Radio Communication

The Journal of the Radio Society of Great Britain

December 1993

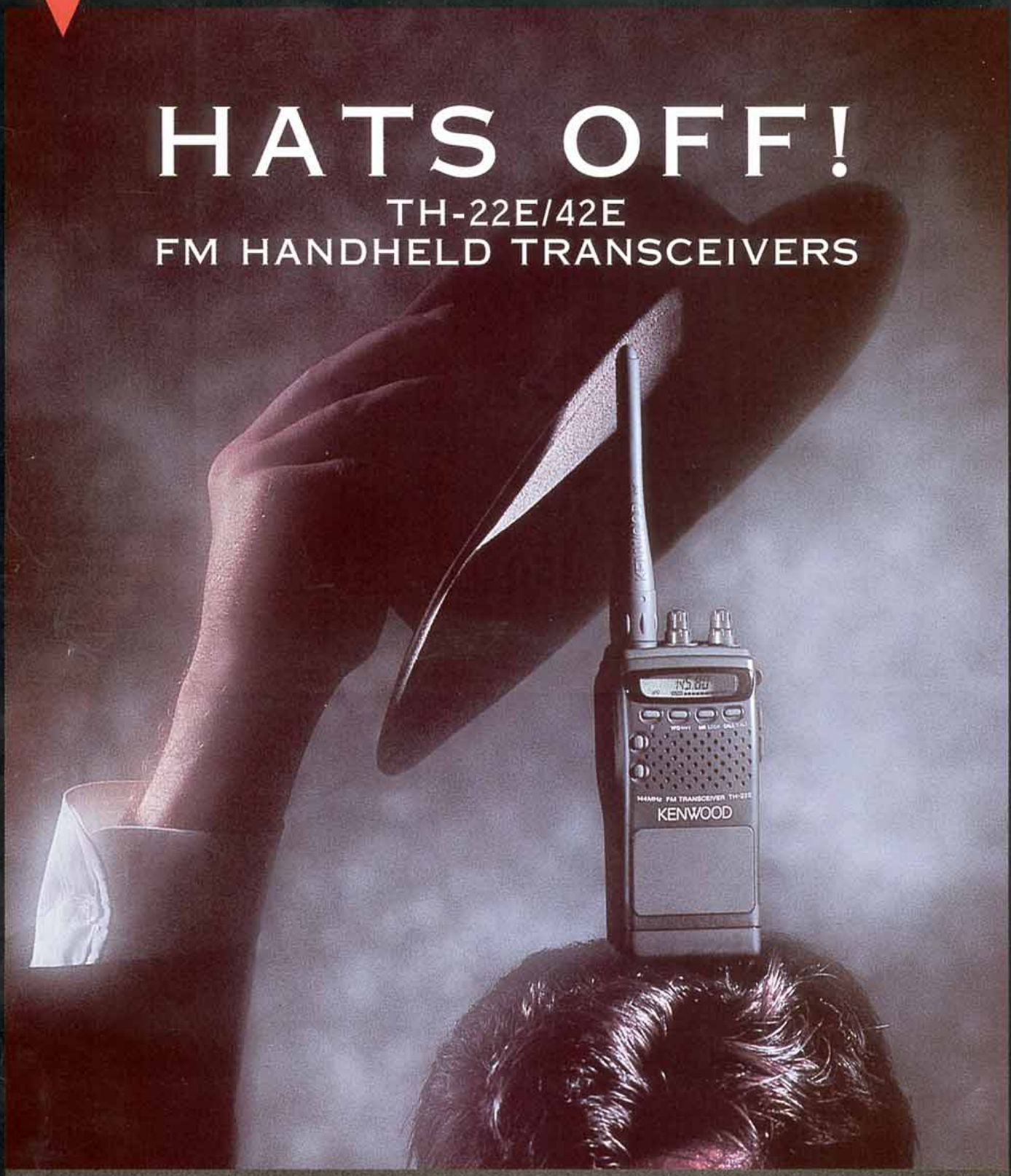
Volume 69 No 12

THE VOICE OF AMATEUR RADIO FOR 80 YEARS

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

HATS OFF!

TH-22E/42E
FM HANDHELD TRANSCEIVERS



The news is out. And it's too exciting to keep under your hat.

Kenwood's new TH-22E (144MHz) and TH-42E (430 MHz) redefine hand-held communications, with a palm-size format and impressive performance.

They're small and light enough to carry anywhere, but offer over 5 watts output (with a 9.6V battery) and long hours between charges. The secret's in the FET power module, a world first in this class for sophisticated power management.

Other features? From the user friendly menu system to the 40 EEPROM memory channels, Kenwood's new handheld FM transceivers offer numerous category-leading features and first-class performance. So it's hats off to Kenwood – the transceivers that cap the rest.

KENWOOD

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Radio Communication

NEWS AND REPORTS

TECHNICAL FEATURES

COVER PICTURE:
Professor Martin Sweeting, G3YJO, works on a Microsat at the University of Surrey. Pictured is a commercial satellite which is identical to OSCARS 26 to 28 launched recently.

Photograph: Surrey Satellite Technology Ltd.

REGULAR ARTICLES

RADIO SOCIETY OF GREAT BRITAIN

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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Zone F: I J Kyle, GI8AYZ
Zone G: I D Suart, GM4AUP

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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

from

The President

Another year has passed – the eightieth one since the Society was formed. More Old Timers have become Silent Keys, and more new amateurs have joined the ranks. The Amateur Service has carried on in all its many facets and activities, and all those volunteers in the cause have given more of their time.

Have we achieved anything? I think so. Although the hope at the beginning of the year that we could get a full-time PR person at HQ has not, for a variety of reasons, proved possible, many of our other tasks, expected and unexpected, have been carried out effectively. As my year as President comes to an end, I would like to thank, and pay tribute to members of staff, volunteers, and last but not least, my fellow Council members for their support and assistance during the year. It has been a busy year, with a large amount of business travelling detracting from the time available for the Society, but nevertheless an enjoyable one.

There are always times when volunteers wonder if the game is worth playing, but the results in the end are the reward. If we can leave amateur radio better than we found it, by virtue of our example as operators, or the encouragement of newcomers, or the technical input to the art, or by the use of our skills for the public good, we have achieved something positive. Those achievements deserve to be accomplished with goodwill and friendship – that is part of the Amateur Code – and even more so at this time of the year. I hope that we can all achieve something for the common good next year as well.

A happy Christmas and a prosperous New Year to all.

Peter E Chadwick MIEEE, G3RZP
President

and

The General Manager

As the end of 1993 approaches I think that all the staff at Headquarters can look back with a good deal of satisfaction at what has been achieved throughout the year. This time last year I spoke of laying the foundations for the Society to go from strength to strength. The signs are encouraging.

During 1993 I have had the opportunity to meet large numbers of members from all parts of the United Kingdom. The views given to me on the performance of the Society in looking after the interests of all licensed amateurs have been positive. The concensus of opinion is that the RSGB is doing a good job.

The HQ staff feel the same way; however, we are not complacent. We know that we can improve on our performance in serving our members and the aim for 1994 and future years is to continue to improve our current services and to introduce more membership benefits.

1993 has been a good year for amateur radio, 1994 promises to be an even better one.

On behalf of the HQ staff may I thank you for your continued support and wish you all a happy and peaceful Christmas and a prosperous New Year.

Peter Kirby, G0TWW
General Manager

NEWS & REPORTS

● IN THE USA, 5978 new amateur licences were issued in June, the largest monthly total in more than two years. The US has recently seen a boom in licence applications following the introduction of a 'code-less' VHF-only licence similar to our Class B licence.

● TO REDUCE the impact of its cellular radio antennas on a church near Kansas City, the Bell Telephone Company built an attractive bell tower which doubles as an aerial mast.

● SHORT-WAVE Broadcaster HCJB in Ecuador has a weekly half-hour amateur radio programme on Wednesdays at 1930GMT on 17.490, 17.790 and 21.480MHz.

● SOLENT Fortifications Amateur Radio Group, having spent six years running special event stations, will take a rest during 1994, resuming their activities in 1995.

● JOINTLY SPONSORED by the ARRL and the Council for the Advancement of Amateur Radio in New York City is a contest for school club stations.

● THE NEXT IARU Region 1 Conference will be held in Israel in 1996.

● BBC2's ARENA programme on 18 December features amateur radio.

Dorset RLO

THE RSGB Liaison Officer for Dorset, Ken Powell, G1NCG, has changed his address to: 27 Bingham Road, Verwood, Dorset BH31 6TU. RLOs hold a wide range of information and should be used by RSGB members seeking advice.

RSGB International HF and IOTA Convention was held in October 1993, at Old Windsor, Berkshire

An Enjoyable Convention

IF THE QUALITY of an event can be judged by the obvious enjoyment had by all concerned, the RSGB's 1993 HF IOTA Convention was an outstanding success.

It was a convention in the traditional style and not just like any other 'rally'. It was not simply rows of traders' tables and people with their heads bent down examining the wares and oblivious to all around them. This was an opportunity to meet friends, socialise, and attend a range of lectures and presentations. The description 'International HF and IOTA Convention' was probably a longer way of saying 'DX and IOTA Convention' for that is really what it was.

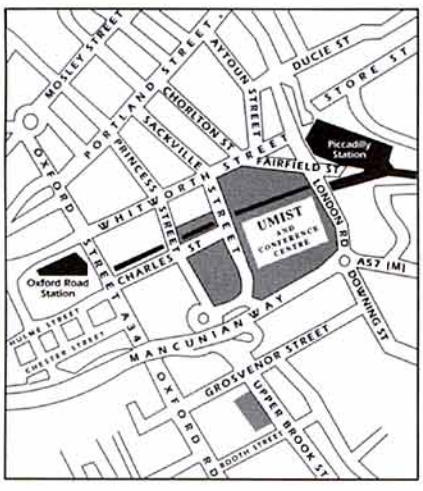
The imposing Beaumont Conference Centre was once again the venue for the Convention.

Of the 25 items on the programme, all were DX or contest related except for the Young Amateur of the Year ceremony and perhaps the lecture on computer antenna modelling. The lectures and presentations were well attended and for some the rooms were packed to capacity. Especially popular were video and slide presentations about recent major DX expeditions given by a member of the expedition team were, as were demonstrations of computer logging and contesting software. A frequent comment in the bar was that something had to be missed because it clashed with another. Visitors were spoilt for choice with two lecture and presentation streams on Saturday and three streams on Sunday.

The high spot of the Convention was the DX Dinner on Saturday evening. It was sold out with more than 180 attending. RSGB President, G3RZP, a proclaimed DXer, spoke to an agreeably receptive audience about matters of mutual interest. The entire speech was a roar of laughter and appreciation.

Amongst the presentations made was the award of the Calcutta Key to Hans Berg, DJ6TJ for his services to international amateur radio through the IARU. As the President spoke, describing the contribution that had been made without naming him, Hans suddenly showed by his shocked expression that he had realised the award was to be presented to him. Red-faced and a little emotional, he for once was lost for words.

CONTINUED ON PAGE SIX



The RSGB Annual Meeting 1993

THIS YEAR's RSGB Annual Meeting takes place in the Renold Building at the University of Manchester Institute of Science and Technology. The meeting starts at 2pm but the doors will be open from 12 noon for those wishing to partake of a finger buffet, buy RSGB books or simply chat with old friends.

Car parking is available nearby. Manchester Piccadilly railway station is a few hundred yards from UMIST.

A notice setting out full details of the Annual Meeting was published on page 6 of November's *RadCom*.

Vote Now

THE DEADLINE for the *receipt* of Council election ballot papers is 12 noon on 30 November. If you haven't yet voted, please do so *immediately*. Election details and a ballot form were sent to all members inside the *Annual Report* with last month's *RadCom*.

An Enjoyable Event

continued from page 5

The last event of the Convention was the Grand Draw. The sale of a large number of raffle tickets at £1 a time greatly helped funding of the Convention. The main attraction was the new Kenwood TS-50S donated by Trio-Kenwood UK Ltd which was won by a popular DX expeditioner who will surely make very good use of it – Nigel Cawthorne, G3TXF.

This annual RSGB Convention again brought together those who enjoy HF, DX, IOTA and the contest aspects of amateur radio. It was the type of event to foster and strengthen amateur radio which is desperately needed at this time. The venue, accommodation and service were excellent and it was an opportunity for many XYLs to enjoy the weekend at Beaumont as well.

The Society is indebted to the joint organisers from the HF Committee, HF Contests Committee, IOTA and the Chiltern DX Club for organising a first-class convention, and especially to the joint sponsors Martin Lynch (Amateur Radio Exchange Centre) and Trio-Kenwood UK Ltd. [Thanks to John Forward, G3HTA, for providing the basis of this report – *Ed*]

● THE IRTS PLANS a News Bulletin on 3.625MHz Sundays to supplement existing broadcasts on 7.043MHz (11am) and 3.650MHz at midday.

First prize in the Convention Raffle was a Kenwood TS-50 mobile HF transceiver, worth nearly £1,000. It was won by DXer Nigel Cawthorne, G3TXF, who was presented with his prize by David Wilkins, G5HY, of Trio-Kenwood UK Ltd.

The Dinner was entertained by the lighter side of DXing as recounted by Peter Chadwick, G3RZP.

G3VA at the IEE

PAT HAWKER, G3VA, will be giving a lecture on 'Clandestine Radio in World War II' at the IEE on 18 January. It will cover the operational problems and equipment of MI6/SIS, SOE, the London Poles and Czechs and equipment secretly built in occupied Denmark and Holland.

The venue is the Institute of Electrical Engineers, Savoy Place, London WC2R 0BL. Assemble at 5pm (tea) for a 5.30 start. Admission is free.

RMG Vacancy

THE REPEATER Management Group invites applications from members for the post of Zone A Repeater Representative (Zone A covers the north of England). Applicants should be prepared to attend six meetings per year, normally held in London and occasionally in Birmingham, and deal in the first instance with all repeater matters in the Zone. They will have been actively involved with on or more repeater groups, have a broad technical understanding of repeater operations and be prepared to liaise with all repeater keepers in the Zone on a friendly basis. The post is voluntary but travel and other limited out of pocket expenses are claimable.

Applications should be in writing and addressed to: RMG Chairman, Geoff Dover, G4AFJ, 31 Newbold Road, Kirkby Mallory, Leicester LE7 7QG.

Balloon Winners

THE WINNERS of the RSGB HQ Open Day Balloon Race were:

1st	Mr V Fisher, RS95008
2nd	Mrs A Coles
3rd	Mr J Case, GW4HWR

Prizes were: RSGB book vouchers for £60, a year's free membership and a goodie bag.

RSGB Council Retirements

RETIRING FROM RSGB Council at the end of December are Terry Barnes, GI3USS, and John Allen, G3DOT.

Terry Barnes has been Member for Zone F, Northern Ireland, since 1985 and was elected President for 1992. He will doubtless carry on working as a staunch supporter of the Society and for the furtherance of amateur radio in Northern Ireland.

John Allen has been Member for Zone B for the last six years and a member of the Membership Liaison and Propagation Studies Committees.

1994 Presidential Installation

THE SOCIETY'S 1994 President Mr I D Suart, GM4AUP, will be installed at an evening reception and dinner on Saturday 15 January 1994 (8.00 for 8.30pm). The venue is the Bothwell Suite, Forte Crest Hotel, Bothwell Street, Glasgow G2 7EN.

Tickets for this prestigious event are £20 per head. Members wishing to attend should apply to Belinda Gannon at RSGB HQ by Friday 17 December, who can also arrange overnight accommodation if required. Please mention any special dietary requirements when applying for tickets.

Representatives from all RSGB committees were invited to make a presentation to the Council on 23 October. Pictured at London House (near RSGB's old HQ in central London) are (l to r): 'Smudge' Lundegard, G3GJW (Council); John Bazley, G3HCT (Licensing Advisory and Council); Tom Lilley, G1YAA (Datacomms); Clive Trotman, GW4YKL (Membership Liaison and Council); Peter Sheppard, G4EJP (Council); Gwyn Davies, G4FKH (Propagation Studies); Chris Burbanks, G3SJJ (HF Contests); Steve Davies, G4KNZ (Microwave); Hilary Claytonsmith (Council); Julian Gannaway, G3YGF (Council); Robin Page-Jones, G3JWI (EMC); John Greenwell, G3AEZ (Council); Peter Chadwick, G3RZP (President); Dick Biddulph, G8DPS (Technical and Publications); John Allen, G3DOT (Council); David Evans, G3OUF (HF); John Case, GW4HWR (Training and Education); John Hall, G3KVA (Company Secretary); Dave McQue, G4NJU (Repeater Management); Tim Hughes, G3GVV (IARU); Brian Bristow, G4KBB (ARDF); Bryn Llewellyn, G4DEZ (VHF Contests); Geoff Bond, G3GJB (Planning Advisory); John Allaway, G3FKM (Council); and Norman Miller, G3MVV.

A Unique Opportunity to Visit Jordan

HM KING Hussein of Jordan, JY1, has invited a group of radio amateurs from St Dunstan's Radio Society, which is for those blinded in the service of this country, to visit Jordan at Easter 1994. Robin Bellerby, G3ZYE, has been given the job of organising the visit.

Robin is looking for a number of keen young amateurs (licensed or SWL), preferably aged 16 years or above, to join the trip and to assist the St Dunstan's members by erecting antennas, setting up equipment etc.

In addition to the St Dunstan's party, sixth formers from schools throughout the UK are being invited to participate in a simultaneous research programme into archaeology, ecology, geology and marine biology, with visits to (and radio operating sessions in) such exotic places as: the Red Sea at Aqaba; Bedouin tribesmen in Wadi Rum (of Lawrence of Arabia fame); Petra, a city carved out of sandstone rock in the middle of the desert; the Dead Sea, the lowest point on the surface of the earth, more than 300 metres below sea level; various castles built by the crusaders; Jarash, a well-restored Greek/Roman city; and of course Amman, capital city of the Royal Hashemite Kingdom.

Those interested in this unique opportunity should write without delay to: G3ZYE, PO Box 24 Malvern, WR14 4YP.

For a full report on the last visit to Jordan by St Dunstans RS, see the colour feature in *RadCom*, July 1991.

Satellite Software

AMSAT-UK wishes to announce that the SATSKED software by Wayne, WA2N has been donated to AMSAT International and that AMSAT-UK hold the Password Identification Codes to enable anyone to use the downloaded UO22/23 software from the satellites.

Readers wishing to open up this excellent software after download should send £30.00 if non-member of AMSAT-UK, £20.00 if member. (Quote M number). G3AAJ will send your personal ID (PIN) within 24 hours.

Send to AMSAT UK, London E12 5EQ. All donations go into the P3D Fund and you get a nice Certificate.

● MICRO SAT OSCAR-26 is now operational. OSCARs 25 and 27 are testing and OSCAR-28 is not yet available.

At the Leicester Show

Mike Devereux, G3SED, of Nevada Communications presents a bottle of bubbly to customer Brendan Walsh, an SWL from Co Kerry.

Mr Aso of Yaesu presented Yaesu Europe's first exhibit at a British amateur radio show.

● THE NEW Treasurer of the Mid-Severn Valley Repeater Group which runs **GB3MH** and **GB3MS** is John Harvey, G4IVJ, QTHR.

● CAMBRIDGE Repeater Group's 70cm data repeater **GB3PT** (RB12) is off the air for a change to 9600 Baud operation.

● ST AUSTELL 70cm repeater **GB3HB** (RB15) returned to service on 24 October.

The RSGB's youngest members: Amy, RS95310 (right), and Carys, RS95311, are the twin daughters of Novice Instructor, David Wright, GW1MVL. They were born on 17 Jan 1991. RSGB members with (perhaps older) children or spouses interested in amateur radio may like to know that Family Membership is only £14 and provides all RSGB benefits except a separate copy of *Radio Communication* to anyone related to, and living at the same address as, an existing Member.

G8KBQ is Remembered

WEDNESDAY, 1 December marks the inauguration of a new 10GHz beacon, GB3KBQ, built by members of the Mendip Repeater Group to commemorate the life of John Moxham, G8KBQ.

John died in November 1989, but his knowledge and sense of humour will be remembered for a long time among his fellow amateurs. He had a fascination for microwave technology and, despite the haemophilia which finally claimed his life, was always available to give a helping hand or a word of advice to those who shared his hobby.

The 10,368.87MHz beacon, sited alongside repeater GB3VS at Taunton, will run 60mW initially but it is hoped to increase power when funds are available. Group Secretary Pam Ives-Whitaker, G7FPW, would no doubt appreciate donations and reports.

YAOTY Presentation

THIS YEAR'S Young Amateur of the Year Award Ceremony was again held in association with the RSGB's HF Convention on 9 October. The principal guest and presenter of this year's prize was Roger Louth, Director, Mobile Services, from the Radiocommunications Agency. He was accompanied by John Keeling also from the Agency.

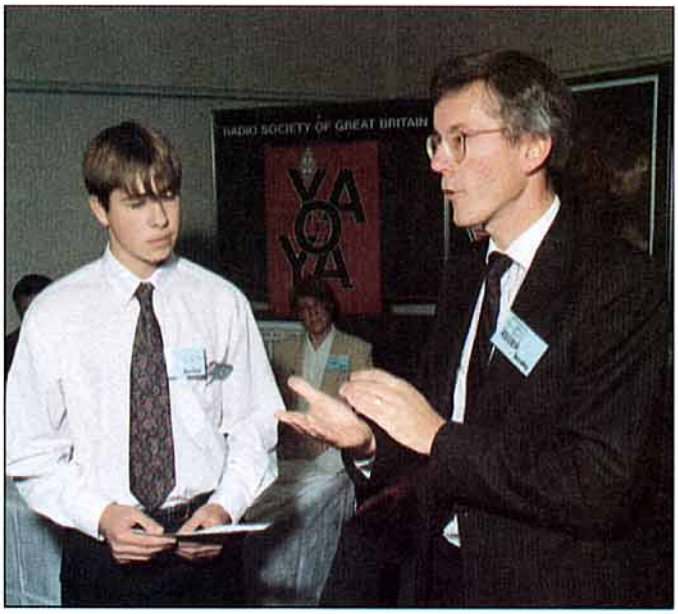
Other special guests, who also presented prizes to either the winner or runner-up, included; Ian Laybourn of the Mobile Radio Users Association, Paul Nicholson of ICOM (UK) Ltd, Carol Keeling from Wray Castle College and Lloyd Arrow from Siskin Electronics. Cirkit Distribution Ltd also made a prize available for presentation to the runner-up.

The ceremony was attended by the RSGB's President Peter Chadwick, G3RZP, and General Manager Peter Kirby, G0TWW, together with Hilary Claytonsmith, G4JKS, the event organiser, John Case, GW4HWR, the Chairman of the Training & Education Committee and David Evans, G3OUF, the Chairman of the HF Committee who was the master of ceremonies.

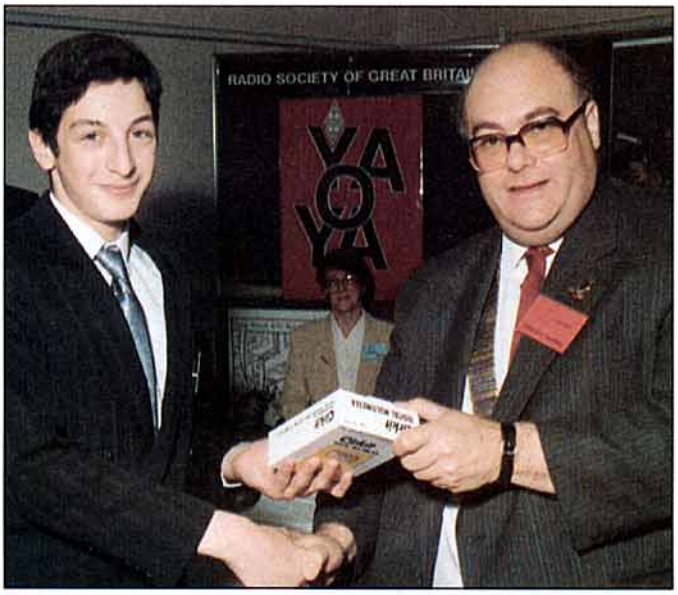
The 1993 Young Amateur of the Year was Tim Munn, G7OTO, from the Isle of Wight. Apart from his keen interest in amateur radio and computers, Tim is also the youngest Novice Licence instructor in the UK. The RA prize consisted of a cheque for £250 and a tour of the RA Monitoring Station at Baldock.

The runner-up this year was Simon Kahn, G0STU, from Salford, Lancs.

The Society extends a cordial thank you to all of this year's nominees and nominators, to the Radiocommunications Agency and to all of the organisations who sponsored and participated in this year's event.



Roger Louth from the RA applauds the 1993 Young Amateur of the Year, Tim Munn, G7OTO.



Runner-up, Simon Kahn, G0STU, is presented with a multimeter from Cirkit by RSGB President Peter Chadwick, G3RZP.

Representatives from Government and Industry showed their support by giving prizes to the winners. (Left to right) Mrs Carol Keeling (Wray Castle College), Paul Nicholson (Icom UK), Hilary Claytonsmith (RSGB), Ian Laybourn (MRUA), Peter Chadwick (RSGB), Roger Louth (RA) and John Keeling (RA).

Radio Course

'AN INTRODUCTION to Amateur Radio' is the name of a residential course aimed at the beginner or newly licensed amateur. A special event station, GB2KRC, will be operational during the three-day course. The venue is Kilve Court, a Georgian country house in North Somerset. Further details can be obtained from the course director, Adrian Dening, G4JBH, QTHR or call 0935 28341.

Discovery Camp 93, Romsey, Hants

SOME 1,200 Guides from 14 nations attended the International Discovery Camp which was held 6 – 15 August on the Broadlands Estate, Romsey, Hants. As part of a number of activities available at the camp, the Waterside Amateur Radio Society (WARS) was asked to provide a radio station so that greetings messages could be transmitted.

Three 90-minute operating periods were planned every day for five days. A short introductory talk was given to each group of Guides who were then split into smaller groups to view the three stations: HF SSB, 2m FM and 4m packet using the callsign GB2HWG. The demands of this schedule required assistance and three other clubs volunteered. Operators and equipment came from the Itchen Valley, Winchester and Andover clubs. A total of 17 amateurs were involved in the project.

Nearly 250 Guides passed more than 600 messages during the five days. The packet system proved popular because the girls, ranging in age from 10 to 18, were all able to operate the keyboard. More than 230 messages were sent by this means. The HF SSB station using a triband beam had a great impact and contacts were made with many DX countries, including Wake Island and the Philippines. The tribander was mounted on a 60ft trailer-mounted mast loaned by South Midlands Communications.

Finally, Lindsay, the daughter of G0SWY, was tested for her Communications Badge. She had already proved useful in organising the groups visiting the stations and during her test was easily able to answer questions on Log Keeping, Q Codes, Callsigns, Receiver basics etc – another Novice in the making.

Organiser Major (retd) J Daw, BEM, G7DKT, thanks all who contributed to the success of this superb public relations event.

Novice Course

A NOVICE Radio Amateur Course is being run at SPRITE, Sheffield TriTec, Thomas Street, Sheffield S1 4LE (0742 750581). The course starts Monday 13 December (3 to 5pm) and runs for ten weeks. Just turn up on the day or contact Steve Jackson at the above address, marking your envelope 'Novice course'.

