SL0ZG (JO99IS) and 19th 1137 LA9DM (JP31). Heard at 1800 on the 4th was 1A0KM working Gs.

Ela Martyr, G6HKM (ESX), worked 1A0KM for a new country on the 4th while RU1A on the 2nd was a new square. On the 18th, UU8JJ (KN74) was a new country and square and LA9DM another new square. The Martyrs attended the VHF/UHF DX Convention in Cheshire and found the lectures very good, the dinner excellent and the trip to Jodrell Bank superb.

New squares for GJ4ICD on 2 July were RU1A, DL9GKA (JO63) and EW7IM (KO53). Next day Geoff worked 5T5JC from his mobile station. On the 17th Joe Ludlow, GW3ZTH/P (IO81FP), caught some reasonable Es. He used a 20W solid-state transverter with 3-ele Yagi to net nine countries in 12 squares from 17 QSOs; not bad for a first portable sortie on the band.

70MHZ

THE ROLLS-ROYCE ARS operated from the Matlock (DYS) area in NFD using the call G4TSN/P. Having run out of stations to work, but with two hours left, they decided to let six operators use their own calls. This resulted in a series of pile-ups. G0LBW/P worked 18 stations, G0RVA/P 14, G2UT/P 13, G7RVA/P 11, G6NNE/P 10 and G7RXK/P 9. Reporter Keith, G2UT, concludes that 4m is a superb band and pleads for more activity.

144MHZ

ALEC TRUSLER, G0FIG (SXW), faxed *eleven sheets* of data including nine pages from his log up to 24 July. During NFD weekend, tropo conditions were good. His DX included French portables in IN93, JN12, 14 and 15, F/G3JHM/P (JN24) and F/IW1CQ/P in JN34, a difficult square; the Italian was running 10W to a 9-ele Yagi on a 3,130m mountain just 500m from the border. More Fs in IN94 and JN03-05 were contacted on the 15th. MS contacts were completed with SP2OFW (JO93), IV3HWT (JN65), DL5DTA (JO61) on 2 July and EA1EW (IM77) next morning.

Peter Burt, G3NBQ (LNH), copied the GB3LER beacon auroral on 14 July but no other signals were heard. Tropo to Spain was good on the 9th with several EAs worked. During NFD he worked DL, F and ON stations, best DX being JN38. Bill Meinerts-Hahn, G3UOL (WMD), added HB9MM/P (JN36) and LX/PE1HUS/P (JN29) to his country tally in NFD. If QSLs arrive, he'll be claiming an SSB QRP Senior Award. His 2.5W brought 11 DLs, two EIs and 15 Fs over that weekend.

Mark Holloway, G4YRY (DOR), worked EA1TA on tropo, then via Es within a few minutes on 22 June; that's *very* short skip from Bournemouth. After not hearing the EA8s on tropo on the 9 July, he finally worked some later in the month. In the QRP Contest on 23 July, G6HKM's best DX was SK0HD (JO68).

Operating from Alan's, GJ4ZUK, new QTH in Jersey, GJ4AFF/P and GJ4VXE/P completed 755 QSOs in the 10-25 June period in addition to their EME ones. In the *Practical Wireless* QRP Contest they worked 408 stations to give away points. Stewart, GM4AFF, reports that in NFD, the GM4ZUK/P station in NE Scotland put up its best ever performance. Best DX was a staggering 2,790km so it will be fascinating to study the results later on.

Brian Higton, GM8HVB (SCD), wrote about his portable operation in Cornwall (IO70NN) in July. Tropo conditions were the best he has experienced in more than 20 years. He used 160W and a 17-ele Yagi at a good site near the west coast. During NFD conditions were good to the south and southeast with many Fs worked in 18 squares. HB9MM/P and HB9AJ were particularly strong.

At 2200UTC on 8 July beacon EA1VHF was S9+ leading to spectacular conditions to Spain till the morning of the 11th. A Spanish contest provided high activity and signals were up to S9+40dB. Brian worked four Canaries stations, EB8BEB and EB8BTV (IL18) being heard all weekend. His final tally for the 1-13 July period was 14 countries in 47 squares.

Jim Rabbitts, GM8LFB (HLD), created a pile-up from IO88JH in the evening of 23 July, starting with DL4AAL/P (JO42) followed by DLs and PAs in JO21, 22, 30-32, 41 and 42. After a few hours sleep he restarted at 0700 next morning. Beacon DL0PR was "end stop" and one CQ call resulted in 40 DL contacts plus LA2PHA (JO38) and OZ6FH (JO47). All that with a TR-9000, 10W to a 9-ele Yagi. Jim's QTH is: Keeper's House, Clythness Lighthouse by Lybster, Caithness, Scotland KW3 6BA.

Edward Allely, GW0PZT (GDD), finally worked EA8ACW (IL28) for a new square in the tropo lift on 27 June. Through NFD there was continuous propagation to central France. In the evening of 2 July, it moved towards Switzerland and HB9IAB/P (JN36). He contacted stations in JN16-19 and 27-29. LX/PE1HUS/P was worked on the 3rd and F2EE/P (JN14QX) was a new square. Five Canaries stations were worked on the 9th including EA8/DJ3OS. F5PAU (IN88) was very loud and the CTs were just about copying UK stations on tropo. He finds the main problem with Spanish openings is that most of the EAs seem to stay on 144.300MHz. On MS a sked with EA1EW (IM79) was incomplete.

GW3ZTH/P was QRV on six July days from IO81FP. Joe completed 229 QSOs in the month with stations in 15 countries and 61 squares. His best DX were EA8AEA, EB8BEB, EB8BTV and EA8/DJ3OS on the 9th and next day EB8BTV, EB8ALZ, F5EPB/P (JN13) and HB9SNR. Joe helped Tim Daniels, GW7KTP (GNS), get going again after winter gales had wrecked his antennas. Running 20W to a 15-ele DL6WU Yagi, with masthead preamp, he worked two EB8s at nearly 2,800km, plus eight EA1s and some Fs.

Lyn Leach, GW8JLY (GNS), caught the Es on 24 June working three IS0s (JM49) and four 9Hs (JM75). At 1905 on 2 July he worked SK5EW (JO79XD) in a short opening. In NFD he worked into JN15, 25-28 and 36-38 on tropo. Not hearing any EA8s from home, he went out /P and easily worked some on the 9th. Next day he did it from home.

430MHZ UP

DURING NFD, the GM4ZUK/P station worked UT5DL/P on 70cm, a QRB of 1,910km. Only five stations in the *DUBUS* 'Top List' record greater distances. Did other stations work so far in NFD? If so, please let us know.

On both 70cm and 23cm tropo was very good in an east/west direction from G3NBQ's W Sussex QTH. Alec worked into IO70 and JO21-23. On 70cm he contacted F6FGO (JN25) and F1JSR (JN36) on 1 July and next day F5GYA/P (JN15), HB9STY/P (JN36), LX/PE1HUS/P, and ON and DL. On 23cm best DX on the 2nd was F5GYA/P at 649km. New squares were IO80, JN08, 37 and 38, JO00, 01 and 31, plus ON7WR (JO20) on the 3rd. On the 24th, DL8BDU (JO43) and GM4ZAP/P (IO85) were also new on 70cm.

Chris Skelcher, G3YHF (WMD), is a new entrant in the 70cm table; recent contests brought four new squares with his 10W. During their Jersey operation, GM4AFF and G4VXE used a TS-790, 100W PA and 19-ele Yagi on 70cm but only worked 12 stations. GW3ZTH/P was QRV on 70cm on 10 July and worked EA1DKV and EB1OL (IN53), EA1YV and EA1AFP (IN52), PE1LCL (JO21), TM5CAN (IN99) and GU3EJL (IN89). GJ4ICD worked F5GYA/P for 23cm square #70 on 2 July.

SIGN OFF

THAT WRAPS IT UP for this month. Let's have some Perseids reports for the **October** issue, the deadline for which is **25 August**. The **November** date is **22 September**. The BT Gold mailbox is 87:CQQ083, my CompuServe ID is 70630,603, the Internet route is 70630.603@compuserve.com and the tel/fax machine is on 081 763 9457.

NOVICE NEWS

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

GEORGE, G3OZY, will be on holiday in Brittany from 4 – 12 September and he will be taking his radio equipment – and key.

He intends to put out calls on the Novice section of 80 metres at 1830 clock time on 5, 7, 10 and 11 September and 1815 on Thursday 8 September. He promises to call very slowly (about 5WPM) and will answer all calls from Novices that he can hear. Then you can dictate the speed if you wish.

The Royal Naval Amateur Radio Society net begins half an hour after these times and, if you answer George, net members will be eager to speak to you too. This would be excellent listening practice if you are thinking of taking your Morse test soon.

Talking of HF operation, you may have read that the RSGB HF Committee is suggesting a Novice calling frequency on Top Band. If you have not found the item yet, see this month's *News & Reports* pages and read it – it is in your interests. The idea is that you call CQ on a defined frequency and on getting a reply, QSY up if you are working SSB and down if using Morse. The HF Committee is hoping to hear your comments on the matter – and would welcome Novice opinions.

SMILES ALL ROUND

THE FACES in the picture say it all. Four students – four passes. Grant, G8BAG, told the story. He confirmed that the first attempt as an Instructor is the hardest – but wonders if it is any easier for the students!

All the ladies have husbands who are radio amateurs, who may have to take a back seat for a little while, as the other Richmond (N Yorks) amateurs will be trying to 'collect' these new callsigns. Dot and Lynn have gone on to take the RAE and I wish them every success in that too.

Obviously, that first experience as instructor proved enjoyable as a second course has just finished and a third is planned.

APPLETON PROJECT

THE UNIVERSITY of Bradford will be holding an Interactive Educational Day on 21 September and there will be many activities to capture the imagination of the youngsters who will be in attendance.

There will be a Special Event station to mark the occasion – listen for GB0APP. It will be manned by the licensed youngsters from Rishworth School – including Emma, 2E1BVJ, who has already achieved TV stardom. Workshops will include demonstrations, radio astronomy, work tasks, computer programs, videos, displays and much more – including details from the life of Sir Edward Appleton along with his 'talking head'. Invitations have been sent to schools and at least six have promised to bring a party.

Richard, G3XWH, (STELAR) Rev George Dobbs, G3RJV, (G-QRP Club) and Gerald, G3SDY, (representing the British Association for the Advancement of Science) are all expected as are some kit suppliers – perhaps to tempt the youngsters!

If you live near Bradford and feel that you would like to see what is going on, then pay a visit. If you can't do that, then perhaps you would like to contact the station.

There is also an ulterior motive in telling you of all this – I have a feeling that after the event, there could be an avalanche of requests for Novice instruction. Which means that Novice Instructors will be needed in the area. Can you help? You do not need a PhD – you just need enthusiasm and a wish to introduce someone else into a hobby that has given you a lot of fun. If you would like to become a Novice instructor, contact the Amateur Radio Department at RSGB HQ on tel: 0707 659015.

I shall report the success of the venture after the event! Meanwhile, if anyone has any information which may help with investigation into Sir Edward's life and achievements, please get in touch with Dianne Excell at: The Appleton Project, University of Bradford, Bradford, West Yorks BD7 1DP. Tel: 0274 384124.

YOUR NAME IN PRINT

YOUR NOVICE callsign is a novelty and is sought world-wide. Do you want it to appear in the *International Call Book*? Then read on.

The 1995 call book will be published in December with the deadline mid-September. If you act quickly your details can appear and you will be greatly sought-after every time you appear on the bands.

All you have to do is send your details (including full Christian name(s) to: Radio Amateur Callbook, P O Box 2013, Lakewood, New Jersey 08701, USA. The postage is less than fifty pence – 41p airmail or 28p otherwise – a small price to pay for fame!

This information comes from Roy, G4SSH, who encouraged Philip, the Club Novice to send his details two years ago. He was the only UK Novice entry and far from feeling lonely, he revelled in his popularity on the air. You may get the chance to speak to him this month if you hear GB30FYD – when the thirtieth anniversary of RAF Fylingdales is celebrated from inside the UK's Ballistic Missile Early Warning Station.

Four proud Novice Licensees: Dot, 2E1COG; Lynn, 2E1CNW; Grant, Liz, 2E1CQQ and Georgina, 2E1CPI (Grant's XYL). Lynn's husband Steve took the photo.

ANALYSIS

THE PASS rate for the NRAE remains over 80%. In fact 83.3% of candidates passed the June exam – the highest pass rate by a small margin.

The report highlights weak areas of knowledge – for instance, if less than half chose the right answer on a question which asked candidates in which type of transmitter a balanced modulator would be found, it may be worthwhile spending a little time looking at the block diagrams during revision at the end of the course. Another question which gave problems was the suffix used at a temporary location. 37% thought it should be /M rather than /P – I wonder if this was because the question was not *read* carefully enough? As every mark counts, it is worth mentioning.

The general comments are encouraging. Many new questions have been added to City and Guilds' question bank and these: "attracted high scores – candidates were generally well prepared for the examination". To all Instructors – congratulations to you too – keep up the good work!

KENT NOVICE NEWS

IF YOU KNOW anyone who lives in the Maidstone area who would like to take up Novice training, this is for you. The course is run at the Maidstone YMCA on Wednesdays at 7.30pm. Membership costs £6.50 plus £1.20 per week which covers all activities through the week.

With three Instructors – Martyn, Howard and Phil (G0s/LCH, RJN and RVU respectively) – individual tuition is assured. Using the Club callsigns there is also a chance to gain a little on-the-air experience and Morse tuition is also available.

There are waiting lists so prompt action is needed. To find out when there is a course starting, ring 0622 676776 and you will then be put in touch with one of the Instructors.

JUST A THOUGHT

I WONDER HOW many families there are where all members are now licensed. I know of three or four where this is the case. I have heard the jocular comments about drawing up a rota to give everyone a fair crack of the whip. Is yours a radio-active family – how do you cope? The possibilities are endless. Is there a TV script writer out there?

QSL

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

THE NEW Sub-Manager for the G0V series is Mr R C Powell, G4VAA, 11 North Park, Fakenham, Norfolk NR21 9RG. Mr Powell is already Sub-Manager for the G4V series.

QSL CHARGE

I RECENTLY received a letter from one of the QSL Sub Managers asking why on earth the Society didn't make a charge for handling incoming cards destined for non members of the RSGB and I have some sympathy with him. As readers know, the Bureau will not handle outgoing cards unless the originator is a member, so all batches of cards received at Potters Bar are checked against the membership database before sorting. If the sender is a non member then the cards don't get sorted and sent out.

Not so with the incoming cards however, and many members just cannot understand why the Society will distribute cards to people who, in the trade, are known as 'freeloaders'. The answer lies in a resolution adopted at the IARU Administrative Council held in Auckland, New Zealand in 1985. It says: "member societies are strongly encouraged, whenever possible to provide incoming QSL bureau service to non members within their operating territory *if non members agree to pay the full cost of this service*". Now I must confess that I was not previously aware of the payment proviso included in the resolution and have followed what the Society has done for some years, namely not to make a charge for incoming non members' cards.

Perhaps that rather generous view should change, but before I raise the issue with 'them upstairs' perhaps readers would like to express a view and make suggestions as to how a charge could be levied. However please bear in mind that it might not be as easy to administer a system as it is to suggest one.

Ian Haynes, AB4SW, who is a member and lives in Tennessee has written to say he doesn't think much of having to pay up to $5 to some operators using exotic calls just to get a QSL card from them. I must say that I tend to agree with him. I have, in my time, sent IRC's and dollars in the hope of getting a rare card and most have responded but on a number of occasions I have received no reply whatsoever even after a second application. Those relatively few experiences have left a sour taste in my mouth because, as a tight-fisted Yorkshireman and an ex-policeman, I hate being 'done'.

QSL CARDS

DERYCK BUCKLEY, G3VLX, one of our stalwart QSL Sub Managers, tells me of a growing habit among some operators to put the callsign of the QSL Sub Manager on the front of the QSL card as well as the destination call. Being charitable by nature I suppose they are only trying to be helpful or they do not know what 'routeing' means. However, as we in the Bureau appoint the Sub Managers and dispatch cards to them regularly, we do actually know who they all are! So, simply put – stop it! If we didn't have sorting ladies who are highly skilled in spotting such eccentric behaviour in some of our customers, it might actually delay the whole process and that would never do!

Dave Broomfield, G0KUC, one of our QSL Sub Managers, is off to VP8 for four months. Here is one of the cards he will be using whilst there. Cards to him can be routed via PO Box 268 Mount Pleasant Airport, Falkland Islands or via his home call. Wife Sandy will be looking after the G0O cards while Dave is swanning about in the South Atlantic.

Mr D W Powell, 20 Crabtree Lodge, Lancing, West Sussex BN15 9NG, has written to say he has compiled a list of postcards with a hovercraft connection. On the list are four QSL cards and he would like to know if there are any more around. Of those four cards Mr Powell has only one in his collection. He wants to know if there are any QSL cards which feature a hovercraft either drawn – or utilising a real photograph. Photocopies of both front and back of the card would be appreciated but of course the actual card would be better! He will reimburse any costs involved.

Alex, RK3DT, pictured in his shack.

I wrote in the August column about the current situation with regard to PO Box 88 which was as a result of a letter I received from the President of the Krenkel Central Radio Club (CRC). It just so happens that Alex, RK3DT (ex UV3DPP), is over here as guest of Nigel, G0BNR. Alex read the piece and wanted to clarify the position for me so Nigel brought him across to see me in order that I could get the other side of the story straight from the 'bear's mouth' so to speak. Alex, pictured here with his home brew equipment, lives just outside Moscow and is a student at Moscow University. He told me that Box 88 has, to some extent, been sidelined and is a shadow of its former self although the staff are still being paid by the government. Vera, that legendary lady who has been responsible for Box 88 for years, is still in post but is now of advancing years. However, a new and alternative organisation for Russian amateurs has been set up, financed largely by sponsorship and contributions from individual Russian hams.

Called Soyuz Radiolyubitele Rosii (SRR) it has over 4000 members and its President is Valery Agabekov, UA6HZ – a much respected Russian amateur. It has premises, a QSL Bureau located at PO Box 59 Moscow and IARU will complete voting on SRR's admission by 11 September. Presumably, if that vote is to admit SRR, then CRC will wither on the vine and Box 59 will be the new destination for Russian QSL cards.

Alex told me that the distribution of QSL cards throughout Russia is via regions and there are about 80 of these. Incoming cards go to the central bureau and are then sorted and sent to one designated club located within each region for distribution to members.

Outgoing cards are sent by the reverse route. He says the problem with Box 88 at the moment is that it charges an inordinate amount for this service and, as a result, there are large numbers of cards at Box 88 awaiting distribution.

So there it is, both sides of a confused situation on which I take no position but I am grateful to Alex for the information fresh from Moscow. Watch this space for future developments.

Don't forget the HF Convention in October – a must for all DX enthusiasts.

The attractive card being used by G0KUC whilst in the Falkland Islands.

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HF F-LAYER PROPAGATION PREDICTIONS FOR SEPTEMBER 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	.....	.....	....122211..	...1344443..	...56777784.	213655556895	865322223689	+52.....3++
MALTA	.....	.....	....222123..	....4544562.	...477778971	432755557897	987532234689	++52....4++
GIBRALTAR	.....	.....	....1...2..	....2322241.	....6765686.	21.576566895	886643334689	+++4....3++
ICELAND	.....	.....	.....	.....11111..	....1454564.	1..256666784	754643334578	+++32...24+
* * ASIA								
OSAKA	.....	.....	....11.....	....2331....	...245431...	...232223341	....1...1451	.....2.
HONGKONG	.....	.....	....1221....	...1344311..	...25545552.	....221246 72	1474	.....4.
BANGKOK	.....	....111.....	...12333....	...2355511..	...2354544 4.	1...212468 3	2.....1476	44
SINGAPORE	.....	....11111...	...1233332..	...2455554..	...2354568 4.	1...121247 82	1.....1476	43
NEW DELHI	.....	....1111....	...123332...	...3455541..	..1334456 53.	311..112478 6	51.....1478	2.....4+
TEHERAN	.....	....1111....	...2343442..	...4455651..	..2433456 851	5331.112478 7	841.....1478	+2.....4+
COLOMBO	.....	....12111...	...234343...	...3455611..	..1223456 562	21...112478 7	51.....1478	2.....4+
BAHRAIN	....1.....	....12222...	...2444552..	...4455675 1.	1.2423456 852	7431..124788	851.....1478	+2.....4+
CYPRUS	....11111...	....232232..	...3565565 1.	...5777788 4.	2137666679 84	8664333457 99	9842 1.112588	+52.....25+
ADEN	....11111...	...1232331..	...2445663..	...4445776 1.	2.2322356 863	8431...24788	861.....1478	+3.....4+
** OCEANIA								
SUVA/S	.....	.....	.....	....122.1..	...12444.51.	...53222262.	...31...13..	.....
SUVA/L	.....1.	.....3.	.....6.	...521...151	..163111.531	...31...3..	.....	.....
WELLINGTON/S	.....	.....	.....	....111.....	...34332..1.	..153222233.	...31...141.	.....
WELLINGTON/L	.....	.....	.....1.	.1.3.....42	11152....242	..131....31.	.....	.....
SYDNEY/S	.....	.....	...112.....	...24411....	...555332...	..133212344 1	...11...1441	.....
SYDNEY/L	.....	.....	.....	1	....2.....33	111231....53	...11...13.	.....
PERTH	....12.....	....2441....	...4663 1....	..1355433 2..	2.113212365 1	1.....1474	.....	42
HONOLULU	.....	.....	.....	.....2..	....11..242.	..133211331.	..231...11..	.....
** AFRICA								
SEYCHELLES	....1111...	...1232332..	...2455665 1.	...4446777 3.	2.132245688 3	842...124788	84.....1478	+.....4+
MAURITIUS	....111221..	....233442..	...2455676 1.	...4556788 3.	1.132345688 4	7421..123688	841.....1478	+.....4+
NAIROBI	....112231..	....233453..	...2455776 1.	...4445788 4.	2.142225688 4	8441...23688	872.....1478	+5.....4+
HARARE	....112342..	....234564..	...2556787 2.	...4555789 5.	21.532356884	8742...23688	884.....1478	++.....4+
CAPETOWN	....112431..	....234653..	...1556786 3.	...3656788 6.	...643346893	5434 1..13688	8851....1478	++3.....4+
LAGOS	....112444..	....334566 1.	....556688 4.	...2655589 7.	12.642236893	7735 1...3688	8862....378	5+4.....4+
ASCENSION Is	....11.134..	....222257 2.	....554478 5.	....7545688.	12..632237 93	6812 31..1488	88631....268	++4.....4+
DAKAR	....112241.	....223346 2.	....555568 6.	....7555688.	12.263223 794	6745 31..1488	88731....168	5+4.....3+
LAS PALMAS	....1...2..	....122124 1.	....455457 5.	....6776787.	12.376667 8955	7857 54334689	998531111379	+++2.....4+
** S. AMERICA								
Sth SHETLAND	.....1221..	.....33431.	.....156763.	.....366776.	1...144466 73	6644 32113346	68731....124	4+4.....
FALKLAND Is	.....11241.	.....133462.	.....355685.	.....566677.	12.115444 564	6755 32111247	88731.....14	5+4.....2
R DE JANEIRO	....111131.	....222362.	.....554576.	.....665577.	12..254225 74	6753 321..258	88731.....27	++4.....4
BUENOS AIRES	....11.131.	.....222252.	.....554575.	6655671	12.1.543346 4	6754 2211.137	88741.....14	++4.....2
LIMA	.....1.1..	.....11122.	.....43344.	.....5445 51	11..124322 45	6742 3211..14	79741.....2	4+5.....
BOGOTA	.....1..21.	.....32244.	2533451	11...443224 5	7641 221...15	7973 1.....2	4+4.....	
** N. AMERICA								
BARBADOS	.....1.1..	....11.122.	.....3322254.	5533561	11..154223 65	7742 321...37	88731.....4	++5.....
JAMAICA	.....11.	.....22233.	433441	1...243224 4	6631 1211..14	6873 1.....2	3+4.....	
BERMUDA	.....11.	.....22233.	1433451	1....443335 5	7531 121..136	7873 1.....3	4+4.....	
NEW YORK	.....	.....11122.	33341	1....244335 4	652..211.125	6862 1.....2	3+4.....	
MEXICO	.....	.....1121.	.....13333.	1.....343223	442.1.11...2	3763 1.....	.44.....	
MONTREAL	.....	.....11111.	233341	1....244345 4	642..211 1135	6862 1.....2	3+4.....	
DENVER	.....	.....	.....1212.	133332	331...122112	2663 1.....	.34.....	
LOS ANGELES	.....	.....	.....111.	24321	2211...221.1	1463 1.....	..4.....	
VANCOUVER	.....	.....	.....11.	13331	2111 1.113212	1353 1...1...	..4.....	
FAIRBANKS	.....	.....	.....	....1111232.	1.143212 3322	1133 1...11..	.....	

The provisional mean sunspot number for July 1994 issued by the Sunspot Data Centre, Brussels was 35.0. The maximum daily sunspot number was 72 on 11 July and the minimum was 7 on 29 July. The predicted smoothed sunspot numbers for September, October and November, are respectively: (classical method) 25, 24, 22 (±6); (SIDC adjusted values) 21, 19,17 (±5).

Contest Exchange

ANDY COOK, G4PIQ
Fishers Farm, Colchester Road, Tendring, Essex, CO16 9AA.
G4PIQ @ GB7MXM.#36.GBR.EU

I WROTE THE July column while preparing for VHF NFD, and this one is being completed just at the end of the aftermath of the event. A full write-up will appear in a few months' time but, briefly, the event was blessed with superb suntanning weather in many parts of the country, and propagation to match, with some excellent sporadic-E on 2m, and some amazing tropo contacts on 2m, 70cm and 23cm. It must be said that the preparation for some of the biggest contests can be rather too much of a strain when having to handle work commitments as well – even I felt that I had overdosed on radio for some weeks afterwards – but there's one thing I can be sure of – full enthusiasm will return with the approach of the next contest!

COMPUTER LOGGING

FOR SOME TIME now I have been putting off writing about contest logging software because I never have all the most up to date versions of everything I want to write about. However, the number of different packages available is on the increase all the time, and I think the time has come to put a 'stake in the ground'. Therefore, this month we'll take a look at the general features which most of the packages offer, and then over the next month or two look at the specific pros and cons of the major available packages.

Perhaps the first question to ask is – what does computer logging give me which paper logging doesn't? The cynic may reply – nothing other than more equipment, something else to learn about, and more boxes to blow up! I take rather the opposite viewpoint to this and find that the little extra effort required to organise computer logging for a contest pays big dividends both during and after the event, and am pretty reluctant to enter any event without the aid of a machine now! The biggest bonus from using a computer must be that you don't have to spend hours after the event transcribing your real-time logs into something which is acceptable to the contest adjudicators. I hate doing any form of paperwork and I find it almost impossible to believe that I used to write up 500-plus QSO contests by hand. Now, at the end of the contest, all that is required is to make a fairly careful examination of the contacts in the file on the computer – make sure that everything looks sensible, and then print out the logs – this *usually* takes minutes instead of hours – you'll see why I say 'usually' later!

The computer is also a big help during the event. Search and pounce operation is much easier than with a paper-based dupe sheet. All you have to do is to type a part of the callsign of the station you have heard into the computer, hit the appropriate key, and the machine will show you whether you have had a previous QSO or not. Speaking as a single operator who cannot write in two places at once, keeping a paper based dupe sheet while making QSOs at a reasonable rate was always a difficult exercise. This problem is of course eliminated with the computer where the dupe sheet is automatically generated as you log the QSOs you make.

Keeping track of multipliers is normally a similar problem, and again the computer can keep track of this for you automatically, with screens to indicate what multipliers are still required. In multiband contests, the networking facilities of the more advanced packages, such as CT by K1EA, also enable easy communication between the various stations and access to the PacketCluster network in an integrated fashion. The ability to send appropriate automatically-generated CW messages from the keyboard is a great aid to keeping down the stress level in CW contests.

You can get computer logging packages for many different types of computer, but I'm going to concentrate on those available for the PC. One of the accusations often levelled at computer logging is that you need to spend a lot of money on the computer. This is not necessarily the case, with many of the packages being able to run on a simple XT. Old XTs can be picked up second hand very cheaply, and there are also some very cheap 'surplus stock' 286s around. Some of the more advanced packages with their additional features and overheads require a bit more power as we will see later. What is probably more important is that the computer needs to be quiet from an RF point of view. Machines vary greatly in this respect, both between models and with frequency for an individual computer. Unfortunately, the only really sure way to find out if a particular machine is going to cause a problem is to try it in the situation in which you intend to use it. There are quite a number of techniques for reducing the noise, much of which tends to escape on the connecting leads, and these solutions have often been covered in other *RadCom* columns over many years. Do make sure that the screening in your own receive system is up to the job – I have experienced instances where I was getting more grief from computer QRM than I felt I deserved, all because the braid of a piece of coax was open at one end.

Immunity to transmitted RF also needs checking – some monitors have a crisis with large quantities of RF, and keyboards have been known to take on ghostly self-typing properties too. I had one computer where, when I was on 80m, you just had to lay your hands above the keyboard to make it start typing of its own accord!

SPRINTING

FOR MANY years now the 'Sprint' contests have been extremely popular in the USA. These are short events where a station cannot win by just sitting on one frequency and calling CQ for the whole contest. Dave Lawley, G4BUO, tells me that he has been involved in the planning of a European version which was initiated by I2UIY. The essential difference between the Sprint and a conventional contest is that a CQing station can only make one QSO on a frequency before having to QSY at least 1kHz *up or down*, with the frequency essentially falling vacant to the caller. The bands to be used are 80m, 40m and 20m, the exchange is RST + Serial Number + Name or Nickname (at least 2 letters long!) and scoring is one point/QSO.

Each contest runs from 1500 to 1900UTC, and logs go to Karel Karamasin, OK2FD, Gen Svobody 636, 674 01 Trebic, Czech Republic. The big problem with this year's contests is that international co-operation seems to have been somewhat lacking in the scheduling – the CW event takes place on 1 October and the SSB one on 8 October – both dates clashing with the major UK contesting social events, including the HF convention. This situation is not from a lack of trying from this side and hopefully sufficient pressure can be brought to bear on the organisers for 1995.

SEPTEMBER'S CONTESTS

HF CONTESTING in September is dominated by SSB Field Day at the start of the month. This is another excellent event for clubs to enter and maybe try out some new ideas. Ed Taylor, G3SQX, tells me that the Flight Refuelling ARS tried computer logging for the first time last year in this event, and this year intends to get some more of the class B licensees to have a go. Just like CW NFD there is not only an Open Section for the better equipped stations, but also a Restricted Section where entrants are limited to 200W DC input and a single element antenna at no more than 45ft. Entering this section need not mean that life will be quiet either – many people are surprised at the quantity and quality of DX which can be worked with just 100W and a wire antenna – give it a try – you may well be shocked! Unlike CW NFD, pre-registration is not required, so a late decision to have a play is no problem. On the same weekend is the 2m trophy contest which always generates a lot of activity, and for the first time this year it includes a six-hour section where single operator fixed stations can pick any contiguous six-hour period starting on the hour for operating.

Who's got the bit with No 2 on it?

SWL NEWS

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

THE TIME has come to remind all listeners that my SWL Challenge takes place on 29/30 October. The full rules will appear in next month's column. This event coincides with the major *CQ* Worldwide SSB contest so there will be plenty of opportunity to spend time on the bands and send in a log.

Last year, there were 43 entries to the challenge but participation from the British Isles was quite poor. This year, after a major publicity campaign covering 25 countries, I am hopeful of at least 60 logs. It would, therefore, be pleasing to have at least a dozen logs from these shores. Mark your diaries, wall charts, etc now and please devote some of your time over the last weekend in October to participating in the SWL Challenge.

SOFTWARE UPDATE

EASILOG

Don, G0MDO, has developed an SWL version of Easilog, called EasiSWL. I have suggested a few changes to the program but it should be available to listeners soon.

The program enables the listener to log 'real time' QSOs, as well as a facility to bring your log up-to-date after a session on the bands. It calculates your DXCC status at any given time, on each of 12 bands for CW, SSB, FM and one other mode and for those, like me, with a large number of log books to browse, has a facility for your DXCC status to be set manually so that you do not have to enter data from many years of DX loggings.

It also tells you at the time of logging if the station heard is a new country for the current frequency and mode. QSL printout is provided in two forms. A short form to enable labels to be printed for sticking on existing QSL cards or a full form which provides a full QSL card complete with any text and RS number.

Three types of log print-out are available. A full log, a check log and a contest log. The program also enables you to browse through the log for a particular callsign or prefix, WAB areas, Oblasts, etc. There are other features too which make this one a must for anyone who wants good information about their DXing exploits. EasiSWL is likely to cost only £5. I will be able to confirm this next month.

SUPER-DUPER

Joan, BRS62088, and I have used a prototype listener version of Super-Duper which Paul, EI5DI, has developed for SWL participation in the RSGB's Islands on the Air contest. This was obviously too late to be on the market for this year's contest, but Paul is amending the program to provide listeners with facilities for logging in all RSGB and most international contests. *RadCom* reviewed the software on pages 31/32 of the September 1993 issue; 'SDL' is based on that. This might be available for the autumn/winter contest season. I will know more next month. More also about cost and how to obtain the program.

SHACKLOG

There is nothing fresh to report here, but I have advised Alan, G3PMR, of the way in which a listener version of Shacklog might have to be altered. Hopefully, I can provide more details next month.

HOMEBREW

MICK TOMS was trying to convert some old Spectrum programs to run on his PC, including a VHF contest logging program. He originally wrote them based on the columns by John Morris, G4ANB, in old *RadComs*. However, the current version of Microsoft Basic – QBasic – does not include the geometric function ARC (Arcosine) which the old versions of Microsoft Basic used to support.

Until he is able to find another distance calculation program which does not use this function, he cannot proceed further. Can anyone help? If so Mick can be contacted via me.

Mick also explained that if readers wish to try 'homebrew' programs, the G4ANB columns appeared in 1986/87 *RadComs* and included a duplicate checker, NGR to QRA conversion, and many other useful programs. Most were written in Microsoft Basic with notes for conversions to other versions ie Spectrum or BBC. Indeed, anyone who has MS DOS 5.00 or later will have QBasic as part of the package.

RSGB HF/IOTA CONVENTION

NEVILLE, G3NUG, is Chairman of the Convention organising committee and was keen for me to explain that there would be plenty to interest listeners at this three day event, to be held at Windsor, Berkshire. Certainly, some of the lectures look very mouthwatering – 3Y0PI, VK9MM and ZD9SXW, LF Propagation (a subject that I covered at the NEC a few years ago) and Computers in the Shack. Perhaps an SWL exhibit could be a suggestion for a future year. I am sure there would be sufficient material to display and enough listeners to man a stand. Has anyone any other ideas?

LISTENING ACTIVITY

HF

Few reports this month due, I suspect, to the fine weather and the onset of the holiday season. Conditions were very mixed, indeed several reporters simply used the word "poor". At the times I listened during late June and early July, I would agree with these sentiments. The main interest focused on the expedition to Scarborough Reef – BS7H – off China. We will have to wait to see whether this counts as a new country.

Otherwise, Sporadic-E activity on 24 and 28MHz provided new European countries to those who monitored these bands. The best was probably 1A0KM.

Some of the better DX noted from your letters were:

3.5: VP8GAV (Antarctica)
7: D2TT, 9M2AX
10: XU0HW, PY0TUP
14: HS0ZAA, 3XY0A.
17: TN0CW
21: DL4HAL/ST2

Robert Small, BRS8841, also referred to a number of interesting IOTA expeditions, which seem to appear mainly around 14.260kHz.

VHF

Apart from the Sporadic-E opening on 144MHz reported last month, listeners did not appear to catch any further Es openings, at least up to 20 July. There were, however, good tropospheric conditions on the VHF Field Day weekend. David Whitaker, BRS25429, seems to have fared best with about 50 Europeans logged. The best were HB9MM/P, HB9JNX/P, HB9DGX/P, LX/PE1HUS/P, F6KFV/P (JN26), GM0MOC/P (IO76), GM0UEP/P (IO87) and F2EE/P (JN14).

David also dusted off the 432MHz converter and heard stations in Holland, Germany, Belgium and France.

Turning to 50MHz, David had 97 countries heard and seems certain to be the second British listener to bag 100 countries on the band. This will be a very fine effort as he started listening on 50MHz after the Winter 1989 F2 openings to the Caribbean.

New ones in June and July were JY7SIX, YL2MB (KO27), UU8JJ and WB4NFS/VP9 (FM72) heard during a double hop E opening on 25 June. Other interesting stations heard included T97V (JN84), RA3TES (LO15) and RA3YO (KO73).

Here in London, 50MHz was frustrating. No new countries were heard since the CY9 on 15 June, and 1A0KM was heard only briefly at 1737 on 2 July, while SV9ANK was heard calling CQ with no takers one evening at around 1900.

FINALLY

DAVID ALSO mentioned that thanks to a local amateur, he was now able to receive the UK Packet DX Cluster. He is, therefore, able to sit idly by the rig and chase off to a particular frequency when a good piece of DX is reported. I hope to have a few more details next month, so that others might care to build themselves the device.

Remember that the copy date is now later. News for the **November** issue must be with me by **18 September**.

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Novice Note Book

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

I HAVE ADDED AN audio amplifier to my test console. An audio amplifier on the bench has many useful functions in addition to the obvious one of replacing headphones when testing a piece of equipment where headphones are normally used. For example it can be used for tracing audio signals in amplifier circuits or for testing that suspect microphone insert. It can also be used for amplifying a Morse practice oscillator for group Morse practice sessions.

There are many audio amplifier ICs and modules on the market and they all have their advantages and disadvantages but I have always found the TBA820 to be a fairly stable IC. All audio ICs have very high gains and wide bandwidths in very small packages. It is reasonable to expect that if care is not taken they will burst into oscillation at odd frequencies. In many cases we do not realise that this is happening until we find that they are drawing unusually high currents or are getting rather hot for no apparent reason.

THE CIRCUIT

THE CIRCUIT CONSISTS of a single AF amplifier IC, the TBA820M, see **Fig 1**. The audio input is fed to the input of the IC via a 0.1µf DC coupling capacitor. The supply to the IC is decoupled by a 220µf electrolytic capacitor. The output of the IC is fed to the speaker via another 220µf electrolytic. The 10Ω resistor and a 0.1µf capacitor has been included on the output to reduce the possibility of HF instability. The component layout is shown in **Fig 2.**

The amplifier requires a 12 volts supply. We have 34 volts from our transformer in the power supply section, which can be used but the voltage will have to be reduced. For this I have used a 7812 twelve volt regulator, which is mounted on the switch of the amplifier's volume control, as shown in **Fig 3.** The metal case of the potentiometer is used as 'ground'. The 34 volt supply is accessed at the switch and the output of the regulator is supported by a decoupling capacitor soldered to 'ground'. As the regulator is used only to supply a few tens of milliamps in normal use it does not need a heatsink.

A kit of parts is available for this amplifier from Kanga Products, but this excludes the volume control and regulator.

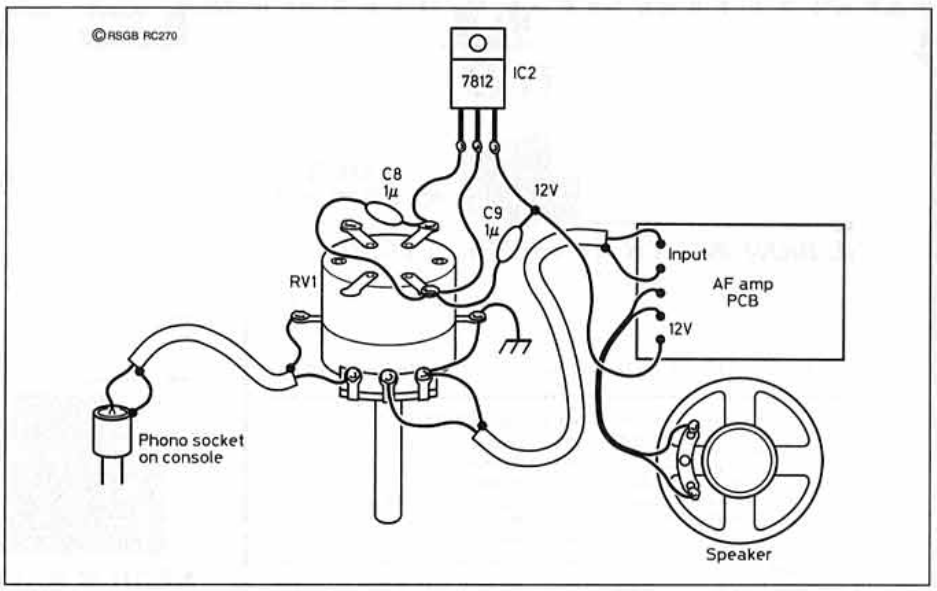


Fig 3: Twelve volt regulator interconnections.

COMPONENTS LIST

Resistors

R1	10k
R2	120R
R3	1R
R4	56R
RV1	50k log potentiometer with switch

Capacitors

C1, C2	100µ
C3	220µ
C4	47µ
C5, C6	0µ1
C7	680p
C8, C9	1µ

Semiconductors

IC1	TBA820
IC2	12V regulator type 7812

Additional Items

Speaker 8Ω
Phono socket

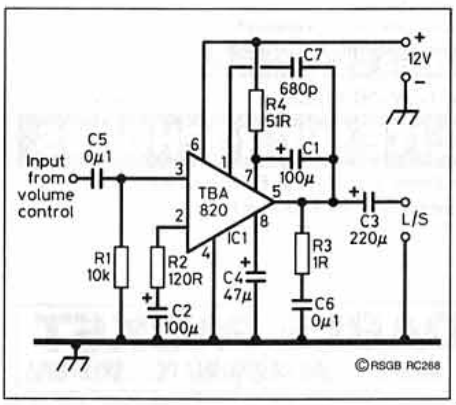


Fig 1: Audio amplifier, circuit diagram.

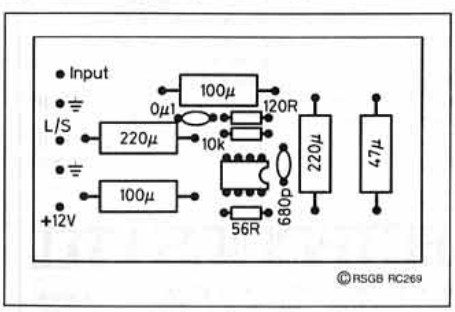
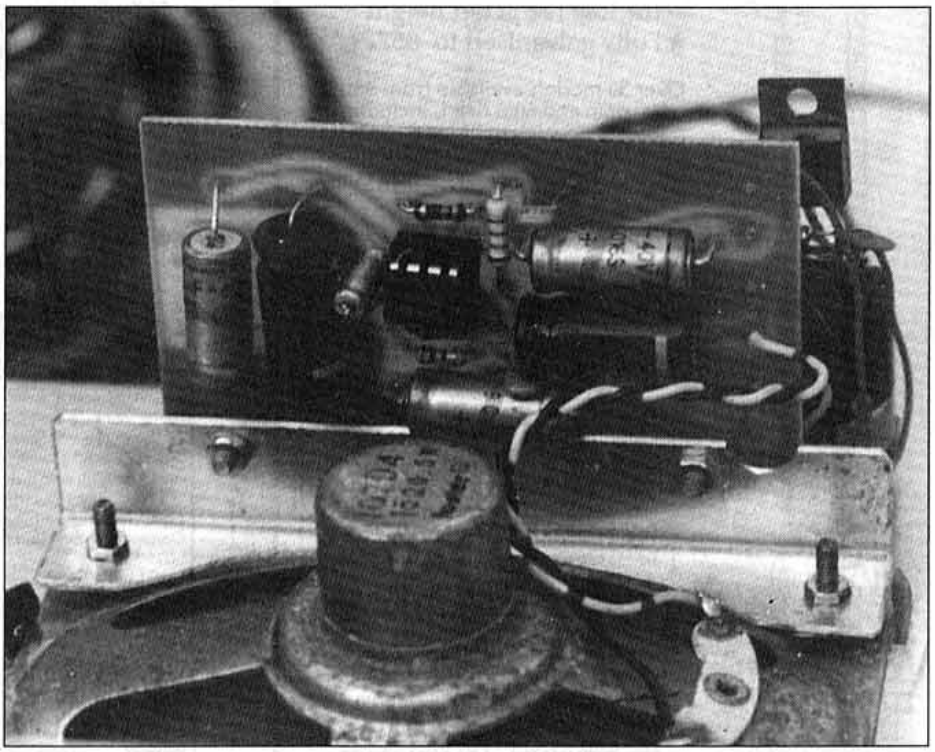


Fig 2: Audio amplifier, component layout.



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CA30M	Houses CTU30/SWB30/ST2	£34.90
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HA12R	Houses ST2	£10.10
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73 from Dave G4KQH, Technical Manager.

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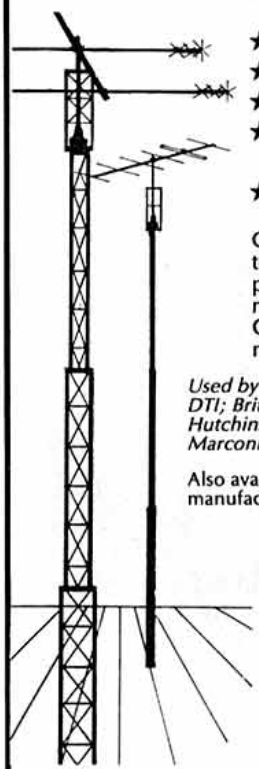

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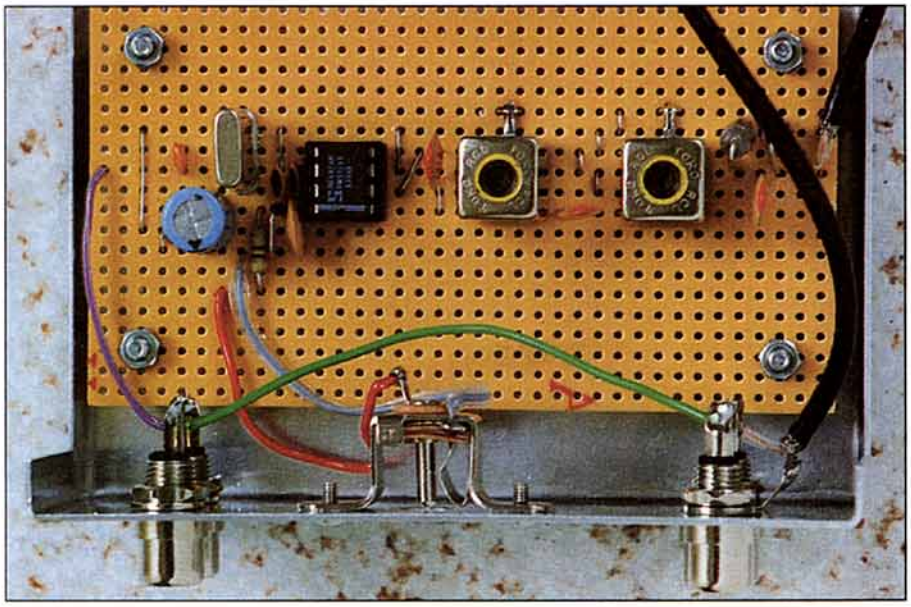
RADCOM TECHNICAL FEATURE

A 40m Converter for the G4BWE Rx

by Steve Price, G4BWE

THIS SIMPLE CONVERTER is for the 40 metre HF band. It was designed to extend the coverage of the G4BWE 20 and 80 metre superhet [1] to 40 metres. Although primarily intended as an accessory for the G4BWE two band superhet, the unit can be used with any receiver covering the 14MHz band.

The converter operates by shifting 40m (7MHz) signals upwards in frequency by just over 7MHz so that they can be listened to with the superhet switched to 20 metres (14MHz). In addition to providing full coverage of the amateur band (7.0 - 7.1MHz in Region 1), the converter also allows monitoring of short wave broadcast stations operating between 7.15MHz and 7.456MHz.



Component layout of the 40m converter.

AVOIDING COMPLEXITY

THE CIRCUIT DIAGRAM of the converter, which is based around an IC mixer oscillator chip type NE602AN (IC1) is shown in **Fig 1**. As the NE602AN provides most of the basic circuitry, only a few other components are required to complete the design. Signals from the antenna are first routed via RV1 which functions as an RF gain control. RV1 is most useful when listening to strong broadcast stations, the carriers of which tend to overload the superhet's AGC system. Constructors using a short antenna, ie less than 20ft (6 metres), and only wish to copy amateur transmissions, may consider omitting RV1 and connecting the centre pin of SK1 directly to the junction of C1 and C2.

T1-2 and C1-4 form a 7MHz bandpass filter which attenuates out-of-band signals. This prevents breakthrough of 14MHz transmissions and also blocks the image response (see below). The signals are input to IC1 on pins 1 and 2, while pins 6 and 7 provide access to the chip's own local oscillator transistor. X1, a quartz crystal, sets the local oscillator frequency to 21.340MHz. 7MHz signals are up-converted by subtraction from this frequency in the mixer (eg 21.340 - 7.050 = 14.290MHz). The mixer will also give a 14MHz output in the case of signals around 35MHz (eg. 35.630 - 21.340 = 14.290MHz) but the 7MHz bandpass filter eliminates this 'image' response. Only one of the two outputs (pin 5) of IC1 is used in this design and so pin 4 is left unconnected. C7 is not just for DC blocking, it also provides impedance matching between the mixer output and the receiver's input, so its value is important.

IC1 requires a 6V supply at 2.5mA. This is obtained from a 12V supply using ZD1 (a 6.2V zener diode) working in conjunction with R1. The total supply current (ie including that drawn by ZD1) will be less than 20mA. A frequency of 21.340MHz has been chosen for X1 so that a signal on 7.000MHz is translated to 14.340MHz. This places the 40 metre lower band edge 10kHz inside the two band superhet's nominal HF limit on 14MHz, thus giving a degree of latitude in the VFO calibration.

Alternatively, constructors who are using a receiver with a more accurately calibrated dial, or digital readout, may prefer to use a 21.350MHz crystal (this will make it easier to calculate the tuned frequency). The receiver will tune 'backwards' on 40m, the upper band edge (7.1MHz) being translated to either 14.240 or 14.250MHz. Also, the sidebands are reversed. This means that the receiver must be switched to USB, even though amateur stations will normally use LSB on 40 metres.

Because the two band superhet does not have a true AM detector, broadcast stations must be carefully tuned to avoid distortion, particularly in the case of music, where a precise 'zero-beat' with the station's carrier is required.

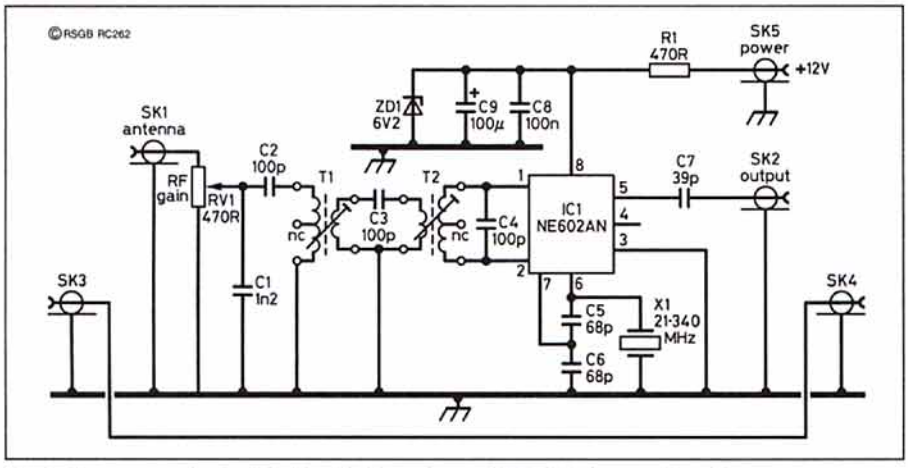


Fig: 1: The converter's circuit is simplified by using an NE602AN mixer oscillator IC.

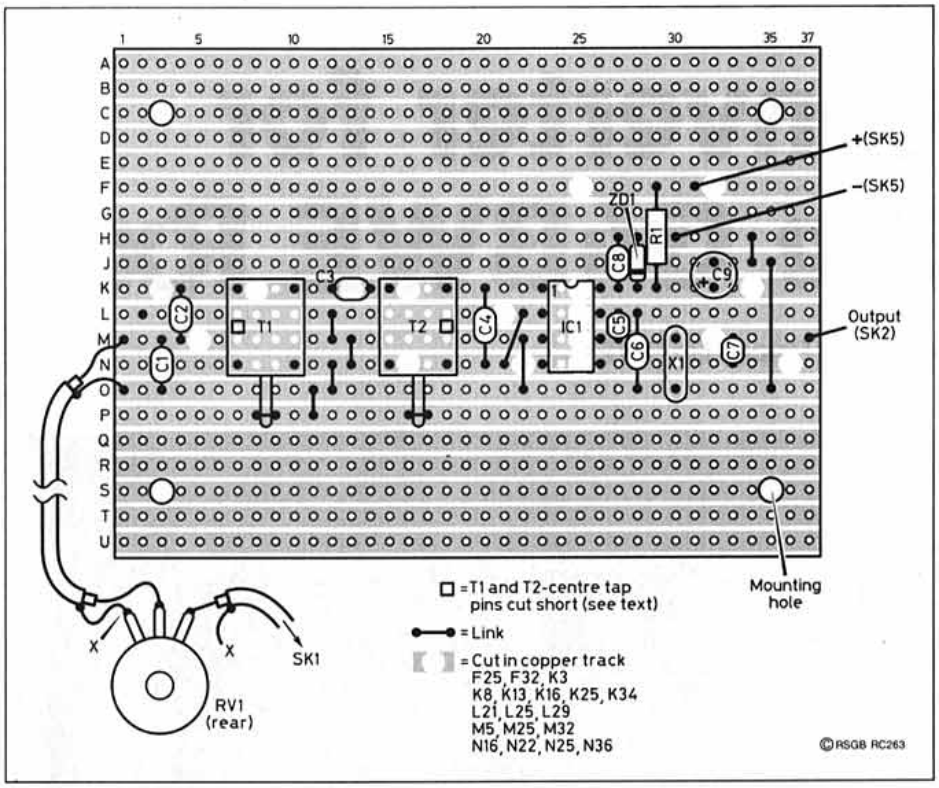


Fig 2: Veroboard layout.

CONSTRUCTION

MOST OF THE COMPONENTS are conveniently mounted on a small piece of 0.1 inch pitch Veroboard (stripboard) which serves instead of a PCB. A piece with 20 copper strips, each having 37 holes, was used for the prototype (see **Fig 2**). This provides plenty of room for four isolated mounting holes (M2.5 clearance), while being small enough to fit into the chosen aluminium box (see Components List). The copper strips must be cut where shown using either a small twist drill or a Vero spot face cutter. Note that there are a number of wire links soldered between strips - the off-cuts remaining when capacitor and resistor leads are shortened can be used to make these.

Before mounting the RF transformers (T1 and T2) it is necessary to remove their centre tap pins (only one of the two windings contained within each transformer has such a tap, and they are not used in this design). The centre pins may be cut short using wire cutters, but be careful to leave a short length remaining, as the base of the pin has the coil winding wrapped and soldered around it (look carefully and you should be able to see this). The outer screening cans of T1-2 are provided with two 'solder tags'. One of these may be cut off and the other bent upwards through 90° so that it rests parallel with the top surface of the Veroboard.

An earth connection may then be made by placing a link over the tag and soldering to this (see Fig 2 and also the photograph). Apart from C1, C8 and C9 the capacitors are miniature high stability plate ceramic types. C1 may be polystyrene, or if the value specified (1n2) cannot be obtained, use a combination of capacitors - a mixture of plate ceramic(s) and polystyrene types if necessary - in order to produce the correct value. The prototype uses a 220pF polystyrene in parallel with a 1nF polystyrene for C1. Because of its large size, it may be necessary to mount the 1nF capacitor vertically.

Make sure that both C9 and ZD1 are soldered the correct way round. C9 will probably have its negative lead marked. There is a band painted around the body of ZD1 at its cathode end - this must be connected to the junction of R1, C8-9. The prototype uses a socket for IC1, but if preferred it may be soldered in place. Fig 2 shows the correct orientation for IC1.

The case front panel is drilled to mount RV1 and the rear panel has holes for SK1-SK5. Four mounting holes of M2.5 clearance (say 3.5mm diameter) are drilled in the base - use the Veroboard as a template to mark the positions of these.

Before fixing the Veroboard in place it will be necessary to solder short flying leads for power and output. Miniature 50Ω coax (eg RG174) is used for the input wiring - solder RV1 before attempting to mount this control on the front panel. You will probably need to cut the potentiometer's spindle to length using a hacksaw - do this first!

Finally, the Veroboard is mounted on 6mm spacing pillars to prevent its underside shorting against the aluminium base.

SETTING UP AND USE

THE SINGLE HOLE FIXING phono sockets used for SK1 - 4 have the advantage of low cost, small size and ease of mounting. It will be necessary, of course, to make up a short coaxial patch lead having a phono plug at one end and a PL259 at the other (assuming your receiver has an SO239 antenna socket). A phono plug is soldered to the antenna which, when listening on 40m, will be inserted into SK1, the patch lead being plugged into SK2. The converter is by-passed when listening on the other bands by plugging the antenna into SK3 and the patch lead into SK4.

COMPONENTS LIST

Most of the components can be obtained from JAB Electronic Components, 1180 Aldridge Rd, Great Barr, Birmingham B44 8PB. The numbers following the component description are JAB part numbers.

Resistors

R1	470R 0.25W, 5% carbon film	CR25-470R
RV1	470R linear potentiometer	SGLN-470R

Capacitors

C1	1n2 Polystyrene	STY-1N2
C2 - 4	100pF ceramic plate	5DP-100
C5,6	68pF ceramic plate	5DP-68
C7	39pF ceramic plate	5DP-39
C8	100n disc ceramic	DIS-102
C9	100µ 16 or 25V radial electrolytic	R25-100

Inductors

T1,2	Toko KANK3334	10K-3334R

Semiconductors

ZD1	6V2 400mW zener	BZY88C-6V2
IC1	NE602AN	

Additional Items

SK1, 4	Single hole fixing phono sockets	PHO-CSN
SK5	2.5mm DC power socket	DCLS-2M5
X1	21.340 or 21.350MHz crystal (HC18, fundamental)	
Small aluminium case, size 139 x 143 x 44mm		BOX-AL55
Veroboard 24 strips, 37 holes		PCVB-02
Stick-on rubber feet for case		FEE-105
2 phono plugs		PHO-PPR (red) PHO-PPB (black)
Knob for RV1		KNO-K7A

Insulated cable for flying leads

Short length of RG174A/U miniature coax

4 x M2.5 or 6BA nuts and bolts

6mm spacers for Veroboard mounting

The crystal X1 can be ordered from Quartslab Marketing Ltd, PO Box 19, Erith, Kent DA8 1LH. Quote the frequency required (21.340 or 21.350MHz), holder type (HC18) and specification (FUND-E).

Printed circuit boards for the two band superhet are still available from the author - see page 66 of the October 1993 *RadCom* for details.

As indicated in Fig 1 and the photograph, a short flying lead is soldered between SK3 and 4 to provide a through connection. The converter is made ready for use by adjusting the ferrite cores of T1 and T2 using a brass or plastic trimming tool. With the antenna connected, tune the receiver to a transmission near the centre of 40m (ie approximately 7.05MHz) and rotate the core of T1 for maximum signal level. Now repeat for T2.

CONCLUSION

THIS PROJECT IS a cost effective and straightforward method of extending the coverage of the two band superhet. The NE602AN is a fairly low noise device which provides a conversion gain of approximately 17dB. This means that the superhet will give a lively performance on 40m, even when using just a short indoor wire as the antenna.

REFERENCE

[1] See September and October 1993 issues of *RadCom*.

RADCOM USER REVIEW

The AKD 7003 432MHz FM Transceiver

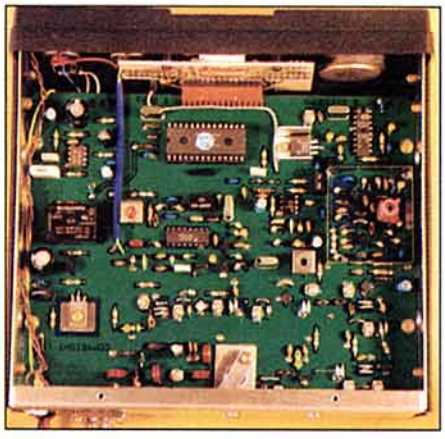
Reviewed by RSGB HQ staff.

AKD IS ONE OF THE very few British companies producing amateur transceivers. Their 50MHz [1] and 70MHz FM base stations lead the field as there is no real competition. The latest AKD box is for the 70cm band where they are competing with FM hand-helds and ex-PMR gear. Nevertheless the AKD 7003 has many unique features, and it's less than £200.

Housed in the standard AKD plastic enclosure (185mm wide by 200mm deep inc knobs/sockets by 55mm high), the transceiver has very few controls. The front panel houses volume and squelch rotary controls, both of which are refreshingly large and easy to use. There's also a small toggle switch for on/off and a 4-pin socket for the supplied fist microphone. A front-facing 2in speaker gives ample volume and clarity.

In the centre of the front-panel is a large and bright display showing a two-digit channel number (0 - 99). This display cuts out briefly to show that the tone-burst is sending.

Frequency selection is a delight. The Channels 0 to 15 are repeater channels RB0 - RB15 and when these are selected the transmitter is automatically shifted +1.6MHz (this could have been made a little clearer in the manual) and the tone burst enabled - no more accidentally sending on the output frequency. From 16 to 24 are IARU simplex channels SU16 - SU24 and the subsequent channels (up to 79) cover all the way up to 434.975MHz in 25kHz steps, including some packet frequencies and all UK repeater inputs. Channels 80 to 99 represent 432.500 - 432.975MHz which includes the lower packet allocation. It also includes the international beacon band and an 'awful warning' might have been useful in the documentation to reduce the possibility of inadvertent antisocial operating. [AKD are now looking at adding this – *Ed.*]



The spacious and well laid-out PCB.

Two of the three push-buttons under the display are used for UP/DOWN tuning and the third selects 'listen on input' whilst using repeater shift, or the calling channel (SU20) if operating simplex. As with the other AKD radios, a simple scanning facility might have been useful, but there is room for some home-brew here.

The rear panel includes an SO239 socket for the antenna, and a 3.5mm socket for an 8Ω external speaker or for connecting to a TNC. On the side are threaded holes for the optional mobile mounting bracket (£11.75, post free if ordered with the radio).

DOCUMENTATION

AN *OWNER'S MANUAL* is supplied, comprising advice on setting up the transceiver, a channel chart, installation in a vehicle and details of how to use the radio with a packet TNC, all written with the complete beginner in mind. A warning about the need to obtain the relevant licence appears in a prominent position, a nice touch. A circuit diagram is also supplied.

A look inside the box reveals a very clearly laid out board with plenty of space between

MANUFACTURER'S SPECIFICATION

GENERAL	
Modulation	FM
Frequency range	432.5 – 434.975MHz
Supply voltage	13.8V ± 10%
Channel spacing	25kHz
Speaker	8Ω internal
Operating temp range	–10°C to +50°C
Frequency stability	± 1.5µHz
Tx/Rx voltage changeover	Relay operated
Tone burst	0.5s of 1750±2Hz
TRANSMITTER	
RF output power	3W (5W DC in)
Supply current	750mA
Harmonic content	<1µW
Audio distortion	Less than 3%
Audio response	6dB/octave pre-emphasis over range 300Hz to 3kHz
Deviation	± 4kHz
RECEIVER	
Sensitivity	Better than 0.25µV for 12dB SINAD
Spurious response	>70dB
Image response	>60dB
Audio response	6dB/octave de-emphasis over range 300Hz to 3µHz
Audio output	2 watts
Standby current	200mA
CONNECTIONS	
Antenna	SO239 on rear
DC Supply	In-line fused (2 amp)
PTT Mic	4-pin front panel socket
External speaker	Jack socket on rear

components – again a refreshing change from many oriental rigs. AKD say that internal modifications will not invalidate the guarantee *provided you haven't damaged the rig.* The guarantee, incidentally, is for two years and includes the output device.

IN OPERATION

THE AKD 7003 WAS extremely easy to use, much more so than even the simplest of hand-helds. On power-up, it selects the FM calling frequency, 433.50MHz but packet operators can have a version which defaults to a packet channel instead.

Received audio was good with more bass response than many radios. On transmit the audio was reported to be much better than the two hand-helds it was tested against. No doubt its physical size was responsible for this.

The PA was tested with open- and short-circuit antennas and no ill effects were noticed, though no guarantees are given about this in the specification.

A double press of the microphone implemented the tone-burst and it was a real pleasure not to have to worry about repeater shift.

A couple of small niggles: It would have been handy to have a milliwatt option as well as the standard 3W output – the low power switch used on the other (25W) AKD rigs was blanked off. And self-adhesive rubber feet would have helped keep this very light-weight rig on the bench at full stretch of the microphone.

The radio is bound to find a market with packet radio operators and AKD will factory-modify it for dedicated packet link use so that it operates in either (but not both) of the 430 or 438MHz linking allocations.

CONCLUSION

THIS RIG IS GOING to be popular with Novices (we had a struggle prising the review model away from the Novice who did most of the operational tests) as well as with anyone wanting a straightforward mobile or base station for 70cm FM. What it lacks in 'bells and whistles' the 7003 more than compensates for in making the commonly required facilities extremely easy to use. At £193.74 plus £5 P&P, it is likely to become as popular as the rest of the AKD stable. AKD's address is: Unit 5, Parsons Green Estate, Boulton Road, Stevenage, Herts SG1 4QG.

REFERENCE

[1] 'AKD 6001 6m FM Transceiver', *RadCom*, February 94, page 65.

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

VSWR METERS

HOW DOES A VSWR METER work? If voltage and current levels vary along a line that isn't matched, how is it possible to measure VSWR using a meter inserted at any single point along it?

THERE'S NO PARADOX HERE. As you say, in a mismatched line there is a variation in voltage and current levels along the line. If you tap into the line with an RF voltmeter at various points you can map out this variation (**Fig 1**). In a lossless line the same pattern is repeated every electrical wavelength and you can calculate the VSWR very simply:

$$VSWR = V_{MAX} / V_{MIN}$$

However, this static picture of standing waves is actually the product of two *travelling* waves, the forward wave going up the feeder and the reflected wave coming back. Even though these two waves travel independently along the feeder in opposite directions, the pattern of standing waves formed by their interaction is static, framed by the length of feeder. If you sample the two travelling waves independently at the same point along the line, this provides an equally valid route to measure the VSWR.

How do we measure two travelling waves independently? The most obvious way is using coupled parallel lines (**Fig 2**). In this arrangement, the main coaxial line is coupled to a 'branch' line via a slot in the outer conductors, which doesn't appreciably disturb the impedance match in either line.

The 'branch' line is now sampling some of the RF power in the main 'through' line. If you connect a matched load to one end of the branch line and a matched power meter to the other, you see two different situations according to which way around you connect them (**Fig 2a** and **Fig 2b**). If the main line sees a reasonably good impedance match at its far end, the Fig 2a configuration produces much more sampled power than Fig 2b. This is because you're sampling the forward-travelling wave in one case and the much smaller reverse-travelling wave in the other. If the main line is perfectly matched, the reflected power meter would read zero. Wherever you insert the VSWR meter along the main line, you'll see exactly the same readings, provided that the line has low losses and the sampling system is working properly.

There are many variations on this theme of coupled coaxial lines. Many VSWR meters use two separate and hopefully identical coupled lines, generally on opposite sides of the main line. Sometimes all three lines are mounted in an enclosed metal trough instead of a true coaxial configuration. Another popular option, though suitable only for low power, is to use transmission lines printed on PC board. You can even make a cheap-and-cheerful VSWR meter by threading enamelled wires under the braid of a length of coax.

The well-known Bird 43 wattmeter uses the same principle as Fig 2, but has only a very short section of pickup line running across the end of the plug-in element. The direction of sampling is reversed by simply rotating the element through 180°.

An alternative method, more suitable for HF where coupled lines might be too long, is to sample both the voltage and the current, and then to combine these sampled signals in different ways to separate the forward and reflected waves. **Fig 3** shows the principle of how it's done. Resistors R1 and R2 form a potential divider which takes a sample of the voltage on the line, producing an RF voltage V1.

The current transformer T1 takes a sample of the current in the line. Usually T1 consists of the main line passing straight through a toroidal core (constituting a single-turn winding) with a secondary of say 15 turns. In the arrangement shown. T1 has two identical secondary windings, wired to produce equal outputs but in opposite phases. The switch SW1 connects either of these two windings to resistor R3, producing a selectable RF voltage of ±V2. The sum or difference of V1 and V2 is indicated by an RF voltmeter connected between points A and B.

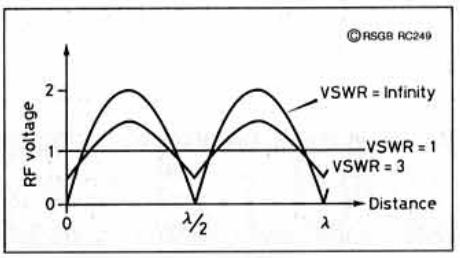


Fig 1: Variation of voltage along a transmission line, with various levels of mismatch.

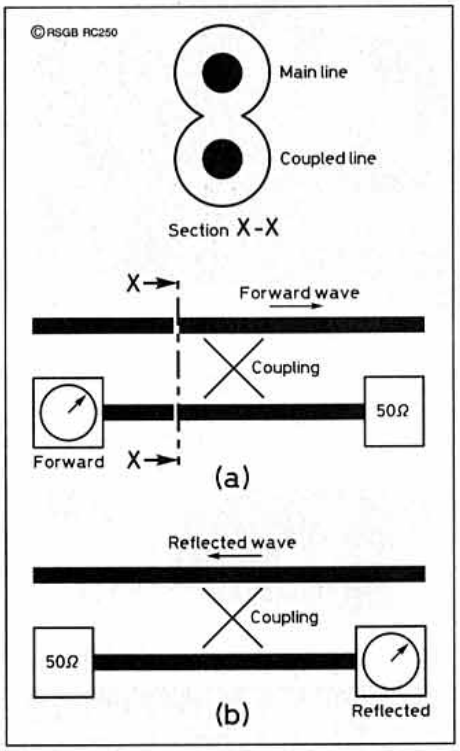


Fig 2: Sampling the forward and reflected waves using coupled transmission lines.

This arrangement reacts differently to the forward and reflected waves on the transmission line, because the currents due to the two waves are flowing in opposite directions at the sampling point. In one position of SW1, V1 and V2 will be in phase (forward wave) and will add; in the opposite position they will be out of phase and will subtract (reflected wave). The potential divider R1-R2 is adjusted to make V1=V2, so that there is complete cancellation of the 'reflected' indication when the line is perfectly matched. Real-life VSWR meters of this type differ in circuit details, but the principle is exactly the same as Fig 3.

The current-transformer type of VSWR indicator is best suited to HF, but can be extended as high as 144MHz. Practical examples are given in *HF Antennas for All Locations, The VHF/UHF DX Book* and just about every amateur radio handbook in existence (see *RSGB Book Case*, August page 94).

In all VSWR meters and directional wattmeters, the quantity that's being measured is RF voltage, even though the meter scales may be calibrated in terms of power. The VSWR is then given by:

$$VSWR = \frac{(V_{FORWARD} + V_{REFLECTED})}{(V_{FORWARD} - V_{REFLECTED})}$$

Check this formula by inserting a few values. If the line is perfectly matched, V_{REF} is zero so the VSWR is:

$$(V_{FOR} / V_{FOR}) = 1.$$

If the line is completely mismatched, V_{REF} is the same as V_{FOR}, so the bottom line of the fraction goes to zero and the VSWR is theoretically infinite. So far, so good. Try an example where V_{REF} is 50% of V_{FOR}: now, if V_{FOR} is set to full-scale (100%) by the calibration control, the VSWR will be given by:

$$(100 + 50) / (100 - 50) = 3.$$

Check this on any commercial VSWR meter: betcha anything that 3:1 appears at mid-scale!

EXTERNAL SHUTDOWN SWITCH

HOW CAN I PROVIDE a shut-down switch outside the house for my unattended packet station?

IF YOUR ARRANGEMENTS notified to the local RIS office involve shut-down by friends while your house is unoccupied, you may not want to provide a house-key for everyone on

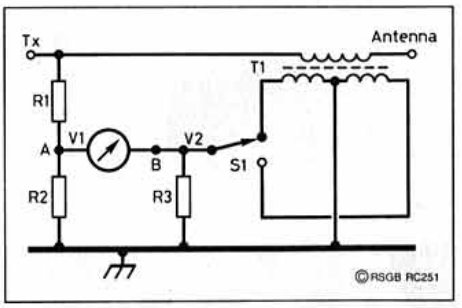


Fig 3: Sampling the forward and reflected waves using a voltage tap and a current transformer.

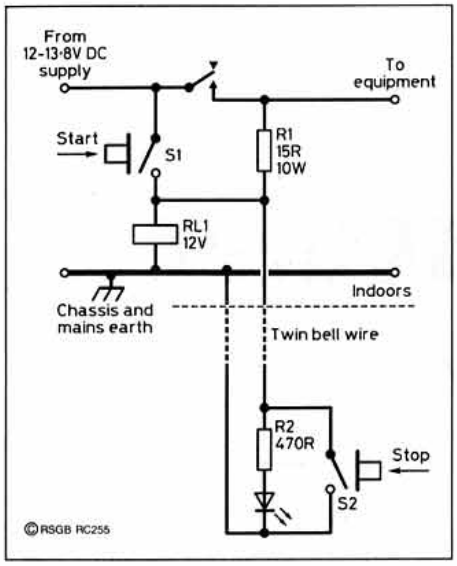


Fig 4: Remote shut-down for 12V DC equipment, using an ordinary bell-push outside the house. SW1, miniature push-to-make; SW2, doorbell push (DIY store); RL1, see text, (or Maplin JM26D); R1, 15R, 10W, (eg Maplin H1T); R2, 470R 0.5W; Red LED.

the list. The alternative is a push-button outside the house, which those 'in the know' can use to turn off the offending equipment if anything goes wrong. The push-button can be mounted discreetly, out of sight to anyone who hasn't been told where to look.

A classy station (not mine) will already have a mains isolating switch for the whole shack, with a remote shut-down button by the door. In this case you simply wire-in another shut-down button outside the house. But here's a simple solution which disconnects the 12-13.8V DC supply and uses an ordinary doorbell push-button. It involves a 12V DC relay RL1 wired in a 'latching' configuration as shown in **Fig 4**.

The relay coil is connected downstream of its own normally-open contacts, so when the DC supply is first switched on, nothing happens. When you press the START push-button SW1 the relay is energized, the contacts close and power is delivered to the rig. On releasing SW1 the relay continues to be energized via R1, whose resistance is much less than the typical 110-200Ω of the relay coil so there is a minimal reduction in coil voltage. Most '12V' relays are specified to pull-in with as little as 9V applied, and will hold-in at lower voltages still. Typical relays would be the round-base 8- or 11-pin plug-in units, often available as surplus, or any other 12V relay with contacts rated comfortably above the current consumption of the equipment being supplied.

The STOP push-button SW2 is a door bell push which is, of course, suitable for mounting outdoors. You can use ordinary twin bell-wire, and one side of the switch should be safely connected to mains earth via the power supply and the rest of the equipment. When pressed, SW2 short-circuits the relay coil so that the contacts release and power is removed from the equipment. While SW2 is being pressed there is considerable power dissipation in R1; hence the 10W rating.

This circuit also presumes that your 12-13.8V power supply can deliver about 1A without damage, which will usually be the case because most transmitters require much more current than that. As a further refinement you may be able to find an illuminated bell-push, which will give positive confirmation from outside the house that power has been removed – the light will go out. Since bell-pushes with internal 12V bulbs are rather uncommon, it may be better to buy one with a translucent housing and somehow fit R2 and a red LED inside.

Note that this unit will also disconnect the transmitter in the event of a power failure. For personal packet or beacon stations this fail-safe feature may be a good thing because power outages are often preceded by large transients. It's probably better to be around when restarting the system afterwards.

FEEDING BALANCED ANTENNAS

CAN I FEED A G5RV antenna direct from the rig to the balanced open-wire feeder without the need to run coax?

IT'S NOT RECOMMENDED to connect any type of balanced feeder directly to a transmitter. To avoid risks of RF feedback into the rig and into the mains etc, you need a proper transition between the balanced feedline and the unbalanced coax connection to the rig. At the very least, try 8-10 turns of RG58 or similar coax in a flat coil, about 15cm diameter; this will make a simple 1:1 choke balun. This suggestion comes from the *RSGB HF Antenna Collection* edited by G4LQI, which contains reprints of the classic articles by G5RV and also his more recent thoughts on the subject. Alternatively try a choke balun of the type made by threading the coax through several large ferrite beads (see Ferromagnetics ads for example) or the W1JR balun (*Technical Topics*, August 1994).

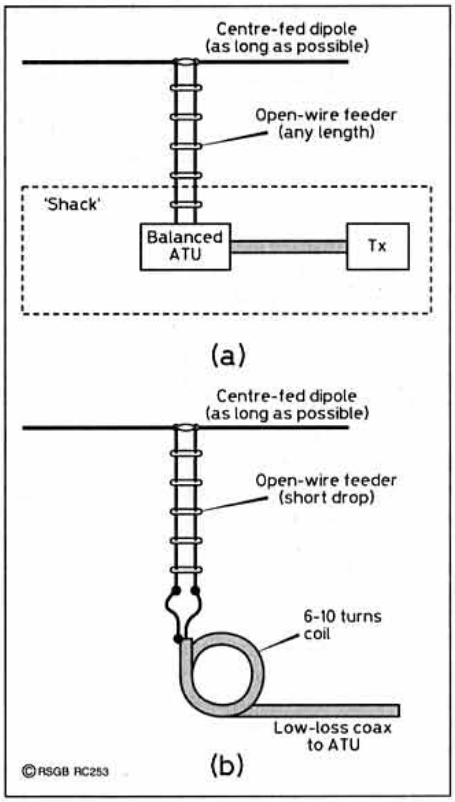


Fig 5: Methods of connecting coax to open wire feeders in multi-band centre fed dipoles.

The feedpoint impedance of the G5RV is not much like 50Ω on any band, except perhaps 20m. The best it achieves is a 'tendency to match' on most bands, avoiding the outrageously high VSWRs that appear with some other combinations of frequency, dipole length and feeder length.

Even if your rig has a built-in antenna tuner, or has a valve PA with front-panel tuning and loading controls, you're unlikely to be able to match the G5RV on all bands. You're going to need a separate antenna tuning unit, or antenna system tuning unit as G5RV himself prefers to call it. Link-coupled ASTUs (ATU) can be used equally well either balanced or coaxial feedlines, and the *HF Antenna Collection* contains several practical examples. Somehow link coupling seems to have gone out of fashion, but it's far better suited to balanced feeders than a more 'modern' ASTU followed by a ferrite-cored balun, which shouldn't really be connected to any antenna showing a high VSWR.

If you're prepared to build an ASTU that can cope with all manner of balanced impedances, remember that you're also free to erect whatever length of centre-fed dipole fits your garden, using whatever length of open-wire line it takes to reach your shack (**Fig 5a**). At least on the lower-frequency bands, the bigger the antenna, the better it will go – provided you can match the impedances that appear at the bottom of the feedline on the bands you want to use. With any type of 'random-length' multiband antenna, you may be unlucky and find impedances on certain bands that your ASTU cannot match. It's a matter of experiment, but try not to let matching difficulties prevent you from using as big an antenna as possible.

If your house and shack are towards one end of the plot of land, as is often the case, it can be inconvenient to bring the balanced feedline away at right-angles to the dipole, and then back to the house beneath one leg of the antenna.

Another strategy is to bring the feedline straight down to the garden fence and join it to a length of coax, using a coil of the coax as a choke balun at the transition point (**Fig 5b**). The coax can then run along the fence line, close to or under the ground, and back to the ASTU in the shack. Note that the run of coax must be of a large, low-loss transmitting type such as RG213/UR67; in this arrangement you're using it as a tuned feeder with some pretty enormous VSWRs which will greatly increase its losses.

If you already have an unbalanced ASTU with a coaxial antenna output, this is a good way to use it with a balanced centre-fed antenna.

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.

RADCOM TECHNICAL FEATURE

The Swallow UHF Prescaler

By Ben Spencer MInstPI, G4YNM

THE SWALLOW UHF Prescaler can extend the frequency range of a digital frequency meter DFM up to at least 575MHz (and typically 800MHz). It features a bipolar front end amplifier, divide by ten prescale ratio, LEDs to indicate POWER ON and prescaler CLOCKING and an integral power regulator capable of running from either a low voltage DC or AC source. This design is a marked improvement on my original UHF prescaler, which I designed in 1984 [1]

Construction and testing are straightforward requiring no special skills or equipment. There are no rare or esoteric components used in the design.

CIRCUIT DESCRIPTION

THE COMPLETE CIRCUIT diagram for the prescaler is shown in **Fig 1**.

FRONT END AND PRESCALER

The front end comprises amplifier TR1, which is capacitively coupled to the signal to be measured via C1. Transistor TR1 is biased in class B by resistors R1 and R2; Resistor R3 forms the collector load which is capacitively coupled via C2 to prescaler IC1 at pins 15 and 16. Prescaler IC1 can be set to divide by 10 or 11 and provides TTL and complementary ECL outputs. In this design the IC is set to divide by ten and the TTL at pin 11 is used. A pull up resistor at R5 at the output is included to ensure the correct TTL levels are obtained.

The output (1/10 the input frequency) is fed to the DFM in the normal manner and the DFM is simply multiplied by ten. What could be easier?

CLOCK DETECTOR

A small amount of the TTL output signal is tapped via C4 and fed to diodes D1, D2 which together with C5 form a half wave doubling circuit. When a UHF input signal has been prescaled and the output (now 1/10 of the input frequency) is present on IC1:11 the voltage doubler drives transistor TR2 via resistor R6 to saturation, illuminating LED D3 and hence indicating that the prescaler is 'clocking' the signal. The LED is unlit during no-signal-input conditions.

POWER SUPPLY

The power supply comprises a bridge rectifier BR1, reservoir capacitor C6 and a standard 1A 7805 regulator IC2, together with decoupling capacitors C7, C8 and C9. An LED, D4 and resistor R9 are included to indicate when power is on.

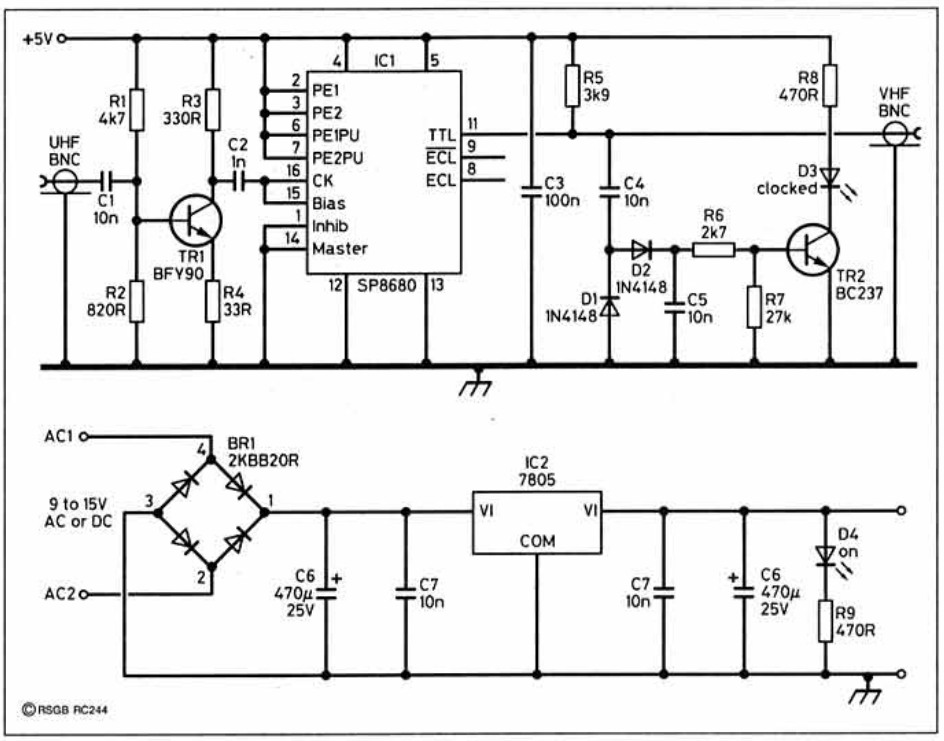


Fig 1: UHF prescaler circuit diagram.

CONSTRUCTION

A SINGLE SIDED PCB has been designed for the prescaler. The component layout and the foil pattern are shown in **Fig 2(a)** and **Fig 2(b)** respectively.

The unit is small enough to fit in some bench DFMs and it might be possible in some instances to take advantage of the secondary AC supply to power the unit. You would of course need to provide fuse protection, a new UHF socket on the front panel and switching between the normal input and your prescaler VHF output.

The switching can be done with a subminiature toggle switch at the prescaler output and normal HF input as the frequency is only up to a maximum of 80MHz here, as long as you keep the wires (ie inductance) to a minimum.

But be warned you might invalidate any warranty if you do this.

If you do not intend fitting the PCB inside an existing DFM case then it should be housed inside a metal case with suitably protected AC/DC source, and a couple of BNC sockets for the input and output.

If you power the unit from a DC source then do not fit the bridge rectifier BR1 but do fit capacitor C6 and C7.

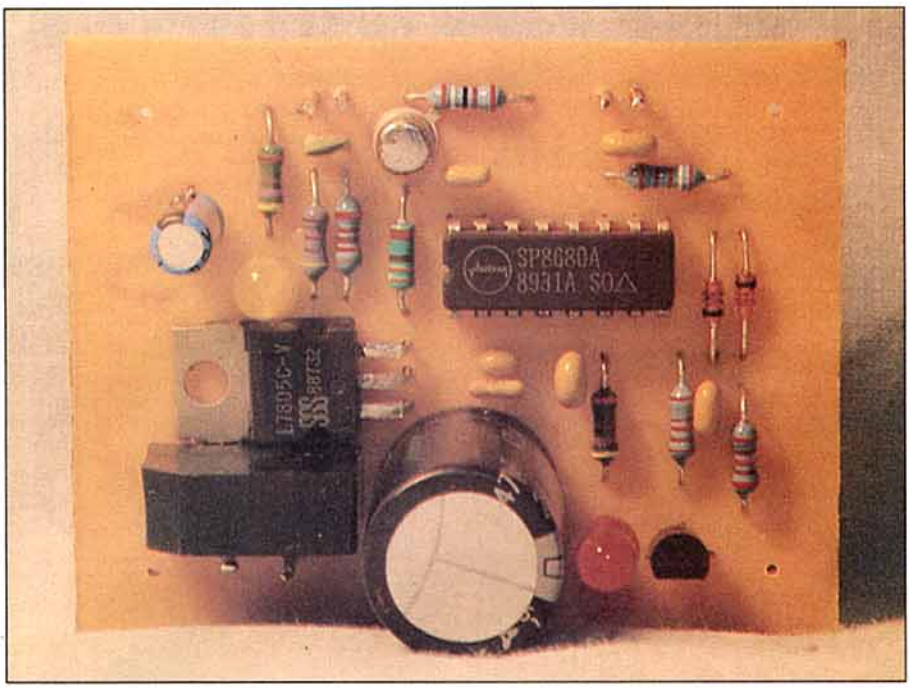
TESTING THE UNIT

THIS UNIT IS EASY to test. Connect a suitable supply and check that the current consumption is about 150mA; if it is wildly different from this value there is a fault on the unit. The IC prescaler normally runs quite warm to the touch; if it is running hot then there is a problem.

Feed in a VHF or UHF signal and check that the 'clocked' LED is lit when there is a

SPECIFICATION

Power Requirements	9 to 15V AC or DC @ <150mA
Indicators	Power ON and CLOCKED LEDs
Prescale Ratio	Fout = Fin/10
Sensitivity	350mVpp @ 650MHz, 600mVVpp @ 40 MHz
Output	TTL Levels
Maximum input voltage	2.5Vpp
Minimum output frequency	40MHz (typically 10MHz)
Maximum input frequency	650MHz (typically 800MHz)



General view of the Swallow UHF prescaler.

signal present. Check that the output frequency is 1/10 of the input frequency. This can easily be done if you have, or you can borrow, a VHF/UHF signal generator.

Otherwise you can use a VHF or UHF handheld transceiver. The prototype unit triggered correctly with a quarter wavelength piece of wire connected to the input socket. This was placed 2.5m from a 7/8 wavelength antenna fed with 1.5 watts at 145MHz.

Finally, do note that at the upper limit of its range (800MHz) the clocked LED will light when the prescaler is counting incorrectly. This is because the prescaler is outputting a TTL pulse stream but the divide by ratio is not 10:1. What is more your frequency counter will sometimes 'tumble' randomly and sometimes show a steady frequency which is incorrect. This does not cause any problems so long as you bear it in mind when trying to measure frequencies above 800MHz.

The prototype counted correctly up to a maximum frequency of 890MHz with 450mV RMS input.

COMPONENTS LIST

Resistors

R1	4k7
R2	820R
R3	330R
R4	33R
R5	3k9
R6	2k7
R7	27k
R2, R9	470R

Capacitors

All capacitors 16V sub-miniature plate ceramic unless otherwise noted.

C1, C4, C5, C7,	
C8	10nF
C2	1nF
C3	100nF
C6	470µF, 25V radial electrolytic
C9	4µ7, 10V radial eletrolytic

Semiconductors

BR1	2KBB20R	bridge rectifier
D1, D2	1N4148	diode
D3, D4	5mm LED	one red, one green
TR1	BFY90 NPN	transistor
TR2	BC237 NPN	transistor
IC1	SP8680 GEC	Plessey UHF prescaler
IC2	7805 1A5V	regulator

REFERENCES

[1] 'An Economy Prescaler', *Practical Wireless*, September 1985.

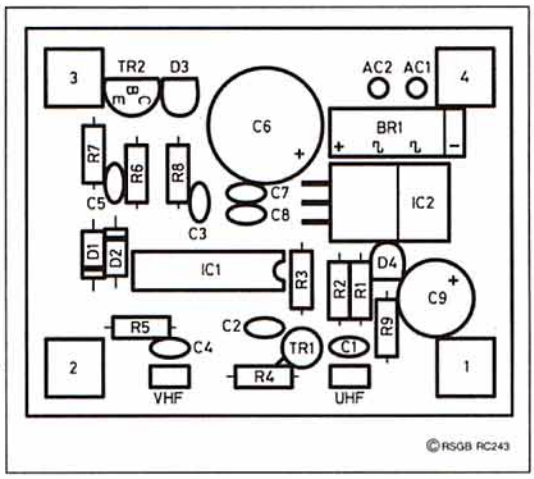


Fig 2(a): PCB, component side screen, actual size.

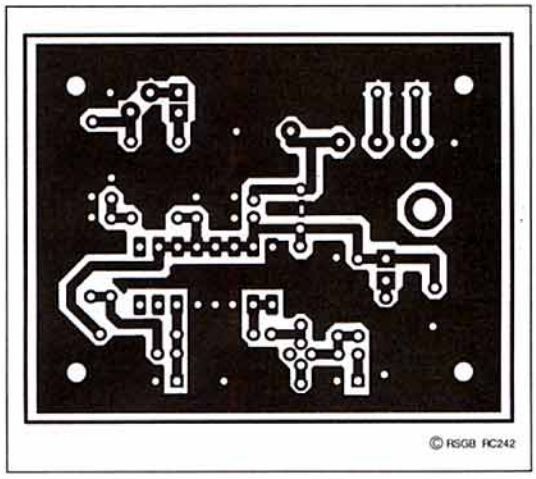


Fig 2(b): Solder side foil pattern, actual size.

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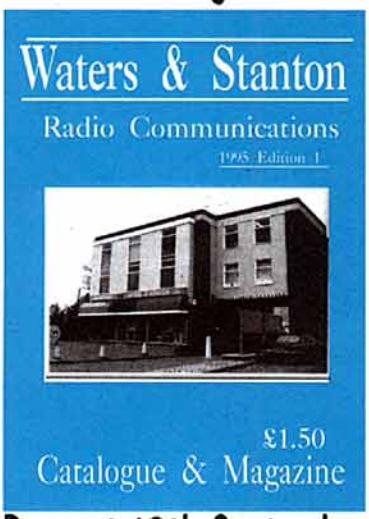

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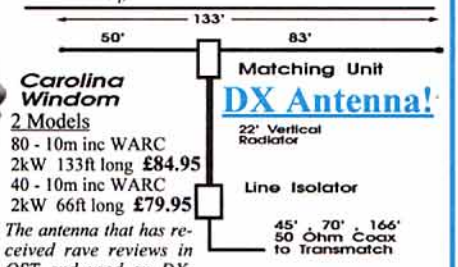

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RADCOM USER REVIEW

Startek ATH-30 Frequency Counter

by Paul Lovell, G3YMP

PORTABLE FREQUENCY counters are very handy instruments to have in and around the shack. If, as with the Startek ATH-30, they're combined with a sensitive field strength meter, they may well become indispensable. A number of other features combine to make this instrument just a little out of the ordinary, if not unique.

MEDIUM WAVE TO MICROWAVE

POCKET SIZED is a true description of the ATH-30. It comes in a lightweight, attractively styled, anodized aluminium case and the telescopic aerial (supplied) plugs into a BNC connector on top. Interestingly, the input is 50Ω only, unlike most other counters which have a high impedance input at HF. The counter sensitivity is adjusted by varying the length of the antenna, but a 50Ω attenuator could be added if required.

A clear ten-segment LED bargraph indicator is positioned at the top of the front panel. This shows field strength most effectively, and would prove especially useful when setting up an antenna system. It is, of course, important to bear in mind that maximum field strength in the shack doesn't necessarily correspond to the best antenna radiation. Still, you can confirm that RF is present on the right band!

Below this is the eight-digit LED frequency display, and although the digits are small, they are bright enough to be read easily from several feet away. The readout is to the nearest 10Hz on frequencies up to 1GHz, but to get this level of accuracy it's necessary to use the slow timebase. Above 1000MHz the slide switch at the top of the front panel selects a divide-by-ten prescaler. On these microwave frequencies the resolution is 100Hz.

COUNTER MEASURES

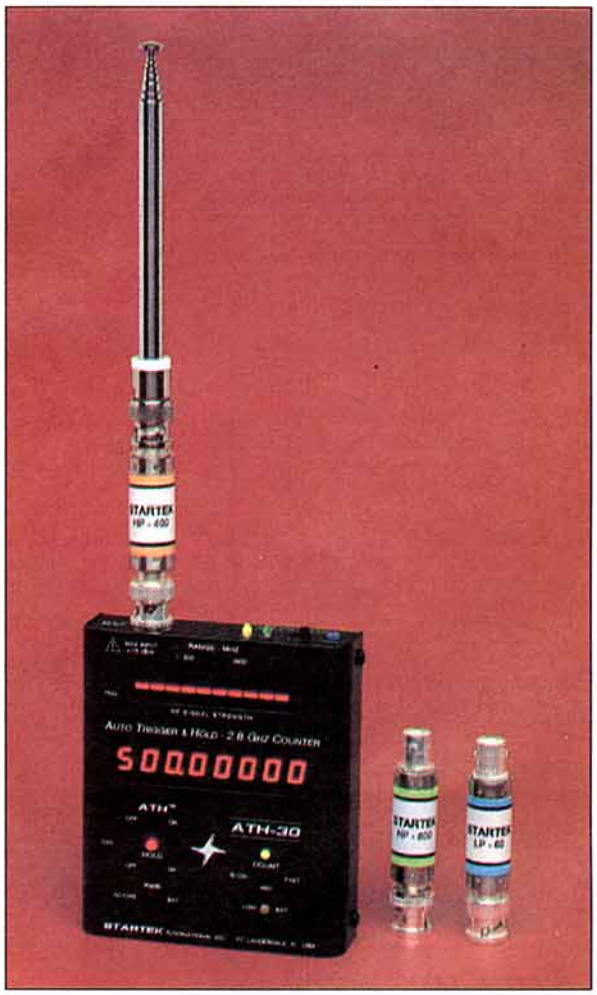
SITUATED JUST BELOW the main LED display is a switch marked 'ATH'. The initials stand for 'Auto Trigger and Hold' – a feature designed to reduce random counting and false readings. In this mode the counter will be enabled only when it has a usable signal. If the signal disappears, the last valid count will continue to be displayed. Under these conditions, many counters would reset to zero and the measurement would be lost. The 'Hold' switch and LED enables *any* reading to be held on the display when the counter is in normal use.

The ATH facility is also used in conjunction with the 'One-Shot' switch located on top of the case. This lights an amber 'Select' LED, and enables readings to be taken from a single short burst of RF energy. Possibilities therefore exist for measurements on various forms of remote control device, which conserve power by emitting a single short RF burst.

Gate time, otherwise known as sampling period, is selected by the switch on the lower right, and a green LED gives an indication of sampling speed (high, medium or low). The internal Nickel Cadmium (NiCad) batteries give a useful three to five hours before recharging is necessary. This condition is indicated by the 'Battery Low' light, to the right of the power On-Off switch. A useful feature on the Startek, is the ability to use the counter while the NiCads are being charged.

RESULTS AND OBSERVATIONS

PERFORMANCE WAS most impressive, with excellent sensitivity and good accuracy. Running just ten watts of CW to a remote 20 metre dipole,



MANUFACTURER'S SPECIFICATION

Frequency range 1MHz to 2800MHz (2.8GHz)

Sensitivity (typ. RMS)

1 to 800MHz	<1mV
150MHz	0.3mV
450MHz	0.5mV
800MHz	0.7mV

Digital display 8 x 0.3in height, Red high-brightness LED

Bar graph display 10 segment, instant response. Indicates relative signal strength from <1MHz to >4GHz

ATH Response Time / **Auto Trigger and hold / resolution**

Count Speed (Gate)	Low range (1 to 800MHz)	High range (1-2800MHz)
Fast	< 0.2sec / 1kHz	< 0.08sec / 10kHz
Med	< 0.8sec / 100Hz	< 0.31sec / 1kHz
Slow	< 6.6sec / 10Hz	< 2.62sec / 100Hz

Timebase Temperature controlled crystal oscillator (TCXO)

Accuracy to Calibration (typical):
Standard timebase ±1ppm, ±1 count (LSD), 25-35°C
Optional HSTB ±0.2ppm, ±1 count (LSD), 20-40°C

Signal input 50Ω female BNC connector
Maximum safe input +15dBm (1.26V RMS)

Power input 9 to 12VDC, coaxial type DC power jack auto polarity, full-wave bridge input.

Size 3.4in(W) x 3.8in(H) x 1.0in(D), weight approx 9oz inc batteries

Battery operation 3 to 5 hours operation, 14 to 16 hours charge, ATH-30 useable during charge

"Portable frequency counters are very handy .... combined with a sensitive field strength meter they may be indispensible."

the telescopic antenna was placed adjacent to the Aerial System Tuning Unit. This gave a full-scale reading on the field strength meter, and an accurate frequency readout.

In fact, the signal strength indicator responds to the strongest signal over the entire frequency range, which makes it an ideal instrument for dealing with EMC problems. I tried placing the antenna near the connecting leads of my computer – the results were most revealing! A high impedance matching network is the only addition I would welcome. This would make the ATH-30 useful for constructors when testing circuits such as FET oscillators etc. However, a simple interface using an FET would be very easy to build.

The brief but informative instruction manual mentions some uses for the counter, and the sort of distances over which it should work. Response speed was tested using a short 'dit' of Morse code, from an HF transmitter. The ATH facility worked well and the frequency was quickly displayed to the nearest kHz. By the way, the count button must be in its 'Fast' position for this test. This mode of operation could be useful for tracking down short bursts of interference.

THE FINAL COUNT

SUMMING UP THE STARTEK'S attributes isn't difficult as I found it a very straightforward and practical instrument to use. The resolution is more than adequate for most users, and the small, neat design should make it ideal for field days, demonstrations and similar events.

A telescopic antenna and mains operated battery charger are included with the ATH-30, and the instruction manual gives useful tips to get the most from the instrument.

The ATH-30 is manufactured by Startek International of Fort Lauderdale, Florida, and the UK price is £269.00 inclusive. The unit is marketed in the UK by Nevada Communications, 189 London Rd, North End, Portsmouth PO2 9AE. Tel: 0705 613900. Our thanks to them for the loan of the review model.

Note: Three other Startek counters are available from Nevada.

RADCOM TECHNICAL FEATURE

Taming the End-Fed Antenna

By Alan Chester G3CCB

THE SINGLE WIRE ANTENNA directly connected to the transmitter is often discouraged in the amateur radio manuals because of the close proximity of the radiating element to house wiring and domestic equipment. This undesirable feature is aggravated by the fact that wild excursions of feed impedance occur when changing operation from band to band and good matching is sometimes difficult to achieve.

All in all, however, the antenna is simple, cheap, easy to erect, suits many house and garden layouts and is equally amenable to base or portable operation. It is therefore not surprising that the end-fed wire is often pressed into service by old hands and newcomers alike who are prepared to work on its more wayward characteristics to produce a thoroughly acceptable multiband antenna.

This article sets out to show how the length of an end-fed antenna can be optimised to serve a given set of bands, tuned to resonance (minimum feed impedance) on each band and then coupled to the transmitter using a wideband matching transformer and any required length of coaxial cable to distance the antenna wire from the operating position. Such an antenna can then be operated against real earth (if a suitable terminal is close to hand) or, more likely, a substitute in the form of a radial (or several) or a counterpoise wire.

BACKGROUND

THE END-FED ANTENNA has traditionally been designed to resonate on one lower band in the HF spectrum, say λ/4 (quarter wavelength) on 80m where the current feed will meet an impedance of around 50Ω. At λ/2 on 40m, the input impedance will rise to a high value presenting a voltage feed to the source. The next band, 30m, will fall in the vicinity of current feed again at 3λ/4 and present a fairly low impedance. The next move to 20m will meet a high impedance again and then through an off-tune 17m to another high at 15m. The sequence continues with some extra complication in that odd multiples of λ will show generally increasing impedance with frequency whereas even multiples of λ (the halfwave points) will show decreasing impedance as the band is ascended.