MARTIN LYNCH

G4HKS

THE AMATEUR RADIO EXCHANGE CENTRE

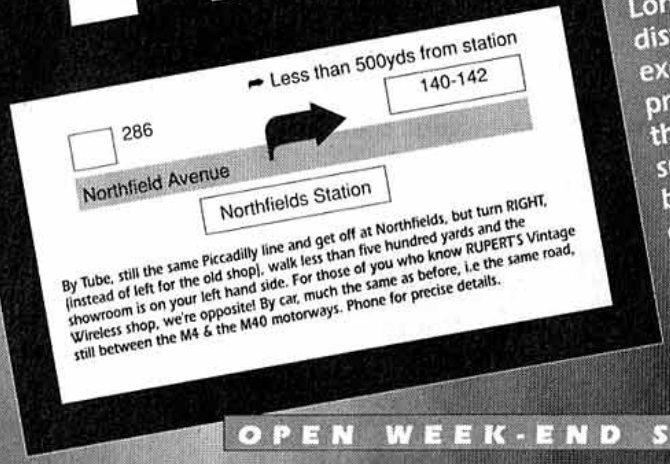
Due to the halls being decorated at Hatfield this year, the VERULUM RALLY will not take place, which is bad news for all those waiting to see Hilary & Jean in their Bunny outfits! Instead, (and not quite as appealing I'll agree), will be your chance to visit the MARTIN LYNCH OPEN WEEK-END at the super new showroom at Northfields.

Opening at 10.00 on Saturday the 11th of December, through until 6.00 & re-opening on Sunday the 12th at 10.00 and closing at 16.00, Martin & his gang welcome you all to his SUPER CHRISTMAS SALE.

There will be extra special offers throughout the week-end, plus FREE MINCE PIES, FREE COFFEE & FREE ENTRANCE. If you miss it, you'll kick yourself! On Saturday, the RAFFLE will be drawn for the YAESU FRG-100 receiver. With all proceeds going to the R.A.I.B.C, have you bought your £1 ticket yet? There is a rumour that the two Verulum ladies maybe appearing in person to sign autographs.....

VERULUM CHRISTMAS RALLY NO!

MARTIN LYNCH OPEN WEEK-END YES



Don't miss my massive new SECOND HAND LIST... IT'S FREE !!

PHONE FOR YOUR COPY TODAY!

Finally, I would like to CONGRATULATE the YAESU MUSEN COMPANY of Japan on them setting up in Heathrow, London & distributing their excellent range of products direct to the retailers. I'm sure the Yaesu brand will continue to go from strength to strength.

OPEN WEEK-END SPECIALS

MAKE	MODEL	DESCRIPTION	LIST	DEPOSIT FROM
KENWOOD	TS950SDX	HF TCVR	£3799	£369
KENWOOD	TS 50S	HF Mobile	£999	£99
KENWOOD	TH78E	2/70 Handie	£489	£49
KENWOOD	TH28E	2M Handie	£299	£75
KENWOOD	TM732E	2/70 Mobile	£689	£69

OPEN WEEK-END SPECIALS

MAKE	MODEL	DESCRIPTION	LIST	DEPOSIT FROM
KENWOOD	TS790E	2/70 Base	£1849	£299
ICOM	IC781	HF TCVR	£4995	£395
ICOM	IC737	HF TCVR	£1495	£195
ICOM	IC728	HF TCVR	£999	£199
ICOM	ICW21ET	2/70 Handie	£479	£99
ICOM	IC21E	2M Handie	£299	£49
YAESU	FT1000	HF TCVR	£3499	£375
YAESU	FT990	HF TCVR	£2199	£229
YAESU	FT890	HF TCVR	£1349	£199
YAESU	FT290R	VHF Multi	£499	£99
YAESU	FT736RD	2/70 Base	£1699	£299
YAESU	FRG100	Receiver	£529	£89

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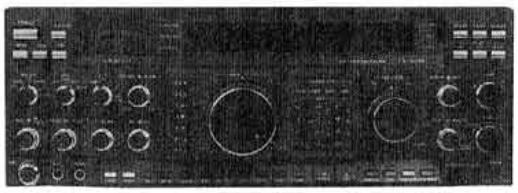
FT1000

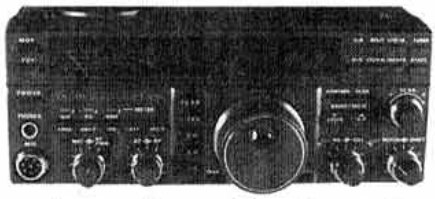


Utilising two 10 bit DDS's provides exceptionally clean VFO signals to drive the PLL and local oscillators results in very clean transmitted signals and a wide dynamic range receiver. A further 38 bit DDS's controlling the IF functions result in an exceedingly smooth tuning feel, equivalent to an analogue VFO this also achieves a TX/RX switching speed of typically 18ms ensuring ease of operation for QSK CW and digital ARQ modes. Simultaneous dual frequency receive on different modes and bands for total receiver flexibility. High power output 200 watts PEP and a fast action tuner with 39 memories give the operator instant access to any band and what's more, the tuner will match SRW's up to 3:1. For the CW operator there are 4 selectable bandwidths plus selectable BFO offsets, a CW spotting oscillator and built-in electronic keyer with 15 step weight selection.
Interfaced to a computer with one of the DX programme packages access to automatic control of the transceiver is possible also computer logging and the preparation of QSL information is possible.
The FT1000 is a must for the serious DX'er.

FT990

Like the FT1000 the FT990 utilises multiple DDS's to provide clean local oscillator signals resulting in a low noise, high dynamic range receiver. High quality shielded plug in circuit boards are employed offering maximum performance and ease of serviceability. Selection of 4 bandwidths plus IF shift, notch and digital filtering offer you total receiver control.
Other features include low noise, high performance power supply, 90 tuneable memories that store frequency, mode, bandwidth etc. effective noise blanker, high speed antenna tuner with 39 memories, a whisper quiet cooling fan, adjustable passband speech processor and what's more important, a remarkably clean transmitted signal.
Special provisions available include adjustable SSB carrier point as well as carrier offsets for CW RTTY and Packet modes.
If you are looking for a top performance HF transceiver then the FT990 meets the bill.

FT890



Following the tradition of its bigger brothers, the FT890 uses two DDS's and a rotary magnetic encoder to provide a clean local oscillator signal and a silky smooth VFO tuning. Two independent VFO's per band, 20 total and 32 memories store frequency, mode, offsets, clarifier, etc. Memories can also be tuned and scanned as required. Duct blow cooling system pioneered on the FT757 allows cool operation of the transmitter at 100 watts output with 100% duty cycle. When fitted with the automatic antenna tuner it offers a compact lightweight package.
The FT890 is ideally suited for mobile or base operation.

NEW

FT840

The new FT840 completes the family of transceivers, again using 2 DDS's and a rotary magnetic encoder to provide silky smooth tuning and clean local signals which give a clean transmitted signal and a wide dynamic range receiver. High quality construction and a modular PA similar to the FT747 ensures reliable power output and cool running at 100 watts PEP output.
Other features include IF shift, reverse CW sideband, effective noise blanker, speech processor, all mode squelch and front panel operation for either the FC10 matching ATU or the FC800 remote ATU.
All in all a truly amazing little transceiver.

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RC5-3	Create Bell type 360 deg. vari speed + preset	319.00	C
G-600RC	Yaesu Bell type Round meter 360 degrees	329.00	C
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RC5B-3	Create Bell type 360 deg. vari speed + preset	939.00	C
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G-2700SDX	Yaesu H/D 450 deg vari speed 50-120 sec	819.00	E
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G-500A	Yaesu Elevation Meter calb +/- 90 degrees	245.00	C
G-5400B	Yaesu Azimuth & Elevation Dual Controller	469.00	C
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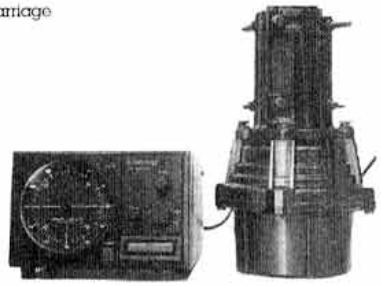

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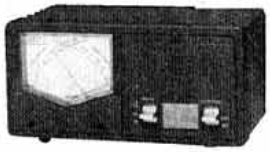

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HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

IT IS VERY SAD to have to report the death of two former writers of this column. Arthur Milne, G2MI, died early in October and Stan Herbert, G3ATU, in September. Arthur will have received mention elsewhere in *RadCom* but I would particularly like to mention Stan who wrote *The Month on the Air* before it was taken over by Roy Stevens, G2BVN. He was a real gentleman and remained active until within a few weeks of his death.

DX NEWS

THE ARRL AWARDS Committee has reinstated **Eritrea** to the DXCC list. QSOs since 24 May 1991 count and if you worked an Eritrean station before November 1962 when it was annexed by Ethiopia and already have credit there is no need to claim under the new listing. QSLs may not be sent for DXCC credit to arrive before 1 January 1994.

ARRL has also approved the following operations for DXCC credit (starting dates follow the callsigns): 6Y5/DF5UL, 6Y5/DL2FAI, 6Y5/DL4ZBI (all WEF 25.4.93), 7Q7CE (20.7.93), D68CA (9.8.93), FH/I4ALU (9.8.93), FJ/I4UFH (9.8.93), TY8OBO (14.8.93), 4S7/OH2VZ (13.8.93), 5R8DP (12.3.93), 9ER1TA (19.10.92), 9ER1TB (19.10.93), A35HX (25.2.93), E31A (2.8.93), E35X (31.5.93), HS0ZBJ (1.10.93), J3/CT3FN (21.5.93), S21ZD (5.9.92), S21ZL (7.3.93), T5YOU (3.9.93), ZF2VA (28.4.93), ZK19HX (19.7.93), and ZK2XH (26.7.93).

The backlog of processing DXCC applications at the end of September was 652 (46,362 QSLs), and processing time was one week. During September the DXCC Desk received 1,330 applications (95,212 QSLs) – the largest number received in a single month since September 1990.

Latest news from Russia indicated that UD is now both 4J and 4K. In due course Arctic and Antarctic stations will change to the R or U series and MV Island will also have a new prefix shortly. UW, UV, UZ, and UN are expected to be changed to RU, RX, RK, and RN by 1 January – the number and suffix will remain unaltered. I have also heard from GW2ADZ that according to UB5IUQ in 1994 UB5 will become US5, RB5 UX5, and RT5 UU5.

G3HCT wishes to let readers know that the A22CT callsign which he used in October 1982 from **Botswana** has now been reissued. He worked on 28MHz only. SM3HLL may still be in **Ethiopia** as ET3BH. He has been reported active between 1230 and 2000 on 18.077, 18.140, 21.028, 21.295, and 24.947MHz. OH3MIG is operating as OH3MIG/4U from the Golan Heights until the end of this month. 9G1XA closed down on 26 September after making some 18,000 QSOs. TL8JL, in the **Central African Republic**, is said to use 21.303MHz at around 2000 but if the band is not open he goes to 14.250MHz. 3X0DEX will be in **Guinea** until sometime this month and seems to like DX nets. 5X1B in **Uganda** appears most days at about 1900 near 14.025MHz.

I have received an official list of licensed amateurs in **Iraq** who are members of the Iraqi Radio Amateur Society. At the end of September there were 42 and these are listed as YI1s AA, AAT, AB, ABS, AFC, AHD, AIA, AL, AMG, AR, ASM, AWC, AWK, AZ, BGD, DZ, EYT, HAS, HKJ, HKK, HMK, HRA, HS, HXH, IY, LHD, MAR, MH, MQ, MSA, OM, RHM, RJ, SAS, SIH, SSS, TAK, THF, TKH, WMS, YMH, and ZX.

Chris Caunce, G3ZUG, is in **Ethiopia** where he is now licensed as ET3CC. He is located in Addis Ababa and expects to be there for more than a year. Equipment consists of an FT747 running 100W into a Butternut HF6V-X mounted at ground level – but the QTH itself is 8,500 feet ASL. Activity will be mostly on 14MHz between 1600 and 2000 but all bands 3.5 to 28MHz should be used. When on leave back in the UK he might well be heard on VHF. The *Long Island DX Bulletin* says that J28RD, in **Djibouti**, has been found on 18.124MHz around 1900 and that he makes skeds for other bands. *DXPRESS* reports that DK2WV who activated 3V8W recently from **Tunisia** claims that it was a legitimate operation and that he has sent documentation to ARRL. He made 6,500 QSOs and may return again around Christmas time. G6LJU was due to be on the air from **Ghana** beginning on 8 November – length of stay unknown, but he will be crystal controlled on 21.269MHz and on 14MHz (no frequency given) between 1700 and 1830. F5NCU is now in **Mayotte** and should be there for another nine months. He hopes to be on all bands, CW and SSB, as FH/F5NCU.

DXPRESS says that FT4WD, on **Crozet Is**, is to be found every Sunday at 1200 on 18.135MHz.

RSGB DX News Sheet says that KH4/N7TNL was expected to be active from **Midway Is** from late October until 6 January 1994. He will mostly use CW but with some SSB on bands from 1.8 to 28MHz (including WARC). The same news source says that FK8CP, in **New Caledonia** is happy to make skeds for contacts on 1.8MHz. He is active most days at sunrise and sunset transmitting on 1.838MHz and listening 1.834 – 1.836Mhz. At the time of writing no Europeans had been worked at his sunset time. FW1FM is reported to have returned to France but **Wallis Is** is still activated by FW1DJ who can sometimes be found on 14.115MHz in the very early mornings.

IV3HUL was expecting to be in **Fiji** at the present time and due to move to **Tonga** on 1 December. On 31 January he expects to return to Fiji for a further two weeks. On 16 February he plans to go to the **South Cook Is** and stay until 8 March when he goes to **French Polynesia** until 1 April. His favourite frequencies will be 3.505, 3.760, 7.005, 7.095, 14.005, 14.260, 21.005, and 21.260MHz and he will also use the WARC bands.

At the time of writing the promised expedition to **Pratas Is** had not yet materialised. The most recent *RSGB DX News Sheet* reported that BV5AF, President of CTARL (the Taiwan national society), had said that he was expecting it to happen in late November and that permission had been given by the Government Defence Department. OH2BH (who is now VR2BH) says that he has been assisting with the preparations – and JA1NUT is quoted as saying that the operation has been cancelled! Several new stations have appeared on the air from **Pitcairn Is.** These include Dennis Christian (VR6DR), Shawn Christian (VR6SC), and Mark Elimoos (VR6ME).

Adel Khalifa, A92FF, at his home in Bahrain.

NEPAL

IN A CIRCULAR letter dated 20 September 1993 the Nepal Amateur Radio League (PO Box 4292, Kathmandu) informs that on 10 June this year Satish Krishna Kharel, Suresh Raj Uprety, and Ram Badadur Gurung passed their written, oral, and Morse tests and became 9N1AA, 9N1HA, and 9N1RB respectively.

Unfortunately none of them owns any equipment yet but they did operate using DJ6JC's equipment when his expedition 9N1HL was active. New rules mean that any properly licensed amateur can now be granted a licence. They can only be issued at times of national celebrations and their maximum validity is 120 days. NARL is prepared to assist and advise anyone who wishes to apply by sending rules, application forms, and other necessary details if they will write to the address above enclosing 20 IRCs.

The letter says that there is no regular activity from Nepal due to lack of equipment and donations of old equipment would be most welcome. Please write to NARL first.

CONTESTS

ARRL 160M DX CONTEST

2200 3 December – 1600 5 December

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continued on page 16 ▶

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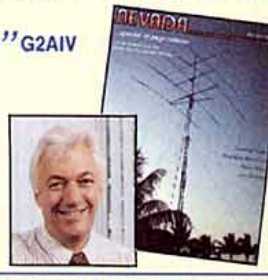

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73 - Mike Devereux

Mike Devereux G3SED

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CONGRATULATIONS GI4SJB!

Mr. John Bruce, GI4SJB, of County Down, was the first of our monthly Prize Draw winners. He has received his Startek ATH-30 frequency counter that covers up to 2800 Mhz. Enjoy John and thanks for your order.

Don't forget, there is still time to win yourself a prize before 20th December by remembering to use a copy of the order form from our FREE RSGB CATALOGUE (spare copies available — call us!) to place your order for a new rig or any accessory.

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Losses quoted at 100MHz

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HF NEWS

continued from page 13

RST and receive from VE/W RST plus ARRL/RAC section number. Five points per QSO. Multipliers are ARRL/RAC sections. Contest rules say that 1.830 – 1.850MHz should be used for intercontinental contacts. Logs have to be submitted no later than 30 days after the contest. I have copies of rules available – SASE please.

ARRL 10 METRE CONTEST

0000 11 December – 2400 12 December

Mixed mode, phone only, and CW only classes. Three categories – as described in the ARRL 160M DX Contest above. Only 36 hours of operation is allowed. Send RS/T plus serial QSO number starting from 001. W/VE stations will give their state or province. Novice and Technician stations sign /N or /T. QSO points are two for each phone QSO, four for each CW QSO, and eight for a contact with a Novice or Technician (28.1 – 28.3MHz only). Multipliers are the 50 US states plus DC, Canadian provinces and DXCC countries *except* the USA and Canada. Entries have to be in within 30 days. I have copies of rules – SASE please.

QRP MIDWINTER CONTEST

1500 8 January – 1500 9 January

3.5 to 28MHz – no WARC bands. Single operator – VLP (less than 1W output, QRP – less than 5W, MP – less than 25W, and QRO – anything more than 25W output. QSOs with own continent count one point, other continents two and if with VLP, QRP, or MP stations who have submitted a log four points. Multipliers are one per DXCC country and two if QSO was with a VLP, QRP, or MP station. QRO to QRO QSOs are not allowed. I have copies of the rules (SASE please). *Please note that the dates for this contest given in Contest Calendar in September and October were not correct.*

INTERNATIONAL NAVAL CONTEST 1993

1600 18 December to 1600 19 December

1.8 to 28MHz (no WARC). CW and SSB. I can supply copies of rules – SASE please.

Results of the **1993 ARRL International DX contests** are now available. In the **Phone section GD0SLY** (operated by K3RV) was top European in the DX listing and won the Dr G Griffin, W8MET 'Bones' trophy. In the **CW section** British scores were as follows:

(All band) G4BUO (1,955,151), GD0SLY (1,735,920), GW5NF (1,216,224), GM0ECO (1,028,976), G3MXJ (1,003,620), GW0/N3JT (391,314), G2QT (313,833), *G0IDE* (240,687), G5LP (216,612), G3TXF (216,504), *GW3JI* (127,539), *G3ESF* (177,072), G3SXW (115,020), *G5MY* (111,384), *G4ZME* (60,480), *GM3ZAS* (50,328), *G3HJF* (44,622), *GW0KZW* (32,319), GM4HQF (26,904), *G6QQ* (24,957), *G3NKS* (13,992), and G3WRR (11,400). On **3.5MHz** G4BLX scored 46,065, and *G4ZOB* 8,856. On **7MHz** G4ODV scored 32,190 points. On **14MHz** *GM3CFS* scored 15,540, and on **28MHz** *G4UZN* 6,630.

In the **Phone section** all-band scores were as follows: GD0SLY (2,218,440), GM0ECO (1,845,450), G3TMA (306,774), GM3BCL (208,626), GS4TMS (121,659), and *G4NXG* (3,822). On **7MHz** G4SZD scored 56,373, and on **14MHz** GW4BLE scored 336,831, *GI0KOW* 84,882, G2QT 58,344, and *GW0RTA* 1,848. On **21MHz** GW0ARK scored 183,918 and G0FDX 63,828. On **28MHz** G4BUO scored 181,440, and G3UFY 90,687. G5LP, G0NYD, and G4MET entered the **QRP section** (all band) and scored 25,272, 8,715, and 8,484 points respectively. (Stations listed in italics were in the less than 150W output category).

In the **1992 CQ WW DX CW Contest** there were plenty of entries from Britain. In the single-operator, **High power** section **G3KDB** came world second on 3.5MHz and **G3KHZ** world fifth on 28MHz. **G4BUO** and **G3MXJ** came European second and fifth respectively in the all-band high-power category, **G4CNY** European fifth on 21MHz, and **G4PIQ** sixth on 1.8MHz. In the low power class **GD4UOL** was sixth European, and in the multi-operator multi-transmitter class **GW8GT** was European third. Actual scores were as follows: **High power class** (All-band) **G4BUO** – 3,983,382, G3MXJ – 3,270,278, G3VHB – 2,444,160, **GJ/K2WR** – 1,840,125, G3UFY – 1,665,348, G4IVJ – 658,552, G3TXF – 127,788, **GM4SID** – 103,896, and G3KKQ – 99,066. On 21MHz **G4CNY** – 462,985, G4ZKJ – 1 (!). On 7MHz **G3WRR** – 26,588, on 3.5MHz **G3KDB** – 360,822, G4ARI – 92,334, and on 1.8MHz **G4PIQ** – 50,410 and G3KMA – 33,361. In the **Low power** (all band) class **GD4UOL** – 1,609,647, **G3SWH** – 1,030,788, G3PJT – 687,984, **GI0KOW** – 678,304, G3ESF – 612,340, **GW3JI** – 483,095, **GM0/NX1T** – 466,817, GD0PWW – 412,542, G0IDE – 339,273, G3GGS – 272,994, G5MY – 246,906, G6QQ – 236,915, G3JKY – 205,567, G3NKS – 151,216, G3VXF – 145,600, G4ZME – 116,998, and G4OBK – 4,998. On 28MHz **G3KHZ** – 319,340, G4UZN – 110,502, GM3CFS – 79,478. On 7MHz **G4ZOB** – 72,700, and on 1.8MHz **G3BDQ** – 5,808. (Calls listed in bold print received certificates).

THE ERNST KRENKEL QSO PARTY

0000-2400 23 December

This celebrates the 90th birthday of Ernst Krenkel who was a famous Russian polar explorer. The objective is to contact as many stations north of the Arctic Circle (4K2-4K4, UA, OH, SM, LA, OX, VE, KL7) and south of the Antarctic Circle (KC4U, 4K1 etc), together with special stations RAEM, UPOL, and R1SRR – R0SRR. Categories are all-band single and multi-operator and listener. No contest type exchange is needed – just RS/T, QTH, and name. Stations above the Arctic Circle will use the 'AAC' suffix. One CW and one SSB QSO per band (not WARC) each counts one point. Logs must include time, callsign, and RS/T sent and received. Send to the Union of Radioamateurs of Russia, Box 59, Moscow 105122, Russia, not later than 22 January 1994.

NINE BAND TABLE NO 8

CALL	1.8	3.5	7	10	14	18	21	24	28	Total
G3KMA	160	275	319	245	325	282	325	271	318	2520
G4BWP	143	269	304	233	326	286	323	256	310	2450
G4GIR	133	262	302	229	327	278	324	246	310	2411
G3XTT	179	238	295	205	325	265	319	235	295	2356
G3GIQ	70	214	280	126	326	250	327	218	309	2120
G3TXF	86	189	251	151	306	176	303	131	271	1864
G4OBK	122	170	220	148	291	209	266	176	243	1845
GM3PPE	68	163	207	187	274	230	254	178	222	1783
G3SXW	79	175	215	171	285	169	277	132	238	1741
G3JXN	49	125	192	126	275	201	280	183	280	1711
G3IGW	122	179	298	170	274	211	227	19	198	1698
G3NOF	5	104	108	–	325	215	327	212	295	1591
G3JJG	52	105	201	169	235	189	260	148	206	1565
G4ODV	87	156	303	142	247	108	239	68	196	1546
G4XRX	3	48	86	102	258	143	282	148	225	1295
G3IAR	59	98	120	129	237	162	209	103	129	1246
G4NXG/M	6	42	96	–	237	128	256	137	238	1140
GW3JXN	15	63	102	63	136	123	160	45	79	786
AVERAGE	80	160	216	144	278	201	275	161	242	1758

Next deadline– To reach G3GIQ by 8 January 1994.
Please note that entry level is 600 total and there is no need to work all bands. (Prepared by G3GIQ). (The scores of G3SXW and G3JJG were of CW contacts only)

QTH CORNER

ET3BH	SM3EVR, Tord Julander, Box 547, S-86020 Njurunda, Sweden.
ET3CC	C R Caunce, c/o UNECA New Conference Facilities Project, PO Box 60229, Addis Ababa, Ethiopia.
T30NA	SP2NA, Witold Wamka, ul Zjednoczenia 28 m 5, 87-100 Torun, Poland.
ZD9SXW	Roger Western, G3SXW, 7 Field Close, Chessington, Surrey KT9 2QD.
3B9FR	R G Felicite, PO Box 31, Rodrigues Is, via Mauritius.

1993 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G3KKJ	138	191	150	479
G3IZD	100	149	115	364
G3SXW	125	127	73	325
G3IAR	112	136	76	324
G4XRV	114	115	29	258
G0MHC	59	118	58	235
G2AFV	87	86	48	221
G4OBK	73	92	23	188
GJ4GG	37	63	41	141
G4MUW	2	69	40	111
G3IQF	45	41	17	103
G0KDS	2	75	3	80
G4CMZ	17	–	–	17

AWARDS

QRP 20 CLUB AWARD

Issued to those who have contacted at least 20 Locator zones in the Republic of South Africa since 1 January 1991 using a maximum of 5W input power. Any mode/s may have been used on the 1.8 – 28MHz bands (but not WARC). Station locations must be clearly shown on QSLs. The same application rules apply as for the Novice CW Award and it is issued free of charge.

PROPAGATION

THIS TIME G8KG remarks that for once we seem to have been lucky with the meagre rations old Sol is handing out! His report goes as follows:- "The decline in

BAND REPORTS

As "Smithy" said elsewhere - things could be worse ! Thanks to the following for information received :G2HKU, GJ4CC, G3s GVV, IZD, KKJ, YRM, G4DJC, GW4KGR, G4MUW, G0KDZ, G0MHC, and the UK DX packet Cluster via G4PDQ. As usual callsigns in italics were of stations using CW:

1.8MHz
0000 *HH2PK, SV8ZS.*
0600 *ZL1AIZ, ZL2JR.*
1800 *ZL2ADX.*
2100 *UJ8JI, UM8GGK, VQ9RM, ZS1TX, 4K2BY.*
2300 *ZD9SXW, 9G1XA, 9K2MU.*

10MHz
0700 *T30NA, T32BE, VK9MM.*
0800 *KL7XDT.*
0900 *FS1/JL1MUT.*
1500 *EA6/G3UUV, VQ9QM.*
1700 *D68CA, JT7/UB0YN.*
1900 *ZA1E, ZD9SXW.*
2100 *A71CW, CY9R, D2EYE, OX3FV, 4J0GAT, 7P27LI, 7Q7XX, 9G1XA.*
2200 *FS/F2YT, S92SS, ZD8M, ZS9/DJ2ZS/P, 5R8DL.*
2300 *FG5GH, VK6HD, IA0KM, 5H3FOE.*

14MHz
0700 FK8KAB/P, H44BC, JA, NH6HX/KH3, W5BOS/NH8. P29KH.
0800 AH9B, C21/KC6DX, CE0ZIS, KL7AMH, SU2MT, *T30NA*, T32BI, VK,VK9MM, YI0BIF, 6K93XPO.
0900 BZ5HAN, FK8KAD, ZK3DM, 5W1GW.
1100 *V29FNP*, VK9NS.
1400 XU7VK, XX9AS, *9M8FC.*
1500 EP2AG, *VK9MM*, XV7TH, *ZA2VD*, ZS8MI.
1600 *D73CW*, XU3RLD, SU1ER, 9M6BZ.
1800 EP2AG, HS1BV, KL7GSL, P39ZZ, 7Q7DU.
1900 DP0GVN, *T5/OZ1FJB, ZD9SXW*, 9G1MR.
2000 *D2EYE*, TZ6FIC.

18MHz
0900 *NL7J, TA6JM.*
1000 ET3BH, *JT1BV, T30NA, VK9MM, 5Z4CW.*
1300 S21ZG, UJ8RA, V63JC, XX9AW.
1400 *BZ4DHI*, TU4EI, *V85XF, 3B8CF.*
1500 *A71CW*, FH5CB, VQ9KC, *ZD9SXW, ZS9/DJ2ZS/P.*
2000 *C91AI, D2EYE.*
2200 HC5MZ/HC8, *HR2/WB6QP*, V31BR.