To achieve a moderate feed impedance on all bands, some means must be found of selecting a wire length which steers well clear of the half-wave points. **Fig 1** illustrates resistance and reactance plotted against electrical length from below λ/4 to 3λ/4 and beyond. It can be seen that dramatic changes begin to occur as the λ/2 (half-wave) resonant point is approached. These dramatic changes are repeated at multiples of λ/2 and these regions must be avoided if the impedances of a multiband antenna are to be kept reasonably low and uncomplicated on all bands of operation.

In general, the magnitude of the λ/2 multiple resistive and reactive excursions reduce as the electrical length of the antenna is increased.

To make a start, it was decided that the sector within ±λ/8 from the λ/4 point represented fairly 'safe' working conditions within which the wire could be tuned by adding the appropriate sign of reactance at the feed end.

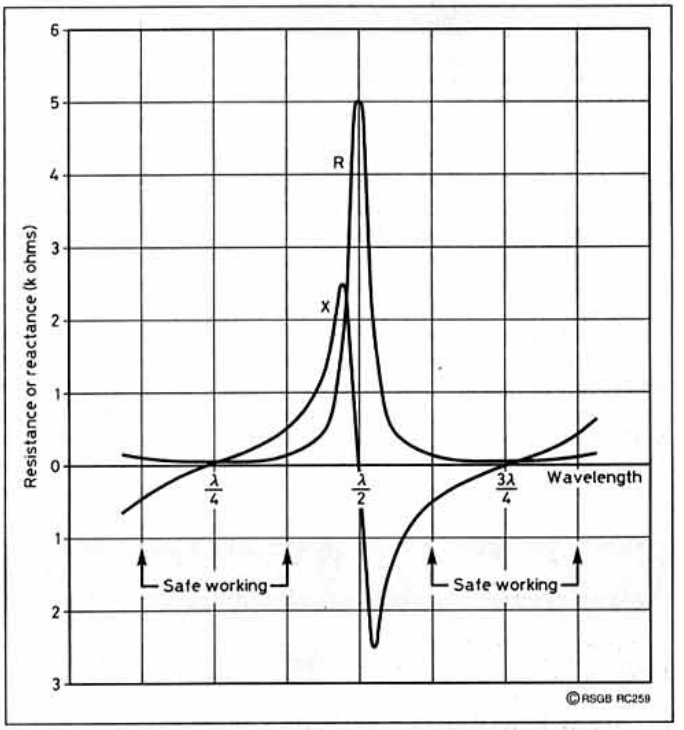


Fig 1: End fed impedance characteristics of wire from λ/4 to 3 λ/4.

In other words, wires on the low side of the λ/4 point (too short) would be tuned by inserting inductive reactance in series with the wire while lengths on the high side of the λ/4 point (too long) would be tuned by inserting capacitive reactance in series. It follows that entry into the 'danger' areas within ±λ/8 from the λ/2 resonance peak should be undertaken with care. The same principle applies for subsequent λ/4 and λ/2 regions on longer wires.

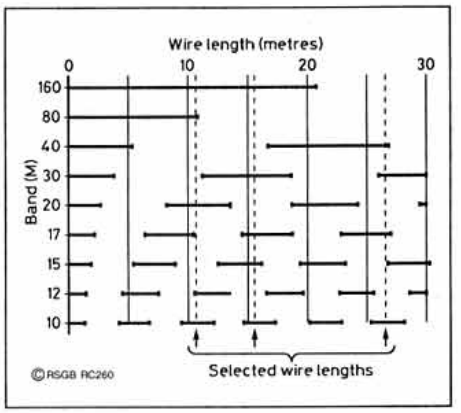


Fig 2: Antenna wire lengths, showing 'no-go' lengths for various bands.

In **Fig 2**, wire length is shown against each of the nine HF bands (including 160m) with 'no-go' portions indicated by the heavy lines. To avoid unnecessary complication, wavelengths were calculated from the lower band edge frequency in each case and no corrections were made for the 'end effect' on a real antenna.

To use the chart, a perpendicular straightedge is dropped from the horizontal axis and moved along until a clear way through the gaps between the no-go sectors is found. Thus, for a wire length of 10.5 metres, the straight-edge just clips the end of the 80m no-go line, then goes through the middle of the 40m safe sector and on through the 30m gap. At 20m, the straight-edge is blocked but there are clear openings at 17, 15 and 12m.

The next opportunity presents itself at a wire length of 15.5m where openings appear at 80, 40 and 20m and, if some tolerance is permitted, at 17 and 15m, and then through the clearance at 12m. The very next choice of bands becomes available at a wire length of 26.5 metres which gives all eight band including 160m but not, unfortunately, 10m where special arrangements have to be made. The wire lengths quoted here may need some

small adjustment when the practical system is built.

TUNING AND MATCHING

IT CAN BE SEEN, from Fig 2, that there is at least one band for each wire length where the straight-edge goes through the centre (or very nearly) of a safe working region. At this point, the feed impedance will be fairly low. For other bands, where the straight-edge lies to the left or right of the gap centre, the impedance will be higher in value and capacitively or inductively reactive. The reactive component is tuned out by inserting an inductor or capacitor of the appropriate value close to the feed point leaving a non-reactive antenna feed of moderate value to be matched very easily to the transmitter.

Some general points need to be made here to assist in the selection and adjustment of tuning and matching components. Near the centre of the safe working regions, relatively small values of reactance will be required to bring the antenna to resonance; at the extremities, larger values will be called for. The outer limits of these regions may be extended by a small amount as practical examples given in 'The Practical System' will show. Since the antenna is pre-tuned on each band and designed to offer only a moderate range of resistive input impedances, it only remains to add a simple wide-band transformer to match the antenna to the transmitter via 50Ω cable. Such a transformer is described in [1].

EARTH PLANE

USING THE PRINCIPLES so far described in the selection of wire length and tuning, it is now necessary to consider the earth plane, real or substitute, against which the antenna will operate.

In general, a good earth connection is hard to find and only practicable from a ground floor room. Unless the earth can be reached within a very short distance, the 'earth substitute' (radial or counterpoise) comprising a single λ/4 wire from the aerial feed point is hard to beat and the technique will also ensure minimum RF voltage at this point. The earth stake version, although often less efficient, is convenient for portable operation and avoids the chore of erecting more wires.

ALAN CHESTER

G3CCB DIED on 13 January 1994, and *RadCom* published his obituary in March (page 101). His practical approach to amateur radio, demonstrated in this article, will be greatly missed.

THE PRACTICAL SYSTEM

THE FULL RANGE OF tuning component values and feed impedances for each HF band against wires of three lengths is shown in **Table 1**. Any one length of wire can be operated either elevated well above ground using substitute earths or very near ground using a real earth connection via a short lead. The longest wire (26.50m) will provide full coverage on all nine bands while the shorter wires (15.00 and 10.00m) will cover seven bands each with some overlapping. It can be seen from Table 1 that two wires, used selectively, will provide full coverage without the complication of inductor tuning.

The main wire is measured to the dimensions given in Table 1 and, after marking, it may be prudent to allow a little extra for fine adjustment during installation; this is accomplished on the 20m band for the 26.50 and 15.00 metre wires and on the 40m band for the 10.0 metre wire where natural resonance occurs in each case. Although it is physically possible to tune the wire to any part of the band as required by the cut-and-try method and avoid the need for the tuning capacitor altogether, it is generally preferable to place the natural resonance a little below the lower band edge frequency and use the variable capacitor (at relatively high value) to move the resonance point up into the band.

The λ/4 substitute earth wire for the elevated antenna can be cut for the required frequency within each band less 5% for end-effect. The measurements are not critical and no difficulty will be found in practice since any fine adjustment required will be taken up automatically when the main antenna wire is tuned. The lead length to the earth stake for the grounded version was fixed at 1 metre to maintain some degree of uniformity between the two versions and to ensure reproducibility of the design. The stake used was about 1.5 metres in length and the short connecting wire was adequate for portable operation from car, tent or even garden shed but, if required, the lead may be extended by a small amount provided an equivalent reduction is made to the main wire. The grounded end-fed wire cannot match the performance of the elevated version unless a very good earthing system is employed. Nevertheless, the simple stake has been shown to provide a useful and convenient earth when operating from a temporary location.

The simplest way to provide the tuning function at any power level is by using one variable capacitor of adequate vane spacing and one variable inductor (roller coaster) connected in circuit as required. The units were calibrated and showed maximum values of 750pf and 32μH, respectively, although extra inductance was sometimes required at 160m. This was the arrangement used when compiling the data given in Table 1. Values given are 'broad brush' based on many measurements taken during trials. A range of values is given where the band is particularly wide.

BAND (M)	TUNE	MATCH(ohms)	Notes
26.50 Metre Wire			
160	32-10μH	50	Various ground planes
80	150pF	112	
40	6μH	112	
30	50pF	200	
20	>100pF	112	Near series resonance
17	2μH	200	
15	25pF	450	
12	>50pF	112	Near series resonance
10	1μH/25pF	800	Parallel resonance (see text)
15.00 Metre Wire			
80	14-10μH	25-50	
40	100pF	50	
20	>50pF	112	Near series resonance
17	25pF	450	
15	4μH	450	
12	>50pF	450	Near series resonance
10	1μH/25pF	800	Parallel resonance (see text)
10.00 Metre Wire			
80	20-14μH	25-50	
40	>100pF	50	Near series resonance
30	50pF	200	
17	2μH	112	
15	> 50pF	200	Near series resonance
12	25pF	450	
10	1μH/25pF	800	Parallel resonance (see text)

Table 1: Tuning and matching guidance data for each band against three lengths of antenna wire (elevated or grounded)

10 METRE OPERATION

AN EXAMINATION OF Fig 2 will show that, for the three preferred wire lengths, the vertical straight edge will go through the centre (or very nearly) of one of the no-go sectors on 10m. Since this point coincides with one of the λ/2 positions on the wire, a relatively high impedance was expected which by measurement turned out to be a fairly moderate 800Ω. Even so, a parallel tuned circuit was called for at the feed point and good performance was obtained with a centre-tapped inductor providing a convenient input of 200Ω from the matching transformer. This is included in **Fig 3**. The inductor comprised 2+2 turns of 18SWG wound on T130-6 powdered iron toroidal core and tuned with 25pF.

LAYOUT OF ANTENNA-TO-TRANSMITTER INTERFACE

IT WAS STATED EARLIER that end-feeding a wire antenna may not be in the best interests of avoiding RF breakthrough. Whatever else might be done to assist in this direction, the physical separation of antenna wire from in-house receivers and mains wiring, not to mention the amateur's own equipment, must be regarded as a major step forward. Physical separation of units will depend on local circumstances. At G3CCB the tuner, matching transformer and isolator are located close together at the antenna wire entry point and a long coaxial cable is used from this point to

the operating position on the other side of the house. Portable operation may not call for the same degree of separation, and a short coaxial cable to the transmitter will then be all that is required.

All antenna wires are measured to the matching transformer terminals and the isolating transformer ensures that tuning is not affected by the way in which the equipment is connected up, eg whether or not the equipment is connected to mains earth. Portable or QRP rigs may not be earthed at all or might share this function with the antenna ground in which case the isolator can be safely left out.

A general layout of interface connections is given in Fig 3. The VSWR meter is shown connected at the transmitter end of the long coaxial cable where it can serve as a general monitor of the system from the operating position. During initial setting up, it will be beneficial to site the VSWR meter at the antenna terminal unit where the coaxial cable meets the isolator and matching transformer. Details of the isolator and matching transformer are given in [1].

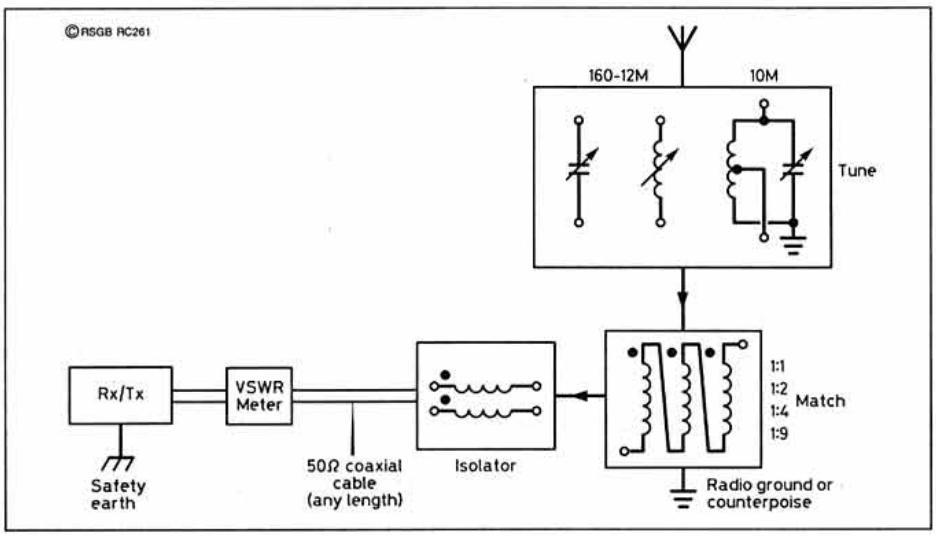


Fig 3: Layout of antenna to transmitter interface.

ALTERNATIVE INDUCTOR TUNING

THE ARRANGEMENTS DESCRIBED above for varying the inductor might be considered to be quite appropriate for QRO use.

Where more moderate power levels are used, especially down to genuine QRP, the roller coaster may be regarded as an unnecessarily complicated and expensive item. A technique to simulate variable inductance by employing a fixed inductor in combination with a variable capacitor will provide a satisfactory solution [2]. This has been employed on the elevated 26.50 metre wire where variable inductance is required on the 160, 40 and 17m bands and a version has been scaled down to suit QRP rigs. A brief note on the principle of simulated variable inductance is given at the Appendix.

CONCLUSION

THE EXERCISE HAS produced a set of three end-fed wires to provide coverage of all the amateur bands which can be operated from an elevated or grounded position and which can be very easily tuned and matched to 500Ω. The opportunity has been taken to try out several interesting techniques which may be regarded as being unconventional, namely the wide-band ferrite antenna matching transformer, the isolating transformer of similar construction and the simulated variable inductor to avoid mechanical methods of adjustment. All these devices have contributed in their way to the simplification of tuning and matching and will assist in the development of remote control of these functions should this be required.

The longest of the three wires (26.50m) is undoubtedly the most useful in taking in the whole HF spectrum but there may be further opportunities using longer antennas. For example, extrapolation of the data given in Fig 2, shows a clear way through the bands from 160 to 10m at around a wire length of 55 metres. The longer wire would certainly produce a better antenna on 160m (near 5λ/8) which could be tuned by a variable capacitor within this band but might result in generally higher impedances appearing throughout the remainder.

All antennas worked well showing a VSWR at the transmitter generally no worse than 1.5 but the on-air performance of the elevated counterpoise versions outshone the grounded wire by a significant margin. This is undoubtedly due to the modest stake in use for the earth connection but it should also be appreciated that a grounded end-fed antenna cannot acquire much height especially for the shorter wires. Perhaps kite flying and very long wires is the answer for portable operation on 160 metres!

Band	160	40	17	
Coil	40	7	2.5	µH
Former	T130-2	T130-2	T130-6	
Turns	60	25	16	
SWG	22	20	18	
Tuning	<750	>150	>50	pF

Table 2. Components required for tuning the lower frequency bands.

REFERENCES

[1] 'Two useful non-baluns', Alan Chester, G3CCB, *RadCom*, October 1993.

[2] 'The transmitter/antenna interface', Pat Hawker, G3VA: *Technical Topics*, December 1984.

SUPPLIERS

POWDERED IRON toroidal cores may be obtained from: Ferromagnetics, PO Box 577, Mold, Clwyd CH7 1AH or Cirkit Distribution Ltd, Park Lane, Broxbourne, Herts EN10 7NQ.

APPENDIX

THE EFFECTIVE INDUCTANCE of a fixed coil may be reduced to a limited extent by adding a variable capacitor in series.

For a series combination of L and C, the net reactance X' is equal to $X_L - X_C$ and will be inductive when $X_L > X_C$. X' can be regarded as the reactance of a reduced inductance $L' = X_L'/2\pi f$. The reduced inductance will, unfortunately, exhibit a correspondingly reduced circuit Q since the loss resistance of the coil will remain unaltered while the inductance is lowered ($Q=2\pi fL/r$). This fact puts a constraint on the amount by which the inductance may be reduced. Fortunately, most amateur bands are relatively small in width and the inevitable reduction in Q can be kept within reasonable limits. 160m is a possible exception and it may be desirable to divide the band into two segments for tuning purposes.

For compactness, coils are wound on T130-2 powdered iron cores and tuned with a variable capacitor to the appropriate value shown in **Table 2**. The highest value of capacitance should be sought consistent with the tuning range required.

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Have you noticed how mad the retail trade has gone over pricing recently? It seems only a short time ago, several dealers were listing RRP prices. Now almost every one seems to be intent on putting the other out of business. Are these desperate times, or what? Giving products away for little profit results in poor service and lack of after care. If you can't see that new product in your local store, then you maybe buying the wrong item in the first place - however "wholesale priced" it is. I'm all for a bargain, but I've been bitten by the "how does he ever make any money, he's always giving it away" store.

When you walk into a radio store here are eleven tips to help make the right decision.

Ask the following questions, call it the Martin Lynch Customers' Charter if you like!

1. Has he got most of the products he's quoting for on the shelf or does he have to chase around ordering it, after your credit card's been debited?
2. Has demonstration stock on show for you to browse at your leisure and doesn't wrap up the demonstrator when you wish to purchase, because he hasn't another in stock?
3. Has he got a proper workshop facility on site, sanctioned by the manufacturers?
4. Is he familiar with the product you're inquiring about or can he only quote you the lowest price. (Gives you real confidence if you have an operating query - or worse - it goes wrong).
5. When you visit the store, are you confronted with non Amateur Radio-related items - what is this retailers speciality?
6. Is he limited in the choice of goods you wish to view? A store biased to one make cannot compare fairly with it's competition - you may be forced into buying the wrong product.
7. Does he employ a "Quality Control" facility, ensuring goods sent, New, Used or Repaired are tested to specification?
8. Does he have a "family" area for those waiting, who are not so nuts about the radio you want to buy?
9. Does he present you with staff who aren't Licensed Radio Amateurs. Would you visit your Doctor, if he wasn't qualified?
10. The only method of attack he has is to keep slashing the price, not realising the care and attention you will need if it goes wrong.
11. Can't offer you "instant credit facilities", either by phone or in the store at very advantagous rates.

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The FT990 is available with built in PSU or as a DC version. Buy during August or September and claim your FREE filters from Yaesu UK.

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Yaesu FT747GX, 100 Watt HF TCVR. (a "GxII" never existed!!)	£849	£649
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Icom IC-737, latest HF Transceiver with built in Auto ATU	£1549	£1199
Yaesu FT-911R, 23cm handie complete with NiCads & charger ideal packet, etc	£429	£299

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ng me when a manufacturer was going to bring
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a mains PSU and an auto tuner in the smallest
id about it's brother, the IC-737 (without 6m).
rig I've tested".

Yaesu FT-900

HF MOBILE SCOOP!!

The NEW Yaesu FT-900 Mobile/Base Transceiver

On July the fifteenth, 1994, Yaesu Musen Co. of Japan unveiled their exciting (and world first), FT-900. For those of you who "preferred" to use the features of the FT-890 for mobile use, but found it a little too large, Yaesu engineers have "split" part of the front panel, enabling full feature HF mobile, with base station facilities from your car, in the new FT-900.

For mobile operation, the new lightweight detachable sub-panel permits separating the transceiver and mounting the main unit in a remote location. This makes the FT-900 convenient for mobile and maritime amateur operation, or wherever space is at a premium.
With similar features to the FT-890, the new FT-900 incorporates an option ATU-2 Auto Antenna Tuner and many more newly introduced features, not yet seen on such a small and compact package.
Operating frequency and other important settings are displayed on a high-contrast back-lit LCD. The new three-mode bargraph meter display features delayed "peak hold" circuitry for the tuning bargraph segments that simplifies tuning stations with rapidly varying signal strength.

Main Points are:

★ Removeable "Sub-Panel" ★ High Contrast LCD Multi Function Display ★ New "CW reverse sideband" letting you switch RX carrier offset ★ Adjustable BFO offset ★ Surface Mount Technology, on composite epoxy boards ★Low Noise RX front end using parallel high-IDSS FETs ★ Twin DDSs ★ 2.5Hz tuning! ★ Speech Processor ★ ★ 100 Watts out with Auto ATU built in, not an external add-on ★

Stock available from Martin Lynch end of July. Prices start from £1299

NEW SUPER SLIM TH-79E

The TH-79E is a new very slim and lightweight DualBander, offering features exclusive to this new design. Despite it's compactness, the radio can operate full duplex and monitor two frequencies at once, within the same band. Monitoring both input and output of repeaters simultaneously are therefore possible.

80 non-volatile memory channels with ID
The TH-79E has 80 multifunction channels - all capable of storing TX/RX frequencies, CTCSS and split channel operation. Each channel can be assigned with letters (upto 7 characters) to identify each one individually. All memories are stored in EPROM, so no more worries about lithium backup!

Multiple scan Modes, DTMF Memory & DTSS & pager functions are all present in this tiny well constructed package.
★ Power on call sign display ★ Selectable dual & single band operation ★ A.B.C. (auto band change) ★ CTCSS operation (with optional TSU8) ★ Tone alert system ★ Auto repeater offset (VHF) ★ 3 position power, High/Low/Economy low ★ Over voltage display and audible warning ★ Auto power off ★ 10 minute time out timer ★

Dot-Matrix LCD & menu/ guide system
Making its debut on handheld transceivers, the dot matrix display greatly improves user friendliness since there are no limitations on the variety of messages that it can handle. In addition to frequency data, this can be used to access a menu system with full alphanumeric display of functions and settings. the operator can also scroll through a summary of current operational status. What really sets this system apart is the "on-line" guide - simple operating instructions appear in the display whenever needed.

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Pat Hawker's Technical Topics

QUARTZ RESONATORS – HISTORY AND PROGRESS

THE QUARTZ CRYSTAL seems such a simple component – little more than a two-pin plug that magically has the characteristics of an ultra-stable resonant circuit. It has existed seemingly throughout the valve and semiconductor eras. Just occasionally, someone – such as Mike Hall, G3USC, (*TT*, October 1991) – reminds us that there is more to the quartz resonator than we usually suppose. One result of this disregard or ignorance is that many amateurs when ordering or using crystals fail to specify their needs correctly and then blame the supplier when the performance does not come up to expectations.

In reality, the quartz crystal was not always available. Until the mid-1920s, valve transmitters were based on self-excited oscillators, either as power oscillators or less commonly as master oscillators driving power amplifiers. As amateurs opened the way to the short waves, initially '200 metres and down', subsequently around 110 metres, 80 metres, 40 metres and then the "daylight DX" band around 20 metres by the mid-1920s, notes became increasingly rough and unstable with drift a major problem. However, in the 1930s reasonably good VFOs could be made using Franklin or ECO circuits with their power supplies using voltage regulator tubes. But as so often has occurred in the history of radio, a solution came along at just the right time.

QST, in July 1924, published 'Oscillating Crystals' by H S Shaw (W)1XAU of the General Radio Company. He described how, drawing on the pioneering work of Dr W G Cady (Wesleyan University) and Dr G W Pierce (Harvard University) and with advice from Dr J M Miller, he had built an HF crystal controlled transmitter. This used two parallelled 5-watt valves working on about 3MHz (95 metres). He made several contacts with 1XAQ (S Kruse, then technical editor of *QST*) a distance of about 85 miles, almost certainly the first time crystal control had ever been used on HF (Dr Pierce with the Harvard transmitter 1XJ, had, on 25 January 1924 used a crystal-controlled oscillator to transmit over a short distance). Thus, by Spring 1924, Pierce and Miller crystal-oscillator circuits had been developed; both configurations (**Fig 1**) remain, some 70 years later, as the two basic single-active-device oscillator configurations from which others have been developed. In his historic article, H S Shaw even proposed the use of crystals – with frequencies separated by about 1kHz – for transmitter and (straight) receiver oscillators.

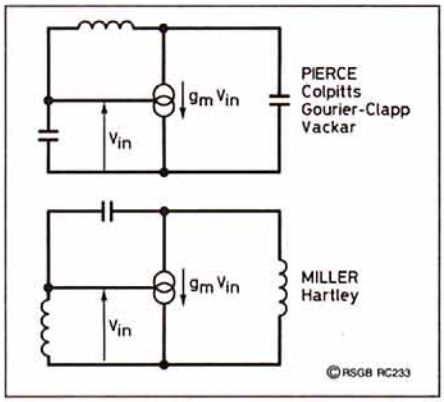

Fig 1: By Spring 1924, Dr G W Pierce and Dr J M Miller had proposed two basic configurations for single-active-device crystal oscillators that for 70 years have, with derivatives, remained standard arrangements.

The revolutionary nature of Shaw's article in an era of woefully unstable oscillators is underlined by Kruse's introductory editorial note: "Can you imagine a transmitter that never shifts its wave even a hundredth of a metre? Can you imagine making a schedule for 96.38 metres and knowing that you will be right on that wave and know that the other man will be tuned right to you? And can you imagine getting from the receiving operator a report that during hours of operation the beat note in his phones never changed even a particle? These things are possible with the oscillating crystal."

By 1920, the phenomena of pyro- (heat) and piezo- (stress) electricity in certain materials – including Rochelle salt, tourmaline, silicate of zinc, cane sugar, quartz and boracite – had been investigated by a number of scientists. For many centuries, it had been known in India and Sri Lanka, that when tourmaline was thrown into a fire it acquired the property of attracting the ashes, and the Dutch brought knowledge of this curious phenomenon, an effect of pyro-electricity, to Europe. In 1717, Lemery presented a tourmaline crystal to the French Academy of Science. Soon serious studies of the effect of heat and stress on a range of substances were being made. In 1881, Pierre and Jacques Curie formulated a number of rules showing clearly the link between pyro-electricity and piezo-electricity.

For radio applications, the breakthrough can be traced to Dr W G Cady and the publication of his paper 'The Piezo-Electric Resonator' in *Proc IRE* (April 1923, pp83-114). This opened with the note: "In the course of experiments with piezo-electric crystals, extending over a number of years, certain radio-frequency phenomena were brought to light, the practical application of which appeared worthy of development. The two applications that seem most promising at present are (1) as a frequency standard, and (2) as a frequency-stabilizer, or means of generating electric oscillations of very constant frequency."

Later, in his classic paper, he wrote: "There are several methods whereby the frequency of an electron tube generating circuit can be rendered practically free from disturbing capacity effects, variations in battery voltage, and so on. All make use of one or other of the properties of the piezo-electric resonator that have already been described."

Within a year, Dr G W Pierce and Dr J M Miller had developed simple crystal-controlled valve oscillators, including the Miller oscillator with a resonant tuned anode circuit adopted by Shaw in Spring 1924 for his HF transmitter: **Fig 3**. Shaw's firm, General Radio Co, later developed and marketed quartz crystals in holders of the form that became widely adopted for some 20 years, and a number of firms marketed unmounted crystal

TWO-COMPONENT EXPANDED-RANGE VOLTMETER

SOME IDEAS FOR expanded-range analogue voltmeters that overcome the disadvantages of using the customary zener diodes were included in July *TT*. This is achieved by using a three-terminal voltage regulator along with associated circuitry.

An expanded-scale voltmeter using just two components is described by D D Contrell in the 'Ideas for Design' feature of the American journal *EDN* (20 January 1994, p73). As shown in **Fig 2** this uses two complementary voltage regulators and a 0 – 5 voltmeter. It is claimed that this results in a linear scale of 10 – 15V and requires no calibration except possibly some mechanical adjustment of the zeroing of the meter.

To quote the *EDN* item: "By using a split-voltage reference system with floating output, the zero point of the voltage supplied to the meter equals the absolute sum of the two references. With the regulators shown in Fig 2, the 0 – 5V meter reads 10 – 15V inputs. If the voltage into the system falls below this level (ie 10V), the output to the meter changes polarity. This feature allows use of the mechanical zeroing of the meter, although this zeroing should never be necessary because most regulators yield outputs more accurate than the meter can read.

"The pinouts of the TO-92 devices are perfect for this application. The small size allows installation of the circuit within most meter cases. Keep in mind that this circuit will present a load of 3 – 5mA and connectors should minimise any voltage drops .... For use with other voltages select regulators whose sum equals the lowest voltage to be displayed. As an example a 78L15 and a 79L05 will output a zero voltage at 20V; a 5V meter will then read 20 – 25V. You can make the circuit adjustable by substituting a 317L adjustable regulator and the necessary resistors in place of the 78L05."

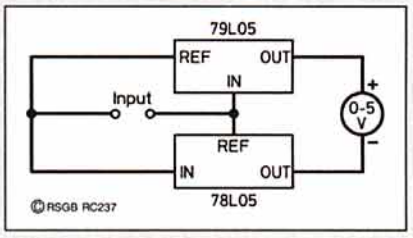

Fig 2: Simple expanded range voltmeter, providing a 10 – 15V range with a 0 – 5V meter. (source *EDN* 'Ideas for Design').

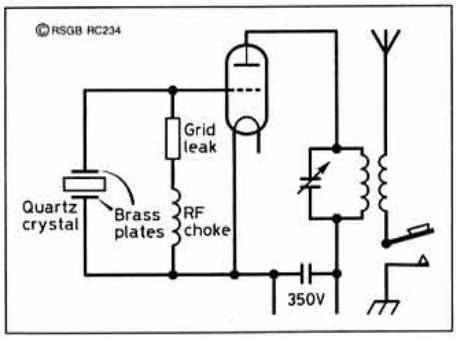

Fig 3: The original crystal-controlled transmitter built by H S Shaw (W)1XAQ in April 1924. It used two 5-watt triode valves with the crystal oscillator circuit suggested by Dr Miller. The resonant anode circuit (not used in the earlier Pierce oscillator) was tuned to approximately the 3MHz crystal frequency.

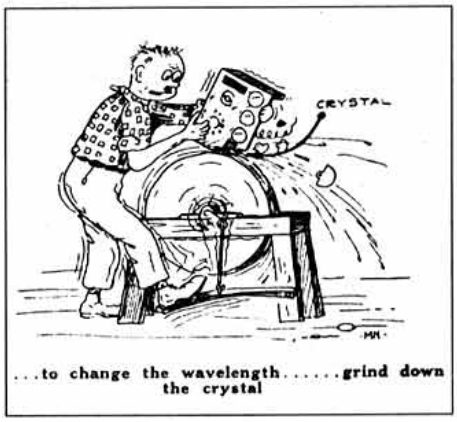

Fig 4: How the *QST* cartoonist saw amateurs tackling the problem of changing frequency upwards by grinding down the crystal. From the July 1924 article by H S Shaw (W)1XAQ.

plates for amateur bands. It was also found that 'quartz pebble' spectacle lenses could be made to oscillate. By 1926 a significant number of American amateurs were using crystal-controlled transmitters, with the practice spreading across the Atlantic in a matter of months. By the end of 1928, a number of British amateur transmitters were 'rock steady' with pure (T9X) notes.

Early quartz crystals were not cheap. In the *T&R Bulletin* of December 1928, one finds Quartz Oscillators Ltd of London NW2 asking £4.15s (more than the average weekly wage of that era) for a 7MHz crystal, with a 1.8MHz crystal priced at £2.15s. Quartz Crystal Company (QCC) founded by G2NH and G5MA at New Malden – destined to become a major supplier of crystals during WW2 – were supplying 7MHz crystals for £2.2s: "Every crystal guaranteed to oscillate with air-gap. We give the actual frequency accurate to 0.1%.... Really FB crystal holders four shillings." Throughout the 1930s, the Post Office demanded to inspect 'crystal certificates' before issuing amateur transmitting licences.

Initially, many British amateurs used 'pebble lenses', some even cut their own plates from natural crystals. Early crystal cuts (X and Y cuts) tended to be sensitive to temperature variations, much reduced with the coming in the 1930s of the 'AT zero-temperature-coefficient cut' which provided virtually zero coefficient over a small range of temperature. An early cartoon demonstrates this process – **Fig 4.**

The idea of using quartz resonators to provide receiver IF selectivity (rather than for stability as foreseen by Shaw) can be traced to the British radio-engineer Dr Robinson (assisted by the late Ernest Gardiner, G6GR) and his 'stenode' broadcast receiver. He developed the basic single-crystal IF filter and lectured on his stenode system in the USA. Although the stenode broadcast receiver was based on the then common but wrong belief that sidebands existed only as mathematical concepts, James Lamb of ARRL realised that the Robinson crystal-gate filter was ideal for narrow-band CW reception and described its use in communications receivers in *QST* in 1932, one of the most important articles ever published in an amateur radio journal.

So much is history – a history in which amateur radio played a significant role. But what of the present? Piezo-electric quartz crystals remain a vital component in the continued search for ever more stable and selective transceivers. In digital electronics, the crystal 'clock' has become ubiquitous. Natural Brazilian quartz has been replaced by synthetic quartz and miniaturized, produced in countless millions at real costs a tiny fraction of what amateurs were prepared to pay in 1928!

Dr Dick Biddulph, G8DPS, has recently pointed out, in connection with the July *TT* item on 8- and 10-pole ladder filters, that Farnell supply 6.000MHz crystals at 65p (plus VAT and postage) each or 52p for ten-off, 43p for 24-off and 37p at 100-off. It should be noted however that these may not have quite the same characteristics for this application as the IQD crystals used by G3SBI with their relatively high-Q and low insertion loss.

Crystal technology and its application to oscillators have continued to progress. To overcome temperature problems there are now in addition to the simple uncompensated crystal oscillator (XO) the more stable temperature-compensated crystal oscillators (TCXO); digitally compensated crystal oscillators (DCXO); microcomputer-compensated crystal oscillators (MXCO); voltage-controlled oscillators (VCXO); temperature-compensated, voltage-controlled crystal oscillators (TCVCXO); and ever better oven-controlled crystal oscillators (OCXO).

State-of-the-art ultra stable crystal oscillators have been developed for space satellites since 1958 at the Johns Hopkins Applied Physics Laboratory in the USA. A general survey of this work and the complex precautions needed to get the very best out of crystal oscillators in terms of frequency stability, environmental immunity, phase noise, ageing rate, size, mass and cost have been described by Jerry Norton and James Cloeren in 'Precision Quartz oscillators and their use aboard satellites' (*Johns Hopkins APL Technical Digest*, Vol 15, No 1, (1994) pp 30-37) from which the following notes have been abstracted: "The quartz resonator .... is the most important component in any quartz oscillator .... The size of the disc and the angle at which it is cut from the quartz crystal primarily determine the frequency of vibration .... Even with excellent oscillator circuits, performance cannot exceed the inherent quality or capability of the resonator. Less than optimum electronic circuits, however, can seriously degrade performance. The potential frequency stability has a wide variation from one part in 10^6 to 5 parts in 10^{14}, measured over 100 seconds. The resonator Q is the best measure of performance.

"Quartz resonators are produced in many shapes, sizes and operating frequencies and have many cost levels. For example, the resonator in a quartz watch is a relatively simple low-Q (about 30,000) device that is inexpensive (it costs less than $1). In contrast, a resonator for a high-precision oscillator is a complex, carefully processed, high-Q (over 3,000,000) device that is very expensive (more than $1000). A precision quartz resonator is capable of controlling frequency very precisely, but the operating environment must be very carefully controlled to realize the resonator's full potential .... A 5MHz resonator can have a Q exceeding 3-million and is the highest-Q resonator commercially available. If phase noise close to the carrier and low ageing rate are the most important oscillator parameters, a 5MHz resonator should be used .... The phase noise floor of an oscillator can be reduced at the expense of oscillator ageing rate.

"For a precision oscillator to generate an output signal that has a low ageing rate, high frequency stability, high spectral purity, and low phase noise, the following conditions must be met: (1) The quartz resonator must be kept excited (driven) at a very constant, low power level. (2) The resonator's operating temperature must be maintained precisely. (3) The resonator must be isolated from changes in external parameters such as power supply noise, magnetic fields, ionizing radiation, vibration, external loads, and parametric changes in the electronic components.

"**Fig 5** is a functional block diagram of a typical precision oscillator. A 5MHz, 3rd overtone, SC (stress compensated) cut quartz resonator is the frequency control element, fabricated from premium Q cultured quartz (hydrothermally laboratory grown). The oscillator is a modified Colpitts type with both alternating and direct current negative feedback to reduce

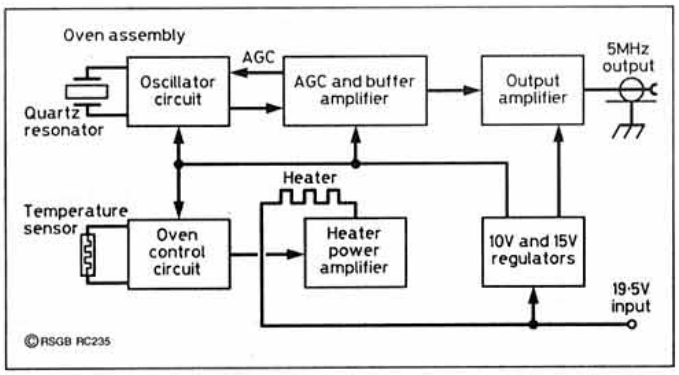

Fig 5: Functional block diagram of an ultra-stable quartz oscillator as used aboard small space satellites. The latest APL Johns Hopkins precision spacecraft oscillator has a frequency stability of 7 parts in 10^{14} over 100 seconds, consumes 0.9W, weighs 0.77kg and has a volume of 790.7 cubic centimetres.

flicker noise and stabilize gain. The AGC circuit . . . . maintains a constant resonator drive current and also provides a large degree of isolation from changes in circuit parameters, input voltage, and temperature. The low-level signal from the oscillator is amplified by a low-noise, high-impedance buffer amplifier to increase the signal level and further isolate the sensitive oscillator stage from the environment. The output amplifier provides power gain, impedance matching, and load isolation for the oscillator signal. A single proportional-controlled oven encloses the resonator, the oscillator circuit, and part of the oven control circuit. The temperature of the oven is adjusted to the turning point of the resonator (about 85°C) and is held within 0.001°C over the normal operating temperature environment."

Ageing rates of 2×10^{-12} per 24 hours have been measured during flight qualification tests and achieved in orbit. While ageing rates of caesium atomic standards are superior to this, they are comparable to those of rubidium atomic standards; moreover quartz oscillators are much less complex, more reliable and less expensive than atomic standards for small satellite applications.

While such extreme performance, which has to be maintained over the lifetime of a satellite, is vastly beyond any reasonable requirements for the Amateur Service – even the Amateur Satellite Service – the general principles remain valid and show the way towards higher performance for less rigorous applications. Remember that the calibration accuracy of modern synthesized transceivers depends upon the long-term performance of a crystal oscillator.

VALVE LINEAR SCREEN REGULATED SUPPLIES

IT WAS EMPHASISED IN *Technical Topics*, April 1986 (see also *TT Scrapbook, 1985-89*, p93) that the 4CX- family of RF power valves need to be treated with care if optimum performance is to be achieved. In respect of a number of suggestions from John Nelson, GW4FRX and others on the use of the 4CX250B, I wrote: "There is no doubt that the screen-grid power supply for this series of valves needs careful design, preferably with shunt regulators and capable of sourcing and sinking at least 40mA for negligible change in the screen voltage. High-voltage transistors and improved regulators with higher loop gain are proving an important advance on the older valve regulators." This assumed that modern high-voltage solid-state devices for the regulator would prove reliable without an undue degree of protection against voltage transients, etc. In practice this seems not always to have been achieved. Brian Horsfall, G3GKG, puts the case for a hybrid approach. He writes:

"As several previous correspondents have pointed out (eg *TT*, April 1986), when using valves of the 4X150/4CX250 family it is essential to provide a well regulated screen-grid supply voltage and to 'hold the screen down' with a hefty bleed resistor to allow for conditions where secondary emission and/or negative screen current can occur.

"At G3GKG, the power amplifier uses a pair of JAN 7609 (ruggedised 4X150D) valves in a classic 'tuned anode, tuned grid' configuration, with a few watts of drive available from an ancient home-brewed exciter. Originally, a series stabilizer circuit was incorporated to provide the 325V screen supply and the bleed current was catered for with a parallel by-pass resistor providing most of that taken by the shunt resistor. Under normal loading and drive conditions, this meant that the bleed current was always greater than the actual screen current with the total current consumption of the regulated supply unnecessarily high; an offence to the frugal (half-Yorkshire) mind of G3GKG.

"Several unfortunate experiences with high-voltage (sic) solid-state devices in this application, led to the present, more elegant design (**Fig 6**) where a reliable, rugged (and to some old-fashioned) valve takes the strain and, with a 27V zener diode, ZD1, and medium-power transistor (TR1), provides the low-voltage supply for the solid-state op-amp feedback amplifier, IC1. The resistor, R1, is chosen to set the overall current to be drawn from a poorly regulated 360V supply (in some respects the poorer the regulation of this supply the better, see below).

"With this arrangement, current is taken by either the control valve, V1, or the PA screen-grids. There is no change in the current drawn from the supply and virtually no drop in voltage, unless or until the design current is exceeded by the demand of the screen-grids.

"A screen current meter is the best indicator of both tuning and loading conditions of this type of power amplifier. At G3GKG, the meter has its zero offset to allow for the possibility of negative current. When the amplifier is correctly loaded and fully driven by a two-tone generator (to 2mA grid current, more than 500mA anode current at 1500V EHT) the screen current peaks on 'tune' to only 20-25mA and the screen voltage remains steady within 1V. If the loading is too light, screen current can rise to alarming levels, so it helps to have a screen supply whose voltage drops rapidly in such conditions. In normal SSB operation, ALC feedback from PA to exciter is turned up so that the full 400-watts PEP RF output is obtained without driving into grid current and with only a few mA 'flicker' on the meter."

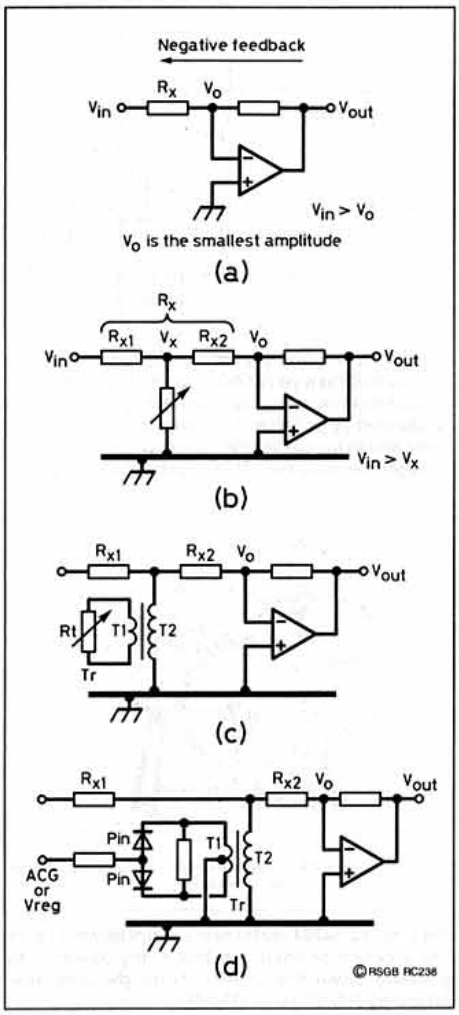

Fig 7: Development of improved AGC system. (a) Amplifier with negative feedback; (b) Attenuator placed at a point between V_{in} and V_{out}; (c) Transformer Tr reduces the voltage across Rt; and (d) Balanced PIN diodes provide linear attenuation. (source *RF Design*).

AGC ATTENUATOR

GIANCARLO MODA, I7SWX draws attention to an *RF Design* awards feature (March 1994, pp94, 96) submitted by Czech-born Carl Zatl who has been living in the USA since 1981. This is introduced as follows:

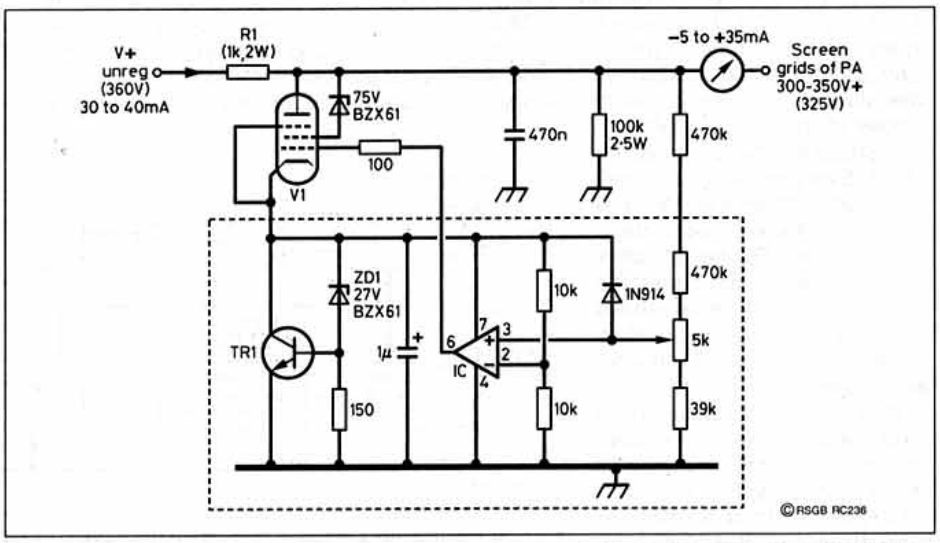

Fig 6: The hybrid valve/semiconductor screen-grid regulator developed by G3GKG for the 4X150/4CX250-series of high-power RF valves. Components within the dotted line are on a printed-circuit board. V1 can be 6BW6, 6AO5, EL84 etc. TR1 is a medium power transistor, eg TIP31. IC is LF355N (or 741). Resistor, R1, see text.

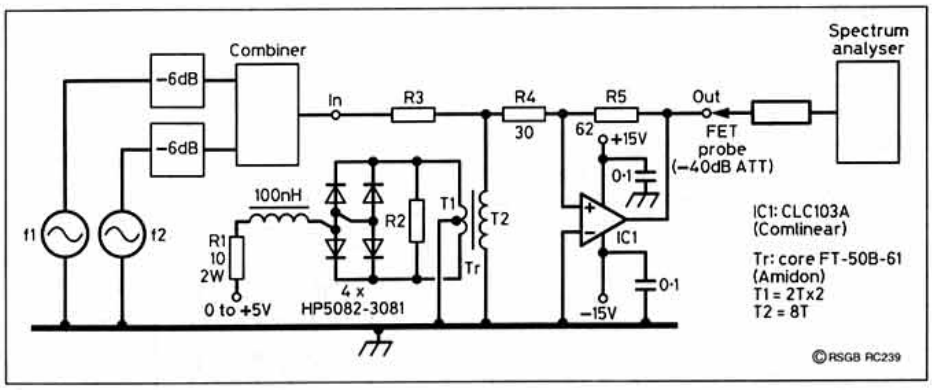

Fig 8: The final AGC system with test set-up.

"One weak spot in modern receivers is the AGC.... AGC voltage is used to vary the bias on the amplifier stages, increasing or decreasing the gain. As signal strength increases, less gain is needed and the AGC voltage changes the operating characteristics of the controlled device(s) to a less linear mode.

The result is that a strong signal is applied to an increasingly non-linear device, exactly the opposite of what is needed for good intermodulation performance. This problem has existed ever since the development of AGC. My goal was to minimise or eliminate that unfavourable condition."

Modern designs often use PIN diodes or FETs as variable resistances to form variable attenuators at the front end of a receiver. But if these devices are driven to higher attenuation, their non-linearity can produce intermodulation or cross-modulation distortion.

Carl Zati's approach is to reduce significantly the problem by placing the attenuating element into the negative feedback of an amplifier where signal amplitude is smaller: the principles on which this was developed are shown in **Fig 7**.

Fig 7(a) shows the point, V_o, where, in an amplifier with negative feedback, the smallest amplitude occurs; (b) shows an attenuator placed at a point between V_{in} and V_{out}; (c) further improvement is reached when the resistor R is replaced by an impedance transformer with resistance Rt, reducing the voltage on this resistance by the ratio T2:T1 (Rt can be voltage-controlled FETs, current-controlled PIN diodes etc, in balanced configurations); and (d) the non-linearity of one diode is reduced by the same but opposite nonlinearity of the other diode.

A resistor is placed in parallel to maintain some reasonable impedance for the transformer while the diodes are 'off'. The ratios of T1:T2 and Rx1:Rx2 are the main factors which specify the attenuator.

Fig 8 shows such an AGC amplifier for a 50MHz receiver in a two-tone (f1 50.000MHz, f2 50.100MHz) test set showing that as gain is decreased, the capability to handle strong signals grows; gain 0dB – IP3 = 38dBm; gain 6dB – IP3 = 42dBm; gain 12dB – IP3 = 45dBm with the input impedance 50 ± 10Ω. Carl Zatl claims: "These characteristics are very favourable and opposite to any other available AGC amplifier or attenuator; as gain is decreased, the circuit's capability to handle strong signals grows."

IMPROVING IC REGULATOR RELIABILITY

EDN 'DESIGN IDEAS' of 12 May 1994, p86 includes an idea from Peter Demchenko, in Lithuania pointing out that a small change to the standard circuit for adjustable three-terminal IC regulators (LM317, LM350 etc) improves reliability.

He considers that the standard circuit (**Fig 9(a)**) suffers from an inherent fault: if the wiper of the potentiometer, R2, loses contact the output goes high and may damage the load. Since the potentiometer is the most unreliable component in this standard circuit, it is worth considering the modified arrangement shown in **Fig 9(b)**. Now, if the wiper loses contact, the voltage output goes low, safeguarding the load. R3 limits the voltage excursion of the output even if the pot short-circuits.

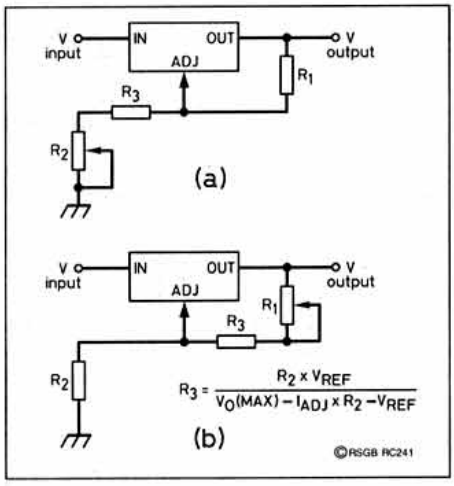

Fig 9: A simple change can improve the reliability of adjustable three-terminal IC regulators by eliminating the danger of over-voltages resulting from the loss of contact of the wiper of the potentiometer. (a) Conventional arrangement. (b) Modified arrangement.