21MHz
0700 HL2DNN, JA.
0800 C53HG, UN7BD, VK9MM, ZK2XX.
1000 S21/PA3BTQ, P29KAB, PY0ZFB, XU7VK.
1100 A71AN, BV2FG, H44MN, J5UAI, V73C, 7Q7XX.
1400 C91BH, FH8CB, ZS9A.
1500 BV0MM, C91HA, VR6BX, YI1AA, ZS8MI.
1700 A22MN, S79MD, VP8CON, *ZD9SXW*, 9G1NS.
1800 C53HG, 5R8DG, 6W1AAD.
1900 P40ST.

24MHz
0900 VK9MM, XU7VK.
1100 ET3BH, XT2BW, 3X0DEX.
1500 P39ZZ, *ZD9SXW*, ZS8MI.
1800 3B9FR, *9G1XA.*
2000 FJ/I4UFA.

28MHz
1300 TA7BA.
1600 CE0ZIS, ET3BH, PY0FF, 7P27LI.

average solar activity reported last month continued until the last week of September with the 27-day mean solar flux dropping to 82 sfu. At this point, however, new activity in a previously quiet area of the Sun caused the mean to rise quite steeply, reaching 105 by the third week in October but then showing signs of levelling off (for those who missed the correction, the solar flux did *not* nearly touch bottom at 70 sfu on 24 September as reported by WWV and the Ursigram – the corrected value was 90 and marked the start of the recovery).

The period under review included three spells of disturbed geomagnetic conditions between which radio propagation was quite stable. The up-surge of solar activity in late September and early October combined with many good periods of good Es conditions to bring some life back into the higher bands and certainly saved the RSGB 21/28MHz contests from being something of a 'whitewash'. Only time will tell whether the up-surge will lead to a sustained recovery during the winter months but they will certainly be a good time to take an interest in the 10 and 18MHz bands if you haven't done so already".

THANKS

TO ALL information sources including the *Long Island DX Bulletin* (W2IYX), *EA DX Boletin* (EA1QF), *RSGB DX News Sheet* (G4DYO), the *Lynx DX Bulletin* (EA2KL), and *DXPRESS* (PA3FQA).

Please send everything for the **February** issue to reach me no later than **December 17.**

VHF/UHF NEWS

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

ALTHOUGH SUNSPOT activity is declining rapidly, geomagnetic disturbances have been prevalent. Significant flares have been recorded resulting in some auroral propagation. Mid-October brought the odd period of 50MHz Sporadic-E activity while persistent high pressure in the latter part of the month resulted in some welcome tropospheric DX and a claimed first England/Ukraine QSO on 70cm.

FIRSTS

THIS MONTH some 'firsts' for the 4m band taken from the official records maintained by Pat Allely, GW3KJW, and John Morris, GM4ANB, are featured. The band was released to British amateurs in January 1960, the allocation being 70.025 to 70.7MHz. The data are callsigns, time, if known, and date.

G5MR – CN8CK/CN8DO 4/6/60; G8XVJ – CT1WW 5/6/92; G5MR – F8GH early-1960 (reported in *RSGB Bulletin* March 1960); G3CLW – FA9VN 28/5/60; G3NKL – PX1RI 1819 23/6/68; G3JVL – TF3EA 27/6/69; G3RIK – ZB2VHF 1708 2/6/67; GC3OHH – ZB2VHF 9/6/68; GI3FNQ/P – EI2W 6/12/64; GI3HCG – PX1RI 2137 24/6/68; GI3RXV – ZB2VHF 1915 11/6/67; GM3EGW – ZB2VHF 1920 11/6/67 and GW4CG – ZB2VHF 1102 11/6/67.

For the benefit of younger readers, FA was the prefix for Algeria, now 7X, and PX was Andorra, now C3. GC was the prefix for all the Channel Islands which were then considered one country. I am unaware of any legal operation from Portugal. There was genuine activity from Belgium for a short period (during VHF NFD?) some years ago. Can we have any information on dates and claimed firsts for that, please? Next month a start will be made on the extensive 2m data.

PUBLICATIONS

ONE OF the amateur publications I most enjoy receiving is *DUBUS-Informationen* which is published quarterly in March, June, September and December in Germany. Now in its 22nd volume, this is a very professional-looking journal, packed with technical reports in English and German, which usually comprise 50-60% of each 104-page issue. The remainder is news of VHF/UHF/SHF activity split into modes, such as EME, tropo, Es and MS.

In his editorial in issue 3/1993, Rainer Bertelsmeier, DJ9BV, comments on the very worrying developments where: "Planned new regulations put a threat on DX-operation on VHF, UHF and SHF in Germany." These would require ludicrously high suppression of spurious emissions – 120dB down – mostly to protect BC and TV cable networks.

Many technical articles are concerned with the microwave bands, but DJ9BV has a long piece on open wire feed systems for 432MHz Yagi arrays, superbly illustrated with high quality drawings, tables and graphs. Karl Schötz, DL9EBL, describes his 1kW PA for 23cm which uses a YL1050 or YL1052 tetrode. The detailed mechanical drawings are nothing short of brilliant.

The UK representative used to be Ken Hatton, G4IZW, but Roger Blackwell, G4PMK, is now doing the honours. His QTH is 57 Station Road, Scholes, Leeds, LS15 4BY and the 1994 subscription is unchanged at £12.50. Cheques should be made out to 'Dubus UK'.

The October issue of Dave Hardy's, G8ROU, *The VHF-UHF DXer* contains 20 pages. The main features are a five-page report on the Five Bells Group's Iceland trip and a piece on the De Haan IARU Conference by Dave Butler, G4ASR. Sam Jewell, G4DDK, continues his 'DX-er 50' project, describing the transmit converter. Dave Ackrill, G0DJA, is taking over G4VXE's 50MHz report column while Andy Cook, G4PIQ, does the 144MHz one and Dave Dibley, G4RGK, the 432MHz and Above notes. Contact G8ROU at QTHR for subscription details.

The European Radiocommunications Office (ERO) in Copenhagen publishes *Newsletters* to keep us informed about regulatory matters in the European Community (EC). The October issue includes a personality profile of David Court, the head of the ERO, who lists his ". . . . other consuming passions in life, Indian cuisine and amateur radio." He is, of course, G3SDL/OZ3SDL and has operated from some rare places on 6m in recent years.

PROPAGATION

SPORADIC-E

The September *Report* by the Six and Ten Reporting Club, edited by Ray Cracknell, G2AHU (HWR), includes further notes on Es by Charlie Newton, G2FKZ, chairman of the RSGB Propagation Studies Committee. He comments: "Last June was one of the greatest Sporadic-E propagation any of us can remember. However, there was an anomaly in that the 23rd was the only day without Es and there was no disturbance that was sufficient to cause it."

This puzzle set Charlie off on an intriguing trail, trawling through years of data acquired from observatories world-wide. He continues: "My first thought was that there must have been a change in the H-field (horizontal field strength) as it is known that where the H-field is strong, there is more widespread Es. To my surprise, instead of the H-field going down, as I thought it would, it went up by a large amount. The range swing over the day was considerably larger.

"If we now take June 11 for comparison, this was an excellent day with transatlantic openings; then the swing was much smaller and the mean for the day much lower. You may well think that the general level of geomagnetic activity is changing, but that is not so. The vertical field mean strength for each June, going back to 1991, has hardly changed, whereas the H-field has increased each year.

"Also the declination change has been constant since 1990 and it has decreased from 6°.20' west to 5°.50' west. At the rate it is going it will be zero declination by June 2009. I know there is a magnetic hot-spot under mid-Europe that is moving our way. The effect may well be improved Es in future years. The intriguing question is what will happen after 2009?"

So it seems that Es propagation is more affected by the horizontal component of Earth's magnetic field, than by the K-index. Another case of the exception proving the rule? The subscription to these monthly reports is £6 and they are printed and circulated by Ian Brotherton, G2BDV. Cheques should be made out to I D Brotherton whose QTH is 6 Cranfield Avenue, Wimborne, Dorset BH21 1DE.

TROPO

For the last two weeks of October the UK weather was dominated by high pressure. This eventually produced a tropo lift as one anticyclone drifted off to the north-east over the last few days. John Nelson, GW4FRX (PWS), passed on some facts and figures from one of his local meteorological offices.

At 0700 on the 28th there was an inversion lying roughly between Long Kesh in Ulster and Schleswig-Holstein in Germany. Around 0930 the temperature at 4000ft was 0°, but at 4500ft it rose to +7°. The inversion layer was still present at 0900 on the 29th when the temperature at 3500ft was +1°, rising to +9° at 4000ft. At Schleswig-Holstein the 3000ft temperature was 0° and at 3500ft it was +11°.

John did some airborne trials between 1000 and 1100 on the 29th. By 1500ft in the Shrewsbury area the VOR beacons at Talla (IO85GM), Sumburgh (IO89IV) and Berry Head (IO80GJ) were all extremely strong and continued so till 2500ft, the cloud base being at 2000ft. At 3700ft, both Scottish VORs disappeared and Berry Head disappeared totally at 3800ft. Talla reappeared weakly at 5600ft, but that was probably a line-of-sight path.

SOLAR DATA

27 September to 10 October was the most prolific period for flares since last June. These produced many sudden ionospheric disturbances (SIDs). There was a solar wind shock wave on 27 September and auroral activity on the night of 9/10 October. Solar flux, sunspot counts and the X-Ray flux rose considerably in this period, averaging 115, 99 and B3.3 respectively.

Thereafter things quietened down as the active region of the Sun rotated away. The corresponding values for the period 18-24 October were 91, 60 and A9.2. These data are broadcast on Sundays by *GB2RS*. For explanations of the various terms please refer to the *RSGB Call Book and Information Directory*, the 1994 edition of which is now available [See RSGB Book Case p94 – *Ed*].

METEOR SCATTER

THE VISUAL peak of the reliable Geminids shower should be around 2200 on 13 December, according to the IMO's *1993 Meteor Shower Calendar*, the radio maximum could occur some hours earlier. The radiant is above a mid-UK horizon from 1630, through midnight, to 1230. Best times are: NE/SW 2100-0200 and 0500-0930; E/W 0030-0400; NW/SE 1900-2300 and 0230-0730; N/S 1900-0100 and 0330-0900. Given a clear sky, this should be an excellent year to observe this shower as New Moon is on the 13th.

The Ursids shower should peak on 22 December and the radiant never sets in our latitudes. Reflection efficiencies exceed 50% as follows: NE/SW 0900-2400; E/W never less than 75%; NW/SE 1700-0830 but N/S is only 40% at best.

LOCATOR SQUARES TABLE
STARTING DATE: 1–1–1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
G3IMV	434	15	501	125	52	1127
G4SWX	–	–	404	–	–	404
G0CUZ	125	–	388	80	–	593
G4RGK	167	–	319	182	58	726
G4RRA	–	–	299	80	–	379
G4SSO	191	–	279	100	–	570
G4YTL	–	38	279	37	–	354
GW8JLY	–	–	277	36	–	313
GW4VEQ	–	–	267	–	–	267
GJ4ICD	611	1	264	121	68	1065
GW4LXO	440	23	261	108	48	880
G4DEZ	201	–	255	71	62	589
G4IGO	565	–	250	–	–	815
G6HCV	468	–	250	–	–	718
G0EVT	230	12	249	65	1	557
G3FPK	–	–	246	–	–	246
G6HKM	456	–	241	118	58	873
GW4FRX	–	–	236	–	–	236
G4DOL	–	–	226	–	–	226
G3XDY	–	–	224	153	100	477
G0MGA	249	–	216	–	–	465
G0GMB	66	–	216	108	–	390
G4TIF	310	28	207	112	–	657
G8LHT	196	20	202	93	17	528
G0FIG	200	–	192	46	–	438
G0EHV	–	35	191	82	–	308
G1SWH	245	33	179	63	9	529
G1GEY	–	–	179	125	35	339
G4MUT	186	25	158	97	34	500
GW0PZT	–	–	160	–	–	160
G7LIJ	–	–	153	–	–	153
GW6VZW	377	–	143	6	–	526
G8XTJ	176	–	126	–	–	302
G1UGH	234	–	122	–	–	356
GM0GDL	–	–	122	–	–	122
G6MXL	110	23	115	64	28	340
GU7DHI	363	–	111	5	–	479
G0NFH	133	26	101	51	18	329
G4OUT	–	21	100	–	–	121
GU4HUY	–	–	84	–	–	84
G3FIJ	32	24	82	27	3	168
G7EWL	54	2	79	6	–	141
G0HVQ	310	–	71	–	–	381
GM0NXP	–	–	69	–	–	69
G0HDZ	11	–	67	–	–	78
G0ISW	147	–	64	20	–	231
GI1CET	95	–	60	3	–	158
G7CLY	70	–	60	2	–	132
G6ODT	–	3	57	62	–	122
G7JAF	–	–	53	3	–	56
G0JHC	512	–	48	–	–	560
G4OBK	21	1	45	–	–	67
G3UOL	–	–	43	–	–	43
G1JDU	93	–	39	–	–	132
GM1XOG	181	–	–	–	–	181

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 30 December. Band of the month 144MHz.

MOONBOUNCE

THE FIRST leg of the ARRL EME Contest on 9/10 October created lots of activity in spite of adverse ionospheric conditions on the Saturday – K-index up to 6. On 2m John Regnault, G4SWX (JO02), completed 41 QSOs with 28 multipliers. His three new initials were VE3ONT, SM5BSZ and W7VXW. KL7X caused a big pile-up but wasn't working too many stations. Sunday was a better day with the sky temperature down to 230° K and a 0.5dB excess path loss.

On 2m Edward Allely, GW0PZT (IO72), heard HB9CRQ, N0XX, W4ZD and K5GW on the 9th. Moonrise on the 10th he found quite poor with only SM5MIX and SM5FRH heard. At moonset he heard WA6PEV, W5UN peaking RST539 and VE3ONT with a weaker than expected signal. Bill Hodgson, G3BW (IO84), after decades of MS work, completed with W5UN for his first EME QSO. He was called by K5GW but failed to complete.

In his November *432 and Above EME News* Al Katz, K2UYH, reports: ". . . . spectacular activity and generally favourable conditions" on 432MHz and up. The VE3ONT tests on 70cm and 2m were a great success and the team made over 300 QSOs

overall. On 70cm their score was 166 with 37 multipliers. Other high scorers on the band were SM4IVE, OH2PO, DL9KR, K1FO, F1FEN and OE5JFL.

Stuart Jones, GW3XYW (IO71), operated on 70cm on the 9th until his polarization rotator failed. He completed with 14 stations, OH2PO being a new initial. He changed to 23cm for the 10th and completed with 17 stations. New initials were EA6/DF5JJ and LA8LF. On 23cm, K2UYH reports that OE9XXI, OE9ERC and AA6WI all did well.

50MHZ

RICHARD CHATWIN, 2W1CCK (GWT), is "totally hooked on 6m" and up to mid-October had worked 16 stations including EH6/7, IT9, OH, OK, SM, SP and 9A. Welcome to Philip Lancaster, G0ISW (CBA), who enters the squares table; he did not give any station details. On 10 October Terry Chaplin, G1UGH (SFK), heard OH3MF on CW off the back of his beam and 20min later contacted ES1CW (KO29). On the 14th he worked CQ7CBI (IM59) and EH6FB (JM08/Ibiza), and next day EH7AJ (IM87), EH7AH (IM67), 9H3SH (JM76/Gozo) and EH1DVY/P (IN82). His last Es was on the 17th with YU7FU, YU1QC and YU1AD (KN04) and 9A2OB (JN95).

Mike Wills, G3OIL (WLT), re-erected his antennas on 13 October in time to work IT9DEC (JM77) and IK0WAC (JN61) at 1800 next day, followed by Es/TEP QSOs with 7Q7RM and A22BW. ZS6WB and Z23JO were heard in ". . . . the best TEP for months." Mike runs 6W to a 9-ele Yagi. Ken Osborne, G4IGO (SOM), doesn't think many operators will be interested in 6m tropo tests as the mode gives better results on 2m.

By contrast, Ted Collins, G4UPS (DVN), rarely fails to complete his daily skeds with G3CCH over a 350km path at 0800. More surprisingly the continuing skeds with SM7AED at 1200km remain remarkably successful. G2AHU agrees that other regular, long distance skeds need to be arranged to explore this mode, whatever it is, so that the results can be published.

G4UPS heard new beacon YU1SIX (KN03KN) on 50.0873MHz on 9 October; he says it runs continuously with 15W of F1A to a dipole. He worked IK0OKY at 1156. There was Es propagation to YU1 and 9A next day from 1011, later swinging round to CT. 7Q7RM was S3 at 1720 on the 12th. There was extensive Es on the 14th with southern Africans heard from 1825. Ted made more Es QSOs on the 15th and 17th with Balkan and Iberian stations, and worked IC8CQF (JN70) at 1716 on the 22nd.

GJ4ICD has delivered the 9M6SMC beacon to Richard Diamond, G4CVI, for despatch to Malaysia; it is crystalled up for 50.014MHz. He reports new station 5T5/F5JKK (IL30AM) QRV from Mauritania, another new country on the band. Eric's (ex-F1JJK) first G QSOs were with G4IGO, G3ZZY, G3WOS, G4CCZ, GJ4ICD and GJ8ORH from 1710 on 10 October; his QSL route is via F6FNU.

144MHZ

G3BW IS STILL keen on MS mode, even though activity has markedly declined. The Five Bells Group's operation from Iceland in August gave him another new square. He keeps his Saturday morning SSB sked with Tom Douglas, G3BA, which started pre-WW2 on 40m, so can anyone beat that? Bill Meinerts-Hahn, G3UOL (WMD), still perseveres with QRP to good effect. He uses a photocopy of the county map in the *AA Road Atlas* to colour in the counties as he works them.

Writing on 24 October, GW0PZT found October tropo conditions very poor. New French beacon FX2VHF (JO10EQ) on 144.858MHz was at good strength on the morning and early evening of the 19th, but no stations were heard, even though it peaked to S9. That night, GW3ZTH/P was working Scandinavians, but Edward couldn't detect them.

Joe Ludlow, GW3ZTH (GNM), takes off for the hills at the slightest whiff of an opening. On 3 October, GW3ZTH/P (IO81FP) only worked GD4XTT and GI4EIZ in average conditions. With pressure building on 16/17 he thought the 18th might bring good tropo, but it didn't. Next day the pressure began to fall as the anticyclone moved away so, with eight lead-acid accumulators fully charged, off he went again.

He started at 1627, his first CQ call being answered by PE1LAG (JO22). Next QSO was with OZ6OL (JO65), last worked in 1973, followed by a steady stream of contacts till 2121. The evening's tally was 77 QSOs in 22 squares, best DX being SM7RYQ (JO76DB). None of the other well-sited GWs got in on the act, so Joe concluded he was getting into an elevated duct.

In the 28 October lift GW4FRX's best DX was DG0CD (JO60), other DX being SM6MPA (JO67), DL7AKA (JO62) and OZ4VV (JO46). John reckons this was a ". . . . typical 'near-Europe' leaky duct-type opening with a few stations in JO31 producing pretty much free space path loss (FSPL) signals, but the majority of the rest being rather weak and watery."

At 2300 on the 30th he found some very loud Fs in JN37 and an hour later there were some HB9s together with LX1EC (JN29) who was 65dB over noise. His best DX was I2FHW (JN44) which was a new square. By 0100 on the 31st it had all vanished but stations further south were still working HB9s. DL0PR was S7 at 0105 but a CQ call in that direction didn't produce anything.

430MHZ UP

THE MOST important news is of a claimed first tropo QSO between England and the Ukraine. On 29 October, G6RAF (IO92QP), operated by Reg Woolley, GW8VHI, worked RB5PA (KO21FC) on 432.190MHz SSB. No OK beacons were audible at the time. Reports were RS57 out and RS55 in. The distance is 1727km. Congratulations to both operators.

GW3ZTH's main reason for portable operation on 3 October was to participate in the IARU Region UHF/SHF Contest. Conditions on 70cm were average and activity good but Joe blew up his GaAsFET preamp, without which his TS-780 is rather deaf. No, GaAsFETs don't like ten watts "up 'em!" Before the disaster he worked PA3BPC/P (JO21), G4JAR (JO01) and GD4XTT (IO74).

On the 13th he operated from home for the 70cm cumulatives in poor conditions, finding it difficult to hear, let alone work anyone. He completed just five QSOs, best DX being G3CKR/P (IO93AD). In the lift on the 19th he worked PA0RDY (JO22), G1SWH (IO83), G1SDO (JO01), OZ1CFT (JO75), OZ7IS and SM7DEZ (both JO65). He reckons he could have worked more Scandinavians on 70cm had it not been their SHF contest night.

GJ4ICD operated on 23cm in the Region 1 Contest but confirms the poor conditions. Geoff worked G6PHJ/P (IO93), F6APE (IN97), F1ANH, F6KEJ (IN97) and a couple of PAs.

A group of Novices operated G7NXQ/P, the VHF NFD station of Christchurch and Purley ARC. Pictured is Richard George, 2E1BXA. Turn to page 81 for VHF NFD results.

SOFTWARE

FOR THOSE with Amstrad PCW8000 series computers, I still have my library of amateur radio programs which I will copy to your ready formatted 3" disks. These programs, such as WA1JXN's *Moon Tracker*, are in Mallard Basic and run under CP/M. I have ported most of the library to my PC which uses MS-DOS 5.0 and QuickBasic. I can copy these to your 3.5" and 5.25" disks up to 1.44 and 1.2Mb format respectively. Send me an SASE for the latest list for CP/M or MS-DOS.

COPY DATES

THE DEADLINE for the **February** issue is **30 December** and for the **March** edition, which will carry the final placings in the Annual Table, it is **January 27**. The BT Gold mailbox is 76:MSX021, the fax machine is on 081 763 9457 and my CompuServe ID is 70630,603. If you can access Internet, the route is 70630.603@compuserve.com. A very Happy Christmas to all readers and contributors.

HF F-LAYER PROPAGATION PREDICTIONS FOR DECEMBER 1993

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

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	....2663....	....4886....	....79982...	....99995...	...288889l..	4416766 44	98664334 6888	++53....3+++
MALTA	....2543....	....4 662....	....79885...	....99998l..	.1.2877895l.	5637655689985	99864224 6899	+++4....4+++
GIBRALTAR	....1332....	....1554....	....28875...	....59888l..	....888896l.	3421866679 74	89876333 5899	++++3....25++
ICELAND	.....122....	.....1551...	.....4884...	.....7997...	....288993..	12..777788 3.	77616545 7887	++++32.245++
** ASIA								
OSAKA	..........1.	....1.....	....4.....	....72.....	....851.....	1..2643343 23	1..1311247 74	.........24+.
HONGKONG	....43.....	....652....	....8841...	...18861....	...266651...	2...3435553 1	1...1112578 5	.........24 3
BANGKOK	....6851....	....7973....	...179861...	...268883...	...136677l..	3...1335764 5	2....1125787	.........24+5
SINGAPORE	....6874....	....7986....	...179981...	...268884...	...136678l..	2....334764 5	1....1125786	.........24+3
NEW DELHI	....664.....	....8861....	...27884....	...36886....	...335673...	521..2346445	73....125788	5.........24++
TEHERAN	....7874....	....1886....	...38882....	...577884...	1..6446782.1	7533113 47766	8731..124788	+5........24++
COLOMBO	....7874....	....17887...	...26883....	...346885...	1..1136782.1	52...134 7766	51....124788	2.........24++
BAHRAIN	....7653....	....18775...	...37781....	...556884...	2..5235774 11	8532..347877	873....24788	+5........45+
CYPRUS	....7876l...	....9988 3...	...29996....	...588898 2..	3317666896 32	8866434 67988	9973113 5898	++4....25++
ADEN	....7765....	....18777 2...	...36678 5...	...544687 2..	4..4113786 42	8531..147888	872....14788	+4........455
** OCEANIA								
SUVA/S	.....1.....	.....31....	....264....	.....577 2...	....16676...	....544573..	....311242..	.........2...
SUVA/L	....21.....	....432..11.	....764 21421	11..876536 42	1112865677 31	..1453336 41.	...231.132..	....
WELLINGTON/S	....12.....	....351....	....1674....	....38871...	....67674...	....643572..	....311251..	.........2...
WELLINGTON/L	....	....	....21...111	11..431..332	111.754345 32	..1263236 31.	...131.131..	....
SYDNEY/S	....4442....	....7665....	....8887....	...188882...	...276677...	...1433574 1.	....1112551.	.........22..
SYDNEY/L	....	....1.....	....131...1.	....3631.231	..1.665436 52	....433456 3.	....21.1341.	....
PERTH	....6653....	....7875....	...278883...	...368885...	...136678 2..	1....334775 3	.....112476 2	.........243.
HONOLULU	....	....	....	.....1..	.....1.24..	.22.313264 1.	.1424111242..	...4......
** AFRICA								
SEYCHELLES	....2365....	...145772...	...256885...	...334788 2..	41.211478 643	851...147888	84.....14788	+.........45+
MAURITIUS	....4665l...	...157772...	...256786...	...344688 31.	42.111378 754	851...147899	72.....14788	4.........4++
NAIROBI	....6555l...	....7777 3...	...266687l..	1..444588 421	64.411268 875	9831...36899	872.....4788	+4........4+5
HARARE	....2345 3...	....4567 5...	...155688 31.	21.244478 642	75.311147 987	9831...15899	862.....2788	+4........4++
CAPETOWN	....1366 4...	....3577 61..	...555784 21	31.144458 753	761321126 898	9842....3699	873.....478	+4........4+
LAGOS	....6776 5...	....7877 72..	1...876785 31	32..754587 64	772352126 898	99752...3799	7883....1588	5+5.....2++
ASCENSION Is	....2654 61..	....4766 72..	....676675 31	22..754467 64	774162113 688	9995 3....489	8885l....168	+++2.....3+
DAKAR	....1776 61..	....3887 72..	....686686 21	121.874477 53	665.741147 98	99955l...1589	87872....268	55+4.....4+
LAS PALMAS	....1776 5...	....3888 72..	....699895 1.	....888887 31	444.876678 85	9995743 35799	9898421 12589	+++52....2++
** S. AMERICA								
Sth SHETLAND	....1123 31..	....2345 52..	....6666 6521	111.776655 42	554.764323 45	4663431...13	23331.....	....
FALKLAND Is	....2256 1..	....1446 72..	....3666 642.	111.675544 42	555.763212 45	688453....14	46653.....1	.342......
R DE JANEIRO	....3212 1..	....5334 2..	....2754 552.	111.474445 42	555.752112 66	999462....37	88873.....15	+++4.....2
BUENOS AIRES	....1113 1..	....3335 2..	....3654 541.	..1.575444 32	445.763111 45	799463....14	688731.....2	3++4......
LIMA	.....7761..	.....8873..	.....8764 1.	.....8544 2.	113.136211 23	6782433....3	5887311....1	25+4......
BOGOTA	.....7761..	.....8873..	.....8765 1.	.....1854 42.	112.146211 33	6682443....14	7887311....2	4554......
** N. AMERICA								
BARBADOS	.....7761..	....28873..	....586651.	....775453.	213.165212 54	7682442....37	887731....15	+544.....2
JAMAICA	.....3761..	.....5873..	.....8865 1.	.....8654 2.	1.2.136422 42	6572543 1..15	7886311....2	4554......
BERMUDA	.....4761..	.....6883..	....188761.	....387663.	1.1.166434 52	6571443 1.147	8886411....15	+555.....2
NEW YORK	.....1761..	.....3882..	.....6885..	.....7877 2.	..1..366555 1	5461443322 46	8786411 1..15	+555.....2
MEXICO	.....561..	.....772..	.....874..	.....1864 1.	..1.113632 21	4461533 4...2	4785411 1....	.5+4......
MONTREAL	.....1661..	.....3872..	.....6985..	.....7887 1.	....366665 1	5461343 43356	8786411 1.125	+555.....2
DENVER	.........3..	.........61..	.........283..	.........585 1.	.........665 3.	355.411 43222	4785411 21..1	25+4......
LOS ANGELES	.........1..	.........31..	.........63..	.........75..	.........364 2.	245.43.4 4211	2684411 21...	.4+4......
VANCOUVER	.....1.....	.....1.....	.....11....	.....33....	.....1762.	354.321 36432	3683411 23111	.3+4......
FAIRBANKS	.....1.....	.....1.....	.....1.....	.....1.....	....211 33..	353.333 46632	3562311 24432	.234.....2..

The provisional mean sunspot number for October 1993 issued by the Sunspot Data Centre, Brussels was 55.4. The maximum daily sunspot number was 100 on 4 October and the minimum was 21 on 29 October. The predicted smoothed sunspot numbers for December, January and February, are respectively: (classical method) 47, 45, 43 (±11); (SIDC adjusted values) 28, 25, 23 (±6).

SWL NEWS

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

WELL, THE December issue of the magazine seems to have come around extremely quickly. It seems like only a few months ago that we were celebrating Christmas 1992. The usual seasonal greetings for Christmas and the New Year are extended to you all.

LIGHTHOUSE WEEKEND UPDATE

MIKE, GM4SUC, gave me the wonderful news that 62 SWLs had applied for the Lighthouse Award following the special activity at the end of August. A breakdown saw 54 applications from Great Britain (including two from Novices and 4 from Gs), 4 from DL, 1 from GD, 1 from EI, 1 from PA0 and 1 from ON. It is good to report such exceptional SWL support for the venture. The Ayr Radio Club received 244 applications in all. Listeners will be pleased to learn that because of the fantastic response, there is likely to be another, different, activity next year.

Back to the Lighthouse Weekend, only 10 of the 11 stations were active. GB2LB had access problems. GB2LK was only operational on the Saturday, while the operators at GB2LL found that their site was the breeding ground for a colony of rats! They beat a hasty retreat and operated /MM from the safety of the adjacent waters. As a result, their signal was not so strong. All of the stations made a fistful of contacts: GB2LA made 416, GB2LD – 479, GB2LG – 1,000, GB2LH – 500, GB2LK – 300, GB2LM – 814, GB2LO – 500, GB2LT – 925 and GT3 Flashing Light House – over 1,000. The Award is shown on this page.

ANTENNA REPAIRS

MICK TOMS, BRS31976, took his 144 and 50MHz antennas down from the chimney stack with the help of G8PUY. Beforehand, they checked the SWR of the 144MHz beam and found it to be over 10:1! When they got the antennas down, they saw why. All the mountings for the eight element beam were corroded so that it could not be dismantled. The waterproof connector box had split, so the coax terminals were corroded, and the polythene mounting for the driven element had three cracks – one on the mounting to the boom, and one on each side where each half of the element was anchored. Apart from those, the bracket to the mast had worked loose so it was pointing upwards at about 20°. Mick was quite philosophical as the 144MHz antenna had been in place for eight years and had survived the storms of October 1987 and January 1990.

The new arrangement is now a 19 element Tonna for 432MHz at 35ft, a 12-element ZL-special for 144MHz, and a 3-element for 50MHz at 30ft. The new configuration seems to work. Mick heard the EI beacon on 144MHz for the first time in years, and GB3ANG, both on an apparently dead band. On 50MHz, the GB3HQ beacon was definitely stronger. With all this in mind, it might be prudent to check my array as that has been up in the air for eight years, too!

7MHZ CHALLENGE

LIKING MY idea of a set listening period, the ISWL ran a 7MHz Challenge during August. David Whitaker, BRS25429, sent in a report. I do not think that too many listeners would class 40 metres as a DX band in August, but the results were quite startling. Over 160 countries were heard during the month. It appears that conditions around 2100 were generally good to Africa as 30 countries were heard from that continent. The 'best' DX was probably ZS8MI on Marion Island, who was audible for over two hours. (Needless to say, I found out far too late and ZS8 is still 'a wanted country' on 7MHz!) From 2000 to 2300 also favoured Asia, 25 countries were heard from there. 9V1ZE was the 'best' DX from those parts. Again that would have been a new country for me!


NORTHERN LIGHTHOUSE ACTIVITY WEEKEND

THIS CERTIFICATE IS AWARDED TO

For Successfully Contacting or Hearing the Requisite Special Event Stations on 28/29 August 1993

GM4SUC Awards Manager

The Following Clubs Took Part in the Activity Weekend :

62 SWLs qualified for the Northern Lighthouse Activity Weekend Award.

Later in the evening, as is usual on most evenings, the band was good to Central and South America. 'Best' DX from that direction was possibly CE0ZAH from Juan Fernandez Is. Perhaps surprisingly, it took some very late and early morning listening to log stations in North America. However, for the deserving, 23 countries were logged, including HK0, KG4, HR, HP, FJ and YN. Oceania is always a bit 'hit and miss', but there were several odd openings to YB and DU. Stations in VK, however, can always be heard around their sunrise and sunset times. Indeed, on 22 September when VK9MM (Mellish Reef) was on the band, VK7AZ was 5x9 on the 'S' meter of my Kenwood R-5000!

I do not apologise for relaying so much of David's report. 7MHz is full of DX potential, and as we head into the Winter DX season, and with HF conditions not as good as they were, 7MHz will be well worth monitoring for the next couple of months.

The only difference between the times given here and what can be experienced in December or January is that the band will be good for DX very early in the afternoons, while signals from the West could well be audible until 1000 or later. If anyone wants to take the band seriously this winter, all the household chores will have to be done between 1030 and 1400z! One personal plea: Can we please have some British SSB activity at the 'grey-line' (around 1400z) to W6/7. There is a path. I accept that the BC QRM is a problem, but there are several slots (above 7.150kHz) where the DX can make themselves heard.

EUROPEAN QRP WEEKEND

BILL MCCONACHIE, BRS88921, provided details of a different SWL occupation – listening to stations running low power. Bill sent in details of the European QRP Weekend on 2/3 October. From the copy of the log he sent, conditions seemed to be quite good with stations from all over Europe logged at good strength on all bands from 21 through to 3.5MHz. Bill considers this type of CW weekend to be far more enjoyable than a full-blown CW contest. Indeed, SWL contest activity on CW has been extremely poor in recent years. Perhaps the Society should consider an event similar to this to flush the CW listeners out of the woodwork.

SWL CONTESTS

THE WHITE ROSE Society has sent details of its annual SWL event. Next year, it will be from 1200 on 15 January to 1200 on 16 January using 1.8 – 7MHz. Further details next month

Jan, ON6JG, provided the results of this year's UBA contest. There were 31 SWL logs, but only one from the British Isles. The top 6 entries all came from our friends in the CIS or the Russian Republics. This year's event falls on 29/30 January. Again, more details next time.

DX NEWS

CONTRIBUTORS THIS month could not decide whether conditions were falling away or picking up. At the beginning of the period in question, I would have sided with those that thought conditions were poor, but moving into October, the bands seemed to take a definite upward trend. There were even some openings on 28MHz and the best DX reported was VP8CKB on South Georgia. 24MHz also provided openings to mirror those on 28MHz. Several South Americans were mentioned, but the best DX was ZD9SXW on Tristan da Cuhna. Even good old faithful 14MHz stayed open longer into the evening. The LF bands showed signs of improving. Robert Small, BRS8841 mentioned 9G1XA on 1.8MHz. The best on offer were: 3.5MHz – A92BE, C91AI, FR5DX, ZD9SXW, 8Q7QC, 9K2MU and 9V1XQ. 7MHz – C53HG, C6A/N3NCW, ET3BH, TU5DX, VK9MM and ZD9SXW. Indeed, ZD9SXW featured in all the CW logs received this time, being heard on eight of the nine bands!

NEW RADIO BOOKS

INTERPRODUCTS has sent details of new books, including the *UK Scanning Directory*, *International Callsign Handbook*, *Computerised Radio Monitoring* and *Maritime Radio Handbook*. Details from Interproducts, 8 Abbot Street, Perth, Scotland PH2 0EB.

FINALE

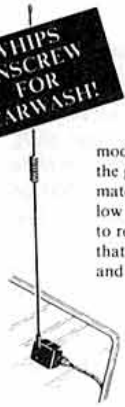
NEWS, FEATURES and DX loggings must be with me for the **February** issue no later than **15 December**.

WATERS & STANTON

UK's LARGEST SELECTION

On-Glass Antennas

WHIPS UNSCREW FOR CARWASH!



Models for:

2 metres
Dual Band
Scanners 30-1300MHz

Here's just what you want for the modern car. These antennas mount firmly on the glass surface and come with internal matching box and 17ft of coax cable. You get low VSWR and no scratches on the car. Want to remove it? Just purchase the optional kit that enables the aerial to be safely removed and re-mounted with new disposable parts.

GM-144 2m	£29.95
PAQ144-440 2m/70cm	£39.95
TGSP Scanner	£32.95

Order before 31st December and we'll send post free. Quote RSGB Advert.

Ham Radio Catalogue

From the Super Store with all the stock, good prices and friendly staff.

Mail Order Code

Immediate despatch
24 Hour delivery on request
Full Value carriage insurance
10 days option to return if not satisfied
12 months parts and labour warranty
No grey imports - just honest prices
Free after sales help
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Nobody beats our Service!

Get your FREE copy today. It's packed with information and details of our products. Simply scan through the pages to find what you want, lift up the telephone and quote your credit card number. We'll tell you on the rare occasion if it's not in stock and ask you if you want us to hold the order. Look at our Mail Order Code. Can you risk dealing with anybody else?

Mark's Message.

By the time you read this Leicester will be over but I will still be here waiting for your calls for even more orders. You know how I like to sell so give me a call and let me do you a deal on any make of equipment you see advertised in this magazine. Latest news is our gift tokens. Ideal for presents etc. We can supply them for virtually any amounts and they can be exchanged by post, in our shops or at rallies. We have some particularly nice deals going on hf gear so let me know your needs and of course we are happy to offer part exchange. Take a look at the new TenTec Scout, it really is great value. The MFJ loop looks equally exciting. A complete hf antenna system in a loft which really works. We hope to have the new ALINCO DJ-G! Boy what a performer! Come and see it working. In fact why not come and pay us a visit. Free coffee and a decent aerial system to try your rigs out on. You'll be made very welcome.

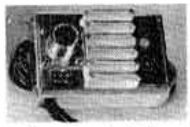
G0GBY

2m 30W Mobile for £59!

P335

This amplifier converts your 2m FM handheld into a 30W output mobile or base system.

- ★ RF sensing
- ★ 1.6W Input
- ★ Ideal for FM
- ★ 12dB power gain
- ★ SO-239/BNC plug
- ★ 12-14V DC
- ★ 74 x 50 x 24mm



This is a well made unit which we have purchased at a silly price. We have limited stocks at this price and you have a full 12 months UK warranty. Ask us nicely and we'll send it post free!

MFJ-1786 Hi-Q Loop

** 6 Bands 10MHz-30MHz* ** 36" Diameter*
** Remove control* ** 150 Watts*
** Fits in loft easily* **£299.95**

It works because we've been testing it ourselves! It fits easily through the average loft trap door. It's also weatherproof for outside and comes with mounting hardware for mast plus control box and AC adaptor. Simply plug adaptor into 240V socket, connect it to control box and run a xoax cable between control box and loop. No other coonnection is necessary. The control box gives you slow and fast tuning plus built in VSWR and Power meter. A complete aerial system in one package.

Gives good low angle radiation for DX and some high angle for local work. Mount it vertically for DX and horizontal for local work. Performance is very similar to a dipole erected at a similar height. However, unlike a dipole, it still works well at low heights of only a few feet. Ideal for portable work. For the full information send today for the specification sheet.

ALINCO - - - factory fresh from the importers!

NEW!

DJ-G1E

£349

2m Tx Dual-Band Rx
With Spectrum Display

80 memories, 2 Watts on ni-cads, 5 Watts on 12V. But the unique feature is the Spectrum Display. The bargraph shows the strength of the signal you are receiving plus the strength of signals on the 3 channels either side. Watch a spectrum display of the activity as you tune the band. It's the most amazing handheld we have seen!

DJ-180EB

£229

2m Budget Class Rig
10 memories (Expandable)
Auto Power Off
Scanning & wide-band Rx
Rotary Control
Ni-cads & Charger

You won't purchase a better quality rig at this price. Derived from their commercial design, this rig is tough and reliable. Ideal as a second rig or/and appealing to those who don't want all the frills (and the expense). Get the adaptor and you can make it into a 5 Watt mobile! And if 2 metres gets boring or goes quiet, you can always listen between 130MHz and 174MHz to pass the time. Get the full details now.

DJ-580E

£479

2M/70cms

Full CTCSS
Wide-Band Rx
42 Memories
Full Duplex

The DJ-580SP is the latest feature-packed handheld from ALINCO. You get ALINCO tough engineering and excellent reliability. You even get AM airband receive. No corners have been cut with the DJ-580SP and to add to its pedigree, it has been selected by many groups for RAYNET operation. No doubt because of its auto repeater mode. Get the facts today and find out more about this lovely rig.

DR-130E 2m Mobile

50 Watts Output **Time Out Feature**
20 Memories **Channel or Freq. Display** **£359**
CTCSS Encoder **Compact size**

This is the newest mobile rig to come from ALINCO and with 50 Watts output it really does pack a punch. Its simple front panel belies its many features yet making operation safer. You can switch between frequency display or channel numbers; nice for "on the move" operation. Frequency control is by rotary control or up/down buttons on the mic. Repeater access is taken care of by the 1750Hz tone with reverse repeater in an instant. And if you get tired of 2 metres you can always listen to the segment 130MHz - 17MHz. Everything you need to mount and operate the rig is supplied. Just connect 13.8V.

ELECTRONICS
OF HAM RADIO PRODUCTS

0702 206835 or 204965

Ten-Tec Scout £589

SSB/CW 1.8MHz - 30MHz Capability!

* 5 - 50Watts Output SSB/CW
* Plug-in Band Modules (40m included)
* Variable Xtal Filter 500Hz - 2.4kHz
* VSWR, Power & S-meter
* Full Break-in * Built-in Speaker
* 100Hz resolution 12 Volt operation

Just arrived from USA. It's the cheapest HF rig with the famous Ten-Tec Pedigree. Just pay for the bands you want. Extra band modules £39.95. Measuring 2.5" x 7.25" x 9.75" it is ideal for mobile, base or portable. Only available direct from us. Plus a full 12 month UK backed warranty.

HF Rig Discounts!

- - - - - - - on most models.

Kenwood Icom Yaesu

We can give you a good deal. One that is fair to you, competitive, yet allows us to give you an honest warranty backed up by our own service department. We could shave another 5% off the price, send your rig back to the suppliers when it goes wrong and make all kinds of excuses why it is taking so long. That's not our way. We are here to serve you before, during and after your purchase. Call us old fashioned if you like. Better still call us on 0702 206835!

Price Crusher!

* 20 Memories
* 2 Watts Output
* Wide-band Rx
* Key-pad entry
* Full scanning

ADI - 2m & 70cms Hand-helds

£199 (2m Version)

We've cut the price to the bone on these rigs. You get great value, guaranteed reliability and superb performance. Fully featured, these rigs are well recommended for the beginner or experienced user. You get two dry packs, one taking 4 AA cells, the other 6 x AA cells. The 70cms model is ideal for the NOVICE operator. By direct selling these we have been able to offer you the very best value. Includes aerial and belt clip. Ni-cads and chargers extra.

AD-145
2m model £199

AD-450
70cms model £219

EAR TALKER £29.95

Factory Direct Price

Combined ear-piece and microphone

Comes with PTT control box and clip. Models for most modern hand-helds. Quote model when ordering.

Mobile?

We used one with a handheld and the quality was superb with low car noise. The performance will amaze you.

WANTED

We want good clean modern used equipment and will pay cash or offer a part-exchange deal. Just telephone us for a quote.

DIAMOND VSWR Meters

The Best!

from

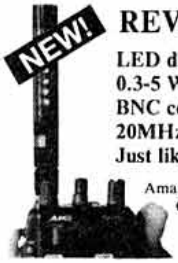
£89.95

SX-100 1.6 - 60MHz 3kW **£124.95**
SX-200 1.8 - 200MHz 200W **£89.95**
SX-400 140 - 525MHz 200W **£104.95**
SX-600 1.8 - 525MHz 200W **£154.95**

For details of the full range including the automatic models, send for our catalogue.

REVEX Power Checker

NEW!



LED display Power
0.3-5 Watts
BNC connector
20MHz - 1300MHz
Just like Rubber Duck

£34.95
PC-705

Amazing device. Just plug into any handheld, CB or cellular phone to read the power. Levels are 0.3/0.5/1/2/3/5W.

MASPRO

The only ones you can mount vertically without loss!

for FM Beams

144-WH5, 5 el, 2m **£29.95**
144-WH8, 8 el, 2m **£39.95**
435-WH8, 8 el, 70cms **£29.95**
435-WM15, 15 el, 70cms **£44.95**
KSB-80, Vertical mounting kit **£7.95**

W9GR DSP Audio Filter £299

Cuts out almost all noise including power lines, static, ignition, hetrodynes etc. Pass bands down to 30Hz and bands to suit Packet, RTTY and Amtor etc. Brings the wanted audio up and reduces the noise by several S-points! It can make an SSB signal with band noise sound just like a local FM signal! Amazing device that has rocked the USA. It's not cheap at £299 but when you hear it you'll realise how much it can cut down listening fatigue.

LED's are OUT!

OptoElectronics M1
10Hz - 2.4GHz

£259.95

LED's are heavy on battery current and poor in daylight

The latest counter from OptoElectronics gives you a low current LCD display. This means low battery consumption, longer life between charges and 100% visibility even in bright sunlight. This latest counter from the leaders in the USA, is bristling with features. You get 3 memories and a built-in microprocessor to filter out random noise and unstable signals. Only genuine signals are displayed. You get a bargraph signal strength meter and a choice of 6 gate times. Sensitivity peaks at 300uV so you can read rf frequencies at distance no other counter can match! You also get free AC charger and telescopic antenna. Available now.

MFJ-1278 Data Controller

10 Modes World Leader **£339**

The most advanced and best value product of its kind on the market. Ideal for TX or just receive, you will be enthralled for days with the capabilities of this item. All you need to add is an IBM PC, receiver or transceiver, and software. Most modes can be operated using shareware or **MFJ-1284** pack at £29.95. For Fax & SSTV you need the 1289 software pack for **£69.95**. Come and see our demo unit in action. There's lots of activity (14.065-14.080) and data comes through at speeds faster than you can type! Even when signals are weak. All in a narrow bandwidth that even 250Hz filters can pass!

1kW 50 Ohm Load

£39.95!

MFJ-250X

Just fill with transformer or vegetable oil, and you have a really robust load. 1MHz - 400MHz with SO-239. Will withstand 1kW for ten minutes!

Special Yupiteru Purchase

MVT-5000 Scanner

£229.95

25MHz - 550MHz
800MHz - 1300MHz
AM - FM

We've managed to purchase the last production run of this receiver at a special price. Full coverage of all the popular channels including the full aircraft marine and ham bands etc. Compare the cost of its competitors! This is a fully specified scanner that comes from the most respected name, Yupiteru. 100 memories and a highly sensitive receiver.

Includes ni-cads
AC charger
12v Cigar lead

Head office: Retail and Mail Order: 22 Main Road, Hockley, Essex SS5 4QS.
Tel: (0702) 206835/204965. Fax: 205843
Retail only: 12 North Street, Hornchurch, Essex. Tel: (0708) 444765

VISA Access

Contest Exchange

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

WRITING THIS as I do, just a few days before the SSB leg of CQWW kicks off, I'm once again discovering one of the most serious impediments to serious contest - the fact that there are only 24 hours in a day to work, write magazine columns, prepare for the contest and occasionally even sleep! However, thanks to the rest of the team, hopefully everything will be alright on the night - it is just a shame that we cannot control the sunspot activity!

CONTEST PAPERWORK

LAST MONTH I spoke about the various bits of paperwork required to enter contests, and there are a couple of important points which are worth adding. I listed a number of forms which are the preferred formats for submitting entries. Copies of these forms are included in the *RSGB Call Book*, and can be photocopied from there, or, alternatively, individual sheets which you can then photocopy can be obtained from contest adjudicators in return for an A4 SASE. We do of course accept computer print-outs which do not have to be on the actual forms, (although some people have obviously had some fun doing superb emulations of the originals using sophisticated word-processing packages). However, the columns should be in the same order and there should be the same number of contacts per page (25 for VHF, 40 for HF) as there are on the proper forms.

ENTRIES ON DISK

THERE MUST be an equivalent of Murphy's law that says that as soon as something is in print it becomes inaccurate. Also in last month's column I wrote that the VHF Contests Committee cannot accept entries on disk; however, at the last meeting of the VHFCC, it was decided that we could now accept 'soft' entries, although, for the moment, while we test the water, we also need paper copies of the logs to be submitted. The disk must be in a standard MS-DOS format, although any of the variations is acceptable, and we would prefer the file to follow the standard RSGB format as described in the *RSGB Call Book*. We would encourage you to submit your logs on disk since we are rapidly nearing the point where the top logs in many contests will be adjudicated by computer, and it is just a matter of whether you wish to irritate the adjudicator by making him do the typing! If you are wondering why on earth that should matter, just look back at what I said last month about how it was in the best interests of your score to keep the adjudicator on your side!

WINTER CLUB CONTESTS

WHILE THE summer tends to be the prime time for portable events which are superb opportunities for clubs to go out and involve a large number of people in a contest, the winter is a much less clement time for such activities. However, there are substitute club based contest activities during the winter, and these are the Affiliated Society (AFS) contests.

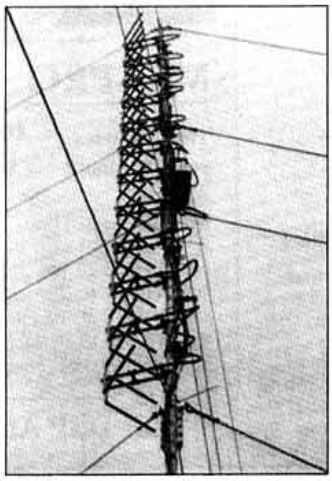
These run on various weekends between December and February on a mixture of bands and modes, both at HF and VHF. The basic principle is just like a normal contest where individual contestants come on the band and build up their own scores; however, there is an additional element where members of an RSGB Affiliated Society can group their scores together to form an overall team score. This team element really does help to bring a very high level of activity to the bands during these events since many clubs try to put at least one team together to do as well as they can in the Affiliated Society table.

Each of the stations which comprise the AFS team can be either single operator or multi operator, and the number of stations needed to form a full team depends upon the individual event. However it is not necessary to have a full team to enter, and many societies enter without a full complement of people. The table below shows how the various contests differ.

There are some specific rules which govern what is acceptable in terms of defining a team, and as always you need to check the rules for the individual contests carefully. The 3.5MHz contests allow portable operation (if you can bear the cold!), however, the VHF/UHF events do not.

These contests are some of the most hectic of the year, with the 80m CW event attracting well over 300 entrants. This could potentially be somewhat daunting to the less experienced, however, there is a part of the band known as the 'QRS corral' where stations are required not to send too quickly, and where things are generally a bit less chaotic. Both the 80m events tend to have the bulk of the QSOs made between UK stations, and to be very successful in this event you do not need fancy antennas. Many of the top stations are using just low dipoles, since these have a lot of radiation at high angles which is ideal for inter-UK working. However, I suspect there is some room for the more adventurous to try something more sophisticated, but which is probably very different from the traditional DX antenna!

The 2m contest normally has well around 150 entrants and top QSO totals are usually between 500 and 600 even under flat conditions – an excellent performance for an 8-hour fixed station contest. The 2m and 70cm events require much more traditional antennas, and generally the more metal you can get up, and the higher that you can get it the better. However, don't let this put you off - most of the entrants have quite small stations, and this is the great thing about all the AFS events - even if your club has a group of people whose stations are quite small, and who would not be placed at the top of the tables, if you can get several of these people on the band, their combined score could place them in a very respectable position in the AFS table.



The 3 Spires Contest Group's omni directional array for 70cm is made entirely of standard plumbing parts.

Another possibility to think about is, if you have a group of people with different resources - perhaps one person has a good 2m station, another a good site with a tower, but no VHF gear, and perhaps another who is a hot operator, you could persuade them to get together and put on quite a powerful multi operator entry which will help your team score along very nicely. If you can get more than 3 or 5 stations together as appropriate for the individual event, you can even put an 'A' team and a 'B' team entry. I seem to remember that one club even managed an 'A', 'B', 'C' and 'D' team for 80m CW one year!

So, if you fancy a little play at some fun contests over the winter why not give these a run, and, even better, put together an AFS entry with other members of your local club. In the past there has been no overall connection between the individual contests, however, after all the AFS results are out, I propose to publish a table showing an overall position for those Affiliated Societies who submitted entries for at least 3 of the 4 events. A society will receive 1,000 points it won any particular AFS contest, or a pro-rata amount determined by the ratio of their score to the leading society's score in that contest. Therefore, if one society happened to win all four AFS events, they would score 4,000 points; or if they won two, didn't enter the third, and in the fourth scored 2,500 points while the AFS leader in that contest scored 5,000 points, they would receive 2,500 points in the AFS Championship. Certificates will be sent to the leading and the second placed Affiliated Societies.

FINALE

SO, THERE you have it - go and haul out the rest of your club onto the bands for these contests - I'm sure many clubs can raise sufficient people to put some respectable teams together and these contests really are a lot of fun. I for one certainly plan to be going for it in all four events - time permitting! See you in the QRM!

Date	Time (GMT)	Band	Mode	Max No of Stations per Team
5 Dec '93	0900-1700	144MHz	SSB/CW/FM	5
9 Jan '94	1300-1700	3.5MHz	CW	5
15 Jan '94	1300-1700	3.5MHz	SSB	3
6 Feb '94	0900-1500	432MHz	SSB/CW/FM	3

QSL

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

DEREK HOLMES, GW3JSV has received a postcard from Mike Waddington, G3UOF, who is currently operating as ZD8M. Mike says he will not be back in the UK until mid March 1994. He has not had any QSL cards printed as yet and will probably leave this task until his return. QSL's are OK via his home call but do not expect a reply until the middle of next year.

RSGB BUREAU HISTORY I

I HAVE MENTIONED previously that the RSGB probably had the world's first national QSL manager. He was C Jamblin, G6BT, who lived in Bury St Edmunds, Suffolk, and was a member of the radio club in that town. In those early days the position was known as the QRA manager, the use of QSL came later.

The bureau was set up because of the high cost of sending individual postcards by mail even though, in those days, one could post 240 postcards for £1!

Jamblin took on the bureau responsibility during 1926. I understand it was a supervisory post in that he did not sort or distribute QSL cards but ensured that the work took place. The sorting was done by two girls employed by the Society at its HQ at 53 Victoria Street in London.

He remained in post for a couple of years and then the responsibility became that of H White, G6WY, and then D Chisholm, G2CX. Again they merely saw that the work was carried out by the girls. That situation continued until just before the war when the task was allocated to Arthur Milne, G2MI (to be continued . . . .).

QSL

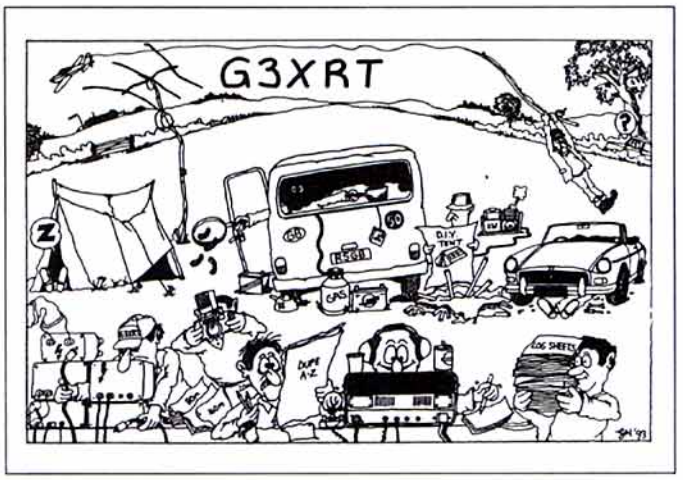
● Neville Cheadle, G3NUG, sent me some more information on the Empire DX Award as did Peter Ives, G3ASQ. It looks as though one did have to be a member of the Society for a continuous period of three years before applying. All the VK and ZL call areas counted separately in addition to those I previously mentioned. Much of the information was contained in an RSGB publication *Certificates and Awards* dated 1956 and which cost 2/6d (about 12p for those younger readers!) Such is the stuff dreams are made of!