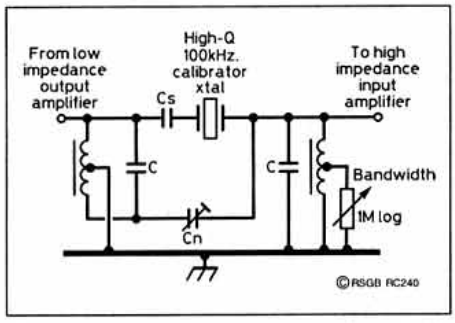

Fig 10: The super-selective, continuously-variable (10Hz to 2kHz bandwidth) 100kHz crystal filter used by SM5BSZ for EME (moonbounce) and similar narrow-band communications. Cn neutralizing capacitor. Cs crystal-equalizing capacitor required when two or more cascaded filter stages are used.

SUPER-SELECTIVE CRYSTAL FILTER FOR EME ETC

THE CLASSIC ROBINSON/LAMB single crystal filter has, for many years, been largely superseded by multi-crystal bandpass filters. There are several reasons for this, including the higher intermediate frequency of modern designs, and the later development of effective bandpass half-lattice and ladder filters: the classic filter with its narrow 'nose' characteristics was primarily suited to 455kHz IFs and CW reception.

However, Jan-Martin Noeding, LA8AK has reported on how Leif Aasbrink, SM5BSZ has resurrected the Lamb-type filter in the form of a super-selective, continuously-variable filter for EME (moonbounce) reception. LA8AK writes:

"At a recent Scandinavian VHF meeting in Denmark, SM5BSZ described his approach to EME using a 500W power amplifier and 4 x 14-element yagi array but his main interest is the development of improved receiver performance. He has an extra receiver with digital signal processing (DSP) using Fourier transform to 'spectrum analyse' the received signals. He finds this also very useful when operating in the aurora-mode in order to investigate his own reflected signals using full QSK with 100W RF power and with BAY96 (some parallel connected) varactor diodes to form a transmit-receive (TR) antenna switch.

"To provide a high degree of (variable) selectivity, he uses a simple but effective form of the classic single-crystal filter. He found that MF/HF crystals tend to have too low a Q for this application whereas 100kHz calibrator crystals are entirely suitable. With the arrangement shown in **Fig 10**, he achieves a nose bandwidth variable between 10Hz and 2kHz depending on the setting of the output impedance which is governed by the setting of the 1M (log) 'bandwidth' potentiometer.

"SM5BSZ finds that even for EME, it is not practical to use the minimum 10Hz bandwidth achievable with this filter and 20Hz seems the lowest applicable limit. Unlike the filters used in the older communications receivers, such as the HRO, Super-Pro etc, this narrow-band filter must be fed from a low-impedance source (anode impedance of a valve is too high unless transformed down).

"The neutralizing capacitor (Cn) has much the same effect as the 'phasing control' of the classic filter in setting the rejection notch by balancing out the effect of the capacitance across the crystal. When cascading two or more such filters, it is important to tune both filters to precisely the same frequency, and an extra series capacitor (Cs) may be used to increase the resonant frequency for the crystal with the lower frequency.

SM5BSZ uses two cascaded filters with transistor isolating amplifiers in his receiver. In order to adjust the selectivity over a wide bandwidth range a multi-turn potentiometer is highly desirable, tapped on to the tuned output circuit for impedance transformation."

PROJECT 6L6 - 1994 STYLE

1986 WAS THE 50th ANNIVERSARY of the introduction of the RCA Radiotron 6L6 beam tetrode followed a year later by an RF version, the classic 807. To mark the occasion, Dean Manley, KH6B, launched a 'Project 6L6 (*TT*, February, April, May and November 1986; see also *Technical Topics Scrapbook, 1985-89*). KH6B was seeking to encourage this project not only to mark the golden jubilee but also to revive interest in simple (KISS) rigs as club projects, home-construction etc. He then wrote: "It seems only natural for amateurs to build and experiment. A simple rig with a 6L6 would fill this bill. Building your own rig is half the fun. The other half is putting it on the air and convincing the disbelievers that you've really a metal 6L6 or glass 6L6G in the final, then taking the rig along to the local club and enticing others into the homebrew game."

I pointed out that such rigs are not necessarily confined to CW. Amplitude (Heising) modulation of a single stage crystal oscillator is not recommended practice, but in the past many did it. "A few brief contacts, just to prove it still works (and can be received as SSB), would hurt nobody. Indeed there is little reason why it should not be reintroduced more widely on 1.9MHz or 29MHz. A two-stage 6V6CO/6L6 or 807PA combination is better than a single-stage power oscillator."

Although we are now approaching the 60th anniversary of the beam tetrode, KH6B believes that the raison d'etre for such projects remains valid. In the February 1994 issue of the *BIARC Bulletin* of the Big Island Amateur Radio Club of Hilo, Hawaii, he returns to this topic reporting that this local club of over 100 members are this year pursuing 'Project 6L6' as a 'club kit' activity.

"Yes, homebrew, hot soldering irons, and valves!" he comments, adding: "Many years have past since the question of whether to build or buy was posed seriously. At one time, it was suggested that your first station should be 'home brew' even if you could afford to buy the best available station equipment. It was even assumed that if you built your own, you knew more than an operator who bought his station. Nothing replaces experience. You learn by building and if you build your own AM transmitter, then put it on the air, you no longer qualify as an 'appliance operator'. Nothing can replace the fun, the educational value, and the pride of operating your own 'home brew' transmitter.

Fig 11 shows the two-stage 1.8MHz AM/CW transmitter that forms the basis of the current BIARC project for which KH6B has developed a kit. This has a Pierce-type crystal oscillator using a 6J5 triode valve plus a 6L6/6L6G power amplifier with pi-type matching network and using a 6.3V, 0.3A (US Nr 47) pilot bulb as tuning indicator. **Fig 12** shows the Heising anode modulator suitable for use with a microphone providing a fairly high output. A 350V, PSU is shown in **Fig 13**. In the UK a number of the components might pose problems for those without a good junk box salvaged from the valve era, but in many cases various substitutions could be made without impairing results.

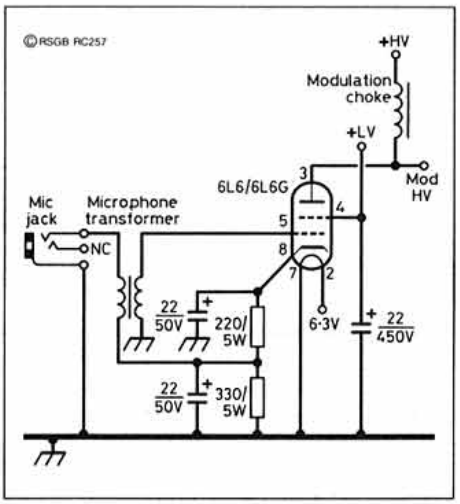

Fig 12: Anode modulator for Project 6L6 for use with carbon microphone.

HERE AND THERE

A NUMBER OF COMMENTS have been received on the May *TT* item about the invention by Sperry of the famous National *PW* dial as used in the HRO receiver, and we hope to return to this topic later. Meanwhile John Teague, G3GTJ, points out that this type of dial was used on a British-made S-band cavity wavemeter of wartime vintage to count the turns on the micrometer type plunger. The dial differed from the HRO dial in being thicker and possibly a little larger in diameter. On another topic, G3GTJ is currently researching one of the most significant wartime developments in radio communications technology: the No 10 microwave (4.4 Gigahertz) multiplexed radio relay system using pulse-width modulation. The first demonstration of pulse-TDM communications was made at SRDE in early July 1942 and was judged so successful that contracts were quickly placed for 600 equipments with GEC, Pye Ltd and the Telephone Manufacturing Company, with operational models available from January 1944, in time for their successful use during the liberation of France and Belgium (see my letter in *Radio Bygones*, No 4, February/March 1990). John Teague, (Perrotts, Lydford on Fosse, Somerton, Somerset TA11 7HA, Tel: 0963 240319) has plenty of technical data but is anxious to contact more of those who used this equipment which, he notes, was used by the RAF as well as the Army.

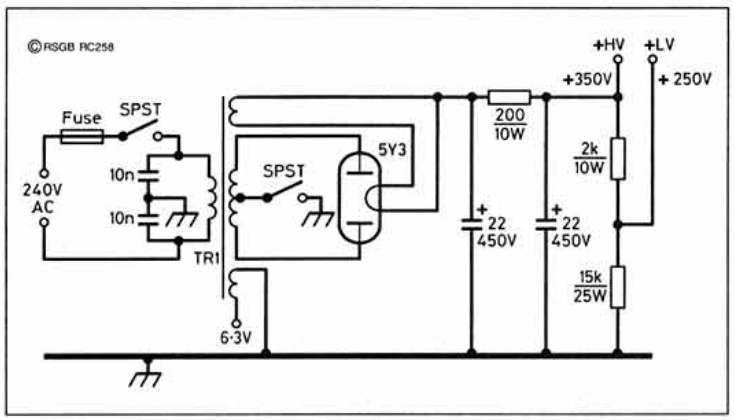

Fig 13: Suitable power supply for project 6L6.

Many years ago, *TT* mentioned the possibility that one day a new form of tiny semiconductor microphone might be developed. This seems to have come much closer to practical implementation according to a paper presented by G Sessler of Darmstadt Technical University at the 127th Meeting of the Acoustical Society of America, MIT, June 1994. David Newland (*Nature*, 7 July, 1994, p21) reports that the German scientist described a two-chip silicon condenser microphone no larger than a pinhead. It is claimed that good sensitivity with a flat response up to 10kHz can be obtained with noise levels comparable to conventional condenser microphones. Micromachining methods can also be used to produce miniature piezoelectric microphones in which the membrane is of a piezoelectric material that generates an output voltage when it is deflected.

So far, silicon condenser microphones have the higher sensitivity and piezoelectric microphones the higher frequency response (first resonance frequencies up to 45kHz). Apart from their tiny size, silicon condenser microphones have other advantages, including the possibility of being manufactured in bulk using the techniques of the semiconductor industry, which means that they should be cheap and reliable. ***G3VA***

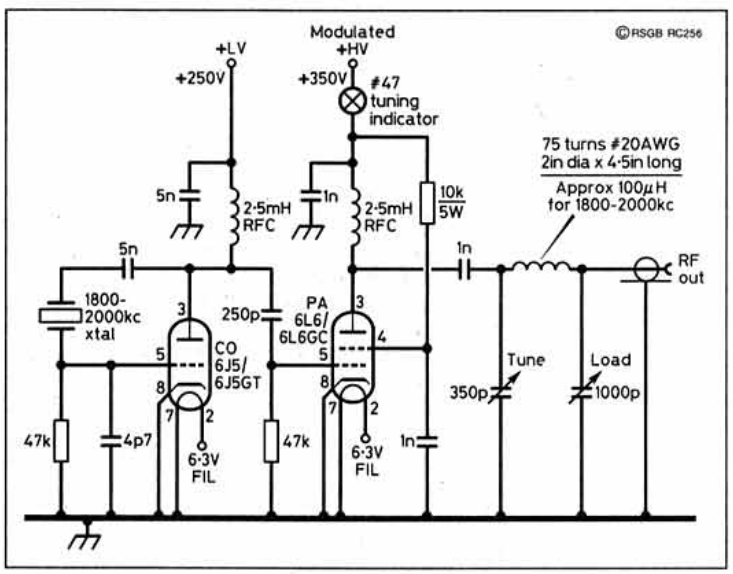

Fig 11: Two-stage 1.8MHz transmitter forming part of KH6B's current 'Project 6L6'.

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DAY

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Holiday Operations from Islands – K5MK

3Y0PI DXpedition – ON6TT

Computers in the Shack – G3XTT

Antenna Circus – G3WLM

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Sunday 9 October

DAY

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Contest College – G3SJJ

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CF-30H	HF Low Pass Filter 2KW PEP	£69.00
CF-30S	HF Low Pass Filter 150W PEP	£17.50
CF-50S	6M Low Pass Filter 150W PEP	£18.00
CF-BPF2	2M Band Pass Filter 150W PEP	£26.00
CD-160H	SWR/PWR 1.6-60MHZ 20/200/2000W	£95.00
CD-270D	SWR/PWR 140-525MHZ 15/60/200W	£82.00
CMX-2	SWR/PWR 1.8-200MHZ 20/50/200W	£110.50

CARR A = £2 CARR B = £5 CARR C = £7.50 CARR D = £12.50 CARR E = £16.50

& Co
Parade
et
r,
13 5NY
5pm Tues-Sat

SMC (Northern)
Nowell Lane Ind. Estate
Nowell Lane
Leeds
Tel. 0532 350606
9.00am - 1.00pm Sat

SMC (Midlands)
102 High Street
New Whittington
Chesterfield
Tel. 0246 453340T

SMC Birmingham
504 Alum Rock Road
Alum Rock
Birmingham B8 3HX
Tel. 021 327 1497

RADCOM TECHNICAL FEATURE

RX84 Advanced HF Receiver

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

ALL THE RF CIRCUITS have been described in the previous four parts. In this final part I will look at the requirements for the local oscillator inputs to the various stages and describe some of the circuits I used to generate them.

LOCAL OSCILLATOR REQUIREMENTS

THE RX84 LOCAL OSCILLATOR requirements, see **Fig 19**, are as follows:

- 41-70MHz for the first mixer to produce an IF of 41MHz from input signals in the range 0 to 30MHz.
- 50MHz for the second mixer to produce an IF of 9MHz from an input from the first IF of 41MHz.
- 8MHz for the third mixer to produce an IF of 1MHz from input from the second IF of 9MHz.
- 200kHz for locking the 1MHz signal, generated in the detector module, to the product detector and the synchronous AM detector.

In addition the 50MHz signal to the second mixer must be capable of being shifted in frequency for the reception of SSB plus or minus 1.4MHz for the reception of upper and lower SSB signals respectively. The 8MHz to the third mixer must also be capable of being shifted plus or minus 1.4MHz at the same time. The effect of shifting both these oscillator frequencies is to shift the selectivity filters following the second mixer to the lower or upper sidebands of the input signal respectively. It also places the received signal so that it has the correct frequency difference relative to the product detector 1MHz local oscillator for resolving the appropriate SSB signal.

In the CW mode the 50MHz signal to the second mixer is not shifted so that the received signal is in the centre of the selectivity filter passband. The 8MHz from second synthesizer is shifted by 750Hz to produce beat note with the 1MHz local oscillator at the product detector .

I used a synthesizer to produce the whole range of oscillator signals required. In the prototype receiver the synthesizer I used was developed by the Telefunken company for use in their E1700 and E1800 communication receivers. For that reason, I cannot give detailed information on this particular synthesizer. What I have done is to give circuits and a brief description of some of the more unusual circuits used to produce the local oscillator signals. In fact two synthesizers are used, a main synthesizer to produce the local oscillator requirements for the first mixer, and a second synthesizer to produce the local oscillator signals for the rest of the receiver.

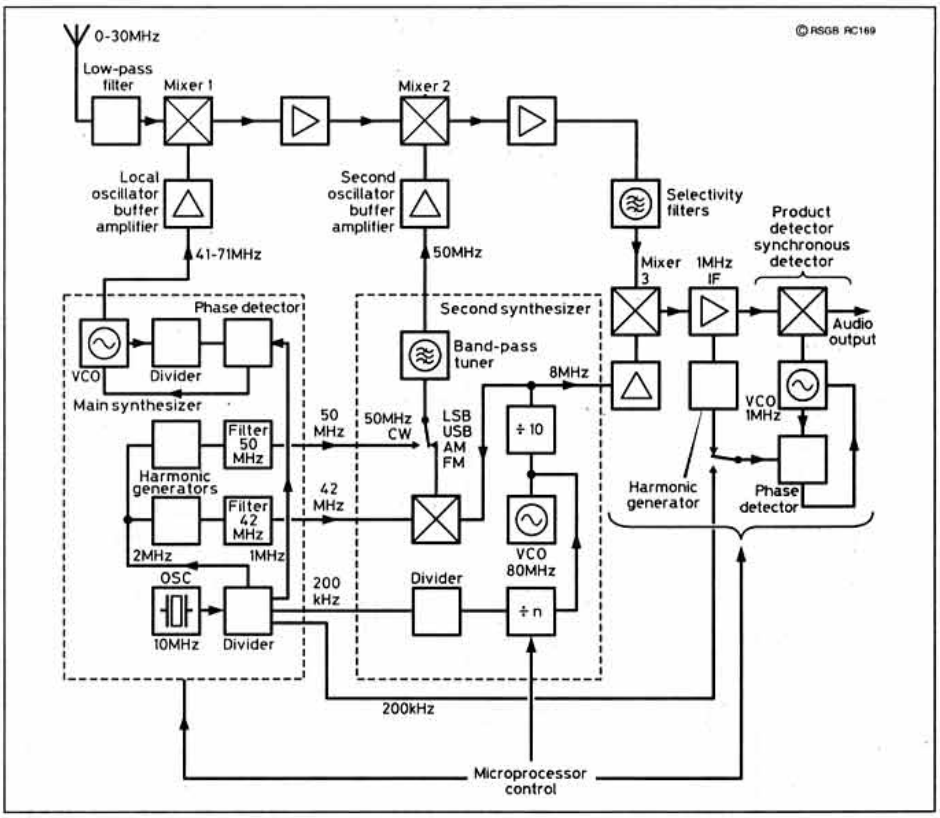


Fig 19: Receiver/synthesizer interface, block diagram

MAIN SYNTHESIZER

A 10MHz OSCILLATOR is used as a frequency reference for all the other oscillators in the receiver, see **Fig 20**. The reference 200kHz for the second synthesizer and demodulator module is derived from 10MHz via a frequency divider.

The 10MHz oscillator crystal, is housed in a block of aluminium, which is temperature controlled to 65°C. This temperature is reached within very few minutes after switching on. The frequency stability of the oscillator is very high (less than 3Hz of drift at 10MHz, for a whole evening after a warm-up period of a quarter of an hour).

As already stated 50MHz is required for the second mixer to produce an IF of 9MHz. In the CW mode this signal is derived directly from the 10MHz reference oscillator – the 10MHz signal divided by five. The resultant 2MHz square-wave signal is then passed through a harmonic generator where it is converted to needle-pulses. These pulses have a very harmonic content, and the appropriate harmonic selected by a 50MHz filter, see Fig 19.

In the SSB modes the signal must be shifted ± 1.4MHz as already described. In this case the 2MHz signal is passed through a harmonic generator, as before, and the appropriate harmonic is selected by a 42MHz filter, as in Fig 19.

VCO CONTROL

THE VCO USES coarse-frequency control by means of fixed capacitors and coils, controlled by a digital counter, see **Fig 21**.

The fine tune control requirement is then limited to a very narrow range of less than 0.5MHz.

The counter is loaded with the required receiving frequency, in parallel BDC code, by the microprocessor.

At the highest receiving frequency of 30MHz, only the two low bits of the most significant byte of the counter are necessary to address this. The BCD-code counts 1 – 2

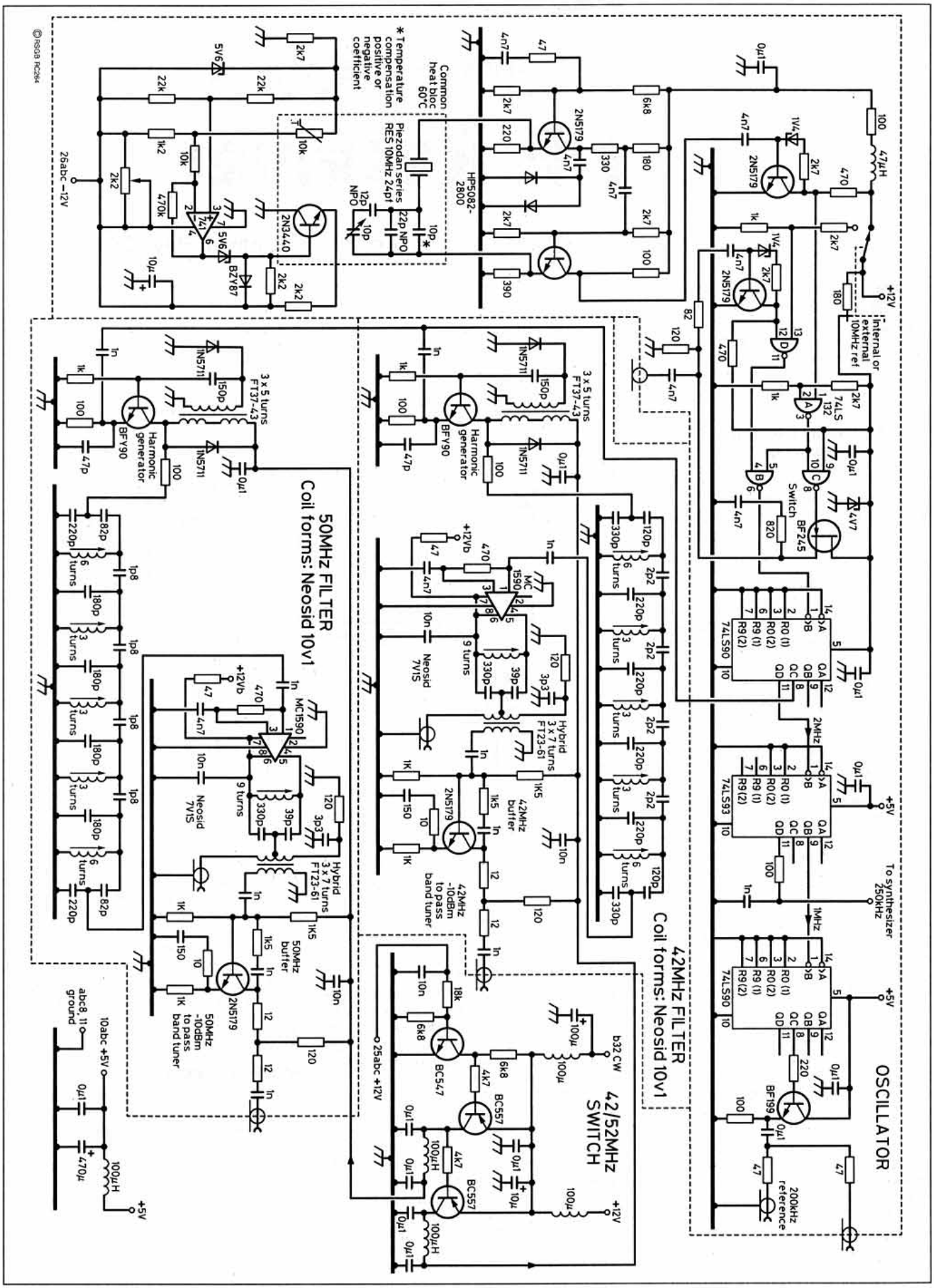


Fig 20: Reference oscillator, circuit diagram.

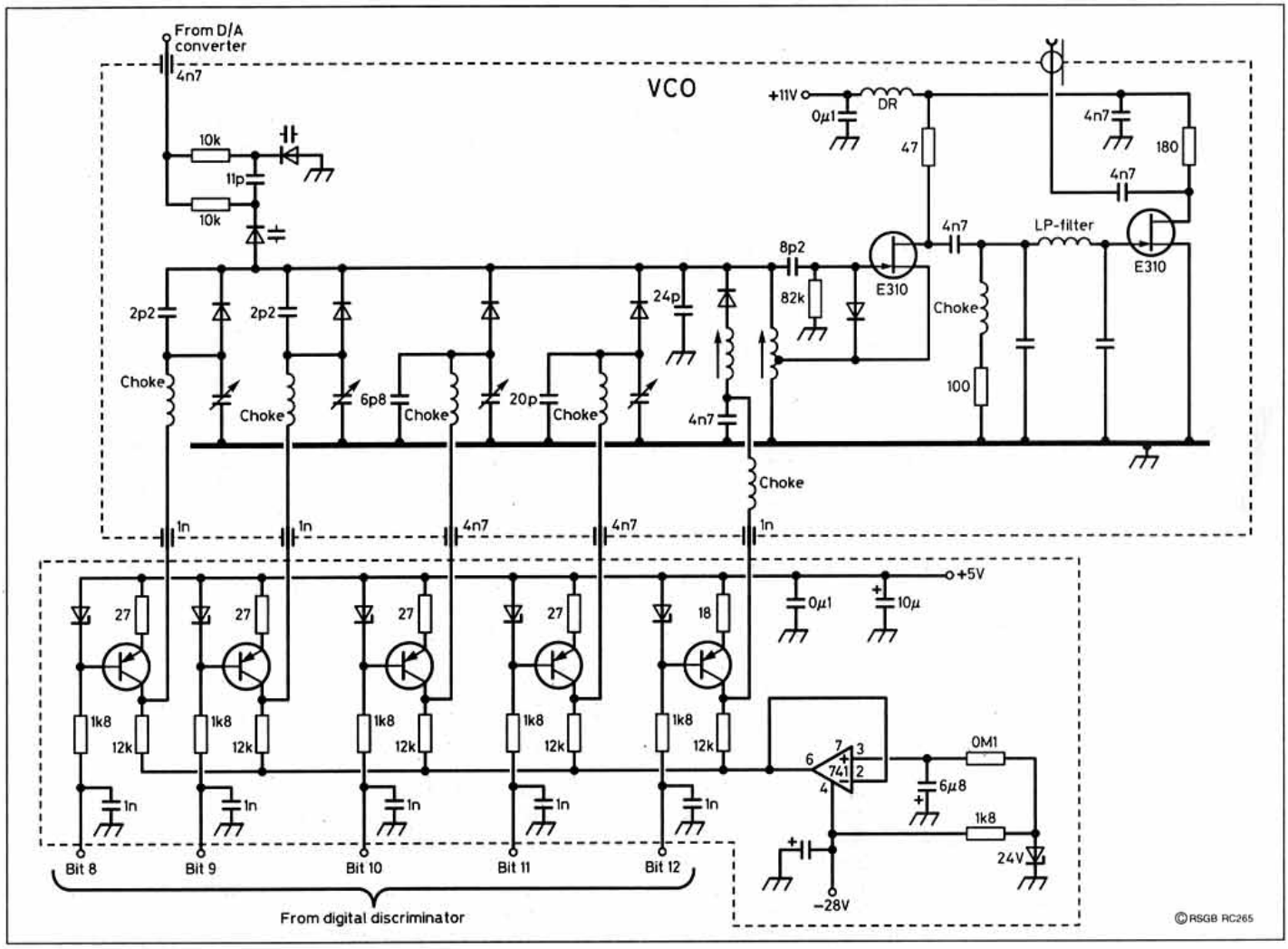


Fig 21: VCO Frequency control, circuit diagram.

– 4 – 8, ending at 9. For instance, if bit No 0 and 1 are set, the result is 3, actually meaning 30MHz). If bit 3 is set high and bit 4 low, the divider will constantly add 40.000.0 to whatever frequency is set by the processor.

The counter reset pulse is formed by gating the outputs from various points in the counter chain, so that reset will occur, when division has passed through zero, and down to 99.000.0. This gives an additional 1.000 steps.

As an example: if the operating frequency is to be 14.307.0MHz, this figure plus the 40.000.0 amounting to 54.307.0 is actually loaded into the counter. When this has been clocked down to zero, counting continues through 99.999.99 and further on to 99.000.0, when the reset will occur.

The sum of the counting steps is 55.307.0, exactly what is required to receive the signal on 14.307.0MHz.

(The oscillator must be 41MHz higher than the received frequency; $f_{Osc} = f_{Ant} + f_{IF}$).

The principle of coarse-steering an oscillator, by means of fixed capacitors and coils, has advantages; the varicap only has to correct the frequency, within a very narrow range (<0.5MHz). Moreover, the voltage applied to the diodes, is a clean DC because the gates in the D/A-converter, will be either on or off. This prevents unwanted noise (Note 2) from 'modulating' the oscillator and, as the transistor used in the oscillator circuit is a low-noise FET-type (E310), the output signal from this synthesizer is extremely clean from phase noise. The capacitors used in the oscillator tuned circuit must of course be of very good quality. Ordinary ceramic capacitors tend to be unstable, which will inevitably lead to an increase in phase noise. We found that good quality chip-capacitors are better. Also the adjustable capacitors should be the air insulated, ceramic type.

Due to the carefully selected time constants in the loop filter, frequency tuning is very smooth to operate. The characteristic 'bouncing' behaviour of a synthesizer has been reduced to a degree, that one almost has the feeling, of tuning an ordinary continuously-tuned VFO. Only when tuning in 1kHz steps is the stepping action noticeable.

SECOND SYNTHESIZER

AS WAS STATED EARLIER the 50MHz signal to the second mixer must be capable of being shifted in frequency for the reception of SSB signals. Also the 8MHz to the third mixer must also be capable of being shifted at the same time.

On SSB a 42MHz signal from the main synthesizer is then mixed with 8MHz. This 8MHz signal in turn is derived from the 200kHz signal from the main synthesizer. The 200kHz signal is divided, under microprocessor control, to control an 80MHz VCO. This frequency is then divided by 10 to produce 8MHz ±10kHz for the second mixer.

Further information on synthesizers are given in [8], [9] and [10].

DESIGN NOTE 2

THE VCO IS NOT exceptionally stable by itself, because of the relatively low Q of the tuned circuit. However, its frequency is compared, in the phase detector, with the highly stable crystal reference oscillator. The error voltage from this comparison is a DC-voltage with a noise voltage superimposed onto it. The part of the noise in the range below the cut-off frequency of the loop-filter is compensated by the feed-back, while the noise above the cut-off frequency cannot be compensated. For this reason it is essential to avoid noise originating, for instance, in the phase detector, the dividers or as flicker noise from the oscillator transistor.

Measurements of phase noise are discussed in References [1], [10], [11] and [12].

REFERENCES

[1] Communications Receivers, Principles & Design by Ulrich Rohde and T T N Bucher.

[10] Ulrich L. Rohde Digital PLL frequency synthesizers, theory and design. Prentice Hall ISBN 0-13214239-2

[11] Hewlett Packard Application Note 150-4.

[12] Hewlett Packard Application Note 283-1

Applications and measurements of low phase noise signals using the 8662A synthesized signal generator.

RADCOM OPERATING FEATURE

To New Zealand on Top Band Phone

by Brian Atkinson, G3GSI

WHAT STARTED as a simple 'sked' to make a first contact on 160m SSB soon progressed into a group of amateurs exploring the regularity of G - ZL short and long paths using grey line propagation.

Although the paths between the UK and New Zealand have been worked over the years by various amateurs, contacts have not been regular. To investigate the paths further, a daily concentrated effort on long and short paths were arranged with two dedicated ZLs. Daily 20m skeds were held to exchange reports on 160m openings, to evaluate propagation conditions and to discuss WWV figures. Detailed notes were taken for later correlation.

On the first day of the skeds, 15 September 1993, weak signals were heard but not positively identified. The next three days produced the same results.

Contact Made

ON THE morning of the 19th, the first contact was made via long path, both sides confirmed reports of 44.

The first short path contact was achieved on the evening of 20 September, with ZL being received at 55. ZL reports of 56 to the G stations were later confirmed. The 29th produced good openings into some areas of the UK, with the favoured locations enjoying contacts of 55 both ways.

The following day both long and short path openings produced some remarkable contacts. The morning tests produced signals, again very localised, which peaked with reports of 59. Whilst stations in the South of England were giving and receiving low signal reports, ZL areas 1, 2 and 3 were contacted from the Midlands, providing a first UK 160m contact for ZL1HY. During the evening, very similar conditions prevailed and 55 reports were exchanged between ZL and several UK and European stations. For the majority, this was their first ever ZL on the band. For others, it produced their first two-way SSB, short path contact.

Mixed results

THE DAILY morning and evening skeds were maintained, with mixed results. On some days contacts were made, with reports of 44 to 58, whilst on others there were no contacts at all. Whilst we were happily 'rag chewing' on 7 October, a ZL was falling victim to the one-way phenomenon: he could copy at 54 but not achieve any response.

On 23 October 55-8 reception of ZL via short path was reported by quite a few UK stations. Unfortunately the ZL station was experiencing QRM from a very strong Loran transmitter. A particularly good opening occurred on the 26th when both long and short paths produced contacts for several stations around Western Europe.

The morning of 10 November saw a remarkable 50 minute opening with 55-8 reports both ways for the UK and some of Europe. This was followed by a five minute opening on the 13th, resulting in contact for only one UK station. Propagation markedly favoured the North of the UK on 26 November. One of the UK operators, on holiday in Scotland, enjoyed an opening of some 56 minutes, whereas the more southerly stations had to be content with the more average 15 to 20 minutes. Signal reports to and from GM were considerably better than the remainder of the UK.

December and January were a disappointment with just an occasional weak contact. Persistent gales created aerial problems. Although split frequency operation was used and QRM was low, very few contacts were made. In January, Jack, ZL2ADX, involved with long and all the short path tests, moved QTH (new callsign ZL4WA) and at the time of writing is not yet back on the air. Jim, ZL2JR, is continuing with the long and short path tests. [The latest news is that contacts had been made up to 4 May but morning QSOs were no longer viable - *Ed*].

Conclusions

LONG PATH has proved to be the most consistent and workable. This provided numerous good openings during September, October and November 1993. December and January openings were erratic and less frequent.

At the commencement of these tests, it was supposed by the UK stations that large, high aerials would be a prerequisite for success. **Table 1** shows the aerials available to the participants. In several instances the 'aerial rule book' failed to apply. A full-size $\lambda/4$ vertical, with extensive ground system, was ineffective compared with an inverted V at the same location. And one GM station worked into ZL on a dipole at a height of 15ft. A temporary 40ft top loaded vertical was erected at one QTH, following gale damage to usual aerials, and a two-way contact was confirmed. These, and similar experiences, showed that pre-conceived notions regarding aerials are not to be relied upon.

Although higher power levels must have helped some UK stations, it has not been proved that power was a major factor in these tests. 100W has been used consistently by at least one UK amateur resulting in reports from ZL

Report from ZL2JR

MY FIRST G contact on 160m was G3SZA on 16 October 1983, using 80W CW into a Minooka whip antenna. Others followed but it was not until 1988 when I erected a $3/4\lambda$ sloper midway between the long and short paths that I fully realised the possibilities of consistent contacts with the UK.

Regular skeds were kept with GU2FRO with great CW contacts on the long path. Further interest by G4XVZ, G3MOU (also GM3MOU), G3GSI and G4CWO saw regular skeds from 1 September 1993.

From 1 September 1993 until 30 April 1994 we had 101 openings at ZL sunset, long path. Eight openings were one-way with no copy in the UK. Some were also to different UK locations other than the sked group. I did not join ZL2ADX on our sunrise openings but when he moved QTH in January 1994 I kept both sked times. From 22 January we have had 28 openings short path.

For me the most exciting opening was on 26 November 1993 when GM3MOU and I ragchewed from 0728 until 0825Z with various breakers. At 0729 OY9JD broke in to make the first OY9/ZL contact with 45 reports both ways. A long path SSB contact of 13,000 miles was quite exciting. Another ZL first was with C31HK on 18 October, the same day as G4XVZ was 45 using only 15W.

Propagation

DURING WEAK openings with normal multiple hops, low angle antennas appear to perform better. However, when chordal path ducting occurs signals are very strong, up to S9 from many types of horizontal antennas.

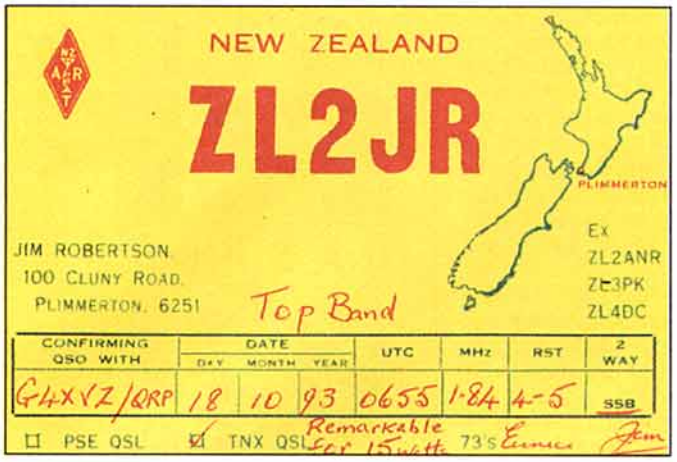
No regular propagation patterns have emerged in ZL. There are times, however, when WWV A-index figures indicate possible openings. A rise from a low to higher A-index often precedes the increase in sun activity prior to a magnetic storm. During the 12 - 24 hour period before a storm fully develops 160m will open quite suddenly before going dead for up to 7 days.

Forecasting of possible ducting formations would be a real bonus if specific measurements of the activity of D and F layers were possible.

Constant grey line charting as given by the VGA Geoclock disc and the more rapid DX Edge are of immense value in understanding possible openings. Careful monitoring for at least 30 minutes of the grey line sunrise/sunset indicators are essential for 160 metres. [The DX Edge software is available from RSGB Sales (see August, page 94) - *Ed*]

As G4CWO stated "The parties freely chose the most perverse, wayward and erratic frequency known to hams!" However, it does pay to reflect that the first ever ZL/G contact was made on a very similar frequency back in the early 1920s.

To date I have worked 37 different G stations plus 1 GD, 1 GI, 3 GM, 1 GU and 2 GW. During this coming low sunspot period I shall endeavour to increase that total and give more Gs an opportunity for their first ZL contact on 160m. From now until the end of April I shall be listening at UK sunrise and sunset times.



QSL card for G/ZL with 15W.

ranging from 55 to 58-9, on both short and long paths. On 13 October a GI using 25W received a report of 44 from ZL, short path. A similar report was obtained by a G on the 18 October using just 15W. Both of these contacts were later confirmed.

Propagation

PROPAGATION IS a mystery. WWV figures and auroral propagation were studied, without much success. Predictions made according to WWV, never materialised. As a consequence, our hope of being able to suggest some kind of pattern never came to fruition. This is still under investigation.

We suspect that there is a geographical aspect which would explain why only certain UK stations were able to have a ZL QSO, eg the GM with the dipole at 15ft had a 15 minute contact whilst no-one else had any reception. Similarly, on 26 October, the eastern side of the UK, on short path, had good propagation in both directions, whilst on the following day propagation favoured the Midlands, short path. Occurrences such as these have arisen very frequently with other UK stations. They all had aerials of differing heights, at non-ideal locations. The same phenomenon also occurred in ZL, where stations reported marked differences in propagation, at differing locations.

What Next?

IT IS PLANNED to continue the tests until September 1994 to give a 12 month pattern. It would appear that the paths between the UK and New Zealand are workable using modest aerials and low power, given the right propagation. Listening times are approximately 20 minutes before UK sunrise until approximately 20 minutes after ZL sunset, for long path. Commence listening 30 minutes before ZL sunrise, for short path.

Thank you to the ZL amateurs, without whose dedication and perseverance these tests would not have been possible. Also thanks for providing an opportunity for many stations to make their first 160m SSB contact with ZL.

G3GSI (Sussex): IC-751, IC2KL linear, inverted-V at 70', dipole sloping from 70' to 30'.

G3MOU (Kent): Drake TR7/IC735, homebrew linear 4 x PL519, dipole at 90', inverted-V at 90', noise reduction system using 'noise antenna'.

GM3MOU (Dumfries & Galloway): FT102/IC735, homebrew linear 4 x 811A, inverted-V at 85', 80m dipole lying in hedge after storms (worked two ZLs with this!).

G4CWO (Reading): JST135, TL922 linear, 224' doublet at 50', inverted-L at 50'.

G4XVZ (Worcester): TS-930, Lambda/4 vertical, Inverted-V at 90', 40ft top-loaded vertical.

Another member of the UK group, **G3KXU**, did not participate in the transmitting tests but has been responsible for coordinating and analyzing the data.

ZL2JR: 400W to 350' long wire sloping from 80' to 16' fed against 60 radials.

ZL2ADX: 400W to multiple 1500' V-beams (24 wires) switchable around 360°.

Table 1: Equipment in use by the participants.

This Month's Book Choice

Reviewed by Pat Hawker, G3VA

NEWNES PRACTICAL RF HANDBOOK

by Ian Hickman.

Published by Newnes (imprint of Butterworth-Heinemann Ltd) 1993. 271 pages (230 by 155mm) soft covers. Price £16.95 (plus £2.50 post & package from Reed Book Services Ltd, PO Box 5, Rushden, NN10 9YX).

ISBN 0 7506 0871 4.

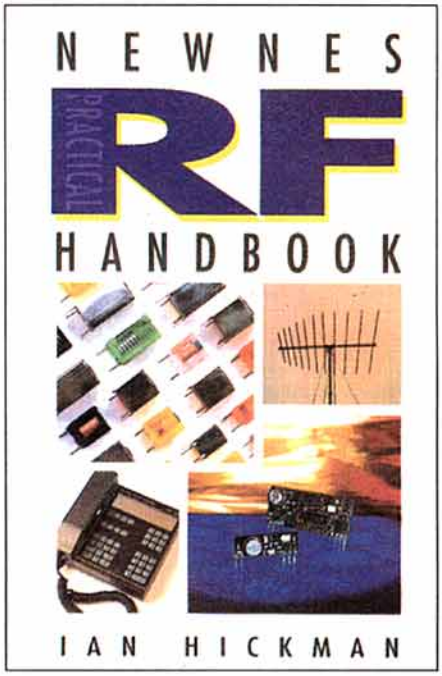
SINCE TRAINING COURSES for professional engineers now put so much emphasis on digital electronics, there remains a demand for – and shortage of – engineers with a sound practical knowledge of RF design, which continues to combine analogue electronics with an ever increasing degree of digital technology, including the new approaches being opened up by digital signal processing.

This new book claims to be aimed at both amateur and professional RF engineering, although the author concentrates primarily on the theory and practice of professional communications rather than amateur radio practice, and the amateur experimenter and designer may be left wishing that the book dealt rather more with, for example, SSB as we know it.

It seems rather idealistic to state that SSB voice communication requires equipment stability of "up to about 10Hz for speech and 1Hz for music", tolerances more associated with broadcast SSB with pilot carriers than the "frequency shifts of +200Hz or –100Hz" held to be tolerable maxima for normal communication requirements as given in a 1966 ARINC publication.

'Ian Hickman' is the pen-name of an experienced author and professional graduate-engineer, but not I suspect an active radio amateur. Of the relatively few 'references' given at the end of each chapter, only one (Wes Hayward's excellent *Solid State Design for the Radio Amateur* published by ARRL) is a specifically amateur radio publication. Nevertheless it should be stressed that the book, with 13 chapters and 11 appendices, is well organised and does give a clear and up-to-date outline of RF theory and practice.

There is much useful information on passive RF components, RF transmission lines, RF transformers, couplers, hybrids and directional couplers, small-signal and power



amplifiers, oscillators and frequency synthesisers etc. The chapter on antennas and propagation, however, may disappoint with, for example, no mention of antenna computer modelling with NEC etc, and little that would in practice help the average amateur radio reader.

A book to be recommended, but with reservations.

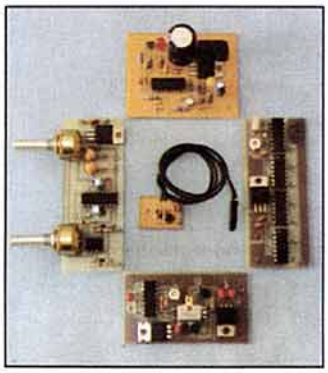
PRODUCT NEWS

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 NAME Ben Spencer will be familiar to *RadCom* readers as he has had several projects published in recent years. His efforts are now going into manufacturing **kits** and his recently published range includes: An Audible SWR Meter to enable blind amateurs to *hear* their SWR (£15.90); a High Frequency RF Head which measures power up to 100W, 80 to 10m (£12.90); a Crystal Calibrator offering markers at intervals from 10MHz to 10kHz all the way up to UHF (£12.90); and a Thermal Fan Controller which switches a fan on only when it is required (£4.90). Each kit comprises a quality fibre glass PCB, all board mounted components (ie no knobs, cases, wire, solder or panel sockets), a Constructors Guide, a circuit and full instructions.

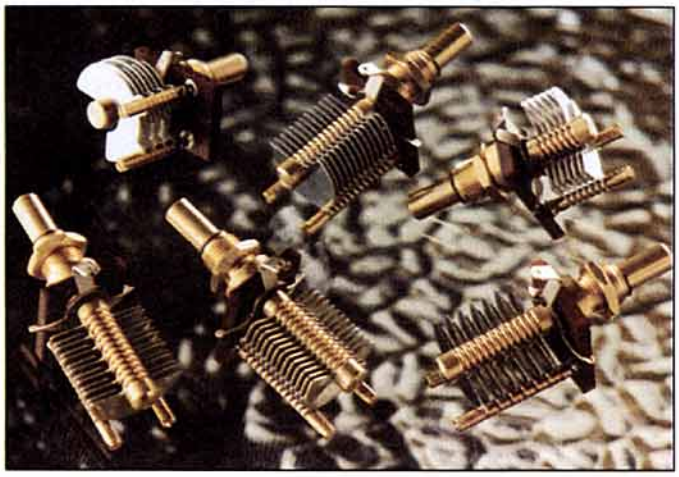
Forthcoming kits include a Deluxe Iambic Keyer, a High-stability Crystal Oven, UHF Prescaler, fully-protected 13.8V 5A PSU and an Automatic Gelled Lead Acid Battery Charger. A technical helpline is available if a constructor gets stuck. For further details get in touch with:

Ben Spencer Consultants, Enterprise House, 33 New King St, Bath, Avon BA1 2BL. Tel: 0793 642856.



ARE YOU PUZZLED by the rig numbers on the *Members Ads* pages? For instance, what is an IC2SRE and how does it differ from an IC2SE? The answers are in ***The Rig Review*** edited by Dave Morgan, GW3KYZ. This 60-page A5 book covers hundreds of amateur band receivers, transmitters and transceivers, sorted by manufacturer, and describes each rig's main features and its original price. In addition, reviews in UK magazines are referenced where appropriate [copies of *RadCom* reviews are available at £1 a page from RSGB HQ - *Ed*]. *The Rig Review* costs just £5, post free, from:

Twrog Press, Penybont, Gellilydan, Blaenau Ffestiniog, Gwynedd LL41 4EP.



IT'S BECOMING increasingly difficult to find **new variable capacitors** these days but a company with a well-respected name is still in this business. Jackson Brothers have announced the C824-series of air-spaced trimmer capacitors which combine low cost with Jackson's 70-year reputation for quality. Trimmers are available from 10pF to 100pF (linear law) with a minimum capacitance of less than 5pF and a maximum working voltage of 350V. The vanes are made of aluminium and the front panel is a low-loss composition. The components are based on the highly successful (and still available) ceramic and silver-plated brass C804 types and, for low power use up to about 100MHz, the two are mechanically and electrically interchangeable. For details of these and Jackson's comprehensive range, contact:

Jim Parker, Jackson Brothers Ltd, Kingsway, Waddon, Croydon CR9 4DG. Tel: 081 681 2754; Fax 081 681 3728.

THE INTERNATIONAL Short Wave League publishes a 25-page book: ***Standard Frequency and Time Signal Stations of the World***. Stations are listed by frequency and by callsign, and full details are given of each transmitter as well as how to interpret the data heard. This unusual publication is invaluable for those interested in propagation or in calibrating their station equipment. The price is a very reasonable £2.50 post paid.

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

AN ENTIRELY new concept in receivers comes from the ComFocus Corp of San Diego. Described as a marriage of radio and state-of-the-art computer technology, SoftWave is a receiver with no controls on it, driven totally by your computer. But this is no ordinary computer-controlled radio. It can take on several 'personalities', eg a communications receiver, a SW broadcast radio, a VHF receiver or a wideband spectrum analyser, all selected from the PC screen. The list of facilities, made possible by the use of DSP, is quite mind-boggling and we'll be reviewing this receiver just as soon as we can get hold of one. If you want to see one in action, contact:

Lowe Electronics Ltd, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel 0629 580800.

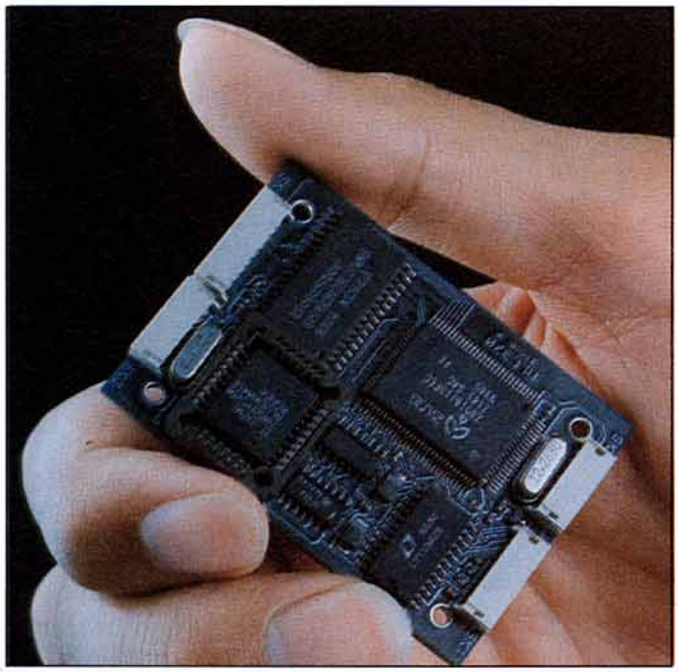
THE **FT-900** IS A NEW HIGH PERFORMANCE compact (238 x 93 x 253mm without knobs) HF all-mode transceiver from Yaesu. It features 100W out on all HF bands and general coverage reception 100kHz - 30MHz. Other features include a bargraph meter with a 'peak hold' facility, reversible sideband on CW and adjustable BFO offset (for correct frequency read-out when using data modes). A built-in antenna tuner saves the need for an extra tuner box and the detachable front sub-panel should make for easier installation in the car. The list price, which includes a hand mic, is £1299. Optional extras include PSU, CW filters, external loudspeaker, computer interface, mobile brackets and desktop microphone.
Available from Yaesu dealers throughout the UK.

FOR A COST, it is easy to connect a modern transceiver to a computer to perform a wide variety of functions. Siskin have come up with an **inexpensive CAT Interface** which puts this facility within the reach of most amateurs. It will control Icom, Yaesu and Kenwood radios and comes in a neat little RFI-tight box. Siskin will supply the appropriate cable for your rig and the appropriate software (IBM-AT). All this for only £69.95 plus £4.00 P&P from:

Siskin Electronics, 2 South St, Hythe, Southampton SO45 6EB. Tel: 0703 207155; Fax 0703 847754.

● KLINGENFUSS HAVE published the 14th edition of their ***Guide to Fax Stations***, covering equipment, theory, detailed listings and sample printouts - concentrating on the many weather fax stations on land and in space. At a massive 400 pages, it's a gold mine for the fax enthusiast. For details of this and other 'Guides' contact:

Klingenfuss Publications, Hagenloher Str 14, D-72070 Tuebingen, Germany. Tel: 010 49 7071 62830. Fax: 010 49 7071 600849.



A VERY SMALL **packet radio modem** is offered by Thorcom Systems Ltd of Worcester. Running AX25 level 2, version 2, KISS mode the modem is small enough to fit inside your mobile radio (it's 63 x 44 x 10mm). The RLC320 offers transmission speeds of 1200, 2400 and 4800 bits per second using FFSK and has two serial ports, one RS232 and one at TTL/CMOS levels. Price around £300 + VAT. Amateur radio sales enquiries to

Siskin Electronics, 2 South St, Hythe, Southampton SO45 6EB. Tel: 0703 207155; Fax 0703 847754.

ADUR COMMUNICATIONS are importing the range of Oak Hills Research **QRP transceivers** and accessories. These are quality kits complete with enclosures, and include dual- and single-band CW rigs, an audio filter, a QRP wattmeter and an electronic keyer. Adur also carry spares and modification parts for the Heathkit SB220 amplifier.