● Lyell Herdman, G6HD has also been in touch about the Empire DX Award. Lyell has all the copies of the *Bulletin* and *RadCom* from 1931 onwards! He says that the announcement about the 'new' Empire award was made in the September 1947 edition of the *Bulletin* and the October 1947 edition carried some slight amendments to the requirements for obtaining it. The membership of the Society requirement was not mentioned at this time so that condition must have been brought in at a later date.

● C Richards, G0SDP, points out that there is a piece about the Empire DX Award on page 207 of *The World at their Fingertips*. Now that book is a good read and the reprint is now available from the Society. [See *RSGB Book Case* on page 94].

● Because of previous difficulties with GB calls we now include a reminder on issue asking the call holder to supply the QSL Sub Manager with envelopes which have been stamped and addressed. We hope it achieves some results. We also ask call holders to put the callsign and date of event on the envelopes. For those who do not read the notice but may read this column and operate a special event station at any time, please remember to send envelopes to the relevant GB QSL Sub Manager. It really does reduce the Valium consumption somewhat!

● At this time of year it is appropriate to thank the girls in the Bureau for their hard work as well as all the QSL Sub Managers who do so much unpaid work on behalf of those that utilise the Bureau system. Their efforts are much appreciated and I wish them all a Happy Christmas and a peaceful New Year.



Gary Milton's, G0CUQ, design for the Ilford RSGB Group's 25th anniversary.

● Laurie VP9NMR who is currently the Bureau Manager in Bermuda wants to take a break from sorting cards and they are looking for a volunteer to take over from him. I only mention this because there may be some slight delays during the transition. Best wishes to Laurie along with many thanks for providing the service in VP9 land.

● We are sending cards for the following series of callsigns to Tatarstan Republic Box 19 Kazan 420045: UA4P RA4P UZ4P RZ4P UA4Q UA4R. It is all getting a little confusing but Doreen at the Bureau is a mine of information on the subject of CIS QSLing so if you are as confused as I am – ring her!

● Jim Hooper, G3PCA, wrote about the RSGB Ilford group of which he is a member. Apparently there was an active club in Ilford well before WW2 with a membership of well over 100. In fact John Scott Taggart gave two lectures to the club in Ilford Town Hall which were attended by over 300 people. After the war the club was renamed the Ilford Group RSGB and met in Fred Ruth's (G2BRH) house until 1968 when Fred sadly became a silent key. From 1969 the Group has met every Thursday at Jim Hooper's workshop in Mortlake Road, Ilford and are still doing so. The Group is going on the air to commemorate that 25 years with the callsign GX3XRT from 3 January 1994 to 9 January 1994. The QSL card shown above was drawn by Gary Milton, G0CUQ, (who is a Group member) and is the one they will use. Jim says it depicts a typical NFD scene. Well, I wish them luck in the future and to those that work them – cards via the Bureau!


THE EDITORS OF
RADIO

Take pleasure in awarding this certificate of merit to

J. D. HICKMAN, G3AH

in recognition of his outstanding and consistent operating in the

1939 DX MARATHON

His total of 32 zones and 72 countries placed him in 46th position among the 50 radiotelegraph competitors. In witness of this achievement the Editors of Radio have affixed hereunto the signatures of two of their number on this TENTH day of MAY 1940.

By Editor — Editor

The certificate produced for the 1939 DX Marathon.

AWARDS

● John Wightman ZL1AH (ex G3AH), sent me a bit of amateur radio history. Reproduced below is a certificate issued by *Radio* magazine for the 1939 DX Marathon. *Radio* was a very popular pre-war American magazine which competed with *QST*. The publishers of *Radio* also started the WAZ Award and John says the WAZ map has not changed since the award was commenced. The magazine folded during the war but was resurrected post-war as *CQ* Magazine.

The DX Marathon ran from 1 January to 31 December 1939 but John wryly says that, in common with many other European amateurs, his efforts were abruptly terminated in September 1939. Certificates were issued for the top 50 scores and as John was only using 25 watts to an end on 66ft he was delighted to qualify and obtain his certificate.

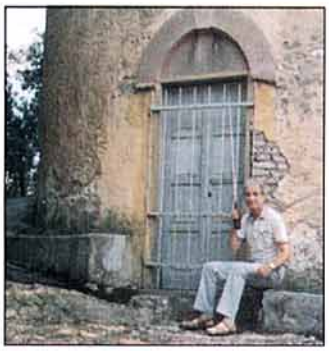
RADCOM NEWS FEATURE

CQ Italia — An I-Land Fling

by Norman Bennett, GM0IYL

SPEAKING ITALIAN like a native (or so I thought) I decided recently to take a two metre rig to Italy. The RSGB kindly gave me a contact number in Italy that I could use at short notice; normally you need several months. When I contacted the man, he asked me to send 25,000 Lire which I did. Nothing happened. I phoned and I phoned and eventually I got a receipt for 5,000 Lire, together with a permit stating that when I arrived in Italy I would have to submit it at a post office together with another 2,000 Lire. I hope you're counting this. The form was in quadruplicate.

Having arrived in Italy, I presented the form at the post office. The price suddenly went up another 900. And if you are travelling to Italy at the weekend, the post offices are closed and you lose two days before you can get on the air.



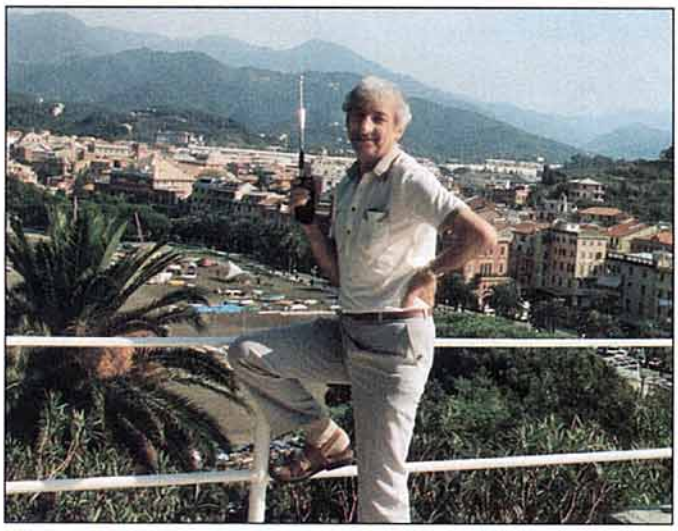
The local club in Sestri meets in the tower at the place where Marconi conducted many of his experiments.

Comprendi?

THE PERMIT was at last valid and the next obstacle was to try to make a contact. I travelled with a Yaesu FT-23R and a Super Rod Telescopic antenna which could operate as a quarter-wave or a five-eighths.

I put out my first CQ call from a hill overlooking Sestri Levante, near Genoa: "CQ due metre". I heard a voice saying "I can't talk to him I don't speak English". This wasn't very encouraging as I was speaking Italian at the time!

After several attempts I did manage to persuade some locals to talk to me. I noticed that there were several repeaters available, and that there was no apparent time out or even a 'K' between overs, it really was a free for all. But conditions were excellent.



The road up to the Marconi tower in Sestri involves a steep climb!

Marconi . . .

SESTRI IS ON the side of a mountain and is where Marconi conducted many of his experiments. It is possible to get right up into the hills, hence Marconi's choice of site.

The local radio club operates from a tower bearing Marconi's name. On top there is a three-element Yagi, and sloping down towards the sea is a long wire. The tower was closed when I was there but apparently it is still in use. A plaque commemorates Marconi's experiments. Needless to say, the view of the Mediterranean from there is breathtaking as is the climb.

From a more modest slope outside the town I made a contact through one repeater right down to Sorrento a distance of several hundred kilometres. I also made several local contacts from my hotel room using only the quarter-wave with no difficulty. Leaving aside the kilowatt brigade, the Italians are the most friendly people you can meet, especially if you try even just a few words of the language.

. . . Cheese

BEFORE I LEFT Scotland to travel to Italy, I had a QSO with Benedetto, IK4LHA from Parma. He suggested I contact him when I arrive which I did, and to my surprise he came to see us - it is a three hour drive from Parma to Sestri.

Not only did Benedetto make the journey to meet a total stranger, he brought with him a kilo - yes a kilo of Parmesan cheese for my wife. We had no difficulty getting it through customs, it walked through on its own. For the next few weeks we had Parmesan with everything.

Although Benedetto doesn't speak a lot of English he is very keen to learn and now writes to me in both languages.

If you are thinking of taking a two metre rig to Italy, I can recommend it. It's great fun. But give plenty of notice for the permit and whatever it says on the paper, expect to pay more. Ciao.

Benedetto, IK44HA, (left) drove from Parma, complete with cheese, to meet me!

IARU

JOHN ALLAWAY, G3FKM
and
TIM HUGHES, G3GVV

WE REGRET that in our August column we made an unforgivable omission. In the list of Region I secretaries the name of Arthur Milne, G2MI, was left out – a quite unforgivable thing to do bearing in mind the pioneering work that Arthur did. Sadly – in early October he died and will not see these words of apology. His wisdom and leadership provided a basis for many of the ideas and ideals which are currently held.

DE HAAN

THE DE HAAN Conference saw a number of changes. Kees van Dijk, PA0QC, who has been Chairman of the VHF/UHF/Microwaves Committee for more than a quarter of a century decided to retire and his place has been taken by Arie Dogterom, PA0EZ. Henryk Cichon, SP9ZD, who had been Chairman of the EMC Working Group also decided to retire and he has been replaced by Christian Verholt, OZ8CY. Hans Berg, DJ6TJ, who is no stranger to RSGB HF Conventions, was previously Chairman of the HF Committee but the post has now been taken over by Alf Almedal, LA5QK, of NRRL.

One of the most important outcomes of the Conference concerned the development and promotion of amateur radio – particularly in Africa. There are more than 50 countries in the African continent which are entitled to a vote during ITU Conferences. Some of these do not attend for financial or other reasons. However, some African countries have very few and others no licensed amateurs and in many of those which do most are expatriates and not locals. If South Africa is excluded from the total then there are less than 1,000 amateurs scattered throughout the rest of the continent! So a great deal of hard work has to be done in that area. The 'Support To Amateur Radio Service' (STARS) Working Group has made provisional plans for support in Algeria, Egypt, Gambia. Mali, Guinea, Burkina Faso, Sierra Leone, Ghana, Kenya, Seychelles, Djibouti, Lesotho, Swaziland, Mozambique, Botswana, Zambia, Zimbabwe and Angola. Finance will come from donations from Member Societies and from a part of the fee which Member Societies pay to IARU Region I each year on behalf of each of their licensed members. Our Society has decided to appoint a STARS Liaison Officer to join with similar DARC and REF officers in organising help. The RSGB *RAE Manual* has been adopted as the standard teaching manual to be used in English speaking Africa and one hundred copies have already been donated by the Society. A big problem seems to be that in several countries aspiring amateurs have to take the City and Guilds of London examination to get their licences. The fee for taking this (in the context of an average *African* income) is unfortunately quite high.

At the Final Plenary, Oyekunle B Ajayi, 5N0OBA, the Honorary Secretary-General of the Nigeria Amateur Radio Society Inc presented Tim Hughes and Peter Chadwick with the NARS 'Outstanding National Award' – G3FKM had been presented with it previously.

An important STARS project is attendance at Africa-TELECOM 94 which will take place in Cairo next April. IARU has already been granted stand space (free of charge) for a small exhibit and has applied for permission to present a short presentation during the associated forum. There will be many administrators in attendance and hopefully they will be made aware of the potentially great value of amateur radio to their countries. There is some possibility that there will be a demonstration station on the stand, manned by members of the Egypt Amateur Radio Society and the Royal Omani Amateur Radio Society.

BRUSSELS

THE IARU Administrative Council (which consists of the President, Vice-President, Secretary of IARU, and two representatives from each Region) met in Brussels immediately after the end of the Conference. During the meeting it was decided that W1RU and VK3KI would be nominated as candidates for re-election by the Member Societies as President and Vice-President respectively at the end of their present five year period in office. The International Secretariat (ie the ARRL) has the right to designate who will be Secretary and it is expected that Larry Price, W4RA, will continue to occupy that position.

Plans for Amateur Radio representation at forthcoming ITU conferences and meetings were made and also for the promotion of amateur radio worldwide. A three year budget was approved together with a policy dividing the responsibility between the three Regions and the International Secretariat. Reports were received from the IARU international coordinators for the IARU Monitoring System, CISPR, satellites and HF beacons. Ways in which to strengthen the ties between the IARU and its Member Societies were discussed – and perhaps even more importantly to strengthen ties with *all* radio amateurs whether members of their national societies or not.

Regions I and II were encouraged to continue their efforts to enable operation by amateurs visiting other countries without the need for additional licensing. Region I, of course, has made great strides towards this objective with the CEPT T/R 61-01 agreement (the application from Peru to take part in this is still being processed). The very important problem of the imposition of type approval for equipment was high on the agenda and all societies have been alerted to the danger which this would pose to the amateur services.

Tim Hughes, G3GVV, presented RSGB books for the STARS programme to Max Raicha, 5Z4MR, at the De Haan Conference.

CITEL

WE REFERRED to a meeting of CITEL which was due to take place in Buenos Aires in September in our last column. Very good news indeed has come from this because the CPT-III (the Permanent Technical Committee) adopted a Resolution proposing the establishment of an international amateur radio permit and proposing also that this subject be included in the agenda of a future competent World Radiocommunication Conference. This is a breakthrough and Region II is to be congratulated on its efforts to bring this about.

ITU

IARU WILL once again have had a presence at the ITU when WRC 93 took place in November. This was only a five-day Conference and most of its work was to consist of deciding agendas for WRC 95 and WRC 97. However, the importance of maintaining a presence and renewing old friendships and acquaintances cannot be stressed too much.

The last piece of news is that an application for IARU membership has been received from the Iraqi Amateur Radio Society which now has more than 40 members.

NOVICE NEWS

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

AMATEUR RADIO is about friendship, and a letter from Geert, ON6FL, describes an opportunity to make friends in Belgium or Germany who share a common interest with yourselves.

He invites anyone interested, to send your full name and address and one IRC (International Reply Coupon) for return postage. Within about a month you should receive three to six addresses of Belgian and/or German people who would like to write to you in English or French.

Geert is Chairman of the Vlaams-Nederlandse Communicatie Organisatie, a non profit-making organisation which aims to introduce youngsters to one another to make friends and correspond, perhaps in a foreign language.

If you like the idea, send your details – plus IRC to: Geert De Maerschalck, Kluisstraat 1, B-2880 Bornem, Belgium.

TELEVISION STARS

ONE OF Britain's oldest Radio Societies – Barnsley and District ARS – celebrated its eightieth birthday earlier this year in grand style.

An amateur television station was set up by members at Darton High School along with their radio equipment. Many youngsters met amateur radio for the first time and were given the chance to pass greetings messages – with the contacts seen as well as heard all over the region.

Stan Bulmer took the picture on the right which shows John, G4LRS, and Roy, G0OCV, with two prospective Novices. Novice training is soon to be extended so perhaps there will be a school station in the area in the future. As Roy said, "Youngsters are the amateur radio users of the future and we want to spark their interest". If you live in the area and are interested, the Society meets at the Darton Hotel each Monday.

PROFILE

YOU CAN do it! Those words were enough to propel James through three callsigns in six months. James is fourteen and has held 2E1BDN, 2E0AET and G0TYG. Keith, G0TIO, his proud Dad, pays tribute to the Rolls Royce ARC in Hucknall and Instructor Phil, G4JSM, with words of praise for the training scheme that made it possible. Congratulations James.

FIVE DOWN, TWO TO GO

A NUMBER of schools run a radio club and training sessions for their students leading to both Novice callsigns and amateur callsigns for students. But in one school activity in amateur radio has been taken much further.

Warwick School boasts twelve Novice passes – one of whom now holds a G7 callsign – a Class A and seven Class B amateurs. A decision was taken to hold their fourth Amateur Radio Camp and Jersey was chosen as the destination. The Isle of Man, Wales and Jersey had been the locations for the previous three camps.

Accommodation was provided at Crabbe by the States of Jersey Education Department and two adults and thirteen pupils packed equipment for HF, 6m, 2m and 70cm operation using the callsign GJ4WKS/P. Due to prevailing conditions HF operation was poor, but the novices put their GB3GU callsign to good use and reached most of the 70cm repeaters along the South coast – much to the delight of many mainland amateurs.

Six metres was more successful logging SP, 9A, S5, I and OK all on one day although no G stations could be worked. David, 2J1BZJ/P, and Joseph, 2J1CAW/P, were the lucky duo who achieved this using only the permitted Novice power output.

Two metre packet proved disappointing as connecting to the mainland proved unreliable but, on the whole, the trip was a success. A day's excursion was made to Guernsey where they were made very welcome and a Swiss contact was made by GU4WKS and 2U1.

There are seven secondary callsign letters and Warwick school have notched up five of them with only GN and GS missing. Plans are afoot for next year which include more tuition, exams, construction and of course, operating. And naturally, the next Amateur Radio Camp. Who knows where that will be situated? Gervald, G0GNF gave me this information. I have asked him nicely to give the when and where of the next one in advance so that perhaps we can be entered in his next /P log.

A BAKER'S DOZEN

BILL HOLT, G7DHM, and fellow instructors Phil, G6HGT, Terry, G6MTF and Dennis, G4ZHW, teach a class of Novice trainees.

The intention was that the class would sit the September NRAE. Unfortunately, by the time it was discovered that external exams were no longer being held locally, it was too late to arrange an alternative. The group are booked to sit the December exam at Airedale and Wharfdale College. (Readers of this page will join me in wishing you all luck). As another course was due to start on 6 September, there should be a long list of new Novices in the New Year.

Leeds and District ARS run the courses at the Club premises at the Yarnbury Rugby Club in Horsforth, and there are already several Novices in the area to testify to their success. If you have any interested friends who would like to join a class, suggest that they contact Bill at 20 Lingfield Mount, Moortown, Leeds LS17 7EP, or ring him on 693524 for more information.

PHOTOGRAPH: STAN BULMER

John, G4LRS (standing) and Roy, G0OCV, with two prospective Novices at the amateur television station set up at Darton High School.

70CM REPEATER

THE CLYDE Coast Repeater Group was formed in the autumn to establish a 70cm repeater for the Inverclyde area, as coverage by current repeaters was not very good. With the Group actively supporting the Novice licence, it was felt that the best encouragement they could give was to provide the facility to really use their licences. There is little other activity on the band in the area, so it was hoped that a local repeater would encourage more amateurs to invest in 70cm equipment which in turn, should generate more activity. Members of the Group are busy at present collecting and re-aligning PMR gear for use by the newly licensed.

GB3PG is sited close to the centre of Greenock at Larkfield some 500ft above sea level. The antennas rise another 60ft above that, so good coverage is assured. Thanks go to the RAC who own the site and charge the Group a nominal annual rental.

With a current membership of around 25 – and growing – the group feels able to attend all local rallies and events and even visit local clubs and societies to give lectures about the repeater. (Club secretaries in the area, please note).

More about this project or indeed any of the Repeater group projects is only a phone call away. Simon, GM4PLM, sent the information and a call to him on 0436 75984 or Andy, GM7DME, on 0389 62909 will be welcomed.

Remember – any organisation is only as strong as its membership – if you can use this repeater join the group! I wish it outstanding success.

I MISSED YOU!

DURING THE October run of Kidlink, I kept my promise and glued myself to the chair and listened.

Conditions were much better and good contacts were made. I found seven different schools and spoke to over twenty youngsters. As more information is received I will pass this on in a future column.

One incident which proved that amateur radio makes a small world even smaller – in conversation with one school, another station joined us. I dropped out – leaving father talking to son!

Novice Note Book

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

I HAVE OFTEN been asked about charging batteries and to supply suitable circuits for this purpose. This month we cover the various cells/batteries and methods of charging them. There are two types of cells – primary and secondary. Primary cells provide current until the chemicals they contain are used up, whereas secondary cells are rechargeable. The secondary cells can be recycled many times providing we treat them properly. Cells can be connected in series to provide higher voltages and are then called batteries.

LEAD ACID

I THINK WE must all have seen these, but know them as car batteries! They are made from one plate of lead and the other of lead peroxide with an electrolyte of sulphuric acid. During discharge the lead peroxide and sulphuric acid changes to lead sulphate and water and, during charge, the lead sulphate changes back to lead peroxide and sulphuric acid. This change in concentration of sulphuric acid is a very good indication of the state of charge of the cell and a hydrometer can be used as an indicator. The disadvantages of the lead acid cell is that it must be kept upright, it is very heavy, the acid is corrosive and, if overcharged, they 'gas' giving off hydrogen (a very explosive gas).

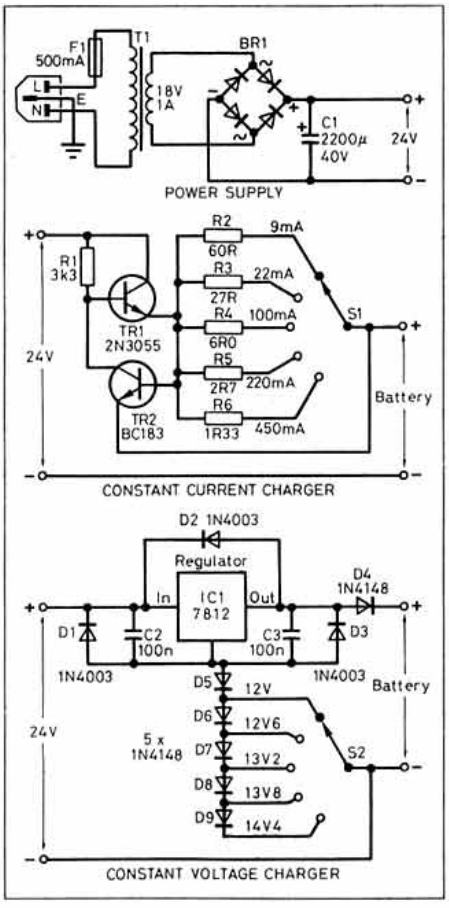


Fig 1: Two types of battery charger.

Charging wet lead acid cells (as found in cars) is fairly simple as many households have a 'battery charger' in case the car battery goes flat! In general terms, we recharge them by passing an electrical current in the reverse direction (equalling about one tenth of the battery's ampere/hour capacity). A typical car battery of 40 ampere/hour capacity would charge at 4 amps for 12 hours, the extra two hours to overcome losses.

SEALED LEAD ACID

THESE WE OFTEN see at rallies as a plastic block with two terminals. They are very similar to the wet lead acid cell but consist of very thin plates with a sulphuric acid gel between them. The problem is that they must not be allowed to become overcharged as they will then 'gas'.

This creates two problems, firstly the gas bubbles will remain lodged in the gel and increase the internal resistance so ruining the cell and secondly – and far more dangerous – the pressure could, under unfavourable circumstances, cause the case to rupture and squirt out the acid gel. This once happened to me but fortunately the battery was under the bench; if it had been on top and the gel had landed in someone's eye the consequences could have been serious. This can only happen if we mistreat the battery – providing we make it impossible to overcharge the battery all will be safe.

To ensure safety charge them using a *constant voltage charger*, reducing the charge to a trickle prior to gassing commences. By experimenting I have found that 13.2 volts is maximum and so I charge them to 12.6 volts to allow a safe margin.

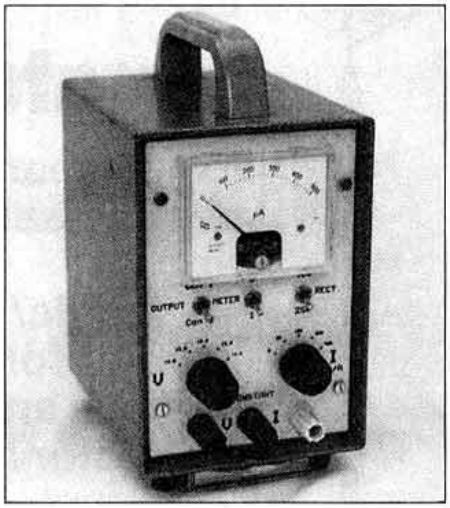
NICKEL CADMIUM CELLS

OVER THE LAST ten years these have become very popular due to their low price, high charge capability and durability. However, to maintain them in good condition they must be charged properly.

Prior to charging they should be *discharged* to a terminal voltage of 1.1 volts and then charged at one tenth of their capacity for 14 hours. Provided this is done the cells will last for many charges indeed – if not their life will be reduced to a few tens of charges!

Another cell that is worth mentioning is the NiFe cell. At first glance these could be confused with the wet lead acid cell – until you see them as a battery. It is then apparent that each cell is carefully insulated from each other, and that there are five instead of three cells in a six volt lead acid battery. These have a fully charged terminal voltage of 1.25 volts and a linear discharge terminal voltage, and should be recharged at about 1.1 volts, because the battery terminal voltage is getting low.

The major advantage of NiFe cells is that they are virtually indestructable. Their charge capacity is about one third that of an equivalent weight lead acid cell and this, combined with the steady drop of terminal voltage during discharge, has led to a drop in popularity.



The charger I built from bits out of my junk box. I added a few luxuries such as metering but the basic circuit is shown in Fig 1.

CHARGING

GEL CELLS REQUIRE a maximum voltage to ensure that over-charging does not take place. **Fig 1** shows a suitable charger circuit. In practice this can perform two functions, a bench 12V 1 amp power supply and charger! I used a standard 12volt, 1 amp regulator, the 7812 and diodes to jack-up the output. A switch is provided to enable different output voltages to be selected between 12 and 13.8 volts.

For NiCads we require constant current charging at one tenth of the cells' capacity. PP9 types require 9mA but 'C' cells require 450mA. A large range indeed! I decided to switch to the common cells and, if an uncommon cell required charging, use a lower current and increase the charging time to suit. With an 18V transformer this circuit will charge batteries of up to 15V with no problem. However the current setting resistors are required to *pass* the charging current and will have 0.6V across them. On the higher current ranges this will be in excess of 0.25W of heat to dissipate so it would help to use several resistors in parallel to ensure that they do not overheat! To calculate the resistor value use Ohm's Law.