Adur Communications: 13 Dawn Crescent, Upper Beeding, Steyning, W Sussex BN44 3WH. Tel: 0903 879526.

● HAYDON COMMUNICATIONS have announced a new range of **VHF-UHF mobile and base antennas** at a cost savings of around 20% made possible by cutting out the middle man.

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IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

A high-performance 145/434MHz diplexer **can be made using amateur resources.** Henk van Amersfoort, PA0HVA, **tells how in *Electron* (NL) 6/94.**

IF A DUAL-BAND ANTENNA is to be used with two single-band rigs, or a dual-band transceiver with separate amplifiers and/or antennas, a device is required which can separate or combine two signals of different frequencies.

A diplexer is such a device; entirely passive, it is inserted in the coaxial feeders and permits simultaneous operation on the two bands.

Performance criteria are attenuation in the desired path (as low as possible), isolation in the blocked direction (as high as possible), and SWR (as close to unity as possible).

HOW IT WORKS

THE CENTRE PORT IN **Fig 1** is common to both frequency bands and may be connected to, say, a dual band antenna; the 145MHz port on the left would then be connected to a 145MHz transceiver and the 434MHz port on the right to a UHF transceiver.

An incoming 434MHz signal on the common port would see, towards the left, a λ/4 coax, shorted at its far end by a series-tuned LC circuit; seen from the common connector this is a very high impedance. The 434MHz signal can travel to the 434MHz port on the right, however, unhindered by the LC circuit series-tuned to 145MHz, as it represents a high impedance at UHF.

Conversely, for 145MHz signals, the path between common and 145MHz connectors is open while the route to the 434MHz port is blocked.

The same goes for a signal on its single-band port; it can travel unimpeded to the common port, but not beyond to the other single-band port. In other words, a diplexer is bi-directional.

CONSTRUCTION

FOR LOW-LOSS OPERATION, high-Q tuned circuits are a must. The quarter-wave lines have low losses if made of good-quality coax. To achieve best Q in the series-tuned LC circuits, the inductances should be as large as possible and the capacitances as small as consistent with a reasonable tuning range.

The chosen design values are 6pF & 200nH for 145MHz and 2pF & 67nH for 434MHz. The trimmer capacitors are professional piston models, 12 and 3pF maximum respectively. Other high-quality types can be used. The coils are wound of 1.5mm dia. enamelled copper wire. 200nH works out to 7 turns close-wound on a 9mm rod, then stretched to a length of 20mm. For the 67nH coil, the dimensions are 4 turns, 6mm ID and 10mm long. From the measured isolation of the unwanted ports of 40dB, the effective series resistance of the LC circuits was calculated as 0.5Ω, ie a Q of 365.

The λ/4 lines were made of RG316 [Note 1] PTFE-dielectric miniature coax, which has a velocity factor of 0.695. This requires 359mm for λ/4 @ 145MHz, 120mm for 434MHz. PTFE does not melt when the ends of the braid are soldered directly to lugs under the mounting nuts of the coax connectors [Note 2]. **Fig 2** shows the assembly in a 150x50x30mm cast-aluminium box.

An N-connector is used for the common port, BNCs for the other two.

ADJUSTMENT

WITH THE 145MHz PORT terminated with a 50Ω dummy load, and a sensitive power indicator with 50Ω termination [Note 3] connected to the 434MHz BNC, feed a 145MHz signal (eg from a hand-held transceiver) into the common port. Adjust the 12pF trimcap for minimum indication. Do not readjust.

Interchange the items connected to the 145 and 434MHz ports, feed a 434MHz signal into the common terminal and adjust the 3pF trimcap for minimum indication. Tune-up is now complete.

MEASURED PERFORMANCE

ASSUMING A TRANSMITTER output of 100W, and an isolation of -26dB (see **Table 1**) or better, no more than 250mW will reach the receiver on the other frequency. The input bandfilter of almost any transceiver will further reduce that by 20dB or more, exposing the first receiver semiconductor to no more than 2.5mW - a pretty safe value.

NOTES

[1] RG316 coax is sold in the UK by Mainline Electronics, Leicester, @ £1.38/m + £1.50 per order P&P + VAT. Minimum order £10 all-in.

[2] With a hot iron, and care, the braid of RG58C/U or UR76 coax can also be tinned all around and soldered to a lug without damage to the dielectric. λ/4 lines for 145 and 434MHz would be 341 and 114mm long. To avoid coiling this thicker coax too tightly, a wider case is suggested. *[G4LQI]*

[3] A sensitive indicator can be improvised by connecting an RF millivoltmeter across a 51Ω composition resistor soldered to a BNC plug or even by a sensitive wavemeter (*Eurotek* 6/94) coupled closely to that resistor. *[G4LQI]*

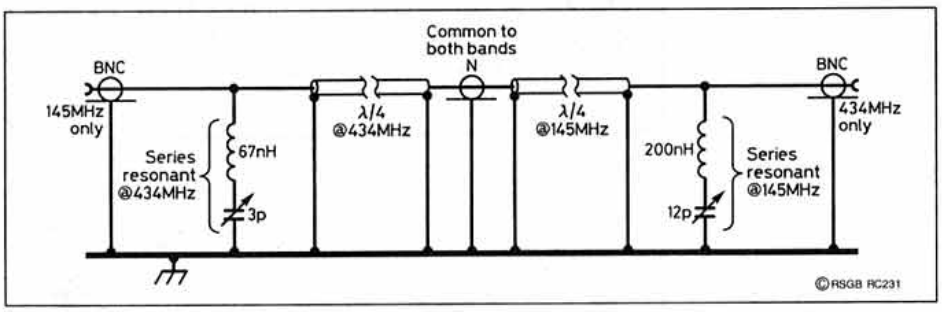

Fig 1: The circuit of PA0HVA's 145/434MHz diplexer

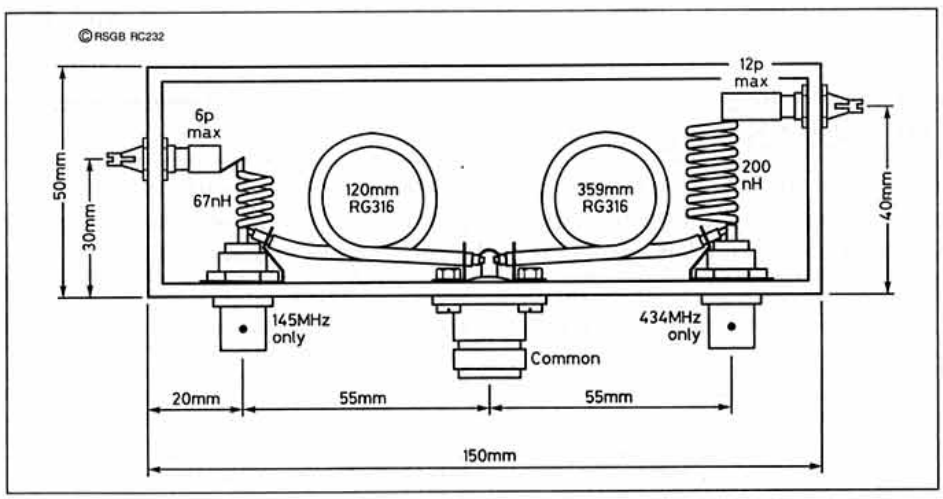

Fig 2: The construction of the 145/434MHz diplexer

Freq MHz	Isolation dB	Insertion loss (dB)	SWR
144	26	0.15	1.05
145	40	0.15	1.02
146	26	0.15	1.05
432	29	0.25	1.03
434	40	0.25	1.04
436	30	0.25	1.06

Table 1. Diplexer Performance

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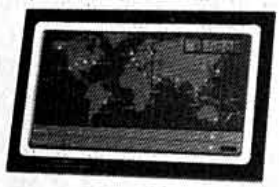

This superb clock from Seiko is not radio controlled but does offer features ideal for use in the shack. It shows timezones across the world and at the press of a button will speak the zone location and the present time in that zone.

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UR95, 2.3mm, 50 ohm, mini nylon coax	30p/m
UR111, 2.3mm, 75 ohm PTFE mini coax	40p/m
UR57, 10.3mm, 75 ohm low loss coax	70p/m
UR70, 6mm dia, 75 ohm transmitting coax	30p/m
Double screened, 75 ohm coax, 8mm dia	40p/m
UHF low loss TV downlead, 75 ohm	25p/m
75 ohm twin balanced feeder, 400 w PEP	25p/m
300 ohm standard ribbon	25p/m
RG62AU, 6mm dia, 95 ohm coax	50p/m
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RADCOM OPERATING FEATURE

Have a Go In An HF Contest

by John Kennedy, G3MCX, RSGB HF Contests Committee

NEWCOMERS TO contesting may be daunted by the rough and tumble of the major international events such as *CQ* Worldwide, but a number of RSGB events provide a gentler introduction.

As a first step, listen to someone operating in a contest: observe that careful netting is needed on CW as narrow filters are often used. CQ calls are kept short, and once contact is made callsigns are sent a minimum number of times, with no exchange of names and no unnecessary procedure. Repeats are sent only if they are likely to be needed.

SIMPLE BEGINNINGS

PICK A SHORT SINGLE-BAND contest which needs just a single antenna. Two to four hours is quite long enough: although fun, the concentration needed for even a short event is taxing, so start off fresh if possible. Carefully read the rules before starting. Check the date and time, and any restriction on the range of frequencies; do not stray outside the specified band segments.

Check the contest exchange required. This is usually RS(T) plus a three digit contact serial number starting from 001, and a county code for most RSGB events. The full list of county codes appears in January *RadCom* and in the *RSGB Call Book*.

Call CQ only if you are confident of being able to handle the response. Otherwise, start with the 'search and pounce' technique, picking off callsigns methodically while tuning across the band. This will show where the centre of activity is, and will help to indicate the best part of the band for the beginner to use for CQ calls, later in the contest.

At the end of the event you will feel that you have worked hard, and contacted all the stations you possibly could. Do not be disheartened when you find the leaders have made twice as many QSOs! This can happen at first so keep trying, and compete with your own previous scores and with those around you.

GOOD HABITS

IMPROVE YOUR POSITION in the results table right from the start by forming good habits: in many cases more points are lost after the contest than during it. This may be hard to believe but it is true. Many errors are due to easily avoidable carelessness after the event, when the pressure should be off.

A carefully written-up entry without errors will often move five places up the table once adjudication has been carried out. Unmarked duplicates for which points have been claimed are heavily penalised by a 'fine' of *ten times the claimed score* for that contact.

Beginners of all ages can enjoy HF contesting with quite modest gear.

The adjudicator's job is made much easier if you include an alphabetical list of callsigns worked ('dupe sheet'), ideally with the serial number you gave noted against each contact. Callsign errors lose all the claimed points for that contact. Adjudication of a recent CW contest found that a mixture of Morse and transcription errors had left very few characters that had not been mixed up in at least one log. Watch U and V; G, O and Q; 5 and S, etc. Either the entrant or whoever writes up the log often cannot read the original, or fails to check it afterwards. To illustrate the difficulty, write out a list of callsigns and ask a non-amateur to read them back: see how many will be difficult or wrong.

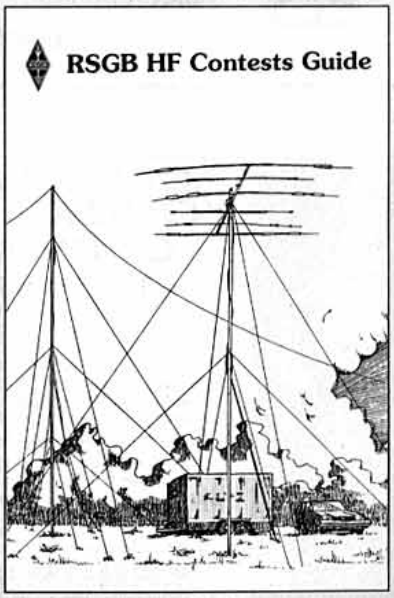
CHECK CAREFULLY

BEFORE SENDING IN THE ENTRY, check it right through. It has happened for example that a whole column has been missed from a page! Check for the impossible, such as a station sending a Welsh county code but with a GM prefix. An adjudicator checking a hundred or more logs should not be able to find silly mistakes that an entrant checking just one log has missed; read the rules again and check carefully before committing to the post box.

One final point. Members of the RSGB's contest committees are all volunteers and spend hours checking logs to try to ensure a fair result, but they also like to be able to operate themselves. Please help by keeping entries tidy and in the correct format. Total pages separately, include lists if requested and *never* write in red. If you can't beat 'em (yet), join 'em. Have fun!

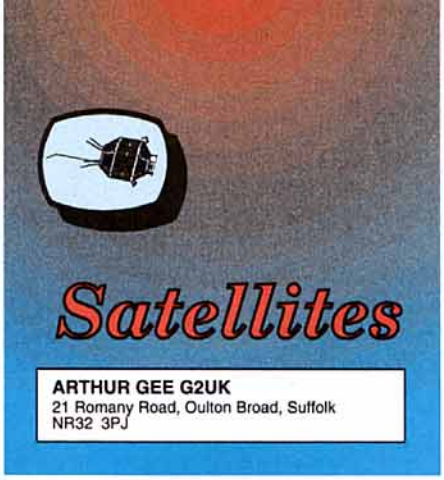
RSGB HF CONTESTS GUIDE

Published by the RSGB's HF Contests Committee, this two-dozen-page A4 booklet is a boon to newcomers to contesting as well as to the more experienced.



It includes an introduction to HF contests, a beginners' guide, a description of RSGB HF contests and some major overseas ones, an International Contests Calendar, an explanation of log-checking and hints and tips. Copies of all contest forms are included and these may be photocopied to use for your contest entry.

The *RSGB HF Contests Guide* is available from the HF Contests Committee, either at their HF Convention stand, or by post at £3 from Chairman Dave Lawley, G4BUO, 'Carramore', Coldharbour Rd, Penshurst, Tonbridge TN11 8EX.



Satellites

ARTHUR GEE G2UK
21 Romany Road, Oulton Broad, Suffolk NR32 3PJ

I EXPECT MOST READERS of this column will be aware that Ron Broadbent, G3AAJ, recently announced his decision to retire from his many posts within AMSAT-UK.

Professor Martin Sweeting, G3YJO, Chairman of AMSAT-UK, formally announced the plans for the future of AMSAT-UK, with a statement in the June issue of *Oscar News*, to the effect that this matter had taken up a substantial part of each committee meeting during the past year to formulate plans for the future running of the organisation.

After much discussion and in order to minimise the disruption of an abrupt hand-over, Ron has agreed to retire gradually rather than relinquish all his commitments at the same time. He will remain as Secretary and Treasurer for the foreseeable future, but hand over the editorship of *Oscar News* to Fred Southwell, G6ZRU. This will be a phased handover to be completed by mid-1995. Doug Loughmiller, G0SYX, assisted by Jackie Brooks of the University of Surrey, will take over as Colloquium Manager. It is hoped to hand over the management of AMSAT-UK Goods and Books to another committee member, thereby relieving Ron and his wife Beryl of some of the routine workload which they have had to shoulder in the course of AMSAT-UK's ever-expanding activities. All those who have known Ron and Beryl over the past years will, I know, wish to join me in thanking them for all they have done for AMSAT-UK and for deciding to continue still longer in keeping the organisation going until others can pick up the reins.

ALTRUISTIC RADIO AMATEURS

JOHN BRANEGAN, GM4IHJ, can be relied upon to come up with thought-provoking ideas from time to time, as readers of this column will know from previous quotes from his writings. In a 'Letter to the Editor' addressed, via Packet, to the editor of *Oscar News*, he has some pertinent views to make on the topic of recent satellite launches which, he says: "appear to have little to do with amateur radio, except that they use amateur radio frequency bands. These satellites are built by colleges and universities, apparently with little regard for the fact that they simply duplicate what College X did last year, and what very few people are using this year". He admits there are exceptions. "The University of Surrey 'store and forward digital birds' totally revolutionised international dissemination of amateur radio Packet traffic and DOVE is very close to what the educational satellite should be. The original UoSats were crammed with excellent educational facilities, but most of the rest of the college birds, either in space or going there shortly have nothing of any real value to ordinary radio amateurs". John quotes a typical example: "A recently announced 'project', will carry earth picture equipment and navigational reporting facilities – items which already exist in other satellites and which appear to attract only a small number of users. There is no mention of provision of any facilities useful for the ordinary radio amateur". John suggests that any satellite using amateur radio frequencies must in future deploy at least one mode of amateur voice/CW communications via a transponder, plus at least one amateur band beacon.

This topic is an old one. Right at the beginning of the amateur radio satellite scene as we know it today, this matter came up for discussion at an early AMSAT-UK Management Committee meeting, when the first UoSat satellite was being discussed. The plans for this first UoSat satellite did not provide enough energy facilities to run a transmitter as well as a receiver for 'transceive' mode but, rather than lose the opportunity of launching it, the committee agreed with the plans, in spite of violent disagreement from one or two members of the then AMSAT-UK committee. As experience was gained subsequent amateur radio satellites built by the University of Surrey team always had amateur radio facilities.

In his reply to GM4IHJ, Ron Broadbent expressed his agreement with much of John's views. He pointed out that much of the problem arises from confusion through misinterpretation of the wording of International Licence regulations, local agreements, etc, across the world. For instance, in Europe and Africa, the licence regulations state ". . . . for self training", whereas in north and south America (Region 2 ITU) the words were changed a long time ago to 'Education', which has a much wider interpretation.

Ron's reply to John covers the matter in detail in the June *Oscar News* No 107, which those who are interested in this matter will find well worth reading.

AMRED – AMATEUR RADIO IN EDUCATION

AMRED IS A NEW MAGAZINE, brought out by the STELAR Group (Science Technology through Educational Links with Amateur Radio). The Group brings together all those who are involved in educational amateur radio projects. Its chairman is Richard Horton, G3XWH. In his first editorial in *AMRED*, he writes as follows: "Welcome to the first issue of *AMRED*! We hope you will like this unique publication dealing with all aspects of Amateur Radio as seen from an Educational perspective."

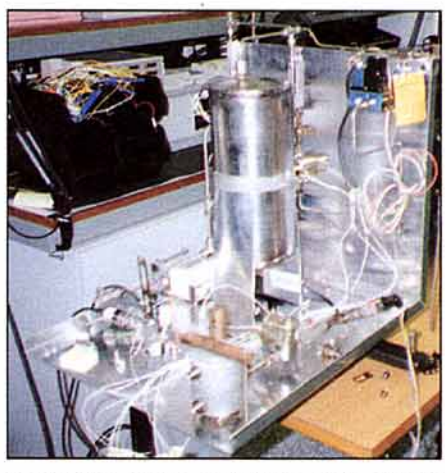
"One feature of the magazine will be the regular 'getting started' series and in this edition we kick off with items on Packet Radio and Amateur Satellites."

"I am often asked 'Who are the STELAR Group and what do they do?' and feel it appropriate to fill in a little history at this point. Since teaching at Harrogate Ladies College for some sixteen years, I have been fortunate to be involved with many Educational Amateur Radio projects and have come across many schools and colleges in this time who use amateur radio as part of their curriculum. It has always seemed to me that two needs have been largely unfilled. That of coordinating the dissemination of information of what is happening in these institutions; of bringing the prime movers together to share experiences and to offer support to schools who are not aware of the potentialities of the hobby as a vehicle to aid good practice in the teaching of Science and Technology."

"It was with these objectives in mind that I convened a small 'committee' meeting at the ASE headquarters in August 1993."

"The above aims were discussed and those present were unanimous that educationalists had a unique contribution to make in these respects. This is not to say that we feel we can replace existing organisations, far from it. The special roles played by the RSGB and organisations such as AMSAT-UK will always be of great importance to schools and colleges and we are most grateful for their support of our aims."

There are so far seventy two schools affiliated to STELAR, over fifty of whom have amateur radio transmitting licences. AMRED is sponsored by Trio-Kenwood Ltd, who stepped forward to explore the possibilities of supporting the group's objectives. They made it clear from the start that they were looking for a vehicle to support the educational community and not as a sales promotion for their company. Further information from: Richard Horton, BSc, G3XWH, Chairman STELAR, 7 Carlton Road, Harrogate, North Yorkshire HG2 8DD.



Development work on a hybrid rocket motor for satellite positioning by University of Surrey.

CQ MAGAZINE'S SATELLITE VIDEO

CQ MAGAZINE PRODUCES several operating guides for various aspects of amateur radio, such as DXing, Packet, Contests Satellites and so on. Their video 'Getting Started in Amateur Satellites' is an excellent introduction to amateur satellites, covering typical satellite radio stations, the equipment needed for this mode, the satellites in operation, analogue and digital modes and much else. In VHS with PAL colour standards. Running time approx 50 minutes, it is priced at £20.15 inc VAT and P&P and is available from AMSAT-UK.

For anyone giving lectures on amateur radio satellites or similar public relation activities, teaching in schools etc, it is a most useful 'visual aid'. Its approach is straightforward and presentation simple and easily understood. Sound and colour are excellent.

Data Stream

RICHARD STERRY G4BLT
1 Wavell Garth, Sandal Magna, Wakefield,
West Yorkshire WF2 6JP

IN FEATURING the Apple Mac in July, I did not include a postal address for the benefit of those who are not on packet. Anyone interested in exchanging information, ideas and software concerning the Apple MAC range, can send an SASE to Tom Kershaw, G7MMM @ GB7OAR, 47 Balls Road, Oxton, Birkenhead, Merseyside L43 1UT.

FIRMWARE UPGRADES

THE G-TOR FIRMWARE upgrades are now available from Lowe Electronics (tel: 0629 580800), and from Siskin Electronics, (tel: 0703 207155 or 207587), at a cost of £35 inclusive of VAT and carriage. The upgrade consists of an EPROM with version 7 firmware, plus documentation and a disk, and is available for the Kam-Plus, and KAMs fitted with the enhancement board.

The bad news is that, according to Kantronics, "G-TOR is a processing and memory-intensive mode, ... and the EPROM is nearly full. As a result, monitoring was not included in the G-TOR protocol. However, a G-TOR monitoring program, GMON, has been included in a new distribution disk for both updates and new units". Now, GMON is only available for IBM compatibles, and requires a 286/16 or faster processor. There is a simplified GMONX program for slower machines, or alternatively you can stream data onto disk and decode it off-line with the GOFF program. According to the .DOC file, GMON is "not intended to be a general-purpose terminal program."

The fact that you cannot monitor G-TOR activity without a separate program is inconvenient enough, let alone the problems of attempting operation when using a computer which is either slow, or not IBM compatible. I have not yet had time to install my own firmware upgrade, but I have strong reservations about this aspect. You can monitor CQ calls made by stations using the G-TOR FEC mode, as this apparently is the same as the AMTOR FEC mode, but you cannot easily monitor a QSO between two stations using the G-TOR ARQ mode.

Also available from Siskin is the PacComm TNC firmware version 3.2 for TNC2 clones such as the Tiny-2, TNC200, BSX2, KFN2, TNC2-DL, TNC-Plus etc. This has a number of bug fixes over 3.1, plus some new commands; contact Siskin for details on 0703 207155 or 207587.

DATA EMISSION CODES

WHEN ENTERING A DATA QSO in the logbook, it can be tricky deciding on the correct emission code to be entered, as detailed in the *BR68* document accompanying the amateur licence. For example, RTTY/AMTOR is F1B for direct FSK, and J2B for AFSK of an SSB transmitter, (which is what most people probably use). Packet is F2D for AFSK, eg on VHF/UHF, and J2D for AFSK of an SSB transmitter, eg on most HF bands. The 'B' denotes 'Telegraphy for automatic reception', whilst the 'D' denotes 'Data'. So, where does this leave newer modes such as PACTOR and G-TOR, which have some attributes of both AMTOR and Packet? I put this question to Karen Scott of the Radiocommunications Agency of the DTI, and I quote the latter part of her very helpful reply. ITU, by the way, stands for International Telecommunications Union.

"The ITU wording was used in the *BR68* because it gives radio amateurs considerable flexibility to experiment with many types of emission. In the longer term, we are considering the possibility of simplifying this aspect of the logging requirements but our main concern is to retain the flexibility for specialised emission types while providing sufficient information for RIS investigations.

"The definition of 'telegraphy' given by the ITU suggests that emission designator 'B' covers all types of messages, including fixed images eg graphics transmitted by RTTY/AMTOR/Packet/PACTOR etc. However, the emission designator 'D' for data, telemetry and telecommand, is more appropriate to cover the 'switching' commands used in mailbox and node control and the transmission of compressed files. An operating session containing messages and commands should be classified as 'W' to indicate a combination of 'B' and 'D'. It is not necessary to log each individual packet. If there is any doubt which designator should be used in the log, it would be helpful to include the generally recognised name of the system eg Packet, AMTOR, CLOVER etc".

BOOKS

If you want some reading matter on the subject of CP/M, then here are some books that have been recommended to me: *CP/M the Software Bus* by A Clarke, J Eaton and D Powes-Lybbe is published by Sigma Technical Press under ISBN 0-905104-18-8. *The CP/M Handbook with MP/M* by Rodnay Zaks is published by Sybex under ISBN 0-89588-048-2. *The CP/M Bible* by M Waite and J Angermeyer is published by Sams under ISBN 0-672-22015-6. *The Soul of CP/M* by M Waite and R Lafore is published by Sams under ISBN 0-672-22030-X. *Amstrad CP/M Plus* by A Clarke and D. Powes-Lybbe was published by MML Systems under ISBN 0-946443-09-2.

Although no longer in print, this last book can often be found in secondhand bookstalls, and perhaps also at rallies. You may also find some manuals published by Digital Research themselves, and these are worth having. Finally, I understand that there is also a book called something like *Using CP/M on the Amstrad*, but I have no other details.

MORE ON THE 'RIGHT' TONES

MY PIECE ON THE 'RIGHT' HF data tones back in January of this year, resulted in a few enquiries from readers. All were users of the Yaesu FT990, but I suspect much the same situation arises with similar transceivers. I use AFSK on all data modes, and this works well, but some users have had problems when using FSK modulation, (referred to as RTTY mode on the FT990).

It seems that at least part of the problem is due to a slight misunderstanding of the situation. When using AFSK, the transmit tones and the receive demodulation are handled by the multimode controller or terminal unit. However, when using FSK the demodulation is still carried out as per AFSK, (ie the output from the rig is AFSK not FSK), but on transmit the tones are in effect generated within the transmitter. Thus, if there is a mismatch between the tones being transmitted, and what the controller is expecting on receive, you will observe an apparent offset between transmit and receive frequencies.

For example, if the transmitter has been set up to use 2125/2295 tones, and the controller has been set to use 2025/2195 tones, then you will have an apparent offset of 100Hz which you would have to correct with the RX or TX clarifier. Worse still, you might have the tones reversed on receive relative to transmit! You have to think very carefully when using FSK, and personally I prefer to stick to AFSK.

JVFAX/SSTV, HAMCOMM, AND PKTMON

IF YOUR ARE ACTIVE on VHF/UHF packet radio, then you can hardly have failed to hear mention of a program called JVFAX. This program was written by Eberhard Backeshoff, DK8JV, and enables amateurs to send and receive FAX and SSTV images, both greyscale and colour! This program follows in a tradition of very high-quality non-commercial amateur radio software/firmware from Germany; eg TheNet, Digicom, and Baycom.

JVFAX v6.0 runs on IBM-compatible computers, and for optimum performance you need an 80386 machine with an SVGA colour

A colour SSTV picture received on 20m using JVFAX with a simple interface.

View of PacketPet screen, showing easy selection of different connect streams.

card and at least 4Mb of RAM. However, it will run on much more modest 80286 and 8088 machines, with degraded performance. It does not multitask under Windows or OS/2 because of the processor-intensive nature of the program, and the critical timings needed.

A variety of interfaces to the RS232C serial port are possible, the simplest of which consists of a very simple 741 op-amp circuit. This can even be built in to the 9-way or 25-way D-connector shell if required. The circuits are supplied in the form of very detailed GIF (Graphics Interchange Format) files, and indeed the program uses this format to store and display all the images sent/received. You can also buy the interfaces, if even the 741 circuit overwhelms you, and Badger Boards is one well-known source (021 353 9326).

I have seen a brief demonstration of JVFAX by John Badger, and I was absolutely staggered by the simplicity of the interface and the effectiveness of the program! Alas, it was only receiving WEFAX (WEather FAX) transmissions at the time, and not SSTV.

However, I have plenty of examples of SSTV pictures from JVFAX, and I've included an example of what can be done over HF. Pictures sent on, say, 2m are absolutely superb, but would make poor examples because they look just too good! On the example shown opposite, of DJ7HX received by Bill Holt, G7DHM, on 20m last December, you may see the horizontal lines caused by QRM. Nevertheless, I think the result is still very impressive, and quite typical of what can be achieved.

There are two other programs which can use the same simple interface as JVFAX, though not specifically the same simple interface as that supplied by Badger Boards:

HamComm by W F Schroeder, DL5YEC, supports RTTY, ASCII and Morse modes, plus some very nice 'Spectrum Analyser' and 'Scope' signal monitor aids. The latter modes require a 386/16 PC, but the data modes will run on virtually any PC.

PktMon by Pawel Jalocha, needs a reasonably fast PC, 386/16 MHz or better. It allows 300 Baud and 1200 Baud PACKET monitoring and timestamping, with data displayed separately from the other information, either on the screen or to a file. Note, this is receive only.

All three programs, plus Interfaces, Manuals, GIF picture disks, and sometimes even useful advice, can be supplied by Peter Lockwood, G8SLB. He has been enjoying SSTV for several years, using a homebrewed Robot 1200c to test and evaluate, and he thoroughly recommends JVFAX to anyone wanting to try sending or receiving 'pictures by radio'.

For an illustrated leaflet send an SASE, plus an extra stamp, to Peter Lockwood, G8SLB @ GB7HSN, 36 Davington Road, Dagenham, Essex RM8 2LR, or telephone him on 081 595 0823 for a chat.

HAMGOPHER DATABASE

HAMGOPHER IS A store-and-forward file request system. It is run by Tony Howat, G7LZB, on the GB7NWI BBS of David Norris, G4TUP, in Southport on the North West coast of England. It's basically a library of hundreds of files, both binary and text, which can be requested using BBS messages. The commands are not complex, but versatile, and this makes it impossible to do them justice in a few column inches. Instead I suggest you send a *personal* message to GOPHER, (that's a letter 'O', not a zero), as follows :

SP GOPHER @ GB7NWI	
REQUEST	*(or any title you like)*
texttype zip	*(optional; see text)*
get manual	*(ask for file)*
bye	*(terminate request)*
/ex	*(or Ctrl-Z)*

HamGopher will then automatically send you the full manual as soon as the request arrives. To reduce the total size, the file will be PKZIP compressed and 7+ encoded, unless you omit the line *texttype zip* in which case it will be plain text in three 4k parts. The manual will give you all the information you need so you can access the Megabytes of useful data and text on HamGopher. The amount of data being sent to an individual is 'rationed' each day, to reduce the strain on the network, but of course there is no substitute for restraint and common-sense!

There is a similar database system known as CLIVE, which has been running for some time on GB7KLY and certain other BBSs. However, the request syntax is different from that of HamGopher.

PACKETPET FOR WINDOWS

MY THANKS TO Nick Robinson, 2E1BFB, for kindly offering to review this program, which as the name suggests is suitable only for an IBM-compatible PC running MS Windows. My thanks also to PacComm for the review copy. Nick's comments were:

"PacketPet for Windows is PacComm's Windows terminal and is brimming with the type of features that we come to expect of windows programs; complete control over the colour and layout, mouse control along with sound files associated with selected commands. Key features include a variety of split-screen options, offering any combination of Tx, Rx and Edit windows simultaneously, with handy buttons to switch the relative sizes of each.

"You can run several copies of PacketPet, each with different TNCs and settings. The program also informs you verbally of connections while in background mode. Multiple connections are straight forward and a group of buttons allow you to monitor input of two separate streams and switch easily between them.

"The integrated text editor is comprehensive and can be used to send commands directly to the screen or to save/edit files or incoming text. There is a variety of drop-down menus, many of which can be customised to suit the user, and keystrokes can be recorded and replayed via a menu. Oft-used commands can be linked with standard .WAV files, (examples are supplied), and provided you have a sound card fitted the computer will announce connections for you! The macro facility can (in theory; see later) make use of a variety of PacketPet commands such as a timed macro, search for text string, monitor to file, log connects etc.

"The actual user interface is both friendly and well thought out; the user can make it perform almost any task he/she wishes by way of logging on, Listing, Reading etc, with many menus open to user-definition. However, I have so far been unable to make a macro multiple connection work, even though the same commands entered singly do seem to work. A very full response from the programmer has not been able to solve this so far. Also, the documentation for macros is less than adequate. As a modest programmer myself, I found the PacketPet macro language both obscure and awkward. Perhaps a fuller section in the manual might help here. Perhaps a language similar to BASIC would be a good idea? [I think macro and script languages do tend to be tricky to master. The landline comms program I use has a subset of C as the script language; fine if you happen to be familiar with C! – *G4BLT*]

"Scroll bars can be visible or hidden, but when hidden you cannot page back through received text as the cursor keys and PAGE UP/DOWN keys don't work, and when visible the last character received spills onto the next line, which looks rather untidy. (I think it may be because I am using 640 x 480 pixels VGA rather than 800 x 600 SVGA.) Although the edit feature is very adequate for anyone's needs, the transmit command line interface itself is weak; you cannot use the cursor keys or mouse to correct mistakes, only Delete back to them. In addition, there is no word wraparound facility. The motto seems to be 'type it through the editor'; perhaps not a bad thing with some of the bulls that go out 'live'! There is no facility for remote access, nor is the YAPP protocol supported yet, limiting PacketPet's appeal to some users.

"If you are used to a conventional command-driven terminal program then PacketPet is great, but compared to some DOS programs the automating script facility is weak. However, the program offers a great many useful facilities and is straightforward to use. Whilst I do have certain reservations, as I have mentioned, I would certainly use PacketPet when in a windows session (so I can do other work whilst monitoring packet), but by preference would stick to my tried and trusted Paket 6. The ultimate windows packet program still needs writing!"

PacketPet for Windows is password-protected, and is available from Siskin Electronics at £59.95 including VAT. Most TNC types are catered for, including PacComm (Tiny-2 etc.), Kantronics KAM (-Plus), KPC-3, AEA PK88/232/900, and so on. For review, it was tested on a 486 machine with a BSX2 TNC running PacComm PMS firmware.

AR SK

'RICK' G4BLT @ GB7WRG.#19.GBR.EU

Microwaves

MIKE DIXON G3PFR
'Woodstock', Gazebank, Norley, Warrington, Cheshire WA6 8LL

THE MAP SHOWN as **Fig 1** (courtesy of the *Microwave Newsletter* editors) shows the 10GHz terrestrial paths in excess of 300km worked during 1993. Locators of the numbered points are given in **Table 1**. It should be noted that when these maps were first published in the *Newsletter* (1991), the paths plotted were those in excess of 150km. In 1992, this was extended to paths of over 200km and now, in the current plot, over 300km. Such is the march of technology!

These results have been brought about by two main changes in amateur operating on this band. The first is the advent of the G4DDK/G3WDG modules and the second the availability of higher powers, either solid-state or TWT. Both these have led to more fixed station operating and more frequent monitoring of the band to reveal, and make use of, exceptional propagation conditions. At the same time, of course, the technological improvements in equipment have led to EME capability – but that's another story!

A similar, although not so dramatic, change has occurred on the 24GHz band, with contacts steadily increasing with increasing usage rather than with technological improvements. There is still comparatively little narrowband activity on this band and it will be interesting to see what the effects are when there are more narrowband stations in action. We can expect further increases in average distances worked but, because of atmospheric absorption, not nearly as dramatic as on the 10GHz band. **Fig 2** is a plot of all the paths worked in the UK during 1993 and the Locators and distances are given in **Table 2**. In this instance, there are no fixed stations.

SO NEAR, AND YET SO FAR!

THE FIRST INTER-G EME on 10GHz contact took place on 19 June at 2340, between G3WDG/G4KGC at Rushden, Northants, and a station constructed and operated by members of the Flight Refuelling ARS, G4RFR, at Wimborne in Dorset. In terrestrial terms, the

The Flight Refuelling ARS moonbounce team: (l to r) Andy Talbot, G4JNT; Julian Gannaway, G3YGF; Carl Rabe, G6NLC; Steve Power, G0DQQ and John Fell, G0API.

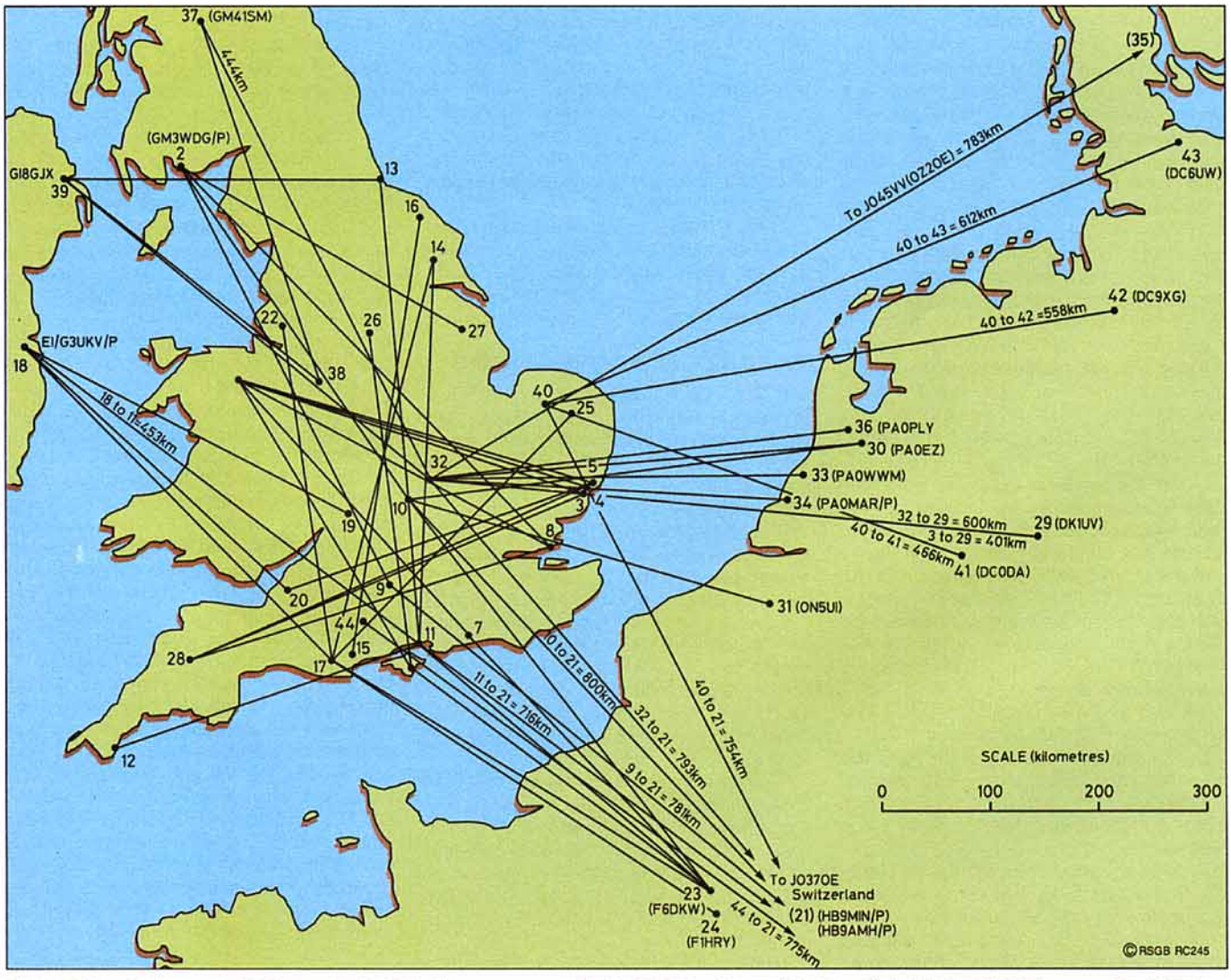


Fig 1: 10GHz paths in excessof 300km worked in 1993. The map was compiled by G3PHO and was originally published in the *RSGB Microwave Newsletter* (see also Table 1).

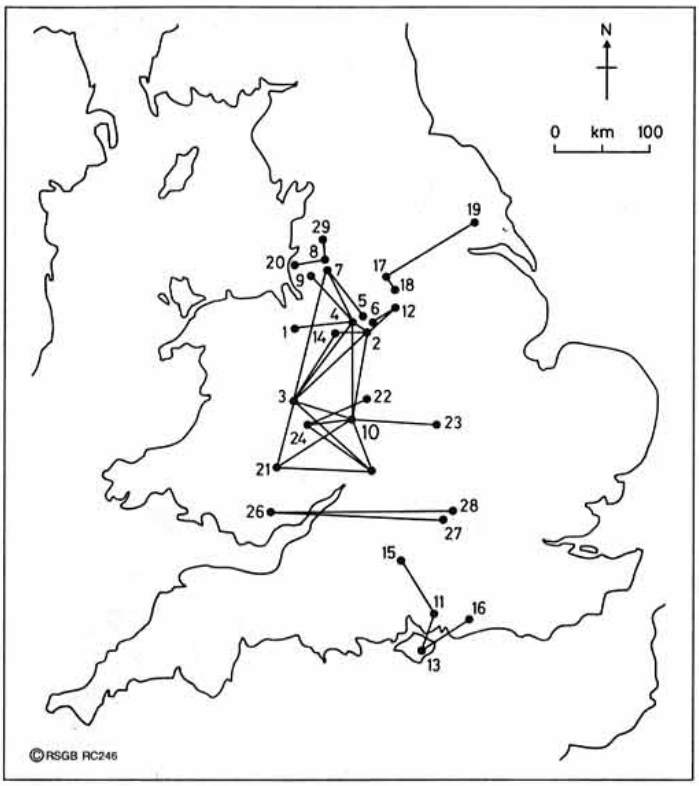


Fig 2: 24GHz paths worked in 1993 (see also Table 2).

Site No	From Locator	To Locator	Distance (km)
1	IO83LC	IO83WE	65
2	IO93AD	IO82NN	90
3	IO82NN	IO83RO	120
4	IO83WE	IO82NN	90
5	IO83XG	IO83RO	50
6	IO93AF	IO93EI	30
7	IO83RO	IO82NN	120
8	IO83RP	IO83LO	34
9	IO83PM	IO83WE	57
10	IO82WJ	IO83WE	88
11	IO90MX	IO91GI	53
12	IO93EI	IO93AD	30
13	IO90JO	IO90SV	61
14	IO83VC	IO82NN	75
15	IO91GI	IO90MX	53
16	IO90SV	IO90JO	61
17	IO93EU	IO93PV	72
18	IO93FK	IO93EU	21
19	IO93PV	IO93EU	72
20	IO83LO	IO83RP	34
21	IO82LA	IO82WJ	75
22	IO92BN	IO82RJ	50
23	IO92MJ	IO82WJ	69
24	IO82RJ	IO92CA	65#
25	IO92CA	IO82NN	90#
26	IO81LQ	IO91OR	156*
27	IO91MP	IO81LQ	146
28	IO91OR	IO81LQ	156*
29	IO83RU	IO83RP	23

* New UK record; # Narrowband

Table 2: 24GHz paths worked in the UK during 1993

distance is of the order of 195km: by EME the distance is about 750,000km or almost half a million miles!

The station operated by G3WDG and G4KGC ran 40W to a 3m dish and used a receiver with 1.2dB noise figure – home designed and constructed of course! At the other end, constructed and operated by G0API, G3YGF, G6NLC, G4JNT, G0DQQ and others, the station ran 15W to a 12ft (3.7m) dish with a receive noise figure of about 2dB. Both stations were, before the contact, able to hear their own echoes. Well done to the 'RFR group who were new to the 10GHz EME game, 'WDG/KGC being 'old hands'. In this particular instance a troposcatter QSO might just have been easier, but I guess it 'proved' the 'RFR system!!

SOUTHERN ROUND-TABLE

THE DATE FOR THE THIRD Southern Round-Table of 1994 has now been set for Sunday 16 October (not the 23rd, as stated in the January *Microwaves*) and will take place at the Flight Refuelling ARS club house, Merley, Wimborne, Dorset, commencing at 1000. Further details may be obtained from Mike Scott, G3LYP, QTHR, tel: 0494 881928.

ATV ON 24CM AND 3CM

WITHIN A 50KM RADIUS of my QTH there is a lot of regular ATV activity on both the 24cm and 3cm bands. It seems that there are at least a dozen amateurs active almost daily on one or both bands, with more preparing to come on one band or the other. The most active groups frequently use 433.825MHz FM for 'talkthrough' and other communications. This activity, and the search for microwave database entries mentioned above, prompted me to go through several years' issues of *CQ-TV*, the quarterly journal of the British Amateur Television Club (BATC) which is affiliated to the RSGB. It proved to be a very useful exercise with many constructional articles (and details of modifications to such items as satellite TV LNBs) 're-discovered', suitable for both the experienced amateur and Novice alike.

Membership of the BATC is not expensive and can open a whole new view of amateur radio – pardon the pun! It does have another very important advantage too: Members' Services which offers, amongst other things, publications, reprints from publications, camera spares and circuit boards/components for many video-orientated projects including receivers, transmitters and auxiliary equipment for the two microwave bands mentioned above. A list of these services is issued regularly in *CQ-TV*. Details of membership and the services offered can be obtained from the Membership Secretary, Dave Lawton, G0ANO, 'Grenehurst', Pinewood Road, High Wycombe, Bucks HP12 4DD; tel: 0494 528899 at any 'sociable hour', preferably between 1830 and 2130 and not before 1130 at weekends!.

Site No	Locator	Site No	Locator
1	IO83JA	23F	JN18CS
2	IO74UU	24F	JN18EQ
3F	JO02PA	25F	JO02QN
4F	JO02OB	26	IO93EH
5F	JO02QF	27	IO93TK
6	IO90JO	28F	IO70WT
7	IO90TV	29F	JO41CT
8F	JO01GN	30F	JO22OF
9	IO91GI	31F	JO11VB
10F	IO91KX	32F	IO92RG
11F	IO90MS	33F	JO22FE
12	IO70LB	34	JO21BX
13F	IO94JQ	35F	JO45VV
14	IO93PV	36F	JO22MH
15F	IO80XS	37F	IO85AR
16	IO94MI	38F	IO83UB
17	IO80UU	39F	IO74AQ
18	IO63UE	40F	??????
19	IO81XN	41F	JO31SL
20	1081PH	42F	JO43OM
21	JO37OE	43F	JO44VJ
22	IO83RP	44F	IO91EC

F= Fixed station.

Table 1: 10GHz paths in excess of 300km worked during 1993.

TALKBACK FOR MICROWAVES

I HAVE BEEN ASKED to issue a quick reminder on talkback frequencies to all microwave users, new, old, regular and contest! The following frequencies are commonly used for talkback:

(SSB) 144.175MHz ± 20kHz and 432.250 ± 10kHz; (FM) 144.725 and 433.825MHz.

The procedure is to call on the nominated frequency (unless it is busy, which is why there is a tolerance) and then move away to a frequency mutually agreed.

BITS 'N' PIECES

HARRIS SEMICONDUCTORS (UK) recently announced new 'Gilbert Cell' silicon transistor arrays (ICs) designed for mixer and amplifier applications up to 2.5GHz. Since the device, HFA3101, has been designed for the mass market (cellular telephones to 1.8GHz and wireless LANs to 2.5GHz, etc.) it is likely to be cheap enough in small quantities for amateur use in transmitters and receivers. One of the drawbacks to such ICs has so-far been high noise figures. The configuration of this device is such that double balanced mixers are easily configured using low level LO injection. At 1GHz the power gain is stated to be 11.9dB, 50Ω noise figure 2.5dB and third-order intercept +22dBm. Full application notes and design data is available from Harris Semiconductor (UK), Riverside Way, Watchmoor Park, Camberley, Surrey, GU15 3YQ; tel: 0276 686886.

CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest News* January 1994

DIRECTION FINDING

MID ESSEX HF TROPHY (MAR 94)

In 1992 it was decided to make the Mid Essex Trophy event an open contest where the trophy was awarded to the overall winner regardless of membership of the Colchester or Chelmsford clubs. Information handouts were distributed at the RSGB National Final, and the challenge was taken up by George Whenhan and the XYL team.

Pat Hawkins was the starter for the event at Long Melford Green. The two hidden stations were provided by Alan Williams and Mike Hawkins. Both signals were received at the start, giving bearings to the NE and SE.

Alan was hidden on an old railway track near Lavenham about 4km from the start. Most competitors went for this station first because it gave the strongest signal at the start, however the hapless George and Peter decided to use the time between first and second transmissions to drive towards the distant station. Some competitors recognised the operator's car secreted near the track and were in an excellent position for the second transmission.

Mike was hidden on Constitutional Hill to the west of Hadleigh. The undergrowth was not particularly thick but was pretty ferocious. Competitors arriving at this site, having driven all the way from Alan, found two unfortunates beating up every bush and bramble except the one Mike was hidden in!

Thanks go to Mike and Pat Hawkins for opening up their house and transforming our Bring-a-Bite into a very substantial tea, after which the Mid Essex Trophy was awarded to Dick Brocks.

Pos	Name	Club	Time of Arrival at Transmitters (UTC) A	B
1	Dick Brocks	Colchester	1425	1548
2	Andrew Mead	Colchester	1449	1549
3	Peter Graves	Colchester	1451	1600
4	Philip Cunningham	Colchester	1449	
5	Roy Emeny	Colchester	1528	1635
6	Peter Larbalestier	Colchester	–	1549
7	George Whenham	Coventry	–	1555

SOUTH MANCHESTER QUAD NIGHT (MAY 94)

This year's event attracted eleven teams, who assembled at the start on a cool dry night. Signals were received from all four transmitters though approximate bearings were required for the weaker stations due to severe QRM. Competitors split up evenly between the transmitters.

Station A: G3FVA/P, was located furthest away from the start, some 15 miles to the east in a small valley near Lyme Park. The operators were under a large holly bush, by the side of a small stream, and the site posed no particular problems other than mud!

Station B: G3UHF/P, was situated on the southern bank of the river Mersey, two miles north west of the start. This site posed the usual problem - which side of the river is the transmitter? Several competitors chose the wrong side as it was full of suitable bushes.

Station C: G3WFT/P, was approx seven miles south of the start on an often-used site, Lindow Common near Wilmslow. The site was noted by the few competitors for a bush wearing a blue bobble hat.

Station D: G0CAR/P, was situated on the banks of the river Bollin five miles south west of the start. At this point the river passes under the Bridgewater Canal, with a large wood on one side and the transmitter on the other!

Chris Wells was awarded the Quad Night Rose Bowl. Thanks to Mary Holland for making the super hot pot which was enjoyed by all, and Ann Plummer who helped organise the catering. We hope to see everyone next year.

Pos	Name	Club	Tx A	Tx B	Tx C	Tx D
1	C Wells	Mid Thames	22.25	23.31	21.25	20.36
2	C Plummer	S Manchester	21.52	23.57	20.38	22.52
3	G Whenham	Coventry	20.53	23.58	22.04	23.01
4	D Holland	S Manchester	20.52	23.59	22.30	23.30
5	A Collett	Chelmsford	20.50	-	22.04	22.53
6	B Bristow	Mid Thames	-	23.06	21.02	20.30
7	D Yorke	S Manchester	-	23.15	21.45	20.42
8	R Summer	Shrewsbury	-	21.53	23.42	23.00
9	J Hall	Ripon	-	22.42	23.42	20.32
10	G Blomeley	S Manchester	-	22.43	23.49	20.31
11	C Metcalfe	S Manchester	-	-	23.11	

LEICESTER VHF (2M) EVENT

Date: 11 September 1994

Map: OS Landranger (1 in 50000) sheet 140 Leicester and Coventry (this sheet constitutes the DF area).

Start Location: Car park for Lutterworth recreation ground, Coventry Road, Lutterworth NGR SP540846. Competitors collect signing-in slips and are given the callsigns of the hidden stations.

Start Time: 1330UTC

Transmissions: 30-second duration every five minutes from each of two transmitters.

Frequency: 145.425MHz

Rules: As published in May 1994 *RadCom*

End of Hunt rendezous: BP Truckstop on the A5 at NGR SP553763.

Enquiries: Neil, G3RIR, tel: 0455 554522.

HF RESULTS

AFFILIATED SOCIETIES JAN 1994 (CONTINUED)

CW INDIVIDUAL LISTING

Posn	Call	QSOs	Points
1 #	G3KDB	298	2963
2 *#	G3SJJ	290	2874
3	G4BUO	289	2863
4	G4BJM	283	2806
5	G4DJX	290	2776
6	G3VER	278	2761
7	G3LNS	271	2685
8	G3VHB	269	2673
9	G4MBC	269	2661
10	G3RTE	268	2658
10 =	G3NKC	267	2658
12	G3RIR	269	2657
13	G4PIQ	268	2642
14	G5LP	262	2603
15	G3SJX	262	2598
16	G3LET	262	2592
17	G3OZF	260	2581
18	G3TCQ	254	2522
19	G3JKS	253	2515
20	G3UFY	254	2513
21	G3RVM/P	252	2501
22	G3PSM	252	2495
23	G3SYM	251	2486
24	G3RWL	251	2479
25	G4ARI	249	2461
26	G3XTT	246	2430
27	G3ZEM	244	2416
28	G3TBK	245	2415
29	G4EOF	242	2402
30	G3MXJ	242	2401
31	G4CNY	242	2394
32	G4JGV	235	2318
33	G4ALE	231	2291
34	G4ODC	227	2257
35	G3KHZ	228	2256
36	G3WYK	228	2251
37	G3VYI	228	2241
38	G3KAF	226	2241
39	G3GLL	226	2238
40	G3NKS	225	2214
41	G3ROZ	220	2181
42	G4BCA	218	2157
43	G3TMA	220	2153
44	G3SDC	215	2121
45	G3WGV	214	2110
46	G4TLS	211	2086
47	G4CZB	209	2042
48	G3NOM	207	2036
49	G3YEC	208	2021
50	G3SWH	206	2012
51	G3JKF	204	2006
52	G0FDX	204	2000
53	G4PDQ	203	1986
54	G3KTZ	199	1954
55	G3LIK	201	1952
56	G3PIA	198	1942
57	G6LX	197	1940
58	G3ZVW	198	1932
59	G3YAJ	196	1929
60	G3RSD	196	1928
61	G4KGG	195	1926
62	G4ZFE	195	1915
63	G3PDH	195	1909
64	G3GRO	192	1901
65	G4IFB	187	1832
66	G3NOH	186	1821
67	G4SXT	186	1812
68	G3UKV	183	1806
69	G3WSC	185	1804
70	G0OGN	183	1801
71	G3BFP	183	1795
72	G3UJV	182	1792
73	G4IUZ	181	1784
74	G4YYR	179	1763
75	G3RXP	177	1743
76	G3LDI	178	1741
77	G4ALR	178	1736
78	G4RFR	178	1721
79	G3MXH	175	1721
80	G4ERW	176	1702
81	G3JJZ	169	1690
82	G4HSD	169	1671
83	G4SFO	169	1656
84	G3XZO	169	1651
85	G4EBK	168	1636
86	G4JJY	168	1625
87	G3VMO	165	1620
88	G3VRY	166	1618
89	G3ASR	165	1614
90	G3OLX	164	1604
91	G3LRS	165	1602
92	G3XZG	164	1600
93	G2HLU	161	1591
94	G3ZGC	162	1589
95	G4OGB	160	1574
96	G3JSR	157	1564
97	G4DYC	157	1551
98	G3KNU	158	1550
99	G3YLC	157	1538
100	G4ZYN	154	1512
101	G4HMD	151	1510
102	G3HOH	155	1508
103	G0LZL	152	1501
104	G4TSH	151	1500
105	G3JGB	153	1491
106	G0PSA	150	1481
107	G3GC	147	1464
108	G0ORH	148	1461
109	G3WKL	146	1431
110	G3IZD	145	1430
111	G3HKO	146	1428
112	G3JNB	144	1421
113	G0ADH	144	1416
114	G3KKQ	143	1401
115	G3HYH	140	1390
116	G3PDL	142	1384
117	G3HJF	141	1384
118	G3OGP	141	1380
119	G4EYE	138	1368
120	G0OPB	135	1340
121	G3MRC	136	1330
122	G3JFF	135	1321
123	G3EPV	133	1310
124	G4PZQ	133	1306
125	G4SUP	133	1302
126	G3TLI	132	1299
127	G3MCK	131	1294
128	G4JBH	130	1276
129	G3SHF	131	1271
130	G0ORY	130	1268
131	G4BUV	127	1244
132	G3TXZ	128	1242
133	GM4SID	124	1230
134	G3JKB	125	1210
135	G3ZDW/P	121	1186
136	G3EIZ	122	1184
137	G3TIK	118	1180
138	G3AGF	121	1179
139	G3MCX	118	1162
140	G3HFG	116	1157
141	G3AWR	118	1148
142	G4HWK	118	1141
142 =	G3VCN	117	1141
144	G0DID	118	1139
145	G3BSN	115	1131
146	G3MA	112	1117
147	G4DDX	114	1116
148	GW3JI	114	1110
149	G4LNA	113	1102
150	G4WVX	112	1096
151	G4BJU	113	1095
152	G3FNM	110	1090
153	G4IGY	112	1084
154	G3NVO	110	1081
155	G4GTO	110	1074
155 =	G3JZI	110	1074
157	G3XMM	107	1070
158	G3SVL	110	1064
159	G0MBQ	107	1054
160	G0PNU	108	1045
161	G5MY	109	1039
162	GW3SB	107	1031
163	G3KKJ	104	1018
164	G0CUT	105	1012
165	GM4ZUK	104	1010
165 =	G4CIB	101	1010
167	GW4XQK	105	1009
168	G4BJO	101	1007
169	G3DIC	101	1000
170	G0PRB	102	994
171	G3GNR	99	990
172	G3ZDD	102	981
172 =	G0FQT	101	981
174	G4MQM	98	976
175	G3TNO	156	974
176	G4EIX	98	970
177	G3VW	98	961
177 =	G0PNT	100	961
179	G0ASA	98	958
180	GM4AFF	97	949
181	G3LVW	95	936
181 =	G0AIZ	96	936
183	G0DVJ/P	93	930
184	G0NOA	95	921
185	G0JCY	94	920
186	G4OAY	94	912
187	G4GSC	92	910
188	G4AAL	94	908
189	G3LNK	93	904
190	G4FRN	92	901
191	G3YIA	90	900
192	G4MEM	92	895
193	G3TZM	92	894
194	GM0MYV	89	890
194 =	G8GS	91	890
196	G0DAS	92	889
197	GM3DZB	90	887
198	G3TLF	89	880
198 =	G0IGP	90	880
200	G3III	89	878
201	G3NCL	90	876
202	G3CQR	89	874
203	G3YLA	90	873
204	G0KKG	88	871
205	G4IP	88	870
205 =	G4FCH	88	870
207	GM3UM	89	869
207 =	G3GMM	88	869
209	G3YYF	88	866
210	G4JSN	85	850
211	G3ZKN	87	849
212	G3ICO	84	831
212 =	G0NUM	84	831
214	G0IJE	84	828
215	G4PPG	83	826
216	G4ZIY	83	820
217	G0PPO	83	818
218	G4WBX	82	810
218 =	G0SGY	83	810
220	GM3CFS	82	808
221	G8IB	80	800
222	GM3VEY	79	790
223	G3HBZ	80	789
224	G4GZO	80	781
225	G3VNG	79	761
226	G0HDV	77	760
227	G3CJ	75	750
228	G4IZB	76	746
229	G3URA	75	740
230	G3EAO	74	737
231	G0DHZ	75	731
232	G0ECJ	75	726
233	G0GLB	74	721
234	G3ZFE	72	720
234 =	G0EFO	73	720
236	G3TQF	74	704
237	G0LZA	71	695
238	G3JQI	69	690
238 =	G0HAL	70	690
240	GM0JKF	69	688
240 =	G0NLX/P	70	687
242	G3GHN	70	684
243	G0HBB	70	681
244	G0SBA	69	677
244 =	G0FOD	69	677
244 =	G0ATR	68	677
247	G3FFH	67	664
248	G4KDL	68	660
249	G4SYC	68	657
250	G3VLL	66	650
251	G3WFM	64	640
252	G3VIW	64	637
253	G3VJO	64	631
254	G3FVC	63	630
255	G3GN	63	627
256	G3DOT	62	620
256 =	G0STW	62	620
258	G0JNI	62	617
259	G2BDV	62	612
260	G4RGK	62	611
261	G3GUL	61	610
262	G0HUZ	61	607
263	G3SVW	59	590
264	G2RSA	59	580
264 =	G0NID	59	580
266	G4FAS	58	570
267	G0JKN	56	560
268	G0LKO	56	557
269	G4SLE	55	550
270	G0CBJ	54	540
271	GM3HUN	54	537
271 =	G0RXN	54	537
273	G0TFU	53	530
274	G3KQY	53	527
275	G0PNV	50	500
276	G0MRH	50	497
277	G3DQY	49	490
278	G0OSS	49	487
279	G4FQQ	48	480
279 =	G3KLT	49	480
281	G0PDZ	48	477
282	G4CJY	48	470
283	G4YGH	45	450
284	GW4ODN	44	440
284 =	G0GHH	44	440
286	G4SQC	43	430
287	G0IWZ	42	420
288	G4PTN	40	400
289	G3JJG	40	397
290	GW0OPY	38	377
291	G0GAZ	36	360
292	G0RPZ	35	350
293	G4IVJ	33	330
294	G3OZY	31	307
295	GW0MYK	30	300
296	G4ISO	28	280
297	G0JRZ	27	270
298	G0TIB	26	260
299	GM4BKV	25	250
299 =	G0PQU	25	250
301	G4POF	23	230
301 =	G0LHZ	23	230
303	GW0MYY	22	220
304	2E0ACY	21	210
305	GW4KVJ	20	200
305 =	G3FXA	20	200
305 =	G3CLN	20	200
305 =	G2CLN	20	200
309	G3XKD	15	150
310	G0THX	13	130
310 =	G0ORJ	13	130
312	G4RBE	12	120
313	G4DXW	11	110
314	G4WHK	12	107
315	G4UAZ	8	80
316	G4UUB	6	60
316 =	G4FOS	6	60
318	G4GOG	5	50
318 =	G3FGD	5	50
319	GW3GKZ	4	40
320	G0OXH	2	20

Checklog gratefully received from GW3WWN.
* = Marconi Trophy; # = Certificate of Merit

SSB INDIVIDUAL LISTING

Posn	Call	QSOs	Points
1 *#	G4PIQ	333	3278
2 #	G3NLY	323	3203
3 #	G3NAS	309	3045
4	G3VHB	296	2932
5	G4MBC	294	2902
6	G3SJJ	288	2850
7	G4BUO	283	2813
8	G3OZF	277	2736
9	G4CBQ	273	2702
10	G3LNS	271	2686
11	G3WGV	270	2667

12	G3TCQ	268	2628
13	G4CNY	256	2531
14	GW4BLE	253	2516
15	G5LP	252	2495
16	G3ZVW	236	2330
17	G4SXT	229	2261
18	G3SFG	228	2259
19	G0ATX	225	2224
20	G4TLS	221	2191
21	G4ALR	217	2156
22	G4AAL	217	2138
23	G3XTT	214	2121
24	G6RC	211	2096
25	G2UQ	211	2085
26	G3MXH	209	2063
27	G0FDX	209	2051
28	G3IGW	205	2020
29	G3PIA	204	2011
30	G3GRO	202	1981
31	G3XZO	190	1955
32	G4VZR	194	1926
33	G3WHK	194	1919
34	G3LRS	193	1902
35	G4MH	192	1883
36	G4UKR	191	1874
37	G0ORH	182	1810
38	G3UAX/P	185	1806
39	G3OLX	181	1791
40	G0HUZ/P	183	1786
41	G/OZ7SM	180	1763
42	G0CBJ	179	1762
43	G3ZDW/P	173	1701
44	G0CDO	171	1682
45	G4MET	167	1641
46	G3PFM	166	1631
47	GW0ARK	166	1628
48	G0FQT	164	1601
49	G3FNM	163	1595
50	G4OGB	160	1590
51	G4JBH	159	1566
52	G3SVL	158	1560
53	G4TSH	158	1558
54	G3SQX	156	1557
55	G3HYH	158	1551
56	G3JFF	156	1538
57	G3LIK	155	1523
58	G0NYL	152	1510
59	G3NBI/P	148	1470
60	G3EPV	149	1465
61	G0PPO	146	1444
62	G3FFH	144	1432
63	G3RKH	143	1421
64	G3YYF	143	1418
65	G3YLC	142	1401
66	G0ADH	140	1376
67	G0DVE	139	1361
68	G0ODQ	138	1356
69	G0STW	136	1350
70	G4ALE	133	1320
71	G4KDL	133	1311
72	G0ASA	132	1299
73	G3OPL	130	1290
74	G4EIX	130	1287
75	G3LHJ	129	1266
76	G0RXN	127	1261
77	G3NVO	128	1251
78	G0PNU	127	1248
79	G4NLS	126	1241
80	G3WAO/P	126	1238
81	G2IC	124	1230
82	GW4YMJ	123	1221
83	G0GMB	119	1168
84	G0DAY	116	1148
85	G3MA	116	1146
86	G3ZGC	115	1140
87	G2HLU	114	1122
88	G3GHN	112	1106
89	G0NOA	111	1100
90	G0CTQ	110	1090
91	G3DWQ	110	1087
91 =	G0ARF	110	1087
93	G4EBK	106	1042
94	G4CIB	106	1031
95	G4YTA	102	1010
96	G4RUL	101	996
97	G0GCI	98	970
98	G0FYX	99	961
99	G3HBZ	95	950
100	G4OYY	95	936
100 =	G0OPB	95	936
102	G0NUM	95	921
103	G0DCG/P	92	916
104	G3WNI	91	910
105	G3SNU	91	900
106	G4IVJ	90	891
107	G4LVO	90	890
107 =	G4IFB	90	890
107 =	G0NEI	89	890
107 =	G0DAS	90	890
111	G4POF	89	887
112	G3BIT	89	884
113	G0OOF/P	89	880
114	G3ENI	86	860
115	G4WEY	86	857
116	G3GUL	85	841
117	G0MEE/P	83	830
118	G8IB	83	817
119	G4APV	82	817
120	G0DVJ/P	80	800
120 =	G4PLB	80	800
122	G4EYE	80	790
123	G0EYR	78	780
124	G4SJZ	78	777
125	G3AAT/P	78	770
125 =	G0HFU	77	770
127	GW4XQK	76	760
127 =	G4JSN	77	760
129	G0HDV	76	756
130	G0ALE	73	724
131	G3YCH	71	710
131 =	G0GHH	71	710
133	G0TEB	71	706
134	G4LRP	70	700
135	G0RHD	69	690
136	G4DRV	70	686
137	G4TUB	67	670
138	G4JYH	67	660
138 =	G0PDZ	66	660
140	G3VJO	65	650
141	G0DOF	64	636

VHF RESULTS

144MHZ AFS/FIXED/SWL DECEMBER 1993

The number of entrants for this contest continues to grow; up 18% on last years entry. Most contestants agreed that band conditions were "average for the time of year" ie poor! Even so some stations managed to make over 300 QSO. The standard of logging was generally high but an un-marked dupe was found in a computer generated log! Obviously some logging programs do not check for dupes properly!

Congratulations to Martlesham DX and Contest Group for winning AFS, to GD4IOM for winning the Multi-operator section and to G4PIQ for winning the Single Operator section. Congratulations also to the runners up in each section, the zonal winners and DL0WAE the winner of the overseas section. *Ian, G0FCT*

MULTI-OP

Psn	Callsign	Points	QSO	Pwr	Ant	Best DX	Dist km	Zone
1	GD4IOM	4177	304	400	4x9el	DF8AE	901	A*
2	G4ANT	4112	323	400	2x17el	DK0GR	760	
3	G4KUX	3752	314	400	4x19+9el	DC9YX	739	A
4	G6RAF	3513	353	400	2x14+2x9el	DF6NA	804	
5	G4HUP	3041	270	400	2x18el	DK2GR	740	C*
6	G4DSP	2664	255	400	2x9el	DF6NA	776	B*
7	G4NPH	2565	304	350	16el	DF9YX	672	B
8	G6YIN	1889	214	400	2x14el	DH0YAZ	714	
9	G3WSC	1167	193	400	16el	EI9HW	542	C
10	GW4EZW	1023	147	150	8el	DL3EAG	702	E*
11	G0GZQ	1008	194	150	17el	GM8FFX	651	C
12	G7RIH	927	161	30	13el	DG4FCN	624	
13	G3KMI	859	113	180	4x17el	DF2VJ	620	
14	GW4WVO	834	108	100	2x8el	PE1NNX	565	E
15	G8YMD	793	90	100	15el	DG5OAF	633	
16	G8CUL	712	156	60	14el	ON4QQ	405	D*
17	G7DNY	664	160	100	9el	GD4IOM	433	C
18	G3NTS	605	136	280	17el	G14GVS	512	C
19	G0FCT	551	141	50	17el	GD4IOM	400	D
20	G3CDK	440	124	15	16el	PE1NNX	363	C
21	G0HUZ	333	102	25	5el	GD4IOM	424	
22	G0PPO	296	90	150	10el	GD4IOM	427	
23	G4TJE	203	66	50	5el	G4KUX	379	
24	G0HSA	138	30	180	8XY	G3KMI	255	A
25	G7PPB	39	15	10	9el	GW4ALG	227	

SINGLE OPERATOR

Psn	Callsign	Points	QSO	Pwr	Ant	Best DX	Dist km	Zone
1	G4PIQ	5950	523	400	4x15+2x9el	DK2GR	744	C*
2	G4WFR	3944	344	400	8x9el	DG9IC	753	C
3	G4DHF	1868	220	330	20el	DK9OY	715	B*
4	G4NBR	1739	166	200	4x9el	DK9OY	698	B
5	G0GXT	1688	225	400	2x17el	DL0WAE	753	
6	G0NYL	1628	212	100	13el	G3NPB	501	B
7	G4DEZ	1505	184	400	17el	DK2GR	755	
8	G4TZM	1448	176	200	19el	DK9OY	621	C
9	G1WBZ	1375	160	100	2x10el	DF7KF	618	
10	G3MEH	1358	226	400	10/10	DG4FCN	635	
11	G0EGX	1355	161	100	6Q	DK2GR	764	C
12	G4RGK	1322	220	220	9el	DL0WAE	638	
13	G3WHK	1285	225	150	16el	DL0WAE	601	C
14	G3YVR	891	161	100	13el	GM0GMD	614	
15	G3GRO	853	157	150	13el	GM0GMD	617	
16	G8NEY	840	142	250	9el	GM4AFF	620	D*
17	G8APB	794	142	120	16el	PA0GHB	456	A*
18	G3JRM	789	91	100	17el	DK9OY	576	C
19	G0RRC	780	111	100	14el	DF2VJ	514	C
20	G8ZRE	749	117	100	8XY	GU3EJL	387	A
21	G3HYH	743	146	150	2LOOP	GM4AFF	496	B
22	G0HAS	742	116	150	16el	GM8FFX	639	D
23	G0GRI	718	117	100	CQDX	GM8FFX	644	D
24	GW4ALG	717	123	40	9el	ON4QQ	508	E*
25	G0APZ	706	97	25	8Q	DF2VJ	535	**
26	G4JLG	691	105	160	10el	G8ZVM	425	A
27	G4TAD	690	84	100	2x6Q	DK9OY	575	C
28	G4TVR	666	138	100	15el	ON4QQ	473	B
29	G3NLY	662	126	50	10el			
30	G0HKG	650	106	100	9el	DF2VJ	646	C
31	G6SL	624	114	400	17el	DL0WAE	810	B
32	G0GCI	613	99	160	9el	DK2GR	766	C
33	G8MNY	580	136	200	8Q	GD4IOM	537	
34	G1OGY	573	123	80	14el	GI8FLQ	524	C
35	G4VPD	546	110	100	18el	PE1OGE	510	B
36	G0ODQ	535	123	150	9el	GM0GMD	539	
37	G3ZDM	463	73	200	18el	GM4AFF	398	A
38	G0ADH	457	105	50	13el	PE1LCL	398	D
39	G7BWQ	453	76	200	11XY	GM4AFF	473	
40	G4MKW	438	106	80	9el	GD4IOM	450	C
41	G0SAH	436	84	400	14el	DF2VJ	999	
42	G3UKV	433	71	85	9el	GM4AFF	477	
43	G7MFV	425	47	25	8el	G4ANT	424	
44	G0GLB	392	92	30	17el	GD4IOM	352	D
45	G1WAC	385	89	180	18el	GI4GVS	366	B
46	G3PIA	371	81	25	17el	GD4IOM	364	D
47	G0SYK	341	59	50	12el	G4KUX	372	D
48	G0DAY	339	61	50	5el			
49	G0MCN	328	78	85	2x5el	GD4IOM	353	D
50	G8XLH	327	79	100	5el	GD4IOM	364	
51	G1TWS	325	73	25	D8/2M	GD4IOM	440	
52	G0THY	315	76	25	9el	GD4IOM	342	D
53	G3JJZ	307	96	25	8/8	D4IOM	438	
54	G0HFX	301	55	100	14el	G4KUX	371	D
55	G3NAS	300	66	20				

142	G3ZKN	61	610
143	G3VLL	60	600
144	G0IQW	60	590
145	G3GUL	58	580
146	G0PSF	57	570
147	G3VNG	57	566
148	GW4HBK	55	550
148 =	G3DQY	56	550
150	G0TQT	54	540
150 =	G0NVC	54	540
152	G3WWT	52	517
153	G4GUD	49	490
154	G4DTA	47	470
154 =	G0PVK	47	470
156	G4RFC	45	450
157 =	G3JXA	45	450
158	G3ONQ	44	440
159	G3SVW	40	400
159 =	G0FTB	40	400

161	G0RUS	39	390
161 =	G0LMB	39	390
163	GM3CFS	31	310
164	G4BLS	26	260
165	G3OZY	25	250
166	G3MAZ	21	210
167	G3KDB	20	200
168	GM3LGM	18	180
169	G0EQM	15	150
170	G0OXT	14	140
171	G3LNN	8	80
171 =	G0RJJ	8	80
173	G3RVM	6	60
174	G4IEH	4	40

Checklogs gratefully received from G3BFP, G4BJM, G6LX

* = RSGB Lichfield Trophy; # = Certificate of Merit

56	G3YLC	294	72	20	9el	GD4IOM	339	
57	G3JMB	292	66	20	7el	DF2VJ	536	
58	G7KMM	286	70	100	8el	G1WBZ	323	
59	G4YFQ	279	43	10	9el	DL0WAE	461	C
60	G0EYO	260	54	10	13el	GD4IOM	267	B
61	G1VBL	251	57	80	13el	GD4IOM	342	
62 =	(G1COW	245	73	25	9el	GD4IOM	400	D
	(G6NUZ	245	41	25	18el	GD4IOM	331	B
64	G3FIJ	228	40	10	9el	GD4IOM	444	C
65 =	(G0GJV	226	66	20	8el	GD4IOM	396	D
	(G1RDX	226	72	10	9el	F6FLV	370	
67 =	(G3TWG	224	62	50	5el	GD4IOM	390	
	(G6AQP	224	57	8	9el	GD4IOM	438	
69	G0PDZ	221	75	25	8el	G4KUX	379	
70	G7KAO	214	46	150	10XY	GD4IOM	443	
71	G4BAH	206	36	25	13el	GD4IOM	458	C
72	G8UGL	187	37	30	17el	G4PIQ	253	
73	G4IRB	181	29	10	HB9CV	G3WSC	309	A
74	G3WQG	175	55	8	8/8	GD4IOM	386	
75	G0TLK	141	43	15	5el	G4KUX	381	
76	G8PAW	126	36	25	9XY	G4PIQ	244	
77	G0ATR	125	24	10	6Q	GD4IOM	287	B
78	G7BIV	115	35	50	5el	GW4WVO	278	C
79	G7KZB	107	21	10	7el	G4PIQ	278	
80 =	(G6XSY	95	35	20	8el	G0NYL	237	D
	G7POJ	95	29	15	9el	G8IOX	244	
82	G0CVT	87	16	10	6el	G3WSC	A	
83	G0LJD	74	24	10	9el	ON4AIQ	240	
84 =	G4NPD	67	19	15	5el	G4KUX	382	
	G3WMR	67	27	10	8el	G4KUX		
86 =	G3YMC	65	39	10	5/8v	G4WFR	143	D
	G4WGZ	65	33	120	5el	G4ANT	170	
88	G0JSG	57	13	10	9el	G6YIN	267	C
89 =	(G1HKT	39	23	40	5/8v	G4PIQ	157	D
	(G4BLG	39	15	10	9el	G4KUX		
91	G4RFC	35	25	100	9el	G4NPH	97	
92	G4NTY	24	12	10	VERT	GD4IOM	163	A
93	G0MIF	23	9	30	2x5/8	G4AST	157	
94	G7EOC	14	10	2	VERT	G4WFR	72	
95	G4SQG	4	4	15	12el	G7DNY	9	C
96	G7PGQ	3	3	1	VERT	G4TAD	5	C
97	G0CGB	2	2	10	VERT			

OVERSEAS

Psn	Callsign	Points	QSO	Pwr	Ant	Best DX	Dist km
1	DL0WAE	733	31	600	4x17el	GD4IOM	902
2	PE1EWR	544	50	10	10el	GD4IOM	623
3	PE1NNX	397	29	65	13el	GD4IOM	648

AFFILIATED SOCIETIES

Posn	Club name	Score	Operators	Zone
1	Martlesham DX & CG	13921	G4PIQ,G4WFR,G4HUP,G0RRC,G4BAH	C*
2	Spalding & D ARS	8081	G4DSP,G4NPH,G4DHF,G4NBR,G6NUZ	B*
3	Colchester R A 'A'	4254	G4TZM,G0EGX,G0HKG,G1OGY,G3FIJ	C
4	Crawley ARC	3635	G3YVR,G4MKW,G7KMM,G3WSC,G3GRO	C
5	RAF Nth Luffenham ARC	3513	G6RAF	
6	Sutton & Cheam RS	3401	G3WHK,G0GZQ,G7DNY,G3CDK,G4SQG	C
7	Trowbridge & D ARC	2942	G0GRI,G0HAS,G0HFX,G0SYK,G8NEY	D*
8	Aylesbury Vale RS	2765	G3MEH,G8XLH,G1VBL,G3YLC,G0ODQ	
9	Wythall RC	2481	G1WAC,G0EYO,G4TVR,G6SL,G4VPD	B
10	Harwell ARS 'A'	2260	G8CUL,G0ADH,G0GLB,G3PIA,G0MCN	D
11	South Manchester RC	2153	G4IRB,G3ZDM,G4NTY,G4JLG,G8APB	A*
12	Maidenhead & D ARC	1947	G4RGK,G1RDX,G3TWG,G3WQG	
13	Bracknell ARC 'A'	1834	G6XSY,G0GJV,G1COW,GW4ALG,G0FCT	D
14	Lowerstoft RC	1818	G3JRM,G4TAD,G4YFQ,G7PGQ,G0JSG	C
15	Scunthorpe ARC	1628	G0NYL	B
16	Bromley & D ARS 'A'	1317	G3JJZ,G4WGZ,G8MNY,G6AQP,G0TLK	
17	Telford & D ARS	1306	G7BWQ,G3UKV,G8UGL,G8PAW,G7KZB	
18	Lichfield ARS	1301	G3NLY,G3NAS,G0DAY	
19	Clifton ARS	1088	G0HUZ,G0PPO,G0PDZ,G4TJE,G4RFC	
20	Newport ARS	1023	GW4EZW	
21	Mid-Sussex ARS	998	G0APZ,G3JMB	
22	Leicester RS	868	G3HYH,G0ATR	B
23	Southampton Uni RC	859	G3KMI	
24	The Dover RC	793	G8YMD	
25	West Kent ARS	613	G0GCI	C
26	Ariel Radio Gp (London)	605	G3NTS	C
27	Harwell ARS 'B'	354	G0THY,G1HKT	D
28	Bredhurst R&T S	245	G0LJD,G0MIF,G7PPB,G7POJ,G7EOC	
29	Sheffield ARC CG	225	G0CVT,G0HSA	A
30	Colchester R A 'B'	115	G7BIV	C
31	North Kent RS	108	G3WMR,G4BLG,G0CGB	
32	Bracknell ARC 'B'	65	G3YMC	D

* denotes Zonal certificate winner

** denotes winner of "25W to a single antenna" certificate

Thank you for check logs: GM4ZUK/P, G0TRB, G1CEI

Disqualified: G7PAR/P, G4NPD/P: /P in a Fixed Station only contest

HF CONTESTS CALENDAR

(Overseas events in italics; rules in parentheses)

20/21 Aug	*SEANET DX SSB (Jul 94, p19)*
3/4 Sep	SSB FIELD DAY (Jun 94)
3/4 Sep	*JARL AA SSB (Sep 94, p18)*
4 Sep	*LZ DX CW*
Sep/Oct	QRS Cumulatives
10/11 Sep	WAE SSB (as CW, Aug 94, p18)
17/18 Sep	*SAC CW (Sep 94, p18)*
24/25 Sep	*SAC SSB (Sep 94, p18)*
24/25 Sep	*CQ WW RTTY (Sep 94, p19)*
2 Oct	21/28MHz SSB (Jun 94)
8/9 Oct	*VK-ZL CW (Sep 94, p18)*
16 Oct	21/28MHz CW (Jun 94)
29/30 Oct	*CQWW DX SSB*
12 Nov	Club Calls
11/13 Nov	*JA Int'l DX SSB*
12/13 Nov	WAE RTTY
13 Nov	*OK DX (Mixed)*
19/20 Nov	2nd 1.8MHz CW
19/21 Nov	*All Austria CW*
26/27 Nov	*CQWW DX CW*
3/4 Dec	*ARRL 160m*
11 Dec	*ARRL 10m*

VHF/UHF CONTESTS CALENDAR

30 Aug	144MHz CW Cums (Feb 94)
3/4 Sep	144MHz Trophy/SWL (May 94)
4 Sep	4th Back Packers 144MHz (Jan and Apr)
11 Sep	24GHz Cums (Apr 94)
14/29 Sep	144MHz CW Cums
25 Sep	70MHz Trophy/SWL (Jul 94)
25 Sep	10GHz Cums (Apr 94)
1/2 Oct	RSGB 432MHz-24GHz (Jun 94)
2 Oct	1.3GHz Trophy/SWL (Jun 94)
2 Oct	2.3GHz Trophy/SWL (Jun 94)
1/2 Oct	IARU 432MHz-24GHz (Jun 94)
4/19 Oct	1.3 & 2.3GHz Cum (Jul 94)
9 Oct	24GHz Cums
12/27 Oct	432MHz Cum
14/31 Oct	144MHz CW Cums
30 Oct	2nd 23cm & 13cm Fixed/SWL
30 Oct	10GHz Cums
3/17 Nov	1.3 & 2.3GHz Cum (Jul 94)
5/6 Nov	144MHz CW Marconi/RSGB 24hr
6 Nov	144MHz RSGB CW 6hr
11/28 Nov	432MHz Cum
4 Dec	144MHz AFS/Fixed/SWL
5 Dec	1.3 & 2.3GHz Cum

CONTEST CLASSIFIED CONTINUES ON PAGE 82

VHF RESULTS

continued from page 81

1994 70MHZ CUMULATIVES

FROM THE sad level of entries this year, perhaps we can draw the conclusion that this contest's life has now run its course but it will have a last chance in the 1995 calendar. In reality, the level of entries did not actually reflect the activity very well, with the Flight Refuelling ARS, G4RFR, making a good number of QSOs on each occasion from a less than special site on the edge of a river valley in a built-up area, with hills surrounding it. Congratulations and certificates go to all the entrants. *G4PIQ*

SINGLE OPERATOR FIXED SECTION

Pos	Callsign	23-Jan	30-Jan	13-Feb	27-Feb	13-Mar	Norm	QSO	Loc	Pwr	Ant	km
1	G3HYH	97	82	143	74	63	3000	49	74QD	130	Dipole	284
2	G3FIJ	37	72	81	27	16	1826	29	01KV	20	4Y	445

ALL OTHERS SECTION

Pos	Callsign	23-Jan	30-Jan	13-Feb	27-Feb	13-Mar	Norm	QSO	Loc	Pwr	Ant	km
1	G4RFR	283	224	283	230	192	3000	172	90AS	160	2 x 12Y	699

70MHZ FIXED CONTEST (MAR '94)

ONCE AGAIN, this contest produced a reasonable entry with a significant increase in entries to the Single Operator section over the 1993 contest. Conditions were flat as usual but some good contacts were made. GM4ZUK went out portable to give a few points and best DXs away, and my thanks to Allan for his check log which help me to resolve who was going to win the multi operator section! The multi operator section was very closely fought, but the Flight Refuelling ARS won from the Northern Lights by having a more accurate log. One of the nice features of this sort of event is that checking can be made very thorough quite easily. Congratulations and certificates go to the winners and runners-up in each section. *G4PIQ*

SINGLE OPERATOR SECTION

Pos	Callsign	Points	QSO	Loc	Pwr	Ant	Best DX	km
1	GD4IOM	234	26	74QD	40	5Y	G0JBA	474
2	G4SEU	214	39	92FM	80	8Y	GM4ZUK/P	495
3	G1SWH	202	30	83QO	100	8Y	GM4ZUK/P	369
4	G3UKV	190	32	82RR	85	5Y	GM4ZUK/P	467
5	G3JYP	178	23	84SN	40	8QY	G1JRU	419
6	G3HYH	166	32	92JO	130	5Y	GM4ZUK/P	489
7	G0AEV	165	29	81WL	25	5Y	G4KUX	353
8	G0JBA	140	16	01II	90	7Y	GD4IOM	474
9	G0EHV	134	20	94FW	40	HB9CV	G4RFR	464
10	G8FMC	111	19	91PT	35	5Y	GD4IOM	369
11	G4OUT	58	18	92AT	10	3Y	GD4IOM	230
12	G3NKS	37	7	81XU	15	3Y	G3JYP	

MULTI OPERATOR SECTION

Pos	Callsign	Points	QSO	Loc	Pwr	Ant	Best DX	km
1	G4RFR	363	43	90AS	160	2 x 12Y	GM4ZUK/P	686
2	G4KUX	349	45	94BP	160	10Y	G4RFR	430

1ST BACKPACKERS 144MHZ (MAY '94)

CONDITIONS FOR the first of this new series of contests were far from ideal with rain and drizzle affecting most parts of the Country. This is why it was so particularly gratifying to receive so many entries given the nature of conditions. Most entrants commented on how much they had enjoyed the chase for the various multipliers, but one or two fell foul of minor logging errors which reduced the number and hence the final score. There were some really good distances worked, obviously the overlap with the major 2M event provided useful reciprocal contacts at a time when activity would be expected to diminish. Both G0CLP/P and GW1VDF/P produced really excellent scores, supported by a large number of multipliers. GM7LVJ/P also put in a good performance given his distance away from the main areas of activity. Only one group used a multiple antenna array while most contestants favoured a single yagi. Congratulations go to the winners of each of the sections and to the runners-up. Certificate winners *. *G4DHF*

10W SINGLE OPERATOR

Pos		Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1	*	G0CLP/P	29563	117	47	IO93AF	10ele	DL6KR/P	689
2	*	G8JAY/P	26288	86	53	IO91AW	17ele	DK5WO	569
3		G7LQD/P	16456	84	44	IO93AD	9ele	EI9HW	336
4		G0SOO/P	16219	53	49	IO91SE	9ele	GM0UEP/P	654
5		G0SPA/P	13502	66	43	IO93GD	8ele	GJ4ZUK/P	433
6		G0GCI/P	11704	58	38	JO01ED	13ele	GM4ZAP/P	528
7		G0RMG/P	11466	73	42	IO92AG	12 ZL	GM4CXM	436
8		G8NWM/P	9538	40	38	IO92TR	9ele	F6FYZ	441
9		G0SYR/P	7866	38	38	IO91WG	4ele	G8PNN/P	475
10		G3FDW/P	6500	35	26	IO84ME	7 LP	G6CTU/P	380
11		G0OZF/P	5800	26	29	JO02GB	9ele	DF2VJ	485
12		GM7LVJ/P	5590	19	26	IO85QS	9ele	G6CTU/P	529
13		G7KOL/P	2544	24	24	IO92LO	Halo	GM4ZAP/P	339
14		G0NFO/P	1701	22	21	IO84KI	7 ZL	G0LBO/P	247

10W MULTI-OPERATOR

1	*	GW1VDF/P	86751	155	81	IO82JG	13ele	DK5WO	660
2	*	G8PNN/P	26832	66	48	IO95CK	4x9ele	G7PUV	534
3		GW3TAD/P	11960	58	40	IO81KW	17ele	G8DWD/P	323
4		G4FUR/P	6690	51	31	IO91VG	14ele	GM4ZAP/P	491

3W SINGLE OPERATOR

1	*	G0LBO/P	16740	49	45	IO84KI	9ele	G0GCI/P	427
2	*	G7OZE/P	14766	64	46	IO93AC	5 ZL	EI3GE	454
3		G0HIK/P	12728	43	43	IO84FF	13ele	G0MSA/P	435
4		G0HAC/P	8040	39	40	IO83XH	9ele	G7FDC	344
5		G4FUH/P	4851	37	21	IO93SN	9ele	GM4ZAP/P	432
6		G0HAX/P	2140	33	20	JO01ED	17ele	?	
7		G0LJD/P	2100	30	21	JO01FJ	12 ZL	GW0RDI/P	275

3W MULTI-OPERATOR

1	*	GW0SYG/P	3350	14	25	IO71LU	9ele	G4PIQ	420

432MHZ FIXED, AFS, SWL (FEB '94)

ALTHOUGH CONDITIONS leading up to the contest did not promise to be anything special (do they ever), it was gratifying to receive a significant improvement in entries on last year's well supported event. Those Cover Sheets that contained comments said it all: "Flat" (G4PIQ); "Poor" (G3NNG); "Made it hard work!" (G4UDE). Despite these trials and tribulations the level of activity was generally good, particularly into the UK. It was good to see an increasing numbers of Novice callsigns in the logs. Ruth Houghton, 2E1BZR, in particular appeared to have a good time with 1W into a dipole. G4PIQ noticed an auroral event on 2M towards the end of the contest. Turning his antenna North, a CQ call on 432.050 was rewarded with an auroral contact that produced his best DX. Not only did he win his section by yet another convincing margin, but the Martlesham group won the AFS section. The Sutton and Cheam RS put in a good performance as runners up. G4WFR receives a certificate for being the leading station running 25W or less into a single antenna. Congratulations to all certificate winners (*). *G4DHF*

SINGLE OPERATOR FIXED SECTION

Pos		Callsign	Zn	Pts	Qso	Loc	Ant	Pwr(W)	Best Dx	Km
1	*	G4PIQ	C	1048	114	JO01MU	4X17	300	DL5KVD	778
2	*	G3NNG	D	693	107	IO91EP	21	400	DC9KK	670
3		G8FBG	C	519	91	IO91SG	4X28+21	350	DC9KK	552
4	*	G4UDE	B	461	69	IO82KT	2X30	120	PE1OPF	523
5		G6HKM	C	456	75	JO01FT	23	100	GI8AYZ	527
6		G6NTD	B	435	87	IO92IO	2X21	250	PA0EZ	442
7	*	GW6ZUQ	E	418	54	IO81PP	2X19	100	DG5KB/P	617
8	*	G8APB	A	414	80	IO83WD	21	200	G7FDC	325
9	*	G4WFR	C	382	58	JO01OV	21	20	GI8AYZ	567
10		G6RAF	B	371	56	IO92QP	2X21	100	DB8KJ	528
11		G4JLG	A	369	61	IO83TM	88	180	G0JBA	342
12		G4WKN	B	357	61	IO92OG	21	100	GI8AYZ	428
13		G0TDF	B	344	69	IO92CM	21	100	PA0EZ	476
14		GW8GSQ	E	324	35	IO81FL	22	250	PA0EZ	606
15		G8JXV	C	261	53	IO91VE	88	120	PA0EZ	392
16		G0ODQ	D	229	51	IO91NQ	21	100	PA3FPS	390
17		G3UKV	B	182	42	IO82RR	14	80	G4PIQ	262
18		G0MLY	B	170	50	IO92AP	2X21	75	G4PIQ	222
19		G3YSX	C	163	43	IO91WF	21	?	G3FDW	380
20		G0GCI	C	142	32	JO01ED	2X21	120	PE1NTE	355
21		G0TRB	?	130	35	IO92EO	19	10	G0FIG	215
22		G3JJZ	?	125	37	JO01AJ	19	25	G1NXS	287
23		G7RAT	C	124	32	JO22IJ	24	?	PA3FPS	356
24		G4TVR	B	121	31	IO92BJ	15	25	G0GCI	208
25		G4DDK	C	114	20	JO02PA	17	25	GW8GSQ	338
26		G3FIJ	C	105	22	JO01KV	19	20	GW8GSQ	308
27		2E1AGJ	B	104	33	IO82XO	17	3	G4PIQ	226
27	=	G4IRB	A	104	20	IO83TM	21	10	G3OLX	286
29		G0BRV	?	94	32	JO01AJ	19	25	G1NXS	287
30		G1COW	D	92	28	IO91OJ	17	40	G4JLG	259
31		G1WIS	C	86	26	IO91WG	18	25	G8XVJ	287
32		G1WAC	B	85	29	IO92BJ	2X15	25	G4PIQ	208
32	=	G1EHF	?	85	29	IO91PJ	19	50	G8XVJ	254
34		G0EYO	B	69	19	IO92BJ	22	10	G4PIQ	200
35		G4ZJY	B	67	19	IO82SQ	48	100	G6HKM	221
36		G7BWQ	B	63	19	IO82QS	22	40	G4PIQ	269
37		G0GJV	D	51	21	IO83RJ	19	25	G8XVJ	248
38		G8PAW	B	41	27	IO82TM	19	25	G4JLG	111
39		G7LWZ	C	29	17	IO92IO	9	75	G8NTD	172
40		2E1BZR	?	19	11	JO01BI	1	1	G3NNG	125
41		G0EGX	C	13	5	JO01IT	7	10	G3NNG	161
42		G1LNT	?	7	7	JO01AJ	1	15	G3JJZ	18

Checklog gratefully received from PA3FPS

SWL - NO ENTRIES

MULTI OPERATOR FIXED SECTION

1	*	G3OLX	C	479	95	IO91VH	30	250	DC9KK	515
2	*	G0GZQ	C	329	77	IO91VH	30	50	PA0EZ	386
3	*	G3PIA	D	208	49	IO91IN	4X21	25	PA3FPS	421
4		G3WHK	C	189	49	IO91VJ	24	100	G4JLG	278
5		G3WMR	?	70	34	JO01BK	46	20	GW6ZUQ	197

AFFILIATED SOCIETIES SECTION

Pos		AFS	Team	Total	Zn
1	*	Martlesham DX CG	G4PIQ(1048), G4WFR(382), G4DDK(114)	1544	C
2	*	Sutton & Cheam RS	G3OLX(479), G0GZQ(329), G3WHK(189)	997	C
3	*	Harwell ARS	G3NNG(693), G3PIA(208)	901	D
4	*	S Manchester RC	G8APB(414), G4JLG(369), G4IRB(104)	887	A
5	*	RAF Luffenham ARC	G6RAF(371), G4WKN(357)	728	B
6		Reigate ATS (A)	G8JXV(261), G3YSX(163), G7RAT(124)	670	C
7		RS Bloxwich	G0TDF(344), G0MLY(170), 2E1AGJ(104)	618	B
8		Telford ARS (A)	G3UKV(182), G7BWQ(63), G4ZJY(67)	353	B
9		Wythall RC	G4TYR(121), G1WAC(29), G0EYO(85)	255	B
10		Bracknell ARC	G1COW(92), G1EHF(85), G0GJV(51)	238	D
11		Bromley ARS	G3JJZ(125), G0BRV(94)	219	?
12		Reigate ATS (B)	G1WIS(86), G7LWZ(29), G1LNT(7)	122	C
13		Colchester RA	G3FIJ(105), G0EGX(13)	118	C
14		N Kent RS	G3WMR(70)	70	?
15		Telford ARS (B)	G8PAW(41)	41	B

VHF RULES

2ND 23CM AND 13CM FIXED/SWL

Date: 30 Oct

Time: 1700-2100UTC

General rules apply.

Two contests running concurrently, separate cover sheets and logs.

A summary sheet is NOT required.

Sections: For both contests. S Single operator fixed; M Multi operator fixed; L Listeners.

Adjudicator: S Thompson, GW8GSQ, 8 Nant Lais, Corntown, Bridgend CF35 5SA

144MHZ RSGB CW 6 HOUR

Date: 6 Nov

Time: 0800-1400UTC

General rules apply

1 Pt per Kilometre.

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

144MHZ CW MARCONI/RSGB 24 HOUR

Date: 5/6 Nov

Time: 1400-1400UTC

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

Logs for Marconi contest will be forwarded.

Please send two cover sheets and two copies of the log if you are entering both RSGB 24 hour and Marconi 24 hour contest.

You can enter either 6 hour or 24 hour contest, but NOT both.

Adjudicator: For 6h and 24h contests, S Thompson, GW8GSQ, 8 Nant Lais, Corntown, Bridgend CF35 5SA

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 sub-committee 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).

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

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

ALINCO DR-119 2m Transceiver 50w: £235. Tandy PRO44 Scanner, unwanted gift: £90. Icom IC730 HF Tx/Rx: £350. GM4UJZ, QTHR. (Dalgety Bay) 0383 823305.

ANTENNA GEAR. Create Log Periodic CLP5130-1, 50-1300MHz: £50. Hustler TH3JR Thunder Bird Junior 3 ele Beam for 10/15/20 metres: £150. Cuedee 11 ele 2m Beam: £35. Also 12 ele 70cms: £25. Jaybeam Corner Reflector Antenna 1215-1325MHz: £20. Winch 240v AC, will raise 60ft Mast and Antennas: £75. G5RV Half Size: £20. Low Pass Filter for 6m: £10. Phone Peter, G8WYT, QTHR. (Haywards Heath) 0444 450265.

COMPLETE STATION. Kenwood/Trio 940S: £995. Versatower P60: £500. 3 ele Jaybeam: £100. KR600RC Rotator and Bearing: £100. Kenwood TM231E Tcvr: £215. Yaesu FC902 ATU: £100. SP901 Spkr: £15. FL2100Z Linear: £475. Shure 444 Mic: £20. Hy-Mound 808 Morse Key: £30. KAM, all mode TNC: £200. CT300 Dummy Load: £30. Various other items. (Poole) 0202 674285.

GENERATOR 2.8KVA Honda Petrol/LPG with Markon LPG Converter 250v AC +12v battery charge for electric starter: £250 ono. Buyer collects. Also Computers Spectrum +VTX5000 Modem, Acorn Atom 12+12K, B&W Monitor, tapes for both plus PSU's, plus other "Junk" free to genuine young amateur, prepared to collect. G8AGR, phone 9am - 3pm, week days. (Consett) 0207 520749.

IDEAL QTH! Good HF Site, detached modern 4 Bed House, garage, good garden, PVC D/glazed, Gas CH, quiet location. R7 Vertical, G5RV. Early possession possible. Hard standing for caravan. (Plymouth) 0752 775375.

PACKET SYSTEM. VHF/UHF, comprising Amstrad PPC512, LapTop twin 3.5in D/Drive, carrying case, Baycom Terminal and Program Disc and instruction booklet, all leads and Tatung VGA Monitor: £260 ono. FTV-107R Transverter: £80 ono. Datong Auto Speech Processor: £40 ono. Commodore Amiga program AMOS. 2 metre Module to fit 901 or 107 Transverter: £65 ono. Homebrew High Power 6m ATU with Balun: £95 ono. FT77 +FC700: £500 ovno. (Willington, Co Durham) 0388 745787.

PSU 5V at 45A: £120. IBM PS2/30 System: £85. Computer Trolly for IBM: £100. Modem 2400 Quattro: £150. HW101 +PSU, manual: £130. Heathkit SW-RX SW7800: £180. Vodapage Wordcall text pager: £150. Modern Amateur Electronics manual, 3-vols: £50. Softy 2 EPROM Programmer: £25. G3ZLX, QTHR. Phone evenings. Buyer collects or add carriage. (Milton Keynes) 0908 644244.

TONO MR-250 Linear, 210w o/p, 10w i/p, with receive Pre-amp: £160. Toyometer T200 200w Dummy Load, 3.5-500MHz: £25. Tono 5000E Data Terminal, modes RTTY, Amtor, Morse, ASCII Tx/Rx, includes Monitor, Keyboard: £350. TET Swiss Quad SQY-06S Antenna 2m: £25. Hustler Discone Antenna: £20. L.A.R VHF Omni Match 2m: £30. Antenna 23cm Helical 13 Turn R.H Circ: £35. All as new. Phone Peter, G8WYT. (Haywards Heath) 0444 450265.

TS711A 2m M/mode: £450. Drake R2B Rx, Xtals for 80/10m incl WARC coverage, 2NB Noiseblanker, 2CQ Qmultiplier, Xtal Calibrator, matching Spkr, 2m/6m Converters: £275. KW204 Transmitter: £80. TenTec 229 1KW ATU incl Balun: £150. Heathkit DX40/VF1U Tx: £25. Incl manuals. Heil BM10/HC5 Headset: £40. Yaesu MDIC8 Desktop Mic: £45. Hateley Dipoles DD40/10: £25, DD20/15: £15. Bob G3VXJ QTHR. (Worthing) 0903 231466.

YAESU FT7B 50w Mobile/Base HF Tcvr and matching FP12 AC PSU complete with Mic and manual, mint condx, boxed: £350. G4GTR, QTHR. (Bakewell) 0629 640475.

TONNA 4x 23ele 1296MHz, used once, as new: £180. RN Electronics Masthead Pre-Amp 144MHz, 0.8db: £40. Kent Brass Key: £25. Diamond SX-200 VSWR/PWR Meter: £45. Adonis AM-508 Desk Mic with Compressor: £35. Phone Paul, G7GUC, NOT QTHR. (Huntingdon) 0480 454577.