COMPONENTS

R1	3k3 1/4 watt
R2	68Ω 1/4 watt
R3	27Ω 1/4 watt
R4	6Ω 1/4 watt (2 x 12Ω in parrallel)
R5	2.7Ω 1/4 watt (2 x 5.6Ω in parrallel)
R6	1.33 ohms 1/2 watt (4 x 5.6Ω in parrallel)
C1	2,200µf 40 volt electrolytic
C2,C3	0.1µf ceramic disc
Q1	2N3055
Q2	BC183 (or similar)
IC1	7812 regulator
D1, D2, D3	1N4003
D4, D5, D6, D7, D8, D9	1N4148
BR1	1 amp 50 volt bridge rectifier
S1, S2	1 pole 5 way switches
T1	18 volt 1 amp transformer
F1	500ma fuse

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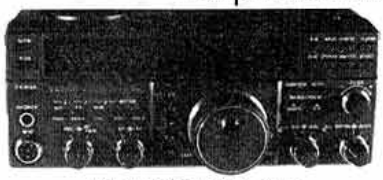
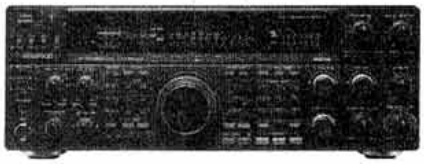


FT-890 £1165
AT model £1375

FT-990 £2035
DC model £1875

FT-1000
£3145

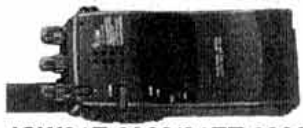


TS-950SDX £3415

TS-850S £1525

IC-737 £1339

TH78E £439



ICW21E £369/21ET £399

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DJ580/SP £429

TM732E £619

FT-5100 £569

IC3230H £609

TM742E £745

FT-26/76
£245/£265

DJF1/F4
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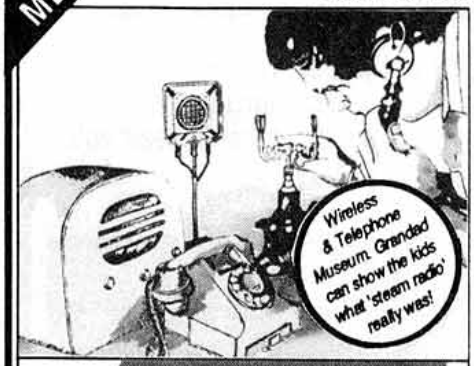

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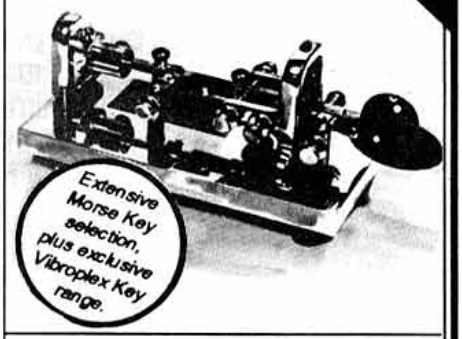

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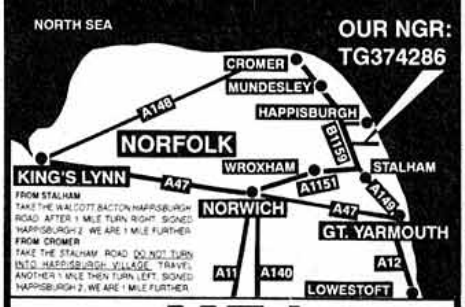

MFJ

ANTENNA TUNERS

MFJ901B	1.8-30MHz Versa Tuner 200W PEP
MFJ910	Mobile 3.5-30MHz 200W HF Matcher
MFJ921	2m ATU 200W + SWR/Power Meter
MFJ924	70cm ATU 200W + SWR/Power Meter
MFJ931	1.8-30MHz Artificial Ground
MFJ941E	ATU 1.8-30MHz 300W
MFJ945D	Mobile ATU 1.8-30MHz 300W
MFJ948	ATU 1.8-30MHz 300W
MFJ949E	1.8-30MHz ATU + Dummy Load 300W
MFJ959B	Active RX ATU 1.6-30MHz
MFJ962C	1.8-30MHz Versa Tuner 1.5kW
MFJ986	1.8-30MHz Roller Inductor ATU
MFJ989C	1.8-30MHz Versa Tuner 3kW
MFJ16010	Random Wire Tuner 1.8-30MHz 200W

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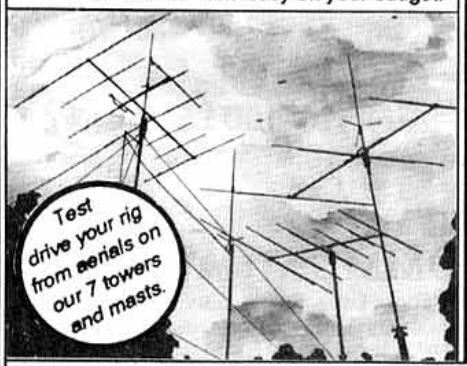

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RADCOM TECHNICAL FEATURE

An Easy to Set Up Amateur Band Synthesizer

by Ian Keyser, G3ROO

I HAVE BEEN building amateur transceivers for years and have always used crystal mixing systems. In the last few years, however, my designs have been copied by other amateurs and friends, but they have always fallen on *my* bench when the crystal mixer filters needed alignment. So I sought methods of alignment for mixer systems that could be done in the average shack, but I soon came to the conclusion that a spectrum analyser was the only method that could be used reliably. There had to be a way that complex test gear was not required.

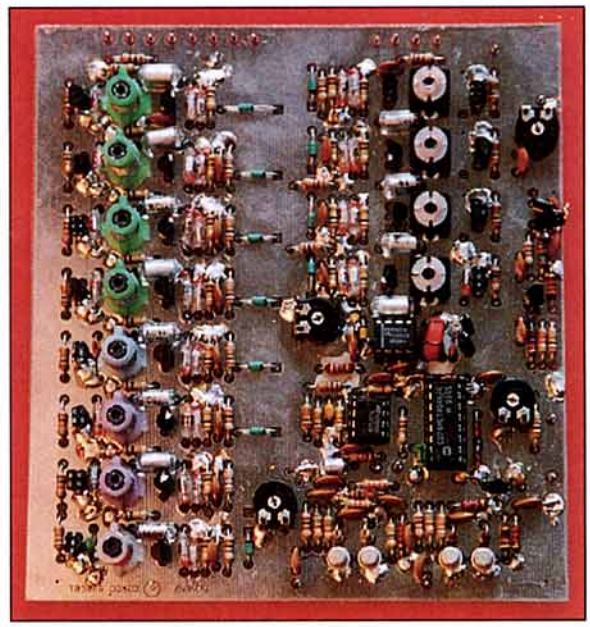
CAREFUL DESIGN

OFTEN, I HAD MUSED over the fact that the Japanese 'black boxes' had all gone over to synthesizers which had revealed some problems. However their complexity was not so significant when compared to the time it took to construct, set up and clean a crystal mixer system. Provided the components were correctly placed in the board and it had been designed properly, the set up procedure was minimal. Unfortunately for the reputation of synthesizers, the earlier designers did not work with the meticulous care required.

I decided that I had to 'do' a synthesizer. It had to be reliable, easy to set up and be reasonably clean but at the same time reasonably simple. With the help of David Stockton, GM4ZNX, I set forth to create a suitable design. The outcome was to be an amateur band only, mixer-type phase locked loop (PLL) with a VFO reference for a receiver or transceiver with a 9MHz IF. With the exception of perhaps the phase detector and loop amplifier, the technology will be well understood by the average constructor. The phase detector is an IC type and should create few problems. If the loop amplifier is also considered as an integrator, its operation becomes clear.

As far as the Voltage Controlled Oscillators (VCO) were concerned, I decided for several reasons to use a separate one for each band. Switching was easier, as each position of the bandswitch would then supply each oscillator, but most importantly the loop gain could be kept constant for each band. This would ease the design of the amplifier.

Consider a VCO that required to tune say 28 to 30MHz, and another to tune 2 to 4MHz. They both require tuning over a 2MHz range, but although it would be easier to tune the 28 to 30MHz VCO with a control voltage variation of one volt, this would be impossible on the 2 to 4MHz VCO with simple designs. Say we managed to do it with a 4 volt swing. This would mean that the overall loop gain of the 28 to 30MHz synthesizer would be 12dB greater than the 2 to 4MHz synthesizer, making the design of the loop amplifier more difficult. Adoption of one VCO per band did increase the cost a little, say £1.25 per additional VCO, but it made the design and setting up considerably easier.



The main synthesizer board, which also has holes for vertically mounted pre-set resistors.

Fig 1 shows the block diagram, with the circuit diagram in **Fig 2** (over page).

A fixed tuning range of 500kHz is provided on each band including 10m, which is divided into four sections. Each VCO is selected by applying a 12V supply to the required stage from the band switch.

The output of the oscillator is diode switched onto a common line which feeds the output amplifiers and the loop mixer, IC1. The crystal oscillators are also selected by the band switch and the frequencies are calculated to give a subtractive mix. The output is between 5 and 5.5MHz when the VCO tunes its required range.

The output of the mixer also contains its input frequencies and other products. These are removed using a low pass filter, L13, L14, C65, C66, and C67. The resultant signal at 5MHz is then amplified in a single stage to increase its amplitude sufficiently to drive the phase detector. A signal from a VFO tuning between 5 and 5.5MHz is fed to the reference input of the phase detector, IC2.

The output of the phase detector consists of a series of pulses, either negative or positive depending on the phase relationship of the input signals. When the two signals are in phase the pulses disappear and the output impedance of the phase detector goes high. If for any reason the phase of the two signals differ, such as drift or tuning of the VFO the pulses return and the loop amplifier will produce a DC voltage to steer the two signals back into phase.

BAND SELECTION

WHEN THE BAND IS changed, a different VCO is selected together with its own crystal oscillator. **Fig 3** shows the PCB layout, with the four LF voltage controlled oscillators on the lower side, and the eight higher frequency

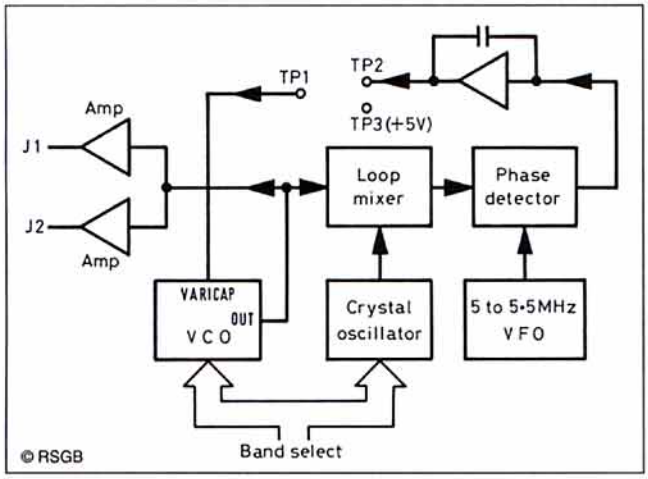


Fig 1: Block diagram of the synthesizer. TP1, 2 and 3 are used in the setting up procedure.

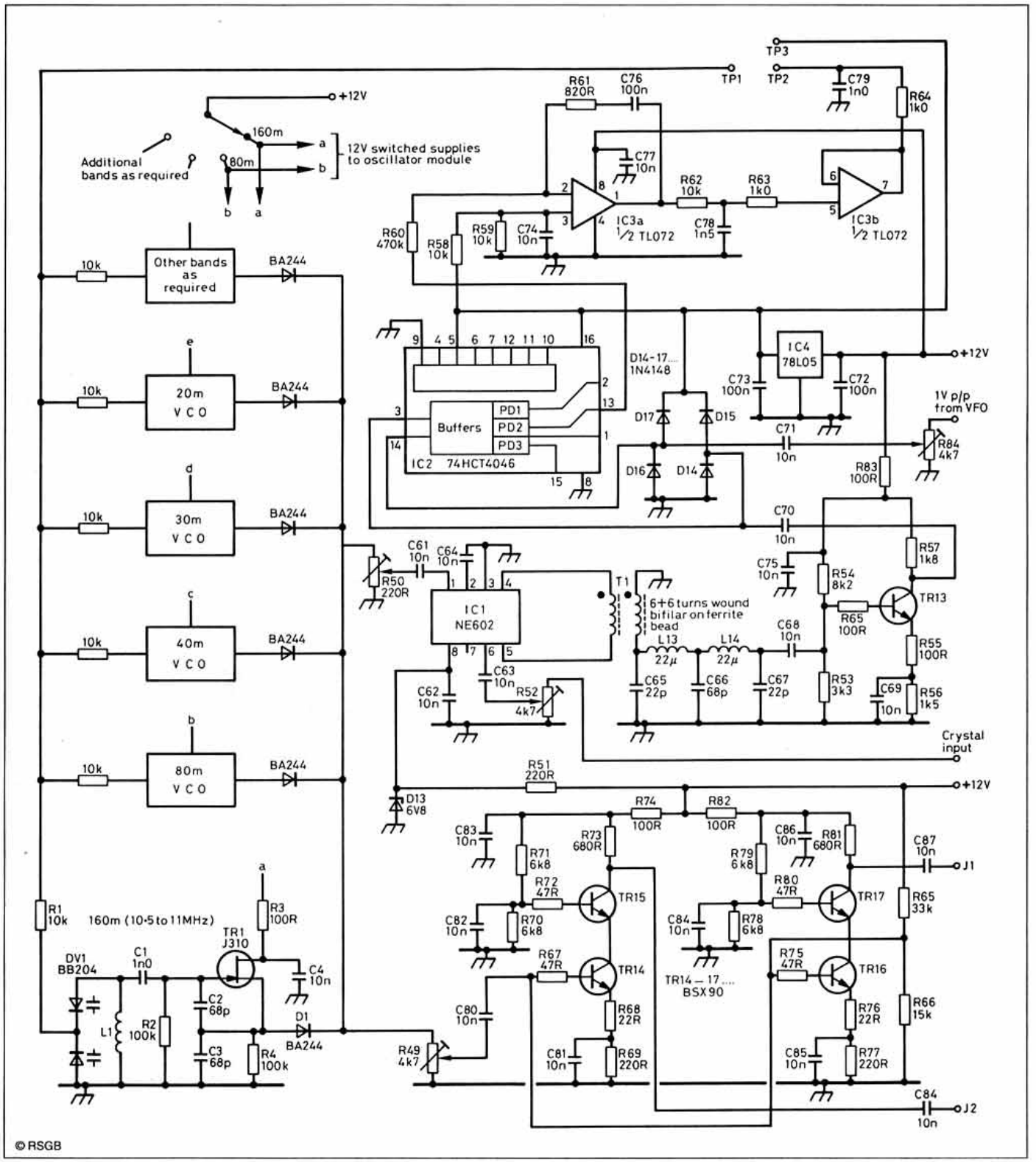


Fig 2: The circuit is based around the 74HCT4046 phase comparator. Note the use of the NE602 which mixes the crystal oscillator input with the output of the selected VCO.

ones at the top. The frequencies selected were chosen because crystals for the old bands are readily available from the G-QRP Club. However WARC band crystals will need to be obtained from a crystal supplier. Another source of crystals are 'spares' for Yaesu sets such as the FT707 or later FT101s – in fact the 'Het' Board for the FT101ZD is an ideal complete PCB which can easily be used in this design!

In my units I have used the Kanga 'Multi Channel Crystal Osc. PCB' with Yaesu crystals, and the Kanga VFO. There are many other designs that can be used but stability and low noise are very important considerations.

There are two output amplifiers on the board each of which consist of a cascode pair of transistors. This configuration provides good isolation between the two outputs, an important consideration when a digital display is being driven from one of the outputs. I use one to drive the display and the other to drive the Tx and Rx mixer ports. The output level is about 500 millivolts RMS which is sufficient to drive a Plessey SL6440 mixer IC.

SETTING UP

THIS IS WHERE THE synthesizer comes into its own! It's redeeming feature is that as it is a closed loop, the synth will exhibit certain clearly defined attributes if all is well. The most easily monitored attribute is the tuning voltage which should vary smoothly when the VFO is tuned. Also, if the scope tells us there

Band	Synthesizer Output	Xtal	Cx	Coil Data	
1.5-2.0	10.5-11.0	16.0	Nil	Scrap 10K Former eg L114	5+5+5+5 Turns per bay
3.5-4.0	12.5-13.0	18.0	Nil	Scrap 10K Former eg L114	4+4+4+4 turns per bay
7.0-7.5	16.0-16.5	21.5	Nil	Scrap 10K Former eg L114	3+3+3+3 turns per bay
10.0-10.5	19.0-19.5	24.5	27pF	Scrap 10K Former eg L114	2+2+2+2 turns per bay
14.0-14.5	23.0-23.5	28.5	56pF	Toko S18 (white) 8.5 turns	
18.0-18.5	27.0-27.5	32.5	40pF	Toko S18 (violet) 7.5 turns	
21.0-21.5	30.0-30.5	35.5	27pF	Toko S18 (violet) 7.5 turns	
24.5-25.0	33.0-33.5	39.0	22pF	Toko S18 (blue) 6.5 turns	
28.0-28.5	37.0-37.5	42.5	22pF	Toko S18 (green) 5.5 turns	
28.5-29.0	37.5-38.0	43.0	22pF	Toko S18 (green) 5.5 turns	
29.0-29.5	38.0-38.5	43.5	22pF	Toko S18 (green) 5.5 turns	
29.5-30.0	38.5-39.0	44.0	22pF	Toko S18 (green) 5.5 turns	

T1 is 6 + 6 turns bifilar on ferrite bead
L13 and L14 22µH Toko 283AS/220J (Bonex 437220)

Table 1: Synthesizer coil and Cx values, for use with a 9MHz IF receiver or transceiver.

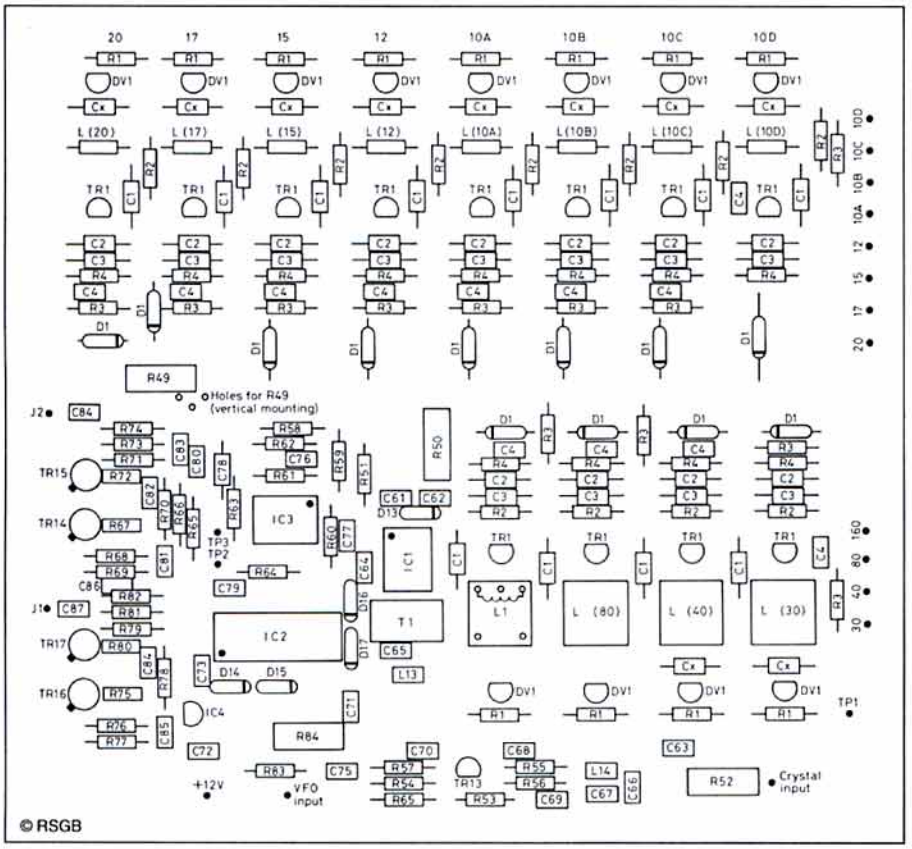


Fig 3: Layout of the main synthesizer board. Components for the VCO are repeated for each band, with appropriate values of Cx and L1.

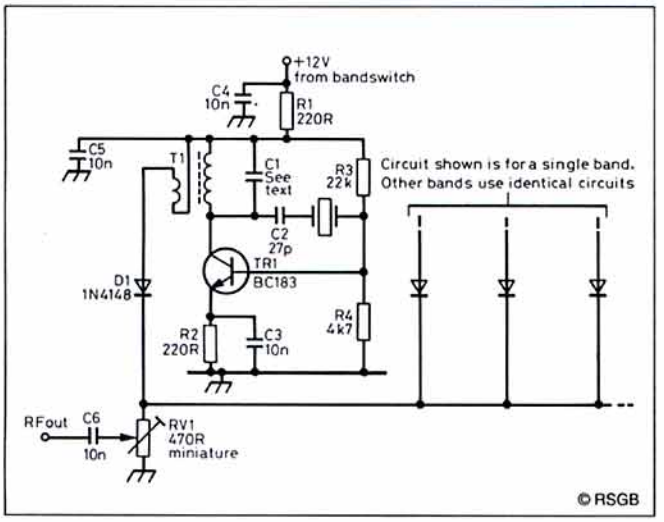


Fig 4: Oscillator circuit for one band. Coils (T1) are 6 turns primary between pins 1 and 3 and 1 turn secondary between pins 4 and 6. 38SWG wire is used on a TOKO 10K coil former. C1 is selected from Table 2.

is no ripple on it (at TP1) we can be fairly confident that all is well within the loop. Checks for purity can be confirmed by feeding a signal into the receiver that the synthesizer is driving and looking for spurious responses. There are going to be some, of course, such as harmonics of the reference VFO etc but these should be a low level.

The other possible gremlin is sideband noise, and this can be checked using a clean signal source and listening for the noise as the signal is tuned out of the pass band of the receiver. If the synthesizer is being constructed prior to the completion of the rest of the receiver the signal generated by the synthesizer can be checked by listening on a second receiver. However care must be taken as sideband noise in its local oscillator could confuse the situation. If the note is not pure sounding then there is a problem somewhere within the loop or the oscillators.

To carry out the actual setting up procedure connect TP1 to TP3, which applies +5V to the tuning line, and select each band in turn. Tune the core of the coil to the centre of the relevant oscillator's tuning range, see **Table 1**. It might be necessary to make a slight adjustment to the parallel capacitor across the coil, but if the values given are used, this is unlikely.

Having completed this part of the procedure, couple the VFO and Xtal Oscillator inputs and check their frequencies on all bands, then set the VFO to 5.25MHz. Remove the link from TP3 and connect it between TP1 and TP2 – this couples the output of the loop amplifier to the tuning line. Connect a high impedance voltmeter between TP1 and ground, which should read about 5 volts. If we now tune the VFO, the voltage should vary smoothly. Remove the voltmeter and use the 'scope to check that there is no ripple on TP1.

Check that all bands are behaving themselves as above and then reduce the Xtal Oscillator input by R52, to the minimum required to maintain lock on all bands. Next, reduce the mixer input (R50), to the minimum to maintain lock on all bands and adjust the VFO level at R84, for minimum reliable input. Finally, the VFO is set to 5.5MHz and each band switched in turn for a voltage of 4 volts on TP1. This will be the test datum for ensuring that all is well within the PLL. On my transceiver, there is a meter position that monitors the control voltage and periodically I set the VFO to 5.5MHz to check that all bands give a reading of about 4 volts. If they don't then a tweak of the relevant VFO is required!

Preset R49, the output level control, is adjusted for the required output levels for your application. If vastly different levels are required on J1 and J2, it is an easy modification to adjust on test the ratio of R68 and R69 for J2, or R76 and R77 for J1, but care must be taken to ensure that the total resistance does not deviate too far from 250Ω otherwise the biasing of these stages will be upset.

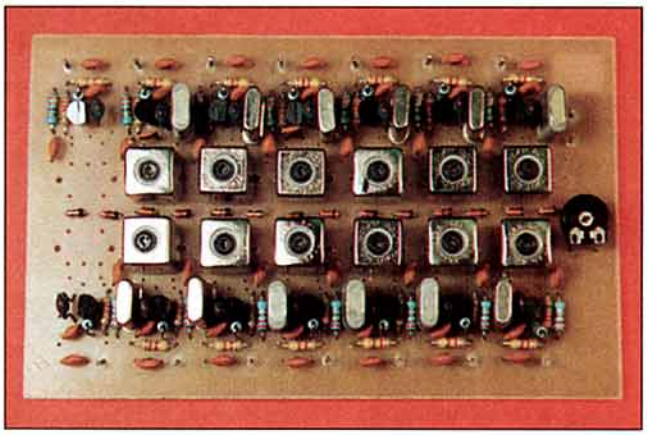
PROBLEM SOLVING

THE ONLY DIFFICULTIES I have had so far have been caused by wrong components being inserted or solder bridges across tracks. However, a few hints on how to tackle fault finding would not go amiss. Firstly, check that all components are correct and, using an eyeglass, check for bridges. If a fault condition is still present it is almost certainly going to manifest itself as a rough sounding signal. Check the VFO and Crystal oscillators with a general coverage receiver – if they are clean we now have to look at the loop itself.

Connect TP1 to TP3 and listen on the general coverage (GC) receiver to make sure that the VCO runs cleanly. If not, check the regulator IC4 with an oscilloscope to ensure

that it is not oscillating, a common fault! If all is well reconnect TP1 to TP2 and relocate the VCO using the GC receiver. If it is still not pure we have a problem within the loop, and the board should be checked carefully for incorrect components. If all is well here, we need to go a little deeper.

Disconnect R60 at IC2 pin 13 by lifting it from the PCB and connect the end to pin 3 of IC3. This will keep IC3 in a non-saturated state enabling a check that there is no instability in that stage. Retune the GC receiver to the VCO and check for purity. If it's clean the fault lies in the phase detector, but if still not pure it lies within the loop amp IC3.



The oscillator board can be built in stages for the bands required.

CRYSTAL OSCILLATOR BOARD

THE SYNTHESIZER REQUIRES two signal inputs for its operation. Firstly, a VFO tuning between 5.0 and 5.5MHz and a crystal oscillator (**Fig 4**) for each band to convert the VCO into the frequency range of 5 to 5.5MHz to compare with the reference VFO. The required frequencies for each amateur band are given in Table 1.

Suitable VFO designs have been covered in many articles [eg 1], but the crystal oscillator design is a little more difficult. Many ideas were tried such as Butler circuits with switched crystals but it was found that much greater reliability was obtained by using a separate oscillator for each band. I can imagine this board finding uses in other projects as it can be used for overtone or fundamental operation and will work between 15 and 55MHz by changing the crystal and resonating capacitor.

There are fourteen individual oscillators on the board and these are laid out so that, by careful cutting, it can contain either one, two, three, four, five, six, seven, eight, ten, twelve or fourteen stages. The coils are all identical and are wound on scrap Toko 10K coil formers (see **Fig 5**). The output of each stage is diode switched onto a common output line and the output level is adjusted by a small preset on the board.

The output level from each oscillator is not constant over the entire range of 15 to 55MHz, but in the majority of applications this is of little consequence. In practice the output level variation is something less than 6dB, with harmonics 30dB down. As the circuit of each oscillator is the same with the exception of the crystal and resonating capacitor, the circuit diagram for only one stage is given. **Table 2** gives the crystal frequencies and resonating capacitors required.

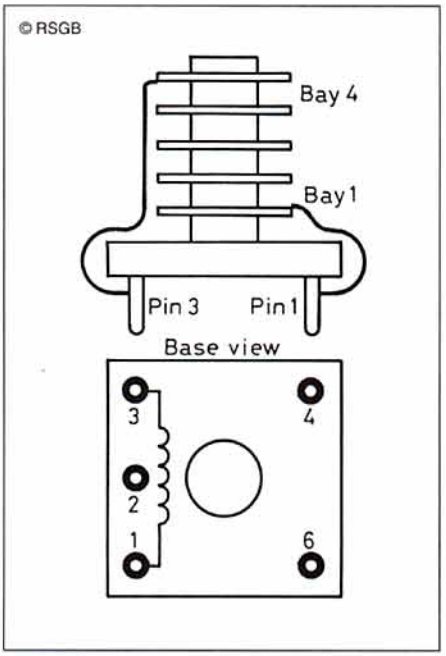


Fig 5: Winding details for LF band synthesizer coils (L1). Oscillator coils are also wound on this type of former.

Band	Crystal Frequency	Resonating Capacitor
160m	16.0MHz	300pF
80m	18.0MHz	120pF
40m	21.5MHz	160pF
30m	24.5MHz	100pF
20m	28.5MHz	56pF
17m	32.5MHz	56pF
15m	35.5MHz	47pF
12m	38.5MHz	47pF
10m	42.5,43.0,43.5,44.0MHz	39pF

Table 2: Xtal and C1 values for oscillator board.