21MHz YAGI. Three tapered elements, excellent gain and F/B, nearly new. Buyer collects. Easily dismantles: £110 ono. Phone after 4pm. (Gloucester) 0452 300920.

35FT TELESCOPIC TILTING MAST, winch, wall bracket, Rotator, 2 ele 21MHz "V" Beam, RG213 feeders, nine months old: £350 ono. Inspect collect. Tel G0GGI. (Kirkby-in-Furness) 0229 889635.

386SX plus 387 Co-Processor, 16MHz Motherboard, known working but no Ram: £25. G3TMU, QTHR. (Camberley) 0276 32204.

A3/A4 PLOTTER 6-pen HP7475A RS232, manuals, pens, paper, acetates: £200. VGA Monitor 12inch mono, metal case: £40. Marconi Dummy Load/ Power Meter, DC-VHF 100W: £20. Exacta 35mm SLR Camera +5 Lenses +Flash: £50. HF - 2m Converter, not boxed: £10. Kev, G0PXF, QTHR. (Leeds) 0532 559939.

ALTRON Three Section 40ft Mast with post and head Unit, manual, Luffing Winch American Strongarm 110 Volt raising and lowering Winch with 1KVA stepdown transformer: £450. No Split, buyer inspects, collects. Delivery by arrangement. Owner G4ZAW emigrating. Apply Colin Tobutt, 15 Westcliffe Drive, Herne Bay, Kent. (Herne Bay) 0227 368636.

ATARI 520STFM upgraded 1Mb, Forget-me-clock. Alfa Data track ball Mouse, Joysticks. Pack-et-Term for packet, RTTY Amtor. Music construction set. 3D const kit, Battle chess, Dungeon master, scabble etc. Boxed up: £110. Buyer to inspect and collect. G3JPX, QTHR. (Canvey Island) 0268 510363.

ATARI STE 4Mb Designer Programme for PCB design, complex pictures etc: £20. Also for 520UP Morse/RTTY Transceive programme: £10. 70cm Co-Linear, 10db: £40. Write to Mr V McClure, 43 Roman Waty, Seaton, Devon EX12 2NT. (Seaton).

ATLAS 215X Transceiver 1.8-21MHz, 100w S/state, manual, mint: £240. Yaesu FT102, all Band, all Mode, inc AM+FM Tcvr, CW Filter, manuals, gwo: £110. National 21MHz 10w Mobile, vgc, manual: £99. Mizuro MX285 28MHz SSB/CW Handy 2w, Nicads, whip, mint: £110. Racal RA117E, manual: £100. SEM 70MHz Transverter: £35. KR400 Med/Hvy Duty Rotator, cable, manual: £95. (Fareham) 0329 230737.

AZDEN 2m FM Tcvr, air band receive, 10/50w: £180. ERA Mk2 Microreader: £90. Carriage. G6TPQ. (Oldham) 061 633 3895.

BIRD THRULINE, leather case, VHF, UHF elements, 25B, 25C, 50C, 10E, 5D 50W 50 Ohm Termline Load, 25W 50 Ohm 3dB Atten. BBC 32k Computer 40/80 Opus 5.25inch Floppy Drive, Colour Monitor. Offers for ALL or part. G8BJL, QTHR. (Altrincham) 061 928 0200.

CAPCO Magnetic Loop Antenna AMA3 13.9-30MHz, complete: £150 ono. G0ELX. (Stockport) 061 477 3912.

COLLECTORS ITEM. W G Pye Decade Resistance Box, 0.1 - 11 Ohms App Mfg Co Coils Resistance 10K Ohms MK4 for Bridge work. Both very high quality Manganin Coils. OFFERS?, G3EDD, QTHR. (Cambridge) 0223 880232.

COLLINS KWM2 (Plug-in Relay), 516-F2 PSU, 302C-1 Power Mwter, manuals, spare valves: £500. Millen Junior Transmatch ATU: £85. Unused 4CX250BC Valves: £40 each. (Cambs) 0954 210374.

COMMODORE 64 inc D/D 1541 Mk2, Tape, Monitor, Printer MPS801, scapab, +S/ware and manuals: £150 ono. BBC Computer, Pace 40/80t D/Disc drive: £75 ono. Buyer collects. G7PGE, QTHR. (Liverpool) 051 226 5877.

COMMODORE C64, two Green screen Monitors, 1541-2 D/D, Digicom Interface, Antenna AZ/EL Control Interface c/w Program for Satellite Tracking. Many amateur programs. Free to buyer, another C64, (sometime has colour fault) and a phone Modem: £115. John, G6SVJ, QTHR. (Uttoxeter) 0889 565836.

COMPUTER BITS, 286/16 Min board, NO Ram: £20. 287 Co-Processor: £20. 200 Watt Computer PSU: £23. Trident TVGA 9000 Video Board: £25. G0KTN, QTHR. (Melksham) 0225 703726.

COPAR AT5 Transmitter CW/AM, 160/80/40, 10w, c/w PSU and Aerial Change-over, vgc: £50. Racal RA17 Receiver, vgc: £100. Buyer collects. G3YFH. (Newark) 0636 71737.

DAWE TRAFFIC Noise Meter, c/w Microphone: £25. SGC SG-230 Smartuner Auto ATU, 1.8-30MHz, matches 8-150ft Wire, 500 memories, fast, waterproof, reliable: £250. Olivetti PR15 Printer, 9-pin Dot Matrix, parallel and serial Interfaces, c/w manual: £35. Wayne Keer Universal Bridge, model B221A, c/w manual: £35. (Stamford) 0780 55001.

DRAGON 64, SSSD Disk, Cassette Recorder, Mono Monitor, books, S/ware, cables. Suit packet radio, buyer collects: £40 ono. Call Nick. (Somerset) 0934 712140.

DRAKE MN2000 2Kw ATU: £180. Drake WV4 Power Meter: £25. Heath Monitor Scope SB610: £60. Datong D75 RF Speech Processor: £40. Trio HC10 Ham Clock: £20. Trio HS4 Headphones: £12. Microwave Modules 6m Converter MMC/50/28: £20. Icom RM3: £25. Collins 180S-1 ATU: £70. John, G3MBM, QTHR. (Cambridge) 0223 860178.

DRAKE R4C/T4C, c/w PSU, 5 herwood filters: £550. MM 432/28 Transverter: £60. BC348 Rx: £50. G3GNR. (Devon) 0409 231301.

DRAKE TR7A, S/no 11600+, 3 filters, fan, all bands. PS7 with fan: £750. RV7: £95. MN75 ATU/Balun: £125. MS7: £35. All little use, superb condition. Vibroplex Original De Luxe, brand new: £75. Datong RF Clipper, never used: £40. Racal MA975A ATU: £60. Racal RA125 Single Chan Rx: £70. HyGain 14AVQ 4 band Vertical: £45. J Beam TB3: £120. Icom IC255E 2m FM: £120. All with manuals. (Weymouth) 0305 832974.

DUMMY LOAD MFJ260B 300w LP Filter Comet CF30S 150w: £50 or Exchange for 1kW Dummy Load, VGC. Also required; Antenna Switch Global CX201 2-way SO239 1kW or comparable Model. Cash adjustment arranged. See AD for Kenwood MC85 Desk Mic. (Truro) 0872 79922.

EDDYSTONE EC10 Mk2: £95. EP20 Panaromic Display: £150. WIN108 Airband Scanner: £75. All in mint condition. G0URX. (Hastings) 0580 830558.

EMIGRATING TO VK Sale. G4WIM D/Bander kit (boards/components) almost complete: £190. Two, Pye E-Band Tx/Rx: £5 each. Sony ICF-PRO80 H/held Rx 0.15-223MHz, AM/FM/SSB/CW: £90. Standard Horizon/ Hand Phone6 Marine H/held Tx/Rx, international and U.S. channels, Nicad and charger: £120. Casio TV-3100 Mini Colour LCD TV, Mains/12v adapters: £65. Odd computer parts, CAD etc. Prefer buyer collects. G4FUJ, QTHR. (Cheltenham) 0242 518776.

EX-LIGHTING TOWERS. Four 14ft x 8in Triangular Lattice Towers suitable for DIY Aerial mast(s). Capable of being bolted together to form two 28ft Masts: £35 per Section or £120 the Lot including a 10ft RSC. Buyer inspects and collects. G1CQX, QTHR. (Sittingbourne) 0795 428685.

FRDX 400 FLDX 400. HF Band Tx and matching Rx with SWR Meter, Mic and Key: £150. BBC Modem: £25. 40Mb Hardcard PC1512: £50. (Winslow) 0296 715526.

FT101Z, SSB and CW, mint condx, with manual, original owner: £250 ono. G3ROK, QTHR. (Potters Bar) 0707 655807.

FT101ZD, WARC Bands, FM board, fan, matching FC902 ATU, SP901 Spkr. Will not split: £450. FT901R Transverter 2m/70cm fitted: £230. All with manuals. G4FYM, QTHR. Phone, 0836 200156(day). (Reading) 0734 572600.

FT690 MK2 with Nicads, charger and Mains power Unit: £350 ono. G4NJU, QTHR. (Milton Keynes) 0908 378277.

FT707 FC707, FP707, Mic, handbook, good working order, fixed price: £500 bargain. (Evesham) 0386 833511.

FT990AC MD1 Mic, Revex W520 SWR, MFJ948, MK703, R7 Vert, FIF-232C, FF501 LPF, Bricomm Safetune, KPC-2 TNC, 3A PSU, IC2 Set, Kenwood Spkr, PS1 IBM with 486SLC, 40MHz, 80 Mb HD, S/Ware. SM2400 Modem. All gd condx. G4UXG, QTHR. Call daytime 081 897 9096 or evening (Reading) 0737 734263.

GOING QRT. TS940S, Auto ATU MC42S: £1150. Daiwa PS304 Mk2 30A PSU, new: £100. Claude Lyons Variac: £50. All excellent condition. (High Wycombe) 0494 534656.

GOULD OS3000A D/Trace Scope, probes and Handbook: £150 ono. Adana Printing Press - Print your own QSL Cards: £30 ono. Crystal Calibrator BC221 c/w Calibration Charts and handbook: £15 ono. Advance AF Signal Gen: £5. Frequency Counter 10Hz-32MHz: £15. Oscar Mobile Antenna's: £5 each. Jaybeam 2m Parabeam: £15 ono. Buyers collect. (Hemel Hempstead) 0442 217461.

HEATHERLITE HF Linear Amps (2) both mint condx, one rarely used: £800 each. G4TML, QTHR. (Huddersfield) 0484 424529.

HEATHKIT SB-200 Linear Amp, manual included, vgc: £350. 400Hz Crystal filter for HW Rigs: £50. Amiga A500, 1Mb upgrade, including some radio programmes, loads of games plus manuals, vgc: £200. Phone evenings. (Pinner) 0895 624361.

HF225 with sync AM/FM, +PSU, bxd as new: £390. Sony SW1E, pocket HF Rx, bxd, manuals, gwo: £95. Tait T198 Xtaled 144.650 and 144.675MHz, 25w, +Mic, workshop manual: £35 ono. Tait T196 70cm 25w +crct diagram: £20ono. Perhaps deliver Midlands. (Southampton) 0703 230990.

IC740 HF Tcvr with Mains PSU: £425. TR9130 2m M/mode Tcvr: £225. FT690 Mk2 6m M/mode plus Nevada 10w Amp and DC PSU: £240. Daiwa CN620A: £50. FRG7700 plus FRV7700 VHF Converter: £175. ALL ono. Ex G3OPR, G4ZNW. Collect London. (London) 081 567 6389.

ICOM 725, FM, Mic, little used, as new, box and handbook: £550. Kenwood Dip Meter DM81: £45. G2CKI, QTHR. (Evesham) 0386 881155.

ICOM IC-72 Receiver, SSB, AM, CW. FM board fitted. Superb Rx, new, boxed: £550. TS-430S, new, boxed: £585. Hallicrafter SR-400 Cyclone 2 Tx/Rx, 80-10m, PSU, manual, vgc: £275. G4AFY. (Kidderminster) 0562 747480.

ICOM IC-R1 100KHz to 1300MHz Scanner AM/NBFM/WBFM, with 1000mAH Battery pack for long life, BC-72 Desktop quick charger plus standard charger and manual: £290. G3UYK, QTHR. (Winchester) 0962 877727.

ICOM IC2SA 2m Tcvr, complete with BC72 chrgr, BP82 Batteries, instruct manual: £150. G4HMQ QTHR (Droitwich) 0905 775537.

ICOM IC701, 701 PS, SM2: £350. RM3: £25. Trio TL922: £1,000. AT230: £120. HC10 Ham Clock: £20. C.R Tube for KW108: £15. G3GGK, QTHR. (Cambs) 0954 210374.

ICOM IC735 Compact/Mobile HF Tcvr, excellent condition, 250Hz Filter, Desk Mic, Gen

coverage Rx, boxed, service manual: £630 ono. Ten-Tec 961, 12v/20A PSU, ideal with IC735: £75. Yaesu FRG-7700 Communication Rx, 0-30MHz CW/SSB/AM/FM, includes clock, timer, internal 240v PSU, digital display, manual: £200. Ed, G3SQX. (Southampton) 0202 891656.

ICOM IC735 HF Tcvr, with IC150 Auto ATU, ICPS55 PSU, ICSM6 Mic: £750. Icom IC251E 144MHz Multi Mode Tcvr, muTek front-end: £385. Trio TS530S HF Tcvr, Mic MC50: £400. Mike, GW8CMU. (Rhoose) 0446 711426.

ICOM ICR-7000 Remote Control Synthesiser: £625. Kenwood SM220 with BS8: £250. Marchwood 13.8v 35Amp PU, professionally built: £80. Telequipment D54 Oscilloscope: £60. Marconi Sigen. Type TF801D: £70. Universal Bridge with Voltage Test: £20. Antenna Noise Bridge: £20. LW/28MHz Converter: £5. G0PJI. (Plymouth) 0752 775375.

ICOM ICR-9000, SP20 Spkr plus 10in Monitor, mint condx: £2,500. Racal 1792 backlit test, all filters. Eddystone 1650, 6 filters, 100 chan memories, direct entry, auto/man tuning, excellent performance. £1,000 each Receiver. Exchange. (Southall) 081 813 9193.

ICOM W2E/4SRE Accessories: HM70 Spkr Mic, BP82 Nicad pack, Two LC72 cases, handbooks, Aerials and chargers. MH12 Spkr/Mic for Yaesu FT23/73R. All in good condition. Offers. (Solihull) 021 743 3626.

JAYBEAM 10XY/2M Unused, boxed: £50. CBM64, tape, RTTY/CW S/ware, Interface, faulty 1541 Drive plus faulty C64 for spares: £50. Kenwood ST-1 Base for TR2400: £20. Amstrad PC2086, 3.5 and 5.25 Drives, 32Mb HD, VGA Monitor, Star LC10 Printer: £250. Buyers inspect and collect. Ron, G6BMY, QTHR. (Manchester) 061 902 9546.

KAM V5 inc Pactor, manuals, box, cables as new: £225. G-Whips 20m + 40m (Mobiles): £25. Yaesu FT102, manuals, vgc: £475. Jaybeam VR3 Ant: £25. (Collect or pay postage). Other small items. Send SAE for list. Derek, G0OEW. (Nantwich) 0270 668111.

KENWOOD 78E D/bander H/portable, under 6 months old, condx new, not even finger marks, considerable saving on new: £375 ono. MC60A Desk Mic: £60. 10M FM Linear 4 i/p-35 o/p: £30. Analog Multi-meter, steel case: £20. AEA 2m Telescopic H/portable Antenna: £15. Azden Mobile Spkr: £20. 'CAR' Speakers new bluespot Door, new Pioneer back shelf passive radiator, exc condx Pioneer door three-way, all: £27 pair. (Norwich) 0328 710641.

KENWOOD R1000 Receiver: £245. ERA Microreader: £95. Datong FL3: £110. Codar PR40 Preselector: £55. All items good condition. (Llandudno) 0492 875433.

KENWOOD TM231E 144MHz 50w Mobile Tcvr: £175. Yaesu SP767 Ext Spkr: £55. Yaesu MD-IC8 Dynamic Desk Mic: £70. Both new boxed. HP6269B 0-40V 50A P/Supply: £200. Bird 43 Thruline Wattmeter body: £80. All Carriage extra or buyer collects. (Horsham) 0403 864222.

KENWOOD TS450SAT as new, Auto ATU, SSB Filter, CW Filter, boxed: £1,095. Kenwood PS31 PSU as new: £135. Yaesu FL2100B Linear Amp, exc condx: £385. Yaesu FT290R 2m M/mode, boxed, manuals, VGC: £195. John, G4RCG, QTHR. (Wakefield) 0924 362144.

KENWOOD TS940S, late model, Lowe Rx Mods, one owner (never opened case!). Mint condition, with box, handbooks, Mic: £1,100. GW4RYK. (Montgomery) 0686 630255.

KENWOOD TS950SD manuals, filters, original packing. Almost unused for reasons which will be explained. Any trial: £2,200. New price £3,000+. G6RJ, QTHR. Phone after 8.15pm or from 1 to 2.30pm. (N Yorks) 0677 470480.

KW ATLANTA HF Tx/Rx, PA needs attention, hence only: £60. (Devizes) 0380 725075.

LOG PERIODIC, 9 element for 10, 12, 15 and 17 Mtrs Super DXer. Yaesu G2000 RC, new Rotator H/duty, Tenna Mast 45 ft crank-up, tilt over Tower with H/duty commercial winch with 2 gears clutch and brake. Bargain half price: £800. SB220 2Kw Linear, VGC: £450. Tokyo HC2000 High Power ATU, new, still in box: £250. Katsumi Electronic Keyer: £40. TS930S with all Filters fitted, MC85 Mic: £750. Icom World Clock: £30. 21ft Aluminium scaffold Pole: £20. 3rd ele for GEM Quad: £15. HF Wave Meter: £35. (Bristol) 0272 642867.

NOTEBOOK COMPUTER 386SX, 25MHz, 60Mb HD, IBM compatable, 2 Serial, 1 Parallel Ports, 2M Ram, DOS-5, unopened, Mains/battery, manuals, carrying case, boxed, 15 months old: £600 ono. WILL Swap for HF Linear. Call make an offer. 2x 813's, new unused: £60. (Inverbervie) 0561 361904. GM0MDB, QTHR.

QRT HF. Icom 735, FL63C, SM6, PS15: £675. Drake MN7, B1000 Balun, 3300LPF: £200. Drake 2B Valves, Mic plugs for Collins S Line, Offers. G3ONU, NOT QTHR. (Swindon) 0793 782604.

QTH 1938 3 Bed Semi, fine elevated position, super take-off all bands. Seperate garage, greenhouse, large conserv, secluded large garden, quiet neighbourhood, views North West. Photos available: £59,950 ono. GM4HMQ, QTHR. (Droitwich) 0905 775537.

RACAL RA17 Mk 2. Rx good condition: £150. Would deliver reasonable distance. (Buxton) 0298 77890 evenings/weekends.

RACAL RA17L 0-30MHz Receiver, good condx: £170. Phone G0UPD. (Felixstowe) 0394 270853.

RADCOMS late 50's to current, sensible offers. Wanted: KW Valiant Transmitter. Contact G4CJY. (High Wycombe) 0494 530018.

RADIO MAGAZINES from 1927 - 1973. I have about 600 copies. Titles include QST, T & R, RSGB RadCom. Lots of years complete. Open to best offer. Few damaged but readable. Phone anytime to inspect. Datong D70 Morse Tutor: £35. (Doncaster) 0302 831135.

SAVE OVER £1000! Rare opportunity to acquire a superb example of the world's finest HF Tcvr, the incomparable FT1000. New May 1993, fitted extra filters, c/w hand Mic, box and manual. Matching extension Spkr and Desk Mic available (will split). SASE for list of remaining QRT Sale items. G0EOL, QTHR. (Winsford) 0606 554857.

SILENT KEY SALE for XYL. All items in excellent condx. FT901DM: £395. FC901 ATU: £100. FT707: £280. Morse Tutor Datong D70: £35. ICS FAX1: £100. RA17L Rx: £150. Strumech 60ft Tower Complete: £500 ovno. Various Heathkit Test Equipment incl Oscilloscope Model 10-12: £85 the lot. Phone GM0SHD, QTHR. (Friockheim) 0241 828559 evenings.

SILENT KEY Sale, G1RCR. Yaesu FT221R: £300 ono. Yaesu FT208R: £150 ono. R N Electronics Transverter 144/6m: £75 ono. (Worcester) 0905 29545.

SILENT KEY SALE, G2BVM. Trio TS530S: £375. Icom 260E 2m M/mode: £180. Icom IC240 2m Mobile: £120. Icom 1050 10m FM 30w: £50. Microwave Modules 28-144 Transverter FM/SSB: Offers? Gould OS110A Oscilloscope with carry-case, leads, manual: £130 ono. Dragon 64 Computer with Disk Drive. Yaesu YVM-1 Monotor: Offers? All with manuals. Must be sold. G4VVP, QTHR. (Wells) 0761 232557.

SONY ICF2001D Receiver: £190 ono. Creed 7B Teleprinter: £5. 6S6 Reader: £5. 7TR Reperf: £5. All ono. Valves, many new. Phone for details. Chris, G4COU, QTHR. (Braintree) 0376 347952.

SSB ELECTRONICS LT2S 28/144MHz Transverter: £350. 4 x 21 ele Tonna Yaggi with power divider + stacking frame: £140. (Bangor, Co Down) 0247 468442.

TEN-TEC OMNI 5 Tcvr: £1,200. Also Paragon: £750. Both in good condition. (Sutton Coldfield) 021 329 2551.

TENNAMAST wall mounted Mast plus Emotator 105TSX Rotator plus cable, no planning permission: £200. (Livingston) 0506 414338.

TRIO TS120S HF Tcvr complete with Mic and manual: £335 ono. Phone Richard, G0ILN, QTHR. (Bexhill on Sea) 0424 216645.

TRIO TS530S with narrow CW/SSB Filter, Tx hardly used, mint condx with Mic, manual, boxed: £450. Delivery arranged. G0AWZ. (York) 0904 424817.

TS520 HF Tcvr, 250Hz Filter, SP250 Spkr FSH, one owner, looks and works as new, original packing and workshop manual: £300. FRG7 Comm Receiver 0.5-30MHz original condition, packing: £100. Manson EP925 PSU, brand new: £70. Copies of original Air Publications for R1132/1481, T1154, R1155 historic documents: £6 each. Carriage on each item at cost. G3KNG. (Wolverhampton) 0902 843134.

TS830S with CW Filter: £500. AT230 ATU: £100. Shure 444: £25. OR the Complete HF Station: £575. G4NLA, QTHR. (Ilkeston) 0602 307841.

YAESU FL2100Z Linear Amp: £500. 80m Homebrew Tx/Rx: £25. H'duty 13.8v PSU: £40. 2m 14ele Beam: £25. 2m 2Way Splitter: £20. EK150 Keyer: £50. 70cms Beam: £20. 70cms Co-Linear: £20. Nigel, G4NRR. (Solihull) 021 744 8672.

YAESU FP800 Power Supply, new, unused: £240. Yaesu 112CW narrow Filter, new: £40. WW2 BC221M Freq Meter, tropicalised: £35. Command Rx 1.5-3MHz, no Dynamotor: £37. Redifon type 6288R heavy duty Long Wire ATU: £107. Army Telephone handsets Type L: £35 pair. Army 38 Set Mk2: £35. KW600 Linear, OK spares: £80 (Heavy.) Buyer collects or carriage extra. Don, GM3NCS, QTHR. Tel: after 6pm. (Burghead) 0343 835635.

YAESU FT201ZD WARC, AT130: £350 ono. ERA Mk2 Telereader: £100. Mobile 160m Whip Coil, 2 bases. G3YAA. (Beverley) 0482 866865.

YAESU FT221R Mutek, manual: £290. Homebrew Marchwood PSU: £25. Marconi FM/AM Modulation Meter TF2303: £15. G4IER. (York) 0904 728892.

YAESU FT290R MK-2, 2m M/mode, complete with case, Nicads, charger etc, boxed and as new: £350 ono. GM4ZMG. (Strathaven) 0357 40471.

YAESU FT720RU 70cm, 10w Mobile, bracket, manual, remote cable, mint: £120. Radio/TV Servicing Books, 1972-80: £4 each. Panasonic VCR Service manuals 850, 430, 230, 730, 810, 100, 7200 and 688: £4 each. Steve, G6AQC, QTHR. Phone after 7pm. (Oxford) 0865 243634.

YAESU FT736R only 9 mths old, fitted with Mutek front-end, also Linear Amp 25W i/p, 160w o/p, used with the 736R, very little use. Reason for sale, to buy HF rig. (Dunstable) 0582 868683.

YAESU FT757 Mk2: £695. FC902 ATU: £165. FT290 Mk1 Mutek: £265. Jaybeam Minimax half size Tribander as new: £300. SX200 Scanner: £95. (Gravesend) 0474 823797.

YAESU Synthezised Scanning VFO Type FU901DM with leads: £140 ono. (Carmarthenshire) 0269 870076.

YUPITERU MVT 7100 new, boxed: £299. Also Yupiteru MVT 7000 as new: £199. Tel Martyn. (St Neots) 0480 471001 or 471800.

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 AP1186 All sections and AP's relating to Radio, Radar equipment. Would purchase current to Post-War Magnetrons, Klystrons, T/R cells, Ignitrons, Thyratrons, Microwave Planar Tubes, TWT'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 any time. (London) 071 511 4786 or 071 790 2846.

BAND 3 TRANSCEIVERS, HF Commercial Linear Amp, 13.8v at 100Amp+, commercial PSU, Video enhancer. Philip, G4ZOW. If out plese leave name and number, or write: 4 Mimms Hall Cottages, Warren Lane, EN6 3NL. (Potters Bar) 0707 660760.

MICROWAVE MODULES 2m Linear Amp MML 144/100-LS. G4JQN, QTHR. (Westbury, Wilts) 0373 864478.

1.6MHz IF Transformer with centre taped windings, such as Electronques S3D-6 or DIF-3. G3PDM SSB Receiver, succesfull or failed project, complete or parts. Tony. (Worcester) 0905 641759.

COLLINS R392, KWM-1, KWS-1, 30-S-1. Sony CRF330K. Zenith 7000/1. Collins 51J1, 51-J4. Sale; Racal 1792 backlit test. Eddystone 1650, excellent. (Southall) 081 813 9193.

CT-160 VALVE TESTER and Collins TCS12 Transmitter, preferably without mods. Phone after 6pm. (Uxbridge) 0895 270772.

FTV901 trnsvtr; SP901P spkr/filter; YO901 multiscope; FC901 antenna tuner. Must be in VGC. Mike, G0OVU QTHR. (Cirencester) 0285 760488

FT401, must be VGC, no Mods no extras. Required. G2CG, QTHR. (Royston) 0763 243093.

FT7 Tcvr or Argonaut 509/515 or Arosy 2 or similar QRP Tcvr. Phone (London) 071 935 7119 weekdays.

HF MULTIBAND Vertical Antenna for base station. Also HF Multiband Mobile Antenna. G3XFB, QTHR. (Stafford) 0902 850033.

GELOSO CONVERTER HF, IF 4-6MHz. Must be in good condx and working order. G3EBG, QTHR. (Haddenham, nr Ely) 0353 740434.

HW8 HW9 FT7 130V. G4OJS. (Bromsgrove) 021 445 3207.

KOKUSAI Electric Co Ltd Mechanical Filter Type MF455-10CK for KW2000 Transceiver. GM3TBV, QTHR. (Blairgowrie) 0250 872520.

LARKSPUR C11 Transmitter, ATU, associated cables and racking etc. Also 24v Power Supply for C42 Tcvr and ATU. (Shipley) 0274 824816.

OPERATING INSTRUCTIONS, Service info on National NCX5 Transceiver. G3VVG, QTHR. (Yelverton) 0822 852867.

SHIMIZU DENSHI SS105S HF QRP SSB/CW/FM Transceiver, with full 10m, in good working condition. Prefer version with all option Boards fitted. ie. FM., Calibrator, Noise Blanker. Peter, G3TZV. (Stockport) 061 442 5901.

SPY SETS. BP3, AP4, A Mk3, AR11 Mk119, Mk122 and Mk217 etc and Accessories. All letters answered. G8PUJ, QTHR. Phone after 6pm. (E London) 081 505 0838.

TAPES. Locator and Logbook Technical Software if possible for Commodore 64. (Lutterworth) 0858 880625.

VERSATOWER 60 or 80ft Mast. Phone stating Model, condition and price. Contact Ian, GM0TGE, QTHR. (Banchory) 0330 822352.

VFO for a Yaesu FT75. Also an ATU with SWR Meter. Also wanted PMR Rig for Packet 433.650 and 433.675MHz. (Hatfield) Contact 2E1AUD, QTHR.

VRM4555A RACAL Tcvr circuit diagrams or service manual. Good price for either. Mr D Chenery, 18 Barwick Road, Dover, Kent, CT17 0LL. (Dover) 0304 207749.

WANTED SECOND Hand Amerton 811X HF 600 Amplifier, good price paid for good condition. Will pay transport costs. (Leominster) 0568 614470.

YAESU FRG7700 Memory back-up Unit and manual. Stuart, G0BEV. (Newcastle upon Tyne) 091 281 0999.

YAESU FT75B with mobile PSU, would consider FT75, will collect reasonable distance. SCR522 Modulation transformer FT101 series workshop manual. G3XSI. (Sheffield) 0742 551417.

CLUB NEWS

DEADLINE - Items for inclusion in the November 1994 issue must be sent to HQ marked "Club News - DIARY", to be received by 23 September 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 - 27, New Members night, Cheese & wine!; Oct A.G.M. Now meets last Tuesday in every month at New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol, BS16 1BG. Details 0272 672124.

SOUTH BRISTOL ARC - 4, Bristol Radio-Computer Rally, Brunel train shed; 7, 2m "Worked all Bristol"; 14, Review of Bristol R-C Rally; 21, Photographic equipment show, Com meeting; 28, Bring & buy - anything. Details 0275 834282.

WESTON-SUPER-MARE - 5, Talk & video "Radio Expedition to Alderney" by G4OJH; 19, Workshop. Details G8WAR, 0934 415700.

BEDFORDSHIRE

SHEFFORD & DARS - 1, Welcome back; 8, talk "Communications Systems" by Bryan, G8EIK; 12, Committe meeting; 15, Mobile DF Hunt; 22, Members activity night and videos of the National Power Grid; 29, Bring your radio equipment for a check. Details 0462 700618.

BERKSHIRE

BRACKNELL ARC - 14, Global Networking by G1MSS. Details 0344 420577.

NEWBURY & DARS - 28, Talk "Yagi Aerials" by

Bill Mansell; Oct 26, Computerised Radio Contest Logs. Details 0635 863310.

READING & DARC - 3/4, Help with Horse Trials, Watership Down - Help required, contact Paul, G8XBE; 8, Talk "IOTA - What's it all about" by Neville, G3NUG; 22, tba. Details 0734 698274 eve.

READING & WEST BERKSHIRE RAYNET G - The club is urgently seeking new members. Net every Monday evening on 144.775MHz at 7.30pm (local). All contacts welcome. Details Denis, G4KWT 0734 698526.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 7, RSGB Questions and Answers Session by Council Member Hilary Claytonsmith, G4JKS; 21, Surplus equipment Sale; Oct 5, Talk "Microwave Engineering" by G8EOW. Details from 0296 81097.

CHESHAM & DARS - 7, General Meeting; 14, Technical Topic, EFD with Dave, G8KBV; 21, Morse Practice; 28, Weather Fax with G8AHS. 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.

MILTON KEYNES & DARS - Meets on 2nd Monday of each month at Drill Hall, Wolverton and 4th Monday each month at Blechley Park. Details 0908 672920.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 2, 2m contest preparation Details 0954 200072.

CENTRAL

STIRLING & DARS - Meets every Thursday at 7.30pm in the Clubrooms, Bandeath Industrial Estate, Throsk, Nr Stirling. Morse instruction available when requested. Details from 0324 636235.

CHESHIRE

CHESTER & DARS - 13, Video night; 20, Talk "Monitoring" by Dennis, G3EWZ; 27, Talk "Transport Control Protocol/Internet (TCP/IP multitasking Packet S/ware)" by Dave, G1YSZ, Oct 11, Talk "DeepSpace radio waves". Details 051 608 3229.

MID-CHESHIRE ARS - 7, Construction and On Air night; 14, Talk on Canals(part 2) by Phil, G0UCJ; 21, Annual General Meeting 8.30pm prompt; 28, tba. Details 0606 592207.

STOCKPORT RS - 14, HMS Bronnington by G3XGE; 28, Surplus Equipment Sale. Details 061 439 4952.

CLWYD

RHYL & DARC - Meets every second Monday in the month at The Wellington Community Centre, Wellington Road, Rhyl, at 8pm. Details 0745 351362.

NORTH WALES R Rally C - Activities include Novice courses, Morse instruction, Club Station on Air and a City & Guilds Approved Examination Centre. All radio enthusiasts are welcomed to visit. Practical Construction Course being arranged for the Autumn and Winter periods. Meets each Thursday at 7.30pm, YMCA Building, Colwyn Bay, Clwyd. Details from 0492 513246.

WREXHAM AR - 6, Computer evening; 20, Quiz night. Details from David, GW1MVL.

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.

CORNWALL

CORNISH RAC - 1, Talk "A Day in the Life of a Coroner". Details 0209 820118.

MID CORNWALL BEACON & REPEATER G - 13, Annual General Meeting at Royal British Legion, St Mary's Street, Truro at 7.30pm. All members are invited, as are non members. Details 0726 63048.

PENZANCE RAC - Regular meetings on Mondays, also 2nd Morse Test centre, via RSGB only. Details Brian, 0736 61427.

POLDHU ARC GB2GM, GX0PZE - Meetings Tuesdays and Fridays, 7.30pm. Visitors welcome to visit. HF net Wednesdays 7.30pm around 3.75MHz. Details 0326 290638.

SALTASH & DARC - 2, Field Day Planning night; 17, Field Day, Crooked Inn grounds. Members stall and Junk Sale. Refreshments at the Crooked Inn adjacent. Visitors welcome. Details 0752 844321.

DERBYSHIRE

BUXTON RA - 13, Amateur TV night; 27, Quiz night. Details 0298 25506.

DERBY & DARS - 7, Junk Sale; 14, Visit to Derbyshire Ambulance Control at Kingsway Hospital; 21, Cheese and wine party in club room; Oct 5, Junk Sale; 12, Visit to Trent Signal box (numbers limited). Details from 0773 856904.

NUNSFIELD HOUSE ARG - Meets every Friday at 8pm, at Nunsfield House Community Centre, Bolton Lane, Derby. Details 0332 518256.

DEVON

APPLEDORE & DARC - Meets 3rd Monday of each month at Appledore Football Clubroom at 7.30pm. Details 0237 477301.

EXETER ARS - 12, Visit to Devon and Cornwall Police HQ; Oct 10, Annual General Meeting. Club meets 2nd Monday in the month. Details 0392 78710.

EXMOUTH ARC - 14, An Open Evening, for member of the public to see the Club and its members; 28, Talk & demonstration of 10GHz equipment by Adrian, G4UVZ - Bring your 10GHz items for calibration, power output and general check over. Meetings held at the Scout Hut, Marpool Road, Exmouth at 7.30pm. Details 0395 279574.

PLYMOUTH RC - 6, Start of Autumn programme, welcome to prospective new RAE candidates; 13, Antenna Workshop by Jan, G0IVZ; 15, Radio DF Hunt at 7.30pm at the George Hotel, Roborough; 20, Talk "Raynet" by G6BJJ; 27, Practical Demo "How to operate the Club HF radio and a Demo on soldering, plugs to Coax; Oct 4, AGM. Details 0752 563222.

SOUTH DEVON RC - Club nights, every Wednesdays at Hillhead, Brixham - 3/4 144MHz Trophy Contest at HQ; 25, 70MHz Trophy contest at HQ; 28, Discussion about Computercations'94 Show on 9th Oct. Details 0803 522995.

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 - Club meets at Dorset Police HQ. **NEW CONTACT ADDRESS**. Details from: c/o Pc 915 Richard Newton, Eastern Control Room, Bournemouth Central Police Station, Madera Road, Bournemouth, Dorset. Tel: 0202 552099 x2031.

FLIGHT REFUELLING ARS - 2, Inter Club Quiz at Bournemouth. Details 0425 653404.

SOUTH DORSET RS - Meets 1st Tuesday of every month. New members and visitors welcome. Details 0305 773860.

DYFED

ABERYSTWYTH & DARS - 3, Across Wales Walk - Raynet Non-Disaster Event, Control at Pantycelyn, UCW; 8, Preparations for JOTA; 29, GW0ARA on the Air(S17); Oct 13, Annual General Meeting. Club meets 2nd Thursday each month at 8pm, Scout Hut, Plascrug Avenue, Aberystwyth. Details 0545 580675.

EAST SUSSEX

CROWBOROUGH & DARS - 22, Foxhunt (local to Crowborough). Meets every 4th Thursday at the Plough & Horses, Crowborough at 8pm. Details 0892 661807.

HASTINGS E & RC - 21, A get together evening, come along and join in; 24/25, Fund raising event at Chartwell on behalf of the British Wireless for the Blind Fund by Bredhurst RS; 30, Morse Tuition, catering for all levels. Details 0424 830454.

SOUTHDOWN ARS - 3/4, Visit to RCN, details from Geoff, G3LFZ; 5, Talk "Phase Locked Loops" by Brian, G0SWH; Oct 3, Surplus Equipment Sale. Please enquire about RAE and Morse Classes. Details 0323 484282 or G0UOI @ GB7HAS.

WORTHING & DARC - 7, RSGB Video "Lancaster"; 21, Discussion evening; 28, Construction Contest; Oct 12, A.G.M. Meets at 7.30 for 8pm at Parish Hall, South Street, Lancing. Details 0903 753893.

ESSEX

BRAINTREE & DARS - 5, Kite Flying, Operating and barbecue; 19, Talk "ATU's - design, construction and use" by Dave, G3PEN. Club meets every 1st and 3rd Monday in the month, at Braintree Hockey Club at 8pm. Details 0376 327431.

CHELMSFORD ARS - 6, Talk "Gliding" by Brian, G3CVI. Details 0245 256654.

VANGE ARS - 1, Junk Sale; 15, Rally Reports/comments; 22, Talk "Valves and all that" by John, G4XTS. Details 0268 552606.

GLOUCESTERSHIRE

CHELTENHAM ARA - Meets 1st Friday of each month at Charlton Kings Library. Details 0242 242336.

GRAMPIAN

ABERDEEN ARS - 2, Junk Sale; 9, Wet String Listening Competition, round 6 by GM0LNQ; 16, SARCON'94 Preparation & Briefing; 17, SARCON'94 at Cults Community Centre; 23, Building Contest; 30, Building Contest Winner's Lecture and demonstration. Meets every Friday at Queen Mother House, Claremont Place, Aberdeen. Details 0569 731177.

MORAY FIRTH ARS - Meets every Thursday at 7.30pm. Details 0343 86395.

GREATER LONDON

BROMLEY & DARS - 20, Equipment Test evening by Ian, G4VTD. Meets 3rd Tuesday of every month, 7.30 for 8pm at the Victory Social Club, Kechill Gardens, Hayes. Details 081 777 0420.

COULSDON ATS - 12, Talk "Nuclear Electric" by Dr A R Ware, Nuclear Electric; Oct 10, "Early Television - Radio Amateurs' Contribution" by Ray, G2KU. Details 081 684 0610.

CRAY VALLEY RS - 15, Talk "Bob's DXpedition package" by Bob Treacher; Oct 6, Sueplus Equipment Sale. Details 081 850 1386.

CRYSTAL PALACE & DRC - 17, Talk "EMC - Avoiding Interference"' by Robin Page-Jones, G3JWI, Chairman RSGB EMC Committee. Details 081 699 5732 or 0737 552170.

EDGEWARE & DRS - Details 081 204 1868.

The R S of HARROW - 3, Proposed trip to Isle of Wight, to visit the National Wireless Museum & Communications & Electronics Museum. Details 0895 632377(eve, w/end) or 071 251 2700(daytime).

KINGSTON & DARS - 21, Surplus Equipment Sale - Auctioneer, Dick, G8DPS. Guests welcome. Club meets on 3rd Friday of every month at 8pm, at "Alfriston", 3 Berrylands Road, Surbiton, Surrey. Details Ray, G0KXK 081 398 1128.

SOUTHGATE ARC - 8, Tutorial "Serial Comms"; 22, tutorial and Demo "PC Contest Simulation; Oct 13, Second Junk Sale of '94. Details 081 360 2453.

SURREY RCC - 5, Talk "Amateur TV" by Bryan, G6ODE. Club meets at "Terra Nova", The Waldrons, Waddon, Croydon. Details 081 660 7517.

SUTTON & CHEAM RS - 1, Informal meeting; 15, Talk "Fibre Optics" by Alan, G6JZN at 7.30pm at Sutton United Football Club, Gander Green Lane, Sutton. Details 081 644 9945.

WIMBLEDON & DARS - 9, talk "The 7th Cavalry, The POGO stick and Guide to Personal Communications" by Brian, G8DIU; 30, Siberian Adventure by P Hughes, G0BXC; Oct 28, AGM. Details 081 540 2180.

GREATER MANCHESTER

ECCLES & DARS - 6, Lecture "Passing the RAE in Japanese" by G4UOT; Oct 4, Lecture "JOTA 1994" by G7ELA. Informal meetings every Tuesday from 9.30pm. Lectures/demonstrations 1st Tuesday of each month. Details 061 773 7899.

SOUTH MANCHESTER RC - 2, Talk "The Club TNC System"; 9, Natter night; 16, Mystery Visit; Details 061 969 1964.

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 - Details from Pat Pearl, GW7MVQ on 0633 250017(work) Fax 0633 840254.

GWYNEDD

DRAGON ARC - 5, Talk "The Anglesey DX Cluster" by Tony, GW4VEQ; 19, Illustrated talk "Stesion Waunfawr" and preparing for GB2VK; Oct 3, Annual General Meeting. Details 0248 600963.

HAMPSHIRE

ANDOVER RAC - RAE classes each meeting at 7pm. Meets at Wildheam Village Hall, 1st and 3rd Tuesdays of each month. Details 0264 773547 evenings.

BASINGSTOKE ARC - 5, Construction evening and Challenge; 24/25, 2m DF weekend in the New Forest; Oct 3, Annual General Meeting. Details 0256 25517.

FARNBOROUGH & DRS - Details 0252 715765.

HASTINGS E & RC - 14, Main Meeting - "A Get Together evening". Details 0424 830454.

HORNDEAN & DARC - 1, Talk "Practical Wireless Magazine" by the Editor, Rob Mannion, G3XFD; Oct 5 (Wednesday), Annual General Meeting. Meets at Horndean Community School, room X5, Barton Cross, (off Catherington Lane), Horndean. Details 0705 472846.

ITCHEN VALLEY ARC - 9, Open Meeting & natter night; 23, Talk "Modern Map Making" by Ray Tarling from Ordnance Survey. Details 0703 732997.

WATERSIDE ARS - 27, Talk "Royal Signals ARS" by Mike, G0SWY, 7.30pm, Hyde Community Centre. Details 0703 783170.

WINCHESTER ARC - 16, Talk "Slow Scan TV" by Peter, G3MCL at Red Cross HQ, Durngate House, Durngate, Winchester. Details John, G4AXO who is QTHR.

HEREFORD AND WORCESTER

BROMSGROVE ARS - 13, Technical Topic/talk; 27, RTTY Night on Air. Details 0527 542266.

BROMSGROVE & DARC - 9, Talk "QRP" by Rev George Dobbs, G3RJV at 1830 UTC. Entry is by ticket, send SAE to John, G4IVJ, QTHR or Tel: 021 477 7447. Club meets Friday night at 8pm, Avoncroft Art Centre.

HEREFORD ARS - Club meets on 1st and 3rd Friday of each month. Details G4MET, QTHR.

REDDITCH RC - Club meets 2nd Thursday each month. WRVS Centre, Ludlow Road (opposite Liberal Club) at 8pm. Details 0789 762041.

HERTFORDSHIRE

CHESHUNT & DARC - Details 0992 464795.

DACORUM ARTS - Now meets 1st and 3rd Tuesdays, 7.30pm at Girl Guide Meeting Rooms (next to British Legion), Queensway, Hemel Hempstead, Herts. Details 0582 766973.

HODDESDON RC - 1, Talk by Hilary Claytonsmith, G4JKS, RSGB Council Member on "The work of the Society and Novice Licence Scheme"; 14, Talk "The Novice Licence Scheme" by Robert, G4OBE Senior Instructor for London area; 31, Talk "Learn Morse Code Alphabet in under an hour" by Steve, G3ZVW. Details G7OCI 0920 466639.

STEVENAGE & DARS - 6, Natter night-CW practice-HF/VHF on Air; 13, Basic Power Supplies by Les Jones; 20, Project Night - How are the projects going?; 27, Franks Theory!!, A questions & answers session on Basic Theory by Frank, G3OVT. RAE class to start in September, contact Neil. Further details from Neil, 2E1ASZ on 0438 350882.

HUMBERSIDE

GRIMSBY ARS - 1, A mystery talk by Adrian, G1BRB; 15, Hobbies for All, organization, Brian, G4KAL; 22, HFA getting the stands ready, venue GTC, Nunns Corner; 23-25, HFA Exhibition; 29, Construction evening by Barry, G8RIW; Oct 13, Annual General Meeting. Details John, G3DOT 0472 825899.

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 - 14, Junk Sale; 28, Video/natter Night; Oct 12, talk "WW2 Radio" by Neil, G7AQK. Details 0689 826846.

DOVER RC - During term time, club meets Wednesday evenings 6.30-10pm. Novice, full RAE and Morse classes. All ages (over 8) welcome. Details 0304 825030.

EAST KENT RS - 1, Talk 'My trip to South America - operating as HK4ET' by Jose, G3ZZZ; 15, Meeting (Topic, tba) at Icom at 8pm; Oct 6, A.G.M. at Parkside, 8pm. Details 0227 743070.

MAIDSTONE YMCA ARS - 6, Dummy Morse Tests, 1 hr coaching; 9, RAE enrolement evening; 10, Morse Test (6mm Mono phones and Key jacks); 16, RAE Class for 94/95 term; 23, Nostalgia Evening - Bring those rare QSL cards, old radios, mics, keys etc; 30, RAE, CW and Club night. Novice tuition every Wednesday, contact Martyn, Tel: 0622 744545. Details 0622 850277.

MEDWAY AR & TS - 23, Junk Sale. Meets every Friday, other evenings include construction and Morse as required plus Novice help. Details 0634 685585 or 201462.

SEVENOAKS & DARS - 19, "Communications" by Eve Fuller, Editor of Sevenoaks Chronicle. Details from The Secretary, Sevenoaks & DARS, c/o Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.

LANCASHIRE

BURY RS - 6, Committee; 13, Presentation by ISWL; 20, Ragchew & Operating; 27, Video evening. Details 061 881 1850 (business hours).

DARWEN ARC - Meets every 3rd Wednesday of the month at 8pm at Darwen Catholic Club. Details Bill, G2AKK 0254 703767.

FYLDE ARS - 13, TBA; 27, Informal; Oct 11, Equipment Sale. Details 0772 635464.

OLDHAM ARC - Meets every Thursday evening at Moorside Conservative Club, Ripponden Road, Moorside, Oldham at 8pm. To run RAE and Novice Licence Courses commencing in September, a City & Guilds Test Centre for both. Details 061 652 8617 (evening) or 061 633 0550 (daytime).

ROCHDALE & DARS - Meetings held every Monday, except Bank Hols at The Cemetry Hotel, Bury Road. Details 0706 376204.

THORNTON CLEVELEYS ARS - 5, Barbecue / GB0XXV operation; 12, Two ten-minute talks;

19, Quiz by Bill, G2CBH; 26, Construction Competition. Details G4BFH, QTHR.

LINCOLNSHIRE

LINCOLN SHORTWAVE C - Meets every Wednesday at the city Engineers Club, Waterside South at 8pm. Details 0427 788356.

LOUTH & DARS - British Legion Hall, Louth at 7pm. Details Neil, 0472 388261.

SPALDING & DARS - 9, Talk on Aerials by G3RED; Oct 14, Talk by G4EMK on TVI/BCI. Meetings every Friday Clubroom, Old Fire Station, Spalding at 7.30pm. Details from 0775 750382.

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 - 14, President's Address; 28, Visit to Museum of Communications, Bo'ness. Meets 2nd & 4th Wednesdays, 7.30pm, at Orwell Lodge Hotel, Polworth Terrace, Edinburgh. Details Brian, GM4DIJ 031 337 7311.

MERSEYSIDE

LIVERPOOL & DARS - 6, Oscilloscope Demonstration; 13, Club on the Air; 20, Presentation Night; 27, Surplus Sale; Oct 11, AGM. Details Ian, G4WWX, QTHR.

NORTH SEFTON ARC - Meets 2nd Wednesday of each month. Details 0704 579017 or Fax 0704 570089.

MID-GLAMORGAN

MID-GLAMORGAN ARG - would like to invite people who are interested in amateur radio with a view of forming a new Amateur Radio Club in the Bridgend area. The criteria to encourage people to improve their knowledge of radio by construction, modifications and talks etc. To look at all aspects of the hobby, depending on needs with view to hold Novice, RAE courses and Morse practice. If any one is interested, please, contact Roger, GW3XJC on 0656 733729 or Tom, GW0TOM on 0656 736954 for details.

NORFOLK

DEREHAM ARC - 8, Possible trip to Lynford Hall - Amateur Radio Collection; Oct 13, Informal Junk/swap Sale. Details 0362 691099.

ARC FAKENHAM - 6, Talk "Weather and Propagation" by Jim, G3YLA. Meets on 1st Tuesday of every month at Trinity Church Room, Hempton at 7.30pm. All welcome. Details from 0485 528633.

NORFOLK ARC - **NEW CONTACT** Now Mike, G4EOL. Details 0603 789792.

NOTTINGHAMSHIRE

ARC of NOTTINGHAM - 1, tba; 8, Forum & night on Air; 15, Fox Hunt number 6; 22, Meteorology with Ernie Perperdine; 30, Construction/Activity night. Details 0602 501733.

MANSFIELD ARS - 12, Foxhunt, followed by talk about "Contesting"; 12/13, SES GB4ASH, Ashfield Show, Sutton-in-Ashfield, Notts - family show. Meets at the Polish Catholic Club, Off Windmill Lane, Woodhouse Road, Mansfield at 7.30pm; Details 0623 423697.

SOUTH NOTTINGHAM ARC - 2, Site Servicing - Breedon Hill; 3/4, FD Breedon Hill; 9, talk/demo on the New Morse Test by Ken, G4HDP; 16, Open Forum - members only; 23, Construction + On Air (HF +VHF); 30, Surplus equipment Sale. Details 0509 672734.

NORTH YORKSHIRE

HAMBLETON ARS - Meetings at Allertonshire School, Northallerton. 7.30 to 9.30pm. Details 0609 776608.

OXFORDSHIRE

VALE OF WHITE HORSE ARS - 6, 'Natter night'. Meets 1st Tuesday of every month at The Fox, Steventon at 8pm. Visitors welcome. Details 0235 531559.

SHROPSHIRE

SALOP ARS - 8, Quiz night with Powys ARC; 17(Sat), A Charity Day - in aid of the County Air Ambulance Appeal; 22, "British Vintage Wireless Society" - a talk by Pat Leggatt; 29, A presentation by The Wartime Recovery Group; Oct 6, A.G.M. Details 0743 361935.

TELFORD & DARS - Meetings take place Dawley Bank Community Centre, Telford at 7.30pm. Details (Telford) 588878.

SOMERSET

TAUNTON & DARC - 2, Sidmouth Observatory. Meet there at 8pm, Map Ref: SY 138 884 (OS sheet 192, Exeter & Sidmouth); 16, Surplus Sale. Meetings 7.30pm in "The Basement" County Hall, The Crescent, Taunton at 7.30pm. Club Net, Wednesdays, 2100 UTC, 3.750MHz+/-. Details 0823 680778.

WINCANTON ARC - 5, Guest speakers, RIS and SSL; 15, RAE enrolment at College; 19, Open meeting, chat & coffee. Details 0963 34360.

YEOVIL ARC - 1, Talk "Every one can enjoy DXing" by John, G3HTA; 8, Talk "Morse Miscellany" by G3KSK; 15, Open Evening, to students from the local school to introduce them to the hobby of amateur radio by G3KSK; 22, Statellite TV DX-ing by G4JBH; 29, Committee mtg and Club station on the Air. Meets every Thursday at The Red Cross HQ, Grove Ave., Yeovil at 7.30pm. Details 0258 473845.

SOUTH GLAMORGAN

CARDIFF RSGB Group - 12, talk "Matching" by John, GW4HWR; Oct 10, A.G.M. Details from GW4HWR on 0222 810368.

SOUTH YORKSHIRE

SHEFFIELD ARC - 5, DF Competition with Dronfield RC; 6, Raynet meeting at the club venue; 12, Club Social night, venute to be set, 197 club will be closed; 19, 5th Round of the inter club contest eliminator; 20, Ten Pin Bowling, venue to be set; 26, Presentation of this years Awards; Oct 3, A.G.M. - voting for new committee. Now meets at The Club 197, Brook Hill, located in the Sheffield University Lecturers Social Club, opposite the main Universaty buildings. Details 0742 446282.

STRATHCLYDE

MID-LANARK ARS - Lecture and chat nights, RAE and Morse classes, every Friday at 7.30pm, at Newarthill Community & Education Centre, High Street, Newarthill, Motherwell. Details GM7FXK, QTHR.

PAISLEY (YMCA) ARC - RAE/Morse classes, run on Tuesdays. Details Stuart, GM0UKD 0505 335195.

SUFFOLK

FELIXSTOWE & DARS - 5, Night on Air(ops); 10, Felixstowe Hobbies Fair, SES, details G4YQC; 12, Novice RAE examination; 19, Talk "The RNLI" ; Oct 3, Visit to Suffolk Ambulance HQ, Bramford, names to G4YQC. Detail 0394 273507(evenings).

IPSWICH RC - All meetings start at 7.30pm, at The Rose and Crown. Details 0473 742072.

SUDBURY & DRA - 6, Annual General Meeting at Wells Hall Old School; 20, Natter & Noggin; Oct 4, Talk "Electrical Safety and Regulations" by Frank, G1MYD and Tony, G8LTY. Details 0787 313212.

SURREY

REIGATE ATS - 20, Surplus equipment Sale. Club meets at Tilgates, Bletchingley at 8pm. Details 0342 325322.

TAYSIDE

DUNDEE ARC - 13, Enrolment & Construction night; 20, Lecture "Viewing the bands - DIY Panoramic reception" by Bill Wilson, Aberdeen ARS; 27, A.G.M. Details from GM4FSB, QTHR.

STRATHMORE & DARC - 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

MID-WARWICKSHIRE ARS - 13, Talk & slides on "Pacific Crossing on Operation Raleigh" by G4AAL; 27, RSGB Videos. Meeting on 2nd and 4th Tuesdays at St Johns Ambulance HQ, 61 Emscote Road, Warwick at 8pm. Details 0926 424465.

STRATFORD U AVON & DARS - 12, Opening night and "Dayton'94" by Herb, OZ7SM and George, G3LNS; 26, Top Band DF Construction by Geoff, G8UKT; Oct 10, Talk "Inside your PC" by Martin, G3XZO. Meets at the Home Guard Club, Main Street, Tiddington, Stratford upon Avon at 7.30pm. Details 0789 740073.

WEST GLAMORGAN

SWANSEA ARS - 1, Planning for Field Day. Details 0792 403527.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC - 19, Talk by Derek Pearson, G3ZOM - Jandek. Meets 1st & 3rd Mondays in the month. Details from 0922 36162.

COVENTRY ARS - Usually meets every Friday at 8pm at Baden Powel House, 121 St Nicholas St., Radford, Coventry. Visitors are always welcome. Details (G1ORG at GB7COV) or Tel: 0203 311468.

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.

SOUTH BIRMINGHAM RS - 7, Talk (TBA). Details 021 458 1603.

STOURBRIDGE & DARS - 5, On Air night & natter night; 19, Building PC's by Andy, G7KPF. Details 0384 374354.

SUTTON COLDFIELD ARS - 12, Antenna Repairs/ VHF night on Air; 26, Talk "Packet Basics" by G0FEO. Details 0827 874010.

WEST BROMWICH CENTRAL RC - 11, Tony, G0SKG - RSGB RLO, a general introduction and an informal talk about his new appointment and issues of the day; Oct 2, Visit by Harry Harrison, of the "The Black Country Bugle" for a chat and pictures, with a view an article in the Bugle. Details 021 561 2884.

WEST SUSSEX

CHICHESTER & DARC - Club meetings at St Pancras Hall, St Pancras, Chichester at 7.30pm. Details on 0243 573541.

HORSHAM ARC - 1, Talk entitled "Dunsfold Aero" by Mr McCue; Oct 6, Surplus Equipment Sale. Details 0737 842150.

MID-SUSSEX ARS - 2, Talk on BBC Computers by Reg, G3GZT; 3, SES GB2HFT, Hassocks Fair; 16, "Make and Mend - a chance to bring faulty gear and use Club gear and expertise to fix". Details 0444 831400.

WORTHING & DARC - Meets at 7.30 for 8pm at Parish Hall, South Street, Lancing. Details 0903 753893.

WEST YORKSHIRE

HALIFAX & DARS - 20, Annual General Meeting. Details 0422 202306.

KEIGHLEY ARS - 1, Natter night; 8, Night on the Air; 15, Ideas for 1995??; 21, Quiz at Northern Heights; 22, Natter night; 29, Talk "Introduction to Computers" by G6WHL. Meets at 8pm. Details 0274 496222.

SPEN VALLEY ARS - 1, Talk & demo "Microwaves the easy Way" by Dave, G0DJA; 12, Brewery Visit, tickets only, will members meet at the club as arranged; Oct 6, Surplus Equipment Sale. Details 0924 497767.

WILTSHIRE

CHIPPENHAM & DARC - Meets Tuesdays 7.45pm, Sea Cadet HQ, Chippenham. Details Jon, G4LGZ 0225 743352.

SALISBURY R & ES - 6, Inter club Quiz, against Andover club home leg; 13, Talk "Digital Communications" by Chris Angel, Racal Vodaphone; 20, JOTA Planning evening; 27, Quiz planning for the interclub quiz away leg and test transmissions for JOTA. Details 0722 330971 (weekends).

TROWBRIDGE & DARC - 7, Design & use of the Log Periodic Dipole Array by G0DAB; 21, Social evening. 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'.

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) - Brunel Centre, Temple Meads Railway Station, Bristol. Doors open 10.30am, 10.15 for disabled visitors. Admission £1, accompanied children under 14 free. Event features over 40 trade stands, large bring and buy, an under £25 bring and buy and a Raffle. Refreshments available. Details G4YZR 0275 834282.

PRESTON Amateur Radio Society Annual Rally - ***CANCELLED***. Details George 0772 718175.

TELFORD Radio Rally - Telford Exhibition Centre (the newer halls), Telford, Shropshire. Doors open 10.30am, venute as first class facilities for disabled visitors. Features many trade stands, both big and small ones, RSGB Bookstall and Enquiries, many special interest groups and clubs stands, a flea market, Novice feature and a bring and buy. Refreshments available, with a sitting area. Details Peter, G4LSA 0785 284388 or John, G0GTN 0743 249943.

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, juntion 10 and not far from M3, M4 and M40. Doors open 10.30am. Features many exhibitors and special interest groups, covering radios, computers, peripherals, software, books, aerials, kits, components, test equipment and with emphasis on Data Communications. Refreshment available. For further details contact Peter, G8VXY 021 453 2676 or write: 38 Mitten Avenue, Rubery, Rednal, Birmingham B45 0JB.

CRANFIELD AMATEUR Radio Car Boot Sale (Organised by the Milton Keynes & DARS) - Cranfield Airfield, Bedfordshire. Near the M1, jn 13/14. Doors open 9.30am to 4pm. Cost of pitch £7 in advance, £10 on the day, no advance booking after 3 Sept. Payment to Milton Keynes and DARS, c/o 2 Ousebank Way, Stoney Stratford, MK11 1LB. Talk-in on S22. Details from Mike, G0FMC 0908 566796, Ray, G1LRU 0908 660798.

13th LINCOLN SHORT WAVE Club "HAMFEST" - Lincolnshire Showground and Exhibition Centre, four miles north of Lincoln on the A15, Lincoln to Scunthorpe road. Doors open 10.30am. All the usual trade stands, large bring and buy stall. Refreshments available. Lots of attractions for the whole family. Talk-in on S22. Free parking and children under 14 free. Caravans welcome by prior arrangements. Details Sue, 0522 525431.

17 SEPTEMBER

SCOTTISH AMATEUR RADIO CONVENTION (SARCON) - 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. The centre has ample parking area and also facilities for the disabled. Talk-in on S22. Details GM0JCN, Tel: 0569 731177.

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. For further details contact 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 - Outwood Grange School, Potovens Lane, Outwood, Wakefield. Just 1 mile from Jn 41, M1 and Jn 29, M62. Events features trade stands covering all the usual radio and computer interests, local radio groups, Novice stand and bring and buy. RSGB Morse Test on demand, remember the two passport photographs. For further details G4RCG 0924 362144 or G0EVT 0924 825443.

PETERBOROUGH Radio & Electronics Society East of England Rally - *** CANCELLED *** Further details contact Ted, G0REM 0733 66471.

SDX CLUSTER Support Group Junk Sale - Community Centre, Maryhill Road, Glasgow. Facilities for disabled. Ample car parking. Tea rooms open to provide hot/cold drinks and also light snacks. Talk-in on S22. Further details from John, GM0OPS 041 638 7670 or via packet to GB7SAN.

2 OCTOBER

BLACKWOOD & DISTRICT AMATEUR Radio Society Rally - Community College, Oakdale, near Blackwood, Gwent. Doors open 10.30am. Features traders, bring and buy one pound per item or job-lot and raffles. Talk-in on S22. Details Norman, GW0MAW 0495 227550.

GREAT LUMLEY RADIO RALLY (organised by Great Lumley AR & E Society) - Great Lumley, near Chester-le-Street, County Durham. Doors open 11am, 10.30 for disabled visitors. The Rally features a varied selection of trade stands and a bring and buy. Entrance £1 which includes a programme, children under 14 accompanied by an adult free. Refreshments are available. For further details contact 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.

RSGB LIVE AGAIN

Supporting the Future of Amateur Radio at

Live'94

20 - 25 SEPTEMBER 1994

Earls Court

LAST YEAR'S Live Consumer Electronics Show was the largest public show to be launched in the UK in the past ten years. It attracted over 140,000 visitors and, at one, time Olympia exceeded it's capacity for the first time in 25 years when 45,627 visitors came through the doors.

This year it promises to be even bigger and even better!

The RSGB have teamed up with seven other amateur radio companies to form an 'Amateur Radio Village' and we will be featuring amateur radio in all its different aspects. We have been joined by Martin Lynch The Electronic Hobbies Exchange Centre, Icom (UK) Ltd, Yaesu (UK) Ltd, Kenwood UK, Lowe Electronics, Waters & Stanton and PW Publishing Ltd.

The show covers all aspects of consumer electronics, including music, broadcasting, computers and photography. The huge list of exhibitors includes leaders such as Sony, Sharp, Yamaha, Apple, Canon, Sky TV, Nikon and - of course - the RSGB.

Win Prizes Every Day

Contact our Special Event Stations GB3RS and GB2VHF at Live '94 and you will automatically be entered into a prize winning draw.

Three winners every day: A major prize, ***PLUS*** an RSGB Membership and a PW subscription, will be given away every day during the duration of the six day show.

Mark the dates in your diary ***NOW*** - to be in with a chance of winning one of the following prizes:

- **Alinco DJ 500E Dual Band Hand Held (2m/70cm)***
  Supplied by Waters & Stanton
- **Kantronics KPC3 Packet Controller***
  Supplied by Martin Lynch The Electronic Hobbies Exchange Centre
- **A Choice between a TH22E (2M) or a TH42E Transceiver Handheld with optional keypad***
  Supplied by Kenwood UK
- **HF150 Shortwave Receiver***
  Supplied by Lowe Electronics
- **FT416 2 metre Handheld and Accessories***
  Supplied by Yaesu (UK) Ltd
- **IC281H 2m 50watts Mobile***
  Supplied by Icom (UK) Ltd
- **A Full RSGB Corporate Membership or Book Vouchers to the same value**
  Supplied by the Radio Society of Great Britain
- **A Subscription to either Practical Wireless or Shortwave Magazine**
  Supplied by PW Publishing Ltd

For the draw, we will be using a Computer Logging System as generously supplied by Lambda Electronics.

1. Only one contact per band, per day, per person, per mode will be entered into the draw.
2. The prize winners will be randomly selected at the end of each day and the winners will be notified in writing by 30 October 1994. The first selected, at the end of each day, will receive one of the prizes marked* and the following two selected will receive the RSGB prize and the PW prize, in that order. We regret, however, that the prizes marked* can only be sent to amateurs residing within the UK. If a non-UK amateur is selected first, they will receive one of the other prizes.
3. The prize winners will also be published in *RadCom* and *Practical Wireless*.
4. A full list of prize winners can be obtained by sending a SASE to RSGB HQ six weeks after the event has finished.
5. The organisers' decision will be final and no correspondence will be entered into.
6. There will be no cash alternative offered for any of the prizes

PLUS

FREE TICKETS

Twenty lucky *RadCom* readers can visit Live '94 - with a friend - ***ABSOLUTELY FREE!*** Just send the label carrier from this month's *RadCom* in an envelope marked 'LIVE '94 DRAW'. The first twenty drawn on Monday 12 September will be sent tickets that day.

EVENTS DIARY

8/9 OCTOBER

THE ALL IRELAND INTERNATIONAL Radio & Hobbies Exhibition - St Patrick Hall, Cathedral Road, Armagh. A two day exhibition by Armagh & DARC and Dundalk RC. Details GI8RLE 0762 870423, Mobile 0374 122213.

9 OCTOBER

KIDDERMINSTER & DARS Rally - Stourport on Severn High School, Minster Road, Stourport on Severn, Worchestershire. Usual traders, bring and buy. Refreshments available and talk-in on S22. Details G8JTL 0384 894019, G4HFP 0299 823818 or G0RJP 0299 822206.

THE COMPUTERCATIONS'94, Amateur Radio and Computer Rally - Hillhead Campsite, Kingswear Road, Brixham, Devon. Doors open 10am. Features trade stands covering computer and radio, bring and buy, raffle. Refreshments available. Talk-in on S22. Overnight camping available, details from Bill, G6ZRM 0803 522216.

21/22 OCTOBER (FRIDAY/ SATURDAY)

LEICESTER Amateur Radio Show - Granby Halls, Leicester. Doors open both days at 10am, 9.30 for disabled. Large trade presence, special group interests section. Refreshment available. Talk-in on 2m and 70cms. Details Frank, G4PDZ 0533 871086.

22 OCTOBER

RSGB OPEN REGIONAL Meeting - Bristol. Details Julian Gannaway, G3YGF, QTHR.

30 OCTOBER

HORNSEA Amateur Radio Club (East Yorkshire) Radio Rally - **(CHANGE OF DATE)** The Floral Hall, Hornsea. Doors open 11am, 10.30 for disabled visitors. Event features trade stands, bring and buy, special interest groups, ATV etc. Refreshments. Talk-in on S22. Details Duncan, G3TLI on 0964 532588.

5/6 NOVEMBER

NORTH WALES Radio Rally - Aberconwy Centre, Llandudno. Also for this year, the new North Wales Theatre will be available. Features over 60 trade stands, covering radio, electronics and computers interests, a bring and buy stall and refreshments. Talk-in on S22. If requiring accommodation or other details contact Tony, GW0NSR on 0492 513246.

6 NOVEMBER

14th NORTH DEVON Rally - Holsworthy Memorial Hall, Holsworthy. Features a bring and buy stand, etc. Details G8MXI, QTHR.

TYNE AND WEAR Repeater Group Auction - Fence Houses & District Community Centre, Fencehouse, nr Chester-le-Street, County Durham. Doors open 10.30am for booking goods in. Auction starts at 12 noon. Details Brian, G8FBQ, QTHR 091 388 2913.

12 NOVEMBER (SATURDAY)

THE ALL MICRO Show, Radio Rally and Electronics Fair - Bingly Hall, Staffordshire Showground, Weston Road, Stafford. (Off the A518 Stafford/Uttoxeter Road) Signposted from Jn 14, M6. Doors open 10am. Features many trade stands, many computer formats supported, inc: IBM PC, Amiga, Atari ST/8 bit, Einstein, Acorn, Apple etc. Hardware, software, accessories, books, components and shareware. Radio, satellite, printers, media supplies, systems and a bring & buy stall. Refreshments. Details 0473 272002 or Fax 0473 272008.

13 NOVEMBER

BARNSLEY & DARC 4th Amateur Radio Rally - **NEW VENUE** The Metrodome Complex, Barnsley Town Centre. Venue less than 2 miles from jun 37, M1. New venue is all on one level, with excellent disabled facilities. Event features the usual amateur radio and computer dealers, radio clubs, specialist groups and a bring and buy. Ample car parking at the metrodome. Details G4LUE, QTHR or tel: 0226 716339 6-8pm, except Monday 6-7pm only.

MARS-STOCKLAND Radio/Computer Rally - Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open 10am. Features the usual traders, local clubs, special interest group stands and a bring and sell tables. Refreshments. Admission £1, free car parking. Details Norman, G8BHE, 021 422 9787 or Peter, G6DRN 021 443 1189 evenings.

20 NOVEMBER

BISHOP AUCKLAND Radio & Computer Annual Rally - Newton Aycliffe Leisure Centre, Beveridge Arcade, Newton Aycliffe, County Durham. Doors open 11am. Details Mike, G0PRQ, 0388 766264.

27 NOVEMBER

BRIDGEND & DARC Radio Rally - Bridgend Recreation Centre, Bridgend, Mid-Glamorgan. Access off the M4 is via jun 35 or 36. Doors open 11am, 10.30 for disabled visitors. Features a large bring and buy, refreshments available all day. Bring along the family, recreation facilities available, swimming etc. Talk-in on S22 and GB3MG RB7 (433.175MHz). Details Mike, GW7NIS 0656 722199 or Don, GW3RVG 0656 860434.

WEST MANCHESTER Radio Clubs "WINTER RALLY" - Bolton Sports & Exhibition Centre, Bolton, (town centre). 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.

22 JANUARY 1995

OLDHAM AR Club Mobile Rally - Details Kathy, G4ZEP, QTHR.

5 FEBRUARY 1995

SOUTH ESSEX ARS Radio Rally - Details 0268 693786 or 0268 755350.

12 FEBRUARY 1995

NORTHERN CROSS Rally - Rodillian School, A61 . Details Dave Tel: 0532 827883.

19 FEBRUARY 1995

RSGB VHF CONVENTION - Details G3MVV 0277 225563.

25 FEBRUARY 1995

9th TYNESIDE ARS RALLY - Details Stuart G0BEV 091 281 0999.

19 MARCH 1995

NORBRECK Amateur Radio Electronic and Computing Exhibition - Details Peter, G6CGF 051 630 5790.

14 MAY 1995

MARS/DRAYTON MANOR Radio and Computer Rally - Details Norman, G8BHE 021 422 9787(evenings).

21 MAY 1995

11th YEOVIL QRP & Construction Convention - Details G3CQR, 01935 813054.

4 JUNE 1995

SPALDING Annual Exhibition and Rally - Details G4OO, 0775 750382.

11 JUNE 1995

ELVASTON CASTLE National Radio Rally - Details from Ken, G3OCA, 0332 662818. Trade enquiries, Keith, G1ZLQ 0332 662896.

9 JULY 1995

SUSSEX Amateur Radio & Computer Fair - Information and booking Ron, G8VEH 0903 763978 or 0273 417756 office hours.

23 JULY 1995

COLCHESTER Radio & Computer Rally - Detaild Richard, G7BIV, 0376 571239.

6 AUGUST 1995

RSGB WOBURN Rally - Woburn Abbey, Bedfordshire. Details from Norman Miller, G3MVV, 0277 225563.

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 24 September. It was taken from the HQ computer on 8 August. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

SEPTEMBER

1	GB0HH	Hampstead House
	GB2GMM	Guglielmo Marconi Memorial
	GB4VE	Victory in Europe
	GB5CR	Cycle Ride
	GB5GT	500 Grass Track
2	GB4OS	Orsett Show
	GB50ARN	Arnhem
3	GB0GDB	Guide Dogs for the Blind
	GB2WMF	Winscombe Michaelmas Fair
	GB2HFT	Hassocks Fair & Twinning
	GB4NFW	Newquay Festival Week
4	GB2AMN	Air Museum Newark
	GB3NFW	Newquay Festival Week
5	GB2GAF	Gloucester Air Force
6	GB0CCA	Chesham Community Association
8	GB2SJA	St John Ambulance
9	GB0RAF	Royal Air Force
	GB1BAS	British Ambulance Society
10	GB0FAD	First Airborne Division
	GB2HCD	Hoddesdon Carnival Day
	GB4ATG	Amateur Teledata Group
	GB2NFR	North Foreland Radar
	GB4DSA	Great Britain for Disabled
	GB4FMF	Friends of Moira Furnace
11	GB5DT	Droitwich Transmitter
14	GB30FYD	RAF Fylingdales
15	GB2BHI	British Horological Institute
16	GB0JET	Jet Aircraft
	GB1JET	1st Jet Aircraft
	GB5OMG	Operation Market Garden
17	GB0NTC	National Trust Charlecote
	GB2MFY	Meteor Flight Yatesbury
	GB2SR	Stelar Radio
	GB4WFB	Wireless for the Blind
18	GB0HMF	Hooe Michaelmas Fayre
21	GB0AP	Sir Edward Appleton
23	GB1FM	Forest Marathon
24	GB0BBC	Bethel Baptist Church
	GB0DIS	RRS Discovery
	GB2HPS	Hunterston Power Station
	GB5DT	Droitwich Transmitter
	GB4EKG	Essex Kite Group
	GB4RSG	Raywell Scout Group

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

G0DIF	Mr A Rawlins	09.07.94
G0DWL	Mr J A Anderson	05.05.94
G0KCR	Mr D F Thomas	28.04.94
G0PUJ	Mr F J Taylor	15.06.94
G1MNH	Mr J F Wilson	
G3GSH	Mr J R Clarke	04.06.94
G3HJN	Mr K M Moseley	
G3LCN	Mr H T Curlis	
G3MVI	Mr D A F Heather	07.01.94
G3NMG	Mr E E Kench	23.02.94
G3PWL	Mr T Hill	11.06.94
G3RBB	Mr R B Boughton	13.06.94
G4KEH	Mr E L Frost	
G4PEP	Mr C North	
G4XTH	Mr R J Freeman	07.07.94
G7ECF	Mr M W Clarke	15.06.94
G8HIW	Mr B L Scott	17.06.94
G8JNB	Mr H Lanyon	Jan 94
GM3UPU	Mr A Dickson	21.05.94
GW1LLG	Mr K Kelson	08.06.94
GW3UTN	Mr B J Davies	24.06.94
ON4LO	Mr L Destruvaux	10.05.94
RS93387	Mr D Bjoerkedal	May 94
VK4EF	Mr E F Fell	

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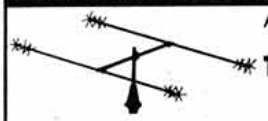

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Zonal Council members

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, 86 Upton Road, Broadwaters, Kidderminster, Worcs DY10 2YB. Tel: 0562 753101.

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 Handscombe, G4BWP; IOTA (Islands on the Air) Awards Manager – Roger Ballister, G3KMA or VHF (and Microwave) Awards Manager – Ian L Comes, G4OUT. Trophies Manager – Post vacant.

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 Liaison Officers

Part 1: Counties A – H

AVON (Zone D) – D Collins, G4ZYF, 63 Church Road, Hanham, Bristol BS15 3AF. Tel 0272 676381.

BEDFORDSHIRE (Zone B) – Geoff Linssen, G0PIZ, 401 Dallow Road, Luton, Beds LU1 1UL.

BERKSHIRE (Zone D) – Dave Chislett, G4XDU, Hilltops, 2a St Marks Road, Maidenhead, Berks SL6 6DA. Tel Home: 0628 25720; Work: 081 540 0600 ext 2086.

BORDERS (Zone G) – Ian Wilson, GM4UPX, 30 Howdenburn Court, Jedburgh, Roxburgh TD8 6JP. Tel 0835 62656.

BUCKINGHAMSHIRE (Zone D) – Ron Ray, G3NCL, Flat 4 Victoria Villas, Gladstone Road, Chesham, Bucks HP5 3AD. Tel 0494 776420.

CAMBRIDGESHIRE (Zone B) – Mr Michael Brooke, G8HXR, 70 Wooton Avenue, Old Fletton, Peterborough PE2 9EG. Tel 0733 340485.

CENTRAL (Zone G) – Brian Waddell, GM4XQJ, 'Carsemount', 3a Polmont Road, Laurieston, Falkirk FK2 9QQ.

CHESHIRE (Zone A) – Dave Glover, G1VJP, 216 Alder Street, Newton-le-Willows, Merseyside WA12 8HS. Tel 0925 225445.

CLEVELAND (Zone A) – Chris Flanagan, G7NRO, 21 Pentland Ave, Billingham, Cleveland TS23 2PG. Tel: 0642 553345.

CLWYD (Zone E) – Peter Higgs, GW4IGF, Oulton, Parkside, Rossett, Wrexham, Clwyd LL12 0BP. Tel 0244 570212.

CORNWALL & ISLES OF SCILLY (Zone D) – Bert Hammett, G3VWK, 'Rosehill', Ladock, Truro TR2 4PQ. Tel 0726 882758.

CO ANTRIM (Zone F) – Belfast: Gordon Curry, GI6ATZ, 4 Rocklands, Annhilt, Hillsborough, Co Down BT26 6NU. Tel 0846 638896. Co antrim: Albert Henry, GI4CRL, 23 Long Common, Ballymena, Co Antrim BT42 2NU. Tel 026641068.

CO ARMAGH (Zone F) – Raymond Ashe, GI8RLE, 49 Deans Walk, Sleepy Valley, Richhill, Co Armagh BT61 9LD. Tel 0762 870423.

CO DOWN (Zone F) – North: see under Co Antrim, Belfast. South: see under Co Armagh.

CO DURHAM (Zone A) – Post vacant – refer to Zonal Council Member.

CO FERMANAGH (Zone F) – see under Co Armagh.

CO LONDONDERRY (Zone F) – Victor Mitchell, GI4ONL, 1 Myrtlefield Road, Londonderry, Northern Ireland BT47 1PG. Tel 0504 311019.

CO TYRONE (Zone F) – see under Co Londonderry.

CUMBRIA (Zone A) – Mike Gibbings, G3FDW, 5 Meadowbank Lane, Grange over Sands, Cumbria LA11 6AT. Tel 0539 532433.

DERBYSHIRE (Zone B) – refer to Zonal Council Member.

DEVON (Zone D) – Mr D Hind, G3VNG, Greengates, 4 Thornyville Villas, Oreston, Plymstock, Plymouth PL9 7LA. Home Tel 0752 401511.

DORSET (Zone D) – Phil Mayer, G0KKL, 16 Haig Avenue, Canford Cliffs, Poole, Dorset BH13 7AJ. Tel 0202 700903.

DUMFRIES & GALLOWAY (Zone G) – refer to Zonal Council Member.

DYFED (Zone E) – Martin Goodall, GW8ZMU, 91 Uzmaston Road, Haverfordwest, Dyfed SA61 1UA. Tel 0437 764009.

EAST SUSSEX (Zone C) – Jim R Harris, G4DRV, Upton, Crowborough Hill, Crowborough, East Sussex TN6 2DA. Tel 0892 655894.

ESSEX (Zone C) – Malcolm Salmon, G3XVV, 54 Church Road, Rivenhall, Witham, Essex CM8 3PH. Tel 0376 514377.

FIFE (Zone G) – Post Vacant – refer to Zonal Council Member.

GLOUCESTERSHIRE (Zone D) – Post vacant – refer to Zonal Council Member.

GRAMPIAN (Zone G) – Mr Stewart Cooper, GM4AFF, 10 Cliff View, Newtonhill, Stonehaven, Scotland AB3 2GX. Tel 0569 731407.

GREATER LONDON (Zone C) Post vacant – refer to Zonal Council Member.

GREATER MANCHESTER (Zone A) – See under Cheshire.

GUERNSEY & DEPENDENCIES (Zone D) – Brian Ayres, GU1HTY, Rousey, Bailiffs Cross Road, St Andrews, Guernsey, CI. Tel 0481 36104.

GWENT (Zone E) – Peter Dombrowski, GW1NYO, 30 Hillary Road, Newbridge, Newport, Gwent NP1 5DD. Tel 0495 246359.

GWYNEDD (Zone E) – North: Dewi Roberts, GW0ABL, 23 Lon Hedydd, Siglan Farm Estate, Llanfairpwll, Anglesey, Gwynedd LL61 5JY. Tel 0248 713647. South: Mr T P Vernalls, GW6IMS, 5 Min-y-Traeth, Minffordd, Penrhyndeudraeth, Gwynedd LL48 6EG. Tel 0766 770546.

HAMPSHIRE (Zone D) – K E Fisher, G0LKX, 102 Fairfield Avenue, Fareham, Hants PO14 1EL. Tel 0329 311724.

HEREFORD & WORCESTER (Zone B) – John Marks, G0OWT, 61 Sebright Road, Wolverley, Kidderminster, Worcs DY11 5UA. Tel 0562 850061.

HERTFORDSHIRE (Zone C) – John Rudd, G7OCI, 23 Grange Gardens, Ware, Hertfordshire, SG12 9NE. Tel 0920 466639.

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The LAST WORD

RADIO WORLD

I am researching a series for BBC Radio 4 called *Radio World*. For this I need to collect show-cases of radio output from around the world to be re-broadcast at the beginning of next year, in a 'pick of the best' presented by Simon Fanshawe. Therefore I'm appealing to your readers to help me, either by letting me know about domestic radio output around the world, or by contacting me if they are travelling abroad and could collect material.

I am looking for different types of radio in English, and with good quality, with these themes:

1. Chat shows which have a love and romance theme; it would be great to hear the Japanese equivalent of 'our tune', or the Nordic lonely hearts show, or any other regional variations ... the only requirement is that it is in English.

2. Shock jocks: all around the world there are disc jockeys who can be charismatic, provocative, outrageous, rude and clever, and we want to hear them, ie Alan Jones on 2UE in Australia, Howard Stern on K Roq and Bob Grant on WABC in the USA. Who are the others in a similar vein?

3. Topical Tips: this is more of catchall. In some countries there is a local equivalent of Gardeners Question Time which we would very much like to have copies of. In other countries there are programmes which give tips on etiquette, or 'fitting in' or just generally give advice on a variety of themes, like motoring. Again, must be in English, but we'd love to hear it.

4. Relationship Advice: there seems to be a wealth of people who give advice and counsel out over the airwaves around the world, from Dr Ruth in New York to Rabbis in Tel Aviv. Do you know of any good ones?

5. Miscellaneous: Adverts, mistakes, religious broadcasting, public service/health announcements, the news, misunderstandings and any other funny output. There is scope here for non-English output.

The recordings can be made from a tape recorder of the radio, but *must* be of good quality. We can provide tape cassettes if necessary. *Material must be received by the end of September.* If you can help, or you are going abroad and want to chat about what we need, please contact: Thembe Mutch, researcher, Radio World at BBC Radio 4 in Bristol. Tel: 0272 732211, Ext 2606; Fax: 0272 237609.

Thembe Mutch

CREDIT DUE

Hardly a month goes by without *RadCom* receiving flak for its editorial contents. I feel the time has come to give credit where credit is due.

I have had at one time or another access to four national society magazines as well as commercial ham radio periodicals. Your magazine consistently exceeds in quality all of them; the contents, attention to detail, originality, clarity and last but not least, the language, are superior to all others. There is not an issue in which I do not find an item of interest. The technical articles maintain the right mix of complex and simple. *Technical Topics* is a continuing source of minor gems. The relatively new sections of *Simply Silicon*, *Eurotek*, *In Practice* and *Novice Notebook* are all extremely worthwhile. Please do not change now!

Specifically, in response to your recent enquiry about the usefulness or otherwise of the reviews, I wish to say this: The reviews are comprehensive and thorough and your reviewers are not afraid to be critical. It is interesting to compare the equipment reviews in *Radcom* and in other magazines, eg the recent review of MFJ249 in *CQ*. The piece written by W1ICP did not compare in length, depth and thoroughness with that of G3RJV and your HQ staff. Living out here in the boonies I have no other means to keep up with new equipment development and I rely heavily on the views expressed by your reviewing staff when considering new purchases. On the whole I would encourage you to continue with these excellent features.

Finally, why not include an editorial comment on your major technical features? This is commonly done in other professional (eg medical) literature. It puts the article in perspective especially if one's knowledge of the subject is superficial. I read the articles on antennas frequently wondering what would Les Moxon, G6XN, make of it (his book on antennas being my bible, frequently read but sadly incompletely understood). I am sure that the recent article on toroidal antennas would have benefited from it! I know that your articles are reviewed carefully so asking one of the reviewers to write a few words to follow the article itself should not prove too onerous. I fell that such a feature would enhance the already high quality of your magazine even further. Keep up the good work!

Mike Koblic VE7EQG, formerly OL1AGS, G4GIU, GW4GIU

LOYALTY EARNED

After our home was burgled recently, we were faced with a battle with our insurers and their loss adjusters to find agreeable replacements for our lost valuables. This included having to replace equipment stolen from our shack.

This task was made surprisingly easy by John Baxter, G8VIQ at Icom in Birmingham after I made just one telephone call and then faxed him a list of the lost equipment. By return of post I had received a comprehensive list of the replacements, their cost, and all the relevant sales literature for me to pass on to the loss adjusters. They were grateful for this and agreed to authorise payment accordingly.

Finally upon receipt of the cheque in the post, we drove over to Icom in Birmingham where every item, including all the relevant optional extras, were waiting collection, in one very large box!

This conscientious level of efficiency is hard to find these days and John surely deserves some praise for this. He is a credit to our hobby and to Icom UK who are now certain of my lifetime customer loyalty not only for the high quality of their products but also for the professional manner of their sales staff.

Stuart, G4KUR, and Valerie Hammonds, 2E1ACG.

FACE THE FACTS

First, congratulations to Mr Kirby's (GW0PLP), son on passing the RAE and the Morse test, and getting his A licence (*The Last Word*, July). Why, oh why, should he get it free? There are many things in this life that people want, and can get, but most of them cost money. If you want them you have to pay for them, and getting the money by the sweat of one's brow makes the goal all the more satisfactory when it is attained.

Young Mr Kirby could have had a Novice Licence free of charge but would have had to accept the restrictions. He has now worked for and got something better - which costs a little money. There are many ways for a 14-year-old to earn £15 today; it may take a month but he has a lifetime ahead of him to enjoy the fruits of his labours.

Will his father be expecting a free licence when his son gets his first motorbike? Of course not, so come off it Mr Kirby, face facts, you get what you pay for, and you must pay for what you get.

P H Stuart G0JCY

RAE COURSE SOLUTION

I refer to G4MLL's letter (*The Last Word*, April) regarding RAE courses. I suggest he and any other course organiser gets in touch with their local Adult Education Centre if they are having difficulty. These centres are generally very receptive to ideas for new courses and their rates are more reasonable than Further Education Colleges. In addition they usually offer concessionary rates to those on state benefits.

Martin Stoneham G4RVV

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.

LICENCE FREE?

I support GW0PLP's plea for retention by his son (GW0ULC) of his pocket money. It does seem an injustice that the more one achieves, the greater financial penalty. While on this subject, I often wonder why I (along with many others) are still paying a statutory fee after holding a licence for close on 40 years, and on a fixed retirement pension.

May I suggest a free-of-charge licence after, say, 25 years, or on retirement, whichever comes first? Or maybe even a one-time fee, like the driving licence.

It is not good enough, Mr Editor, to trot out the views of the RA on this matter; our Society should be seeking to improve *our* conditions by putting forward our views.

R Pattinson, GW3KVX

WAIT YOUR TURN

As a non-French National I was lucky to have been given the opportunity to operate TM5DD/P for the 4/5 and 6 June. Field Day over the 4/5th as always was a pleasure. 1989 was the last time I participated and the standard of operating was as I remembered - fast but courteous.

Regrettably I cannot say the same for the 6th. Since the call was a special event for D-Day the object was to work as many stations as possible yet to avoid the pile-up syndrome by at the very least an exchange of names instead of the usual 599 each way - goodbye.

After ten hours I gave up in disgust. The sheer bad manners of some stations to make a QSO is beyond belief, after all it was not as if I was big-DX. In one instance I asked a G4 for his name at least six times and still haven't got it ... a PA3 I finally gave 'no QSO' because he persisted in QRMing other calls after being asked to wait.

Pile-ups are nothing new to me as I have operated from VU2 and TA2. From TA2 I found the only way I could make pile-ups more pleasurable was to run a QRY (Your turn is number....) list. Something that took a while to catch on as QRY is not often listed in the run-of-the-mill Q's for amateur operation. Once it did, it worked exceedingly well and didn't take long to run a QRY list of 20 stations at a time leaving the frequency relatively clear to top up with fresh calls and also give QRP ops a chance to QSO as well. Those that didn't have the patience to wait their turn missed out, but there again, how many give up in sheer frustration in 'normal pile-ups.

G3SXW's Tristan da Cunha article on the spreading of the pile-up frequency may be one answer but 5kHz is a lot of bandwidth when there is only 40kHz to play around with, and who says it stops at 5kHz. With split frequency working plus a QRY list I found I not only moved through pile-ups a lot faster but also it left me at the end of the QSO, sans mental hernia.

Thanks to everyone who made TM5DD/P a memorable weekend.

Malcolm McLeman, F5VBU/G3UIN

THANKS FOR MALAYSIA

I wish to take this opportunity to express my gratitude to fellow RSGB member and IARU Region 3 Director, Mr Sangat Singh 9M2SS for helping to arrange a 9M2 licence for me while I was working briefly in Malaysia. I received my licence certificate within four working days! Thanks also to Neville Cheadle, G3NUG for sending me an application form and advice on licensing.

Dr R K W Lau, G0TBX, 9M2BX

HONOR ROLL COMPULSORY

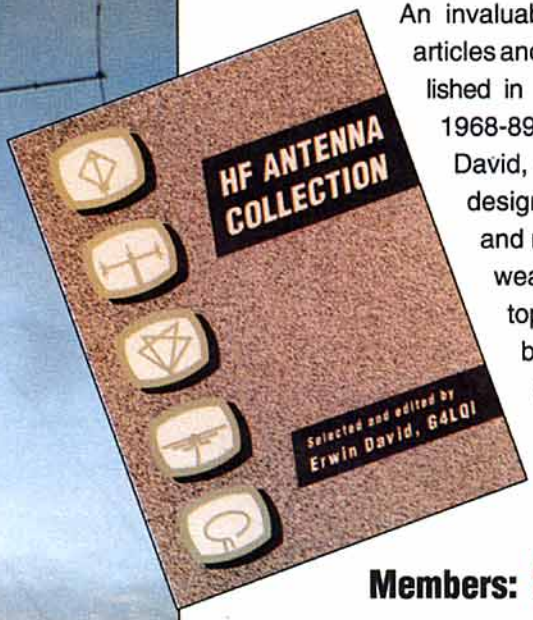
I was very dismayed to see that you have wasted lots more pages in August *RadCom* on the G2AJV toroid antenna. The technical quality of the three articles you have now published on the subject have all been abysmal. All articles have lacked detailed information and seem full of quackery. Perhaps it is high time that the RSGB takes a leaf from the ARRL book . . . no-one is allowed to hold high office in the Society unless they have worked 300 countries. That would keep out the people that have no idea of what the hobby is about. What do you think?

Also, when will the next issue of *RadCom* have a photograph of genuine ham radio interest on the front cover? The latest cover seems to be a tourist plug for New York. The QRP antenna in the picture is of no interest whatsoever. You should look at *QST* Magazine to see how these things are done properly. Wake up - the RSGB is an amateur radio society not a gathering of spotty faced train spotters.

Ian Buffham, G3TMA

Essential RSGB Reference Books for the

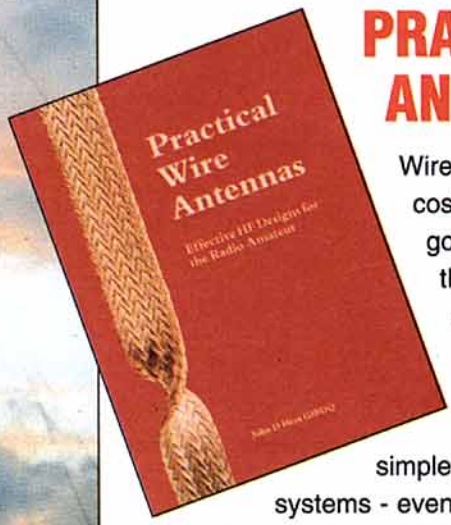
HF ANTENNA COLLECTION



An invaluable collection of outstanding articles and short pieces which were published in *RadCom* during the period 1968-89 selected and edited by Erwin David, G4LQI. As well as ingenious designs for single-element, beam and miniature antennas, there is a wealth of information on ancillary topics such as feeders, tuners, baluns, testing, modelling, and the mechanics of mounting an antenna safely. This book could supply that vital idea for your next antenna project.

Members: £9.34 (£10.99)

PRACTICAL WIRE ANTENNAS



Wire antennas offer one of the most cost-effective ways to put out a good signal on the HF bands and this practical guide to their construction has something to interest every amateur on a budget. Many different types are covered, ranging from simple dipoles to ingenious multi-wire systems - even underground antennas! Full details of feeding and matching are also included. The author, John D Heys, G3BDQ offers 'down-to earth' advice that will be appreciated by beginners and enthusiasts alike. No-one who builds and uses wire antennas can afford to be without this handy guide.

Members: £7.22 (£8.50)

OTHER ANTENNA BOOKS

		NON-MEMBERS	MEMBERS			NON-MEMBERS	MEMBERS
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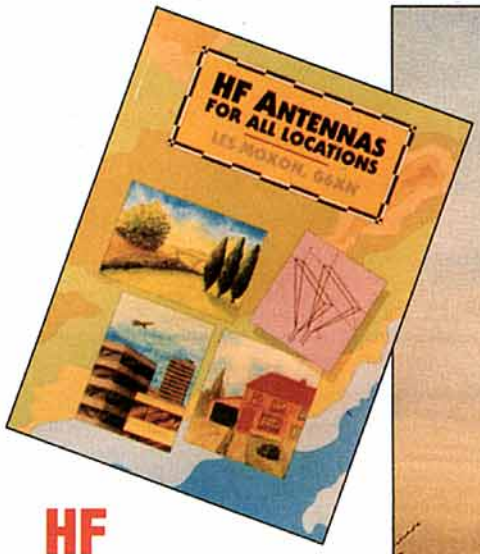
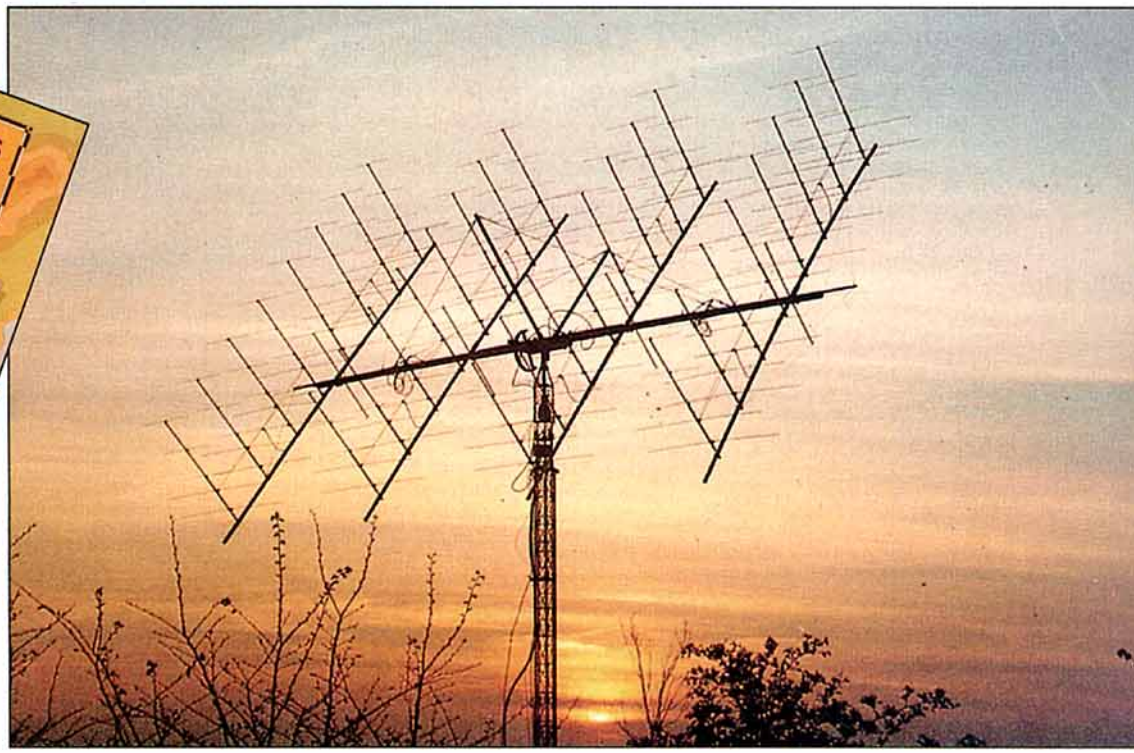
Antenna Compendium – Vol 2	(ARRL)	£10.25	£8.72	Simple Low Cost Wire Antennas	(BPI)	£9.07	£7.71
Antenna Compendium – Vol 3	(ARRL)	£13.50	£11.78	Yagi Antenna Design	(ARRL)	£11.30	£9.60
Antenna Compendium Set Vol 1,2,3	(ARRL)		£23.00	W1FB's Antenna Notebook	(ARRL)	£8.10	£6.89
The Antenna Experimenter's Guide	(DDP)	£10.00	£8.50	Low Profile Amateur Radio	(ARRL)	£5.99	£5.09
The ARRL Antenna Book 17th Edition	(ARRL)	£17.99	£15.29	Antenna Impedance Matching	(ARRL)	£14.99	£12.74
All About Cubical Quad Antennas	(RPI)	£8.50	£7.23	Reflections: Transmission Lines & Antennas	(ARRL)	£14.99	£12.74
All About Vertical Antennas	(RPI)	£9.10	£7.74	Transmission Line Transformers	(ARRL)	£14.99	£12.74

PLEASE REFER TO AUGUST 1994 RADCOM FOR A FULL LISTING OF ALL PUBLICATIONS





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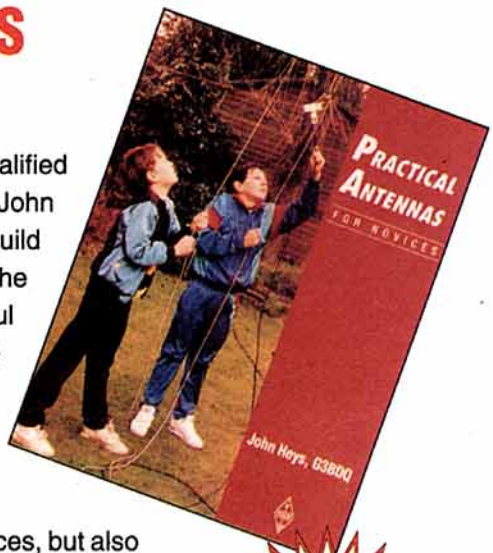

In this guide, written especially for newly qualified holders of the UK Novice Licence, the author John Heys, G3BDQ, describes in detail how to build simple but efficient antennas for each of the Novice bands up to 434MHz, as well as useful ancillary equipment to ensure that they are working correctly. A complete chapter is devoted to the safety and common-sense aspects of installing and using a transmitting antenna.

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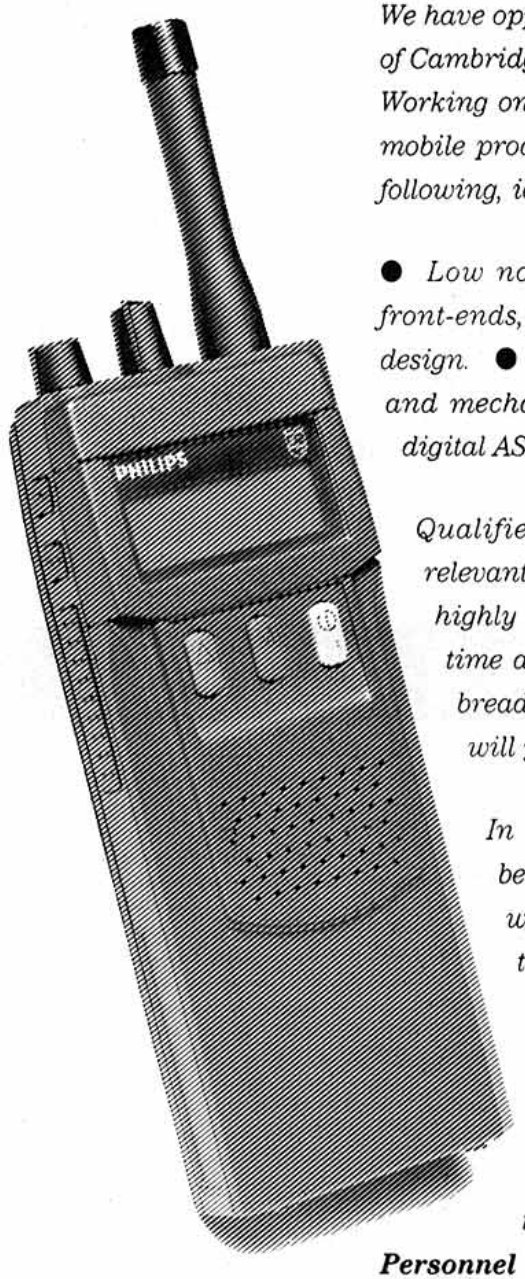

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