FINAL THOUGHTS

TO DATE I KNOW of ten of these synthesizers that are up and running with no problems after six months. It has been a rewarding exercise and, at least in part, I can see the advantages of the synthesizer. However, I still maintain that a properly designed and set up crystal mixer system has advantages in narrow band receivers. More advanced designs can overcome the drawbacks to a large extent. However, complexity then increases to the point where they are impossible for the average amateur constructor who does not have access to the specialised test equipment required.

REFERENCE

[1] 'A Two Band Superhet', Steve Price, G4BWE, *RadCom*, Sept '93, p36, uses a suitable VFO.

COMPONENTS LIST

Main Board

VCO Components (For each band)
Resistors all 5% 0.25W

R1	10k
R2, R4	100k
R3	100R

Capacitors

C1	1n0 polystyrene
C2, C3	68pF polystyrene
C4	10n disc ceramic

Additional components

D1	BB204 dual varicap diode
D2	BA244 switching diode
TR1	J310 FET
L1	see Table 1

Synthesizer components
Resistors - all 0.25W 5% except where stated

R49, 52, 84	4k7 Horiz. preset
R50	220R Horiz. preset
R51, 69, 77	220R
R53	3k3
R54	8k2
R55	100R
R56	1k5
R57	1k8
R58, 59, 62	10k
R60	470k
R61	820R
R63, 64	1k
R65	100R
R66	15k
R67, 72, 75, 80	47R
R68, 76	22R
R70, 71, 78, 79	6k8
R73, 81	680R
R74, 82, 83	100R

Capacitors

C61, 62, 63, 64, 68, 69, 70, 71, 74, 75	10n ceramic
C72, 73, 76	100n ceramic
C65, 67	22p polystyrene
C75, 77, 80, 81, 82, 83, 84, 85, 86, 87	10n ceramic
C78	1n5 polystyrene
C79	1n0 ceramic

Semiconductors

D13	6V8 zener
D14-17	1N4148
TR13	BC183
TR14-17	2N5179 (or BSX20)
IC1	NE602
IC2	74HCT4046
IC3	TL072
IC4	78L05

Multi-channel Oscillator (components for each band)

Resistors 0.25W 5%

R1, R2	220R
R3	22k
R4	4k7
RV1 470R min. preset *	

Capacitors

C1	Resonating capacitor - See Table 2
C2	27pF ceramic
C3, 4, 5	10n ceramic
C6	10n ceramic

Semiconductors etc

D1	1N4148
TR1	BC183
XTAL required (see Table 2)	Select for band

* Only one of these components required per board.

Kanga products can supply kits including PCBs for all 'on-board' components. Prices are £59.95 for the synthesizer (£15 PCB only) and £11.95 for the crystal oscillator board (£5 PCB only). This does not include crystals which can be obtained from suppliers such as Quartslab (tel: 0322 330830). P&P is £1 per order.

Ordering address is as follows:

Kanga Products, Seaview House, Crete Road East, Folkestone, CT18 7EG. Tel: 0303 891106.

Some components are also available from:

Bonex Ltd., 12 Elder Way, Langley Business Park, Slough, Bucks, L3 6EP. Tel: 0753 49502.

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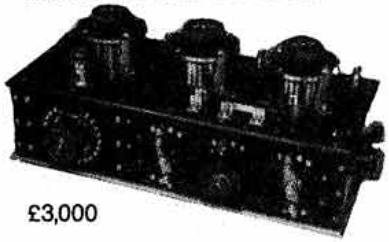

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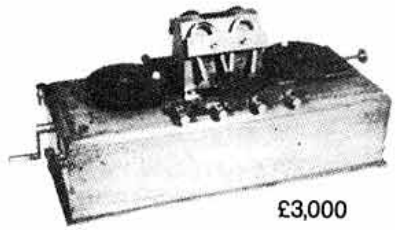

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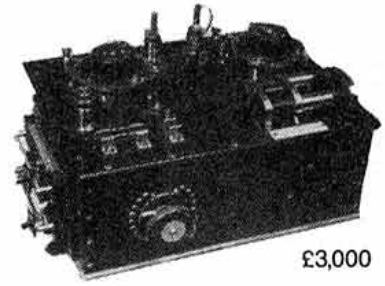

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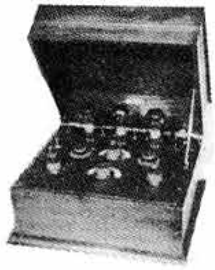

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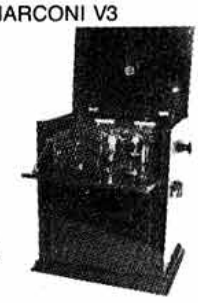

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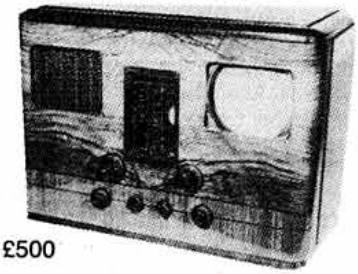

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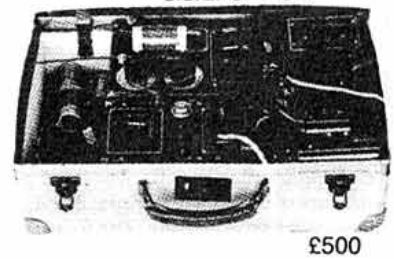

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RESCUING DROWNED RADIOS

HOW DO I RESCUE A RIG that has been immersed in water? Can I use WD-40 or switch cleaner?

IF YOUR RADIO IS SOAKED in water, the answer to the question about WD-40, switch cleaner or other water-repellent chemical cocktails is *no*: strange as it seems, the best thing to use is more water. This information comes from an interesting debate on packet, adapted with my thanks to the contributors.

Roger, G6FHR, wrote: "Don't despair. Take out the battery straight away (to stop electrolytic corrosion), take out the loudspeaker and anything else made of paper, and wash the whole rig out with warm fresh water. If you leave the rig somewhere warm for a couple of days to thoroughly dry out, it will probably work again. This treatment sounds horrible but it saved many a marine-band handheld." Others agreed, suggesting a final rinse with distilled water, followed perhaps by isopropyl alcohol to help volatilise any trapped water. Isopropyl alcohol (IPA) is obtainable from many chemists, and is preferable to methylated spirit because it is sold in pure form.

Martin, G4FIK, added his experience with radio control equipment which had been 'dunked': "Beware of the fire risk when using alcohol, and do not force-dry the unit; just leave it in a slightly warm, dry place to dry out naturally over at least 48 hours. The only problems we had in the long term after such treatment were with corrosion of fine wire such as IF coil windings, but this only seemed to happen if the cleaning was delayed or after dunking in salt water. Sea water is vicious stuff and in most cases you can say goodbye to your equipment!" (All I can add is: to avoid even more vicious corrosion, don't let your cat sleep on top of the warm rig when it's feeling unwell.)

G6FHR again: "The chemicals used in switch cleaner and WD-40 etc have a dielectric constant that is vastly different to air. When they get into the spaces between capacitor plates or even in the air-space between the turns of a coil they change the fixed or stray capacitance quite dramatically and severely upset the tuning of the RF stages in transceivers. I know of several marine-band handhelds that were cleaned with switch cleaner or WD-40 and never worked again. The residue from the cleaner is impossible to remove by anything but a stronger chemical, usually destroying the plastic bits of the set. Simple mechanical cleaning is much better, with no harmful effects. It takes longer but doesn't ruin the set."

G6FHR also pointed out that a cleaner capable of removing carbon deposits from switch contacts could equally well remove the carbon track from potentiometers unless it is carefully formulated. Similarly, too powerful a solvent might attack plastic parts. To be fair to the manufacturers of switch cleaners, at least one is aware of these problems. The instructions on the can for Electrolube Contact Cleaner Lubricant, Cat: EML 200H say "Excellent for . . . . tuners (without causing drift), potentiometers, variable resistors . . . . Safe on metals, most plastics and rubbers . . . ." I have certainly found no problems with this particular product.

Alan, G3GUD, concluded the debate by saying "I often clean electrical and electronic gear in the kitchen sink, by swishing in tepid tap water with a little detergent. Some years ago I was given a burnt-out FT101 and the inside was a gooey mess. I gave it the water treatment first and then used acetone to clear the metalwork of the oily residue. By the way, the cause of the problem was a length of heavy-gauge wire soldered across the mains fuse cartridge. Moral: examine the fuses when looking at second-hand rigs."

TIP – To clean tarnished silver-plated components, including switch contacts, apply Goddards Silver Dip using a cotton-wool bud. Coaxial connectors can be 'dunked' for a few minutes (after removing the cable!) and then washed in water and dried as above.

TIP from G3GUD: To prevent silver-plated components from tarnishing in the first place, store them with a small piece of naphthalene (mothballs). The same would apply to a silver-plated masthead preamplifier.

RIPPLE-CURRENT RATINGS

WHAT IS RIPPLE CURRENT in a power supply? How do I choose a reservoir capacitor to handle it?

I MENTIONED RIPPLE current in passing in November's column about regulated power supplies. When you draw direct current out of a rectifier-capacitor supply (**Fig 1**), an alternating current of similar magnitude flows through the reservoir capacitor, which will be a high-value electrolytic type. This is known as 'ripple current' and since any electrolytic capacitor has significant losses the effect is to cause heating. Unless the capacitor is suitably rated, it will overheat and may eventually even explode, fountaining smelly white goo all over the innards of your power supply and knocking two years off your life-span!

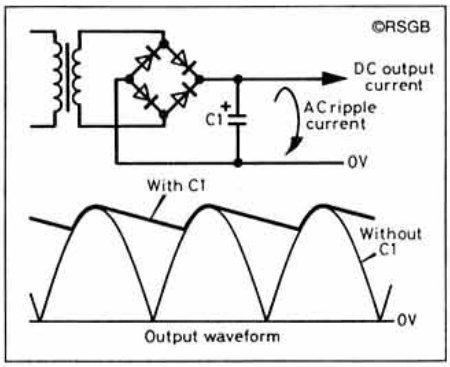

Fig 1: When DC current is drawn from this power supply, an AC ripple current of similar magnitude flows through the reservoir capacitor C1 as it smooths out the rectified half-sine waves.

The purpose of the reservoir capacitor is to smooth out the half-sine waves from the rectifier. Without the reservoir capacitor the waveform emerging from the rectifier would be as shown in Fig 1; note that the bridge rectifier acts as a frequency-doubler, so the frequency of this waveform is 100Hz rather than 50Hz. With the reservoir capacitor, the waveform is much smoother because current is drawn from the capacitor during the troughs of the ripple and the capacitor is recharged during the peaks. Reservoir capacitors have a voltage and also a ripple current rating, and both must be adequate for the job.

The voltage rating is fairly simple: at least 1.4 times the AC voltage across the whole of the transformer secondary in a bridge-rectifier supply, plus 10-15% for high mains voltages (especially if the supply is to be used on a generator), plus at least a few volts extra for safety's sake. For example a 12V DC supply may well have an 18V AC transformer, so the voltage rating of the reservoir capacitor should be at least (1.4 x 18V) + 15%. That works out to about 29V, so a 25V-rated capacitor would not be big enough and I'd only begin to feel comfortable at about 35V. The next-higher commercial rating is probably 40V so that's what you'd have to use. It may seem crazy to be using a 40V capacitor in a 12V DC supply, but do remember that the reservoir capacitor is also under considerable stress from the ripple current, so it pays to be cautious.

Ripple current begins to be a practical consideration in any DC supply producing more than a few hundred milliamps. At much higher currents than that, you must take account of it. The ripple-current rating should be at least 1.3 times the maximum direct current to be drawn from the supply, and a large safety factor would be no bad thing because the ripple-current rating is related to overheating and thus reduces with temperature.

When buying a new or surplus reservoir capacitor for a DC power supply, always look for a printed-on ripple current rating. This rating will be related to the size of the capacitor, which is why you can find electrolytics of the same capacitance and voltage rating in all sizes from miniature wire-ended components to screw-terminal cans the size of a coffee mug. Don't be misled by the fact that other people seem to have used tiny reservoir capacitors, especially in cheap-and-nasty power supplies of the kind I mentioned last month: a properly rated reservoir capacitor is a large component and will probably take up quite a lot of space alongside the mains transformer. If you're buying new, look for ripple-current ratings in the catalogue; if there isn't one, do not attempt to use that type of capacitor in your power supply. New methods of manufacture allow high ripple-current ratings in rather smaller sizes than of old, which is fine if you're buying new components but can cause problems when you're eyeing up a surplus capacitor at a rally. Unless the ripple-current rating is actually printed on the can, you have no way to tell whether you're holding a reliable modern miracle or an older-style capacitor which may go bang.

TRANSVERTER INTERFACING

I AM BUILDING A VHF transverter for use with my HF transceiver. The transverter re-

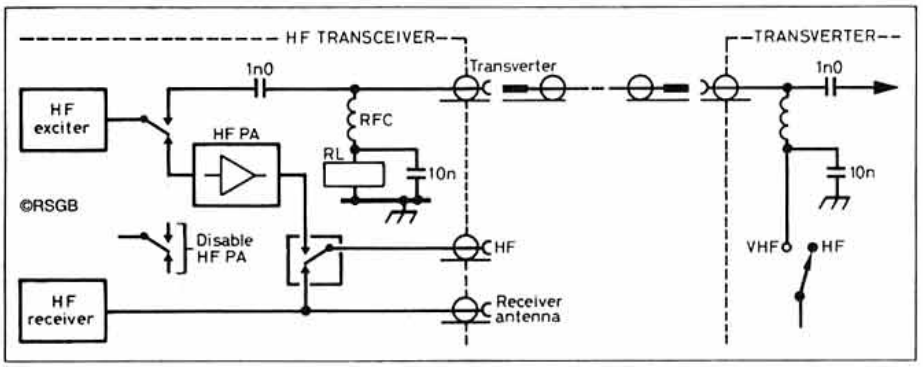

Fig 2(a): A VHF transverter up-converts your transmitted signal from 28MHz onto a VHF band, and similarly down-converts received signals to 28MHz. The transverter requires a low-level 28MHz drive signal, preferably *not* obtained from the normal antenna socket of the HF transceiver.

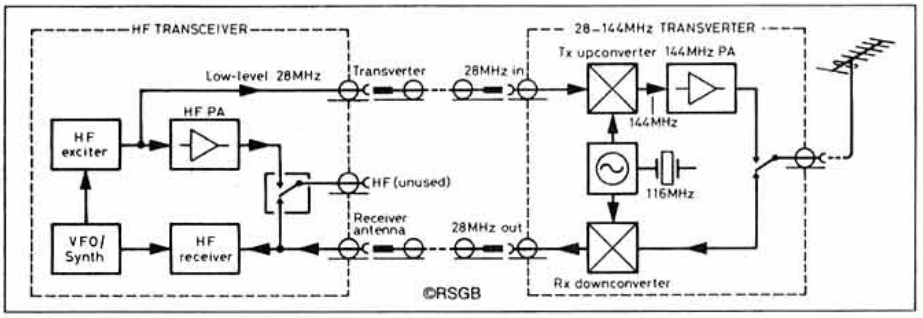

Fig 2(b): Ideas for relay-switching transverter modifications inside an HF transceiver.

quires 10-100mW at 28MHz but my transceiver has no transverter socket and its power is only adjustable from 100W down to 10W. What can I do?

HF TRANSCEIVERS TEND TO BE more highly optimized for DX working than the equivalent VHF/UHF-only transceiver, so an HF transceiver plus a transverter will generally give you better performance on VHF/UHF DX. If you're not familiar with the term, a transverter contains a down-converter for receive and an up-converter and a small power amplifier for transmit. Thus all the facilities of the HF transceiver (except the HF power amplifier of course) become available on the VHF or UHF band (**Fig 2(a)**). Unfortunately, the manufacturers no longer seem to recognise the need to use transverters, and few modern HF transceivers come factory-fitted with transverter sockets.

THE HARD WAY

Trying to interface a transverter directly to the output socket on the back of the HF transceiver is doing it the hard way. There are many problems with this approach, and if you get it wrong you may well damage the transverter. Firstly the available HF power level is far too high, and secondly the transverter has separate 28MHz INPUT and 28MHz OUTPUT ports, so you have to provide switching to separate the transmitted and received signals.

You might think about turning the HF power down to the minimum level of 10W and then attenuating that power down to the 10-100mW required. That would require an attenuator of 20-30dB, suitably rated to dissipate almost the entire 10W. However, you also have to provide suitable switching to by-pass the attenuator on receive, in a fail-safe manner that positively prevents you from shoving 100W of HF into the '28MHz out' port of the transverter. This is by far the largest cause of commercial transverters needing repair!

That's not the only problem, either. Any switching must be correctly sequenced so that all relays are changed-over before any significant amount of RF power arrives. Otherwise you'll get arcing and spikes of RF power where you don't want them, and even a short spike of power can damage the transverter. Moreover, the variable power level of many transceivers is controlled via the ALC (automatic level control) circuitry, which senses the power level at the output of the transmitter and adjusts the internal drive level accordingly. If a 100W transmitter is turned down to 10W using this method, there will always be an initial surge at about 100W before the ALC senses the excess power output and reduces it to 10W. Even if the transverter physically survives the switching transient, it will repeat after every pause in SSB speech or CW keying and make your signal extremely antisocial. This too is a very common problem.

THE RIGHT WAY

All that effort with attenuators and external switching is pointless because the separate 28MHz receive and low-level transmit lines that you need are already available inside the HF transceiver. Really the only satisfactory method of interfacing is to delve inside and find them. It isn't all that difficult. On the receive side, the best place to connect a transverter input is just on the receiver side of the antenna changeover switching where it's protected from high HF power levels. **Fig 2(b)** shows where to connect a socket, and indeed some transceivers already have a suitable connector labelled RECEIVE ANTENNA (Fig 2(a) shows this also). The transmit side may be a little more complex, but with all-solid-state rigs you can usually find a suitable low-level transmit signal at the input to the power amplifier module (Figs 2(a) and 2(b)). You will probably need to fit relay switching here, or if there's plenty of signal you may be able to 'borrow' a few milliwatts on a more permanent basis. There will generally be a DC control line into the HF PA which is intended to disable the PA on receive, so you'll need an extra set of relay contacts to switch this line and keep the PA shut down when transverting.

If you're using relay switching inside the HF rig, it's very handy to be able to control the changeover remotely from the transverter. My favourite method is to feed a switched DC control signal down the coaxial line from the transverter's 28MHz INPUT port – Fig 2(b). The relay is a subminiature 12V DPCO type, controlled by a 12V DC signal from the transverter as shown. You could use a third set of changeover contacts (or a separate relay) to disconnect the HF antenna from the RX ANT port, and ground it so that you can leave the HF antenna connected without suffering from IF breakthrough when using the transverter. Without the transverter plugged in and switched on, the HF rig operates entirely as normal and the transverter is protected against HF power getting into the wrong places.

How do you avoid drilling extra holes in the back of the transceiver? Often there are often a few extra coaxial sockets which you probably won't be using, such as PHONE PATCH connectors. Failing that, you may be able to unscrew an unwanted accessory socket (tape it up, still on its leads, and tuck it away inside) and use the hole to fit a small metal box to carry the plugs and sockets for your transverter interface. If all else fails, sneak thin cables out through ventilation slots.

I have used these ideas to modify three different HF transceivers, and although I cannot deal with enquiries about specific rigs, Fig 2(b) should get you well started. You might also check with the UK dealers for your particular make of transceiver, as they may be able to recommend detailed modifications for transverter interfacing. If your rig is still new, they *may* not regard a well-executed mod as invalidating the guarantee – *but do check with them first.* Another source of information on transverter interfacing and transmit/receive switching is *The VHF/UHF DX* Book.

UNTIL NEXT MONTH . . .

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.

Simply Silicon

MINI-CIRCUITS MMIC MAR-1 To MAR-8

- Wide frequency range
- Low cost
- Simple circuit layout
- Low power consumption
- 50Ω matching
- Good dynamic range

MONOLITHIC MICROWAVE Integrated Circuits (MMICs) have appeared in a number of transmitter and receiver designs over recent years. We thought it would be timely to take an in-depth look at a range of these devices manufactured by Mini-Circuits. They are easily available, and offer a number of useful features for constructors. With just two capacitors and one resistor, it is possible to construct an amplifier for stable operation over a wide frequency range (see **Fig 1** and **2**).

The amplifiers listed in **Tables 1 and 2**, except MAR-8 have 50Ω input and output impedances. The MAR-8 has a complex impedance which is frequency dependent and readers are advised to consult the manufacturers data sheet for this one. Note that the load resistor is effectively in parallel with the output impedance and at low supply voltages, could cause a mis-match. This can be corrected by adding an RF choke as shown.

The total impedance of resistor and choke should typically be 500 – 1000Ω at the lower end of the operating frequency range. Similarly, the coupling capacitors should have a low impedance. Suitable values might be 100nF up to 30MHz, 10nF to 300MHz and smaller value 'chip' capacitors above this frequency. Some experimentation may be useful here.

Finally, Bob Vernall, ZL2CA, has built an experimental amplifier using the MAR-6. His article from the NZART's *Break-In* gives a useful insight into practical applications and results using the MAR-6 MMIC.

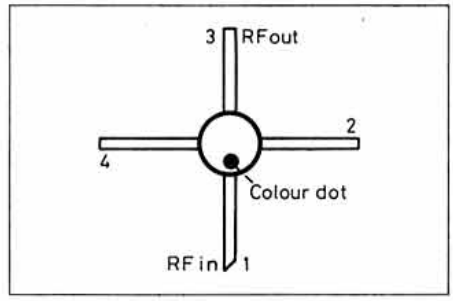

Fig 1: Connections to the MAR amplifiers.

Model Number	Colour Dot	Freq MHz	Gain dB (typ) at f(MHz) 100	500	1000	2000
MAR-1	Brown	DC–1000	18.5	17.5	15.5	–
MAR-2	Red	DC–2000	13	12.8	12.5	11
MAR-3	Orange	DC–2000	13	12.8	12.5	10.5
MAR-4	Yellow	DC–1000	8.2	8.2	8.0	–
MAR-6	White	DC–2000	20	19	16	11
MAR-7	Violet	DC–2000	13.5	13.1	12.5	10.5
MAR-8	Blue	DC–1000	33	28	23	–

TABLE 1

MANUFACTURERS DATA

Seven devices with different characteristics are listed in **Tables 1 and 2.**

Model Number	Maximum power, dBm at 1dB compression	Noise factor dB (typical)	3rd order Intercept dBm	DC Power in at pin 3 Current (mA)	at Voltage
MAR-1	0	5.0	15	17	5
MAR-2	+3	6.5	18	25	5
MAR-3	+8 *	6.0	23	35	5
MAR-4	+11	7.0	27	50	5
MAR-6	0	2.8	15	16	3.5
MAR-7	+4	5.0	22	20	4
MAR-8	+10	3.5	36	27	7.5

* +4dBm from 1 - 2GHz

TABLE 2

PRACTICAL APPLICATION

THE FOLLOWING IS from 'An LF to UHF preamplifier with only four components' by Bob Vernall, ZL2CA, reproduced courtesy of the New Zealand Association of Radio Transmitters, this feature first appeared in their journal *Break-In* (Dec 1992).

Yes, the title is correct. With two capacitors, one resistor and one MAR-6 chip you can make a very wideband preamplifier. However, it does need DC power to function, and depending on power supply needs, component count could increase greatly!

BACKGROUND

I WAS INITIALLY seeking to build a 20dB gain preamplifier to cover the low frequency bands. My transceiver includes a general coverage receiver that tunes down to the 100kHz lower limit. Sensitivity on the LF amateur bands is about 10dB down compared to higher amateur bands. Also the inbuilt 10dB preamplifier, which I normally use on HF, is automatically de-selected when the receiver is tuned below 1.8MHz (the transceiver designer perhaps rightly assumed that as the RF stages are broadband, the lowest range could suffer overload or other intermodulation problems from strong MF AM broadcast signals).

I sought an external preamplifier with around 20dB gain to give the receiver equivalent 'feel' and S meter readings on LF as one is accustomed to on HF amateur bands. Good bandpass selectivity provided in the LF antenna tuner meant I was not concerned with broadcast breakthrough.

WHAT COULD DO THE JOB?

SEVERAL BROADBAND amplifier circuits were tried using a computer emulation program. Indications were that it was none too easy to arrive at around 50ohm input and output impedance, have a reasonable noise figure and obtain a broad response so that no tuning was needed over the bands of interest.

So it seemed to be a project that might involve too much work for too little return. But then a local newsletter arrived, which included information on a homebrew converter to provide HF coverage for a VHF/UHF scanning receiver. It used 'MAR-6' wideband amplifier stages. Investigations showed that these are surface mount monolithic with the following nominal data: specified DC – 2000MHz, designed for 50Ω systems, rated gain is 20dB at 100MHz, 10dB at 500MHz, 16dB at 1000MHz, 11dB at 2000MHz, noise figure is 2.8dB, unconditionally stable, typical DC power 16mA at 3.5V, maximum ratings 50mA current and 200mW dissipation. And they are available from the Branch 74 trading table (New Zealand) for under $10(NZ). Various

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

other Mini-Circuits chips are also available, but the MAR-6 seemed to be the pick for a general-purpose wideband preamplifier.

AMPLIFIER IMPLEMENTATION

THE MAR-6 IS PHYSICALLY a '2mm black speck with four legs'. Mounting is easy, as the legs can be bent down so as to pass through PCB holes, whatever. The preferred way of feeding DC to the chip is via a resistor from a moderately higher supply voltage. For a nominal 12V supply 470Ω is satisfactory, providing around 20mA and keeping well within MAR-6 current and dissipation limits. Clearly this is also practical for RF performance as there is negligible loss from 470Ω shunting a 50Ω output.

Coupling capacitors should have low reactance at the lower frequency limit, which was 100kHz in my case. An 100nF gives around 15ohm reactance at LF, so this was chosen. A small piece of Veroboard was used for mounting components. Fifty ohm coax was used in the input and output, which may seem rather lavish construction for LF operation, but there was no point in restricting the usefulness of a wideband preamplifier for general use from LF to much higher frequencies.

Testing from LF to 440MHz shows it has a little over 20dB gain from LF to 30MHz, 18dB gain at 144MHz and 13dB gain at 432MHz. No instability was experienced. Also there was very little change in background noise level when DC to the preamplifier was switched on or off, indicating that it has a very low noise figure, over a wide frequency range.

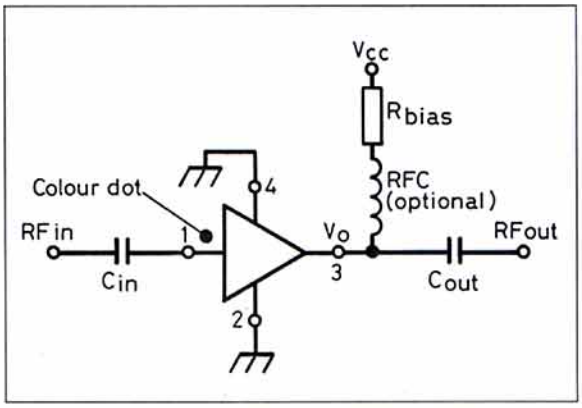

Fig 2: Connections to the MMIC could hardly be simpler.

The MAR-6 data indicates that gain at 432MHz should be 19dB, which is 6dB more than mine achieved. Capacitors typically exhibit inductance at frequencies above self-resonance, so my 100nF coupling capacitors are probably turning into moderate value RF chokes at UHF, and most likely explains why the measured gain falls away at UHF. If you want to make a preamplifier for a VHF/UHF scanner then 1000pF chip capacitors will probably be much better selections. While the MAR-6 specifications are DC to 2000MHz, it would seem that practical coupling capacitors dictate the realisable frequency range. The DC supply can be bypassed at the preamplifier if there is a possibility of RF noise entering via the power supply (gosh, is that a fifth component?)

A MAR-6 based preamplifier would have to be one of the easiest to build accessories encountered. It also provides very good value and performance.

AVAILABILITY

The MAR-6 is available from Cirkit Distribution Ltd, Park Lane, Broxborne, Herts EN10 7NQ. Tel: 0992 444111. The price is £2.61 each including 17.5% VAT, for quantities up to twenty, plus postage and packing at £1.40 per order.

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RADCOM TECHNICAL FEATURE

Filters and Ferrites in EMC

by David Lauder, BSc (Hons), CEng MIEE, G0SNO,
RSGB EMC Committee

THIS ARTICLE IS about the characteristics and use of various filters and ferrites for solving amateur radio EMC (Electromagnetic Compatibility) problems involving breakthrough of amateur signals into domestic equipment, such as television sets, video recorders, stereo systems etc.

This subject is covered in much greater depth together with many other important aspects of EMC for radio amateurs in the RSGB book, *The Radio Amateur's Guide to EMC*, by Robin Page-Jones, G3JWI. The book includes a comprehensive section on filters and ferrites written by myself with equivalent circuits, response curves and test methods. Various aspects of EMC have also been covered in *RadCom* and elsewhere, see [1] to [7].

INTERFERENCE OR BREAKTHROUGH?

IF YOUR TRANSMISSIONS affects broadcast radio or TV, it is important to find out whether the problem is caused by your transmitter producing unwanted signals in a radio or TV broadcast band. To cure this sort of interference, it is necessary to deal with the source of the unwanted signals, that is, the transmitter, not the receiver! Filtering at the transmitter output may be required and this subject is dealt with in [1].

If your transmitter is not at fault, then the problem is generally known as 'breakthrough', as it's caused by domestic equipment receiving strong amateur signals which it is not designed to receive. In the case of breakthrough on TV or radio broadcasts, all channels may be affected, while in other cases, (eg audio amplifiers), the equipment should not receive radio signals at all.

In a TV or broadcast radio, the first thing to check is that it is correctly tuned and that its aerial connections are in good order. In all cases of breakthrough it's important to make sure that the way your station is configured is not contributing to the problem. Where the breakthrough is not too severe, it can sometimes be cured by changes to the type or location of transmitting antenna system or, in the case of HF, the radio frequency grounding arrangements. These topics are covered in ref [2] and [3]. A small reduction in power may also solve some cases.

On each of these occasions, it is vitally important to remember that the root cause of the problem is the poor immunity of the TV or broadcast radio to strong out-of-band signals. If the breakthrough is still not cured, then you will need to add some filtering to the affected equipment.

There is, of course, a limit to the signal strength which the most immune TV can tolerate, even with filters fitted. Running the full legal power into a high gain antenna system close to neighbours' domestic equipment could exceed this limit!

HIGH PASS AND BAND STOP FILTERS

WHERE AMATEUR SIGNALS are getting into a TV, video recorder or FM broadcast receiver via its coaxial antenna cable, this can happen in two ways. The first is where amateur signals are picked up by the radio or TV antenna itself and fed down the coaxial cable in the normal way. These signals are sometimes referred to as being 'on the inner' of the cable but are more accurately known as 'differential mode' signals. They can be reduced by means of a high pass filter (HPF)which lets through the wanted broadcast signal but attenuates (reduces) amateur signals on lower frequencies. Another type of filter which may be used is a band stop or notch filter, which attenuates one particular amateur band only.

'BRAID BREAKERS'

THE SECOND WAY IN which amateur signals may be picked up is commonly referred to as 'on the braid' of a coaxial cable although this type of signal is more correctly known as a 'common mode' signal. For these signals, a

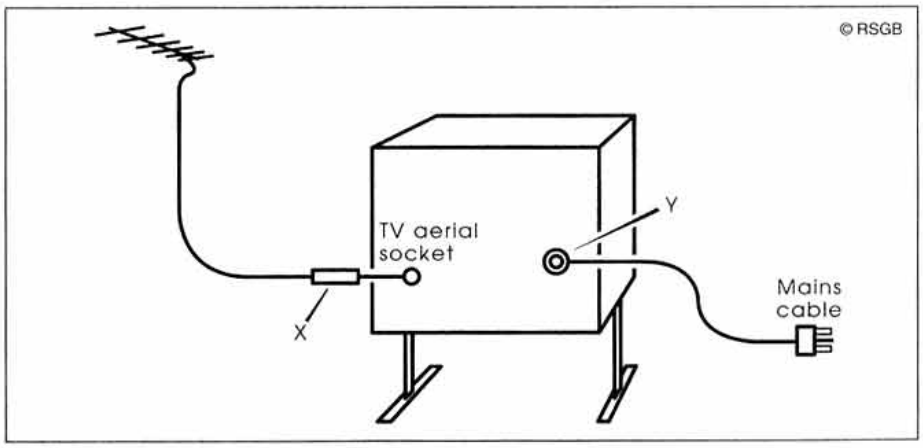

Fig 1: Fitting filters to a TV set alone.

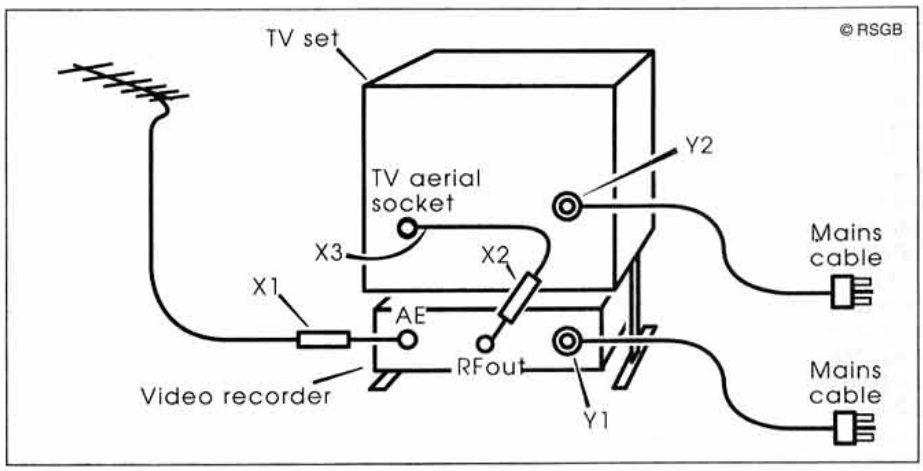

Fig 2: Fitting filters to a TV set with video recorder.

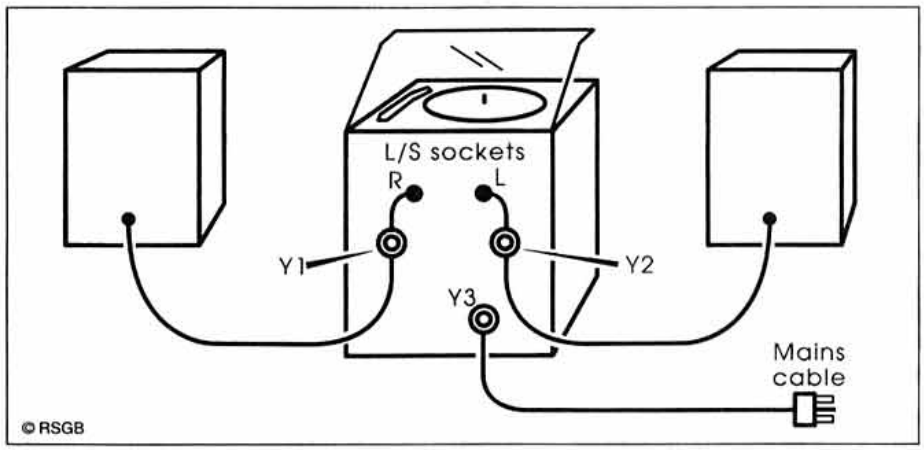

Fig 3: Fitting common mode chokes to a stereo system.

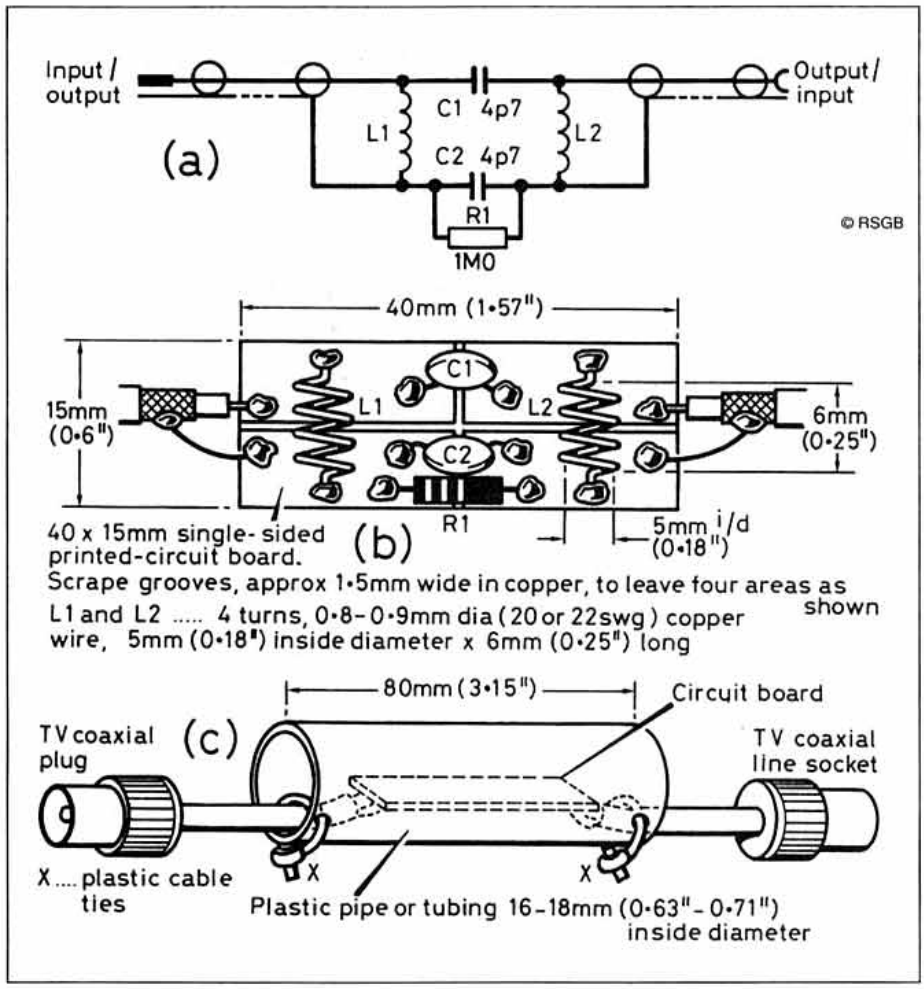

Fig 4: Home constructed high pass filter and braid breaker. (a) circuit diagram, (b) layout, (c) housing.

filter with so-called 'braid breaking' action is required. The simplest way of achieving this is by means of small value capacitors in series with both the braid and the inner. A more effective type of braid breaker is a 1:1 transformer as used in the AKD BB1 and HPFS filters.

A third type is a common mode choke type of braid breaker where a coaxial cable is wound into a coil, often on a ferrite ring or rod core. The common mode choke has the advantage of virtually zero loss for the wanted differential mode signal and it can also be used on any type of cable which is picking up amateur signals, not only coaxial cables but also audio cables, mains cables etc.

WHERE TO FIT FILTERS

SUITABLE LOCATIONS FOR filters on a TV set without a video recorder, are shown in **Fig 1**. 'X' represents a filter and/or braid breaker in the coaxial antenna cable and this is often all that is required, especially at HF. In some cases it is better to fit the filter 0.5 to 2 metres away from the TV set, for example at a coaxial wall socket (the filters are bi-directional so it does not matter which is the input and which is the output)

If this does not cure the problem, then a common mode choke 'Y' may also be required on the mains lead. Keeping this 0.5-2 metres away from the TV set may make it more effective at HF. To avoid the need to remove mains plugs (especially if moulded on!), a short mains extension cable can be made up with the cable wound on a suitable ferrite core.

Fig 2 shows where to fit filters to a TV with a video recorder. A filter and/or braid breaker should be fitted in the coaxial cable at 'X1' and if this is not sufficient, another should be fitted at 'X2' or 'X3'. Further filtering may be required, such as common mode chokes on the mains cables at 'Y1' and/or at 'Y2'.

In cases where an indoor pre-amplifier is used, it will generally be necessary to fit a filter at its input(s), and sometimes also at its output(s). A common mode choke may also be required on its mains lead.

In the case of breakthrough into the audio amplifier of a stereo system, common mode chokes should be fitted near the speaker sockets as shown by 'Y1' and 'Y2' in **Fig 3**. For ease of fitting, two short speaker extension cables can be made up, each with its cable wound on a separate ferrite core. In some cases, common mode chokes may also be required on other cables such as at 'Y3' on the mains cable.

Fig 4 shows a high pass filter suitable for home construction.

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NEXT MONTH

IN PART TWO, David Lauder describes the characteristics of several practical filters.

Christmas Crossword

Have a go at our Fun Christmas Crossword and you could be one of the lucky four people to win a Nicad Charger!

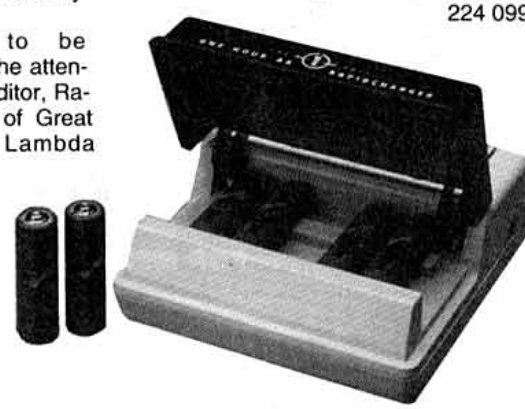
Millennium, one of the world's largest manufacturers of rechargeable products have let us have four of their new 1-hour battery chargers plus batteries to offer as prizes in this competition. You will recall that these were featured in *Product News* in September's *RadCom*.

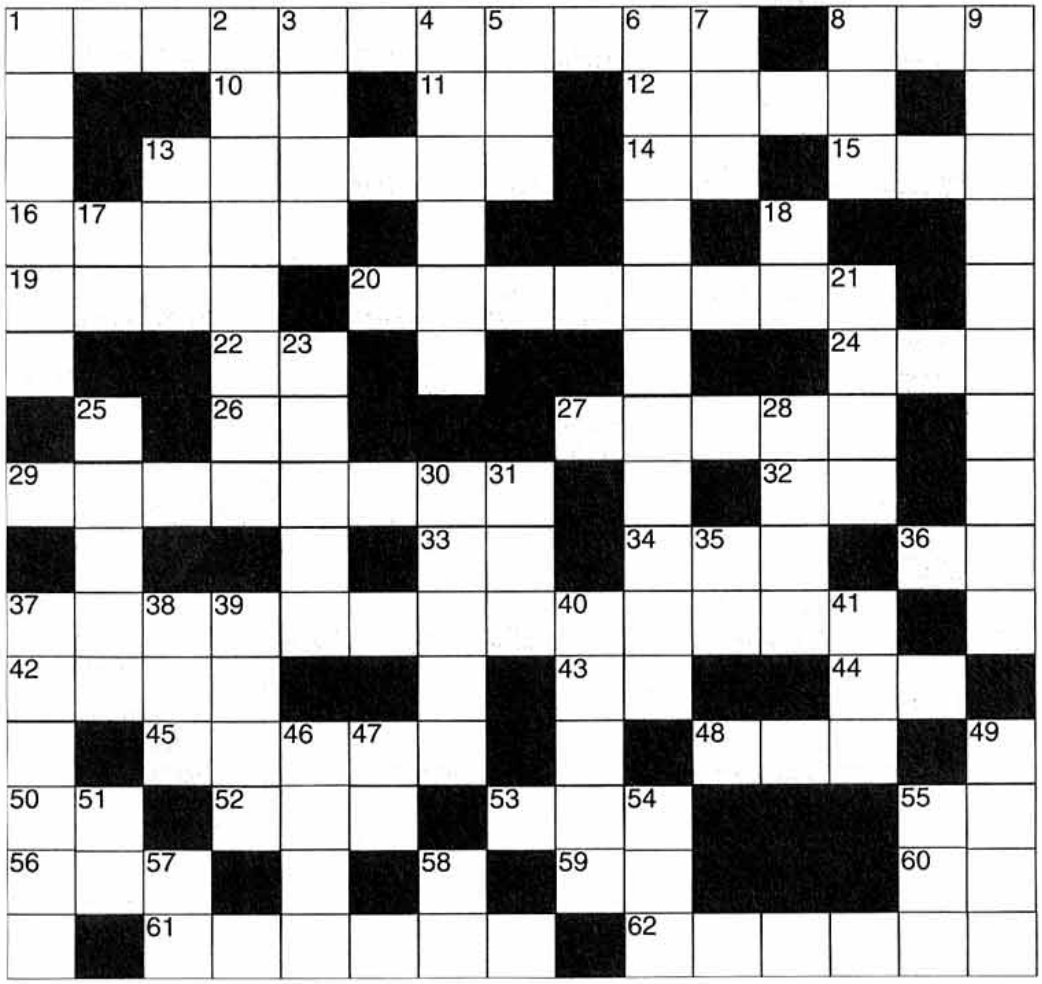
Just fill in the crossword. If you don't want to spoil your copy of RadCom, take a photocopy of the page first, or let us have a list of the answers - then send in your entry to reach us by **3 January 1994**. The winners will be the first four correct entries picked out of the 'hat'.

So, get all the family involved in this one, and you could be saving a fortune in batteries if you are one of the lucky winners.

Entries to be marked for the attention of the Editor, Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

● Information on Millennium can be obtained from Oakes-Bacot Ltd, 58 Queen Anne Street, London W1M 9LA, Tel: 071 224 0994.





CLUES ACROSS:

1 Queen's town covered (11)
8 The first step (3)
10 Friends west of Fishguard (2)
11 Abbreviation for Europe
12 Personal direction (4)
13 Order a wider margin (6)
14 Location of cockney headgear (2)
15 Cone tree (3)
16 Picture, no graph (5)
19 Before the storm (4)
20 Identification (8)
22 Mobile aid (2)
24 Were at 9-down (3)
26 New paragraph (2)
27 She was out of this world (5)
29 Keeps talkers and keyers apart (8)
32 And behold! (2)
33 Do not stay (2)
34 A round-about way (3)
36 The Queen indoors (2)
37 A humanitarian award (13)
42 No longer imperial but well contested
43 A gate (2)
44 A Welsh station (2)
45 Twixt coax and dipole (5)
48 German resistance (3)
50 Exclamation (2)
52 Numerous (3)
53 Title of a walker (3)
55 Thanks to the part-timers (2)
56 Do not stand (3)
59 Jersey is one of these (2)
60 Monetary Department (2)
61 A RARE expedition (6)
62 High Z device (6)

CLUES DOWN

1 Mountaineers' aid (6)
2 South Pole sponsor (8)
3 Outdoor pool (4)
4 Albanian aid (6)
5 Not in (3)
6 For signals which go both 5-down and 39-down (11)
7 Microwaved (3)
8 Look up French society (3)
9 A naval display here (10)
13 India Oscar Lima
17 Dali? (2)
18 For example (2)
21 Pico plus (4)
23 Computer or tree? (5)
25 River transport (5)
28 A special Lotus (4)
30 More than once (5)
31 French? No! (3)
35 Not out (2)
37 Wow! A special event station (6)
38 Lima Romeo Bravo (3)
39 It's only two, but it sounds like it ought to be at Dawn (4)
40 Subject of a technical nature (5)
41 This year it's in Manchester (3)
46 Opposite of gain (4)
47 Ukraine station (2)
49 Deer reviewer (4)
51 Chuckle (2)
54 Round the top (3)
55 Smart dress demands one (3)
57 — or not —? (2)
58 Soldier in Northern Ireland (2)

This Month's Book Choice

Reviewed by Pat Hawker, G3VA

AERIALS II

by Kurt N Sterba & Lil Paddle. A compilation of columns from *Worldradio*, 1985-93.

Published 1993 and available from Worldradio Inc, 2120 28th Street, Sacramento, CA95818, USA (916-457-3655). 84 large format pages with soft covers, price $11 plus $2 postage to the UK.

THE EARLIER *Aerials* was noted in *Technical Topics*, April 1993, p51 where it was explained that a husband and wife team, under the noms de plume of 'Kurt N Sterba' (Sterba Curtain) and 'Lil Paddle' have for a decade in *Worldradio* attempted to destroy at least some of the major myths and old-wives tales that so often surround the operation of amateur-radio antennas. These tend to be perpetuated and/or exploited by some antenna suppliers, over-the-air chatter and in editorial articles as well as the advertisements in some radio publications either from lack of knowledge or carelessness.

Aerials II is the mixture much as before although UK readers may find it is slightly more relevant to the American rather than the European scene - but there is plenty of universal truth within its pages. In his foreword, W1ICP lambastes manufacturers who have "totally no regard for the truth when it comes to gain, bandwidth, performance, etc . . . . then we have the amateur who acquires a little knowledge and misinterprets it. He - or she - goes on the air and holds forth with a string of errors. And, worse, other amateurs accept it as fact".

Manufacturers have no excuses, but on behalf of non-professional amateurs I have to confess that in the field of antennas it is all too easy to get some things wrong. Which is why we need such outspoken, pull-no-punches, critics as the authors of these books.

BRITISH RADIO AND TELEVISION PIONEERS

A Patent Bibliography by David W Kraeuter.

Published 1993 by The Scarecrow Press Inc. 207 + x pages (hard covers). ISBN 0-8108-2716-6. £27.50.

THIS IS A SPECIALISED book, listing as it does the titles of over 1,100 British patents taken out between 1840 (Wheatstone) and about 1955 by 29 inventors deemed by the author to have contributed significantly to the development of radio and television. Patents are listed in chronological and alphabetical order and there is also a cumulative title index, but no attempt is made to describe, other than by title, the contents or significance of the patents.

And there are curious omissions - for example no mention of the many patents taken out in the short life of Alan Blumlein who was mainly responsible for the development of the EMI 405-line electronic television system and stereo disc recording or by Alec Reeves (STC/ITT) who, among many other contributions, invented pulse code modulation (the basis of digital audio and digital video).

However among the 29 are Professor W H Eccles (the 1923-24 President of the RSGB), several Honorary Members of the Society including Marconi, Oliver Lodge and William Crookes, and also John Scott-Taggart, 2ST. The most prolific patentee who seemingly had the habit of patenting everything in sight whether or not it could ever be fully developed was John L Baird with 175 patents. Perhaps more significant were the 170 patents of S G Brown, 123 of E Y Robinson and 105 of H J Round. Marconi himself was satisfied with 47, but his company is well represented not only by H J Round but also Charles S Franklin (65). A research tool rather than a readable book.

RADCOM Helplines FOR MEMBERS

● Wanted, a user/service manual for a **Philips Sampling Scope** type PM3400 (large and heavy) to borrow or copy. All expenses defrayed. Information to G8DPS, QTHR or tel: 081 399 8787.

● Dave Hobden, F/G3XMY needs a circuit diagram of a WW2 vintage **Collins TCS 12** Receiver. All expenses will be reimbursed. Contact Dave at Chez Goribon, Nieul Le Virouil, Mirambeau, 17150 France.

● Information of any source for a voice coil or any spare parts for a **Vitavox** Loudspeaker. Company is believed to have ceased trading some time ago. Contact David, G4LQT by tel: 0785 663688 or 662884 or by Fax: 0785 664977.

● Any information of a supplier or other source for a military **Heliograph** or preferably two, or a military Signalling Lamp, in a wooden case with a Morse Key on top. Anyone able to help, contact Peter Dolphin, G3ELH at 3 Buckmore Ave, Petersfield, Hants, GU32 2EF.

● Fred, G3GZJ, wants any information of a supplier or other source for an audio amplifier chip type **LA3122** for a Sony Music Centre type HMK33B. All expenses reimbursed. Any info tel: 0326 561393.

● A circuit diagram and any technical literature for a **Codar CR70A** Receiver which is in need of an overhaul. Any information to G4HSA who is QTHR.

● Circuit diagram for the **RF Probe** only of the Heathkit VTVM model IM-1B and a Handbook for the Racal RA17 Receiver. Any one able to help contact Adair, G3MDQ who is QTHR.

● Circuit diagram and operating instructions for a **Beulah** Electronics Transistor Test Set model D909. Any information to Ivor, G4RTR who is QTHR.

● Circuit diagran and/or other information for a **MARC** VHF/FM Receiver, 12 Volts, 12 Xtals, Model Nr 56VF1 - No 16092679. All help much appreciated. Write to Mr E Eastwood, G1WCQ, 56 The Mede, Freckleton, Preston, PR4 1JB or tel: 0772 686708.

● John, G3GTJ, wants a circuit and/or Operating instructions or any other technical information for a Marconi Instruments Standard Signal Generator **TF144H/45**, Military designation Generator Signal **CT452A**. All costs will be refunded. Any information tel: 0963 24319 or write QTHR(93/94).

● Paul, G0BHA, would like to beg, borrow or hire for a period of three months, a **Pedal Generator**, type used with the Mk123 Spy set or similar, for operation/battery charging on Ellesmere Island, Arctic Circle next May. If able to help contact Paul at 11 Dudley Crescent, Hooton, S Wirral L65 1AW or tel: 051 327 1481 or contact Dave Rycroft on 0934 823933.

● Information or loan of diagrams and/or manual for a DYMAR Type 1680 Freq Counter and a Kingshill NS1550 13.8v 60A Power Unit is required by Brian, G0RIZ. He can be contacted by telephone on 0872 78020.

● Douglas, G3KPO, wants the loan or a copy of the service book for the **Taylor Valve Tester Type 45D2**. All expenses refunded. Please write to: 52 West Hill Road, Ryde, IOW PO33 1LN or tel: 0983 567665.

● A special request now from Daniel Romila, YO2LCG, an Electronics engineer from Romania. He would like to contact anyone who is interested in corresponding by letter or postcard in English. Daniel can be contacted at Str Circumvalatiunii, NR.69 SCA AP28, Timisoara 1900, Romania.

● Information of any source for a Audio Output transformer for the **AR88LF** Receiver. Contact J P Bortowski, GW0FPY at 4 Bryn Deiniol, Valley Road, Llanfairfechan, Gwynedd LL33 0SR.

● Circuit diagram and/or manual wanted, to copy or purchase for the **Sommerkamp** FL-1000 Linear Amplifier. All expenses paid. Any information to G3XHM who is QTHR, or tel: 0983 566607.

Seasons Greetings

from

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Christmas is with us once again and our good wishes go out to all of our loyal customers who have helped to make 1993 another good year for us. We'll be making sure that 1994 is a good year for you! The last quarter of this year has seen some dramatic changes in the business side of amateur radio. We are pleased to be playing a major part in these developments, which we are sure will be of real benefit to everyone in the hobby, and customers of Lowe Electronics in particular. Although famous for over twenty years as Kenwood dealers, Lowe now stocks, sells, and more importantly services, Alinco and Icom, and for Yaesu fans, we'll have some really exciting news in 1994!
Join us in 1994. We can see a good year ahead of us and we'd like you to share in it! Happy New Year!

WE'VE GOT FOUR PAGES OF GOODIES HERE FOR YOU! WHY NOT REMOVE THESE FROM YOUR RADCOM AND LEAVE THEM SOMEWHERE FOR YOUR FRIENDS AND FAMILY TO FIND! MAKE SOME PHOTOCOPIES IF IT WILL HELP! SLIP ONE INSIDE YOUR WIFE'S COSMO OR GIVE A COPY TO THE KIDS WITH THEIR POCKET MONEY!
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BRISTOL'S OPEN DAY !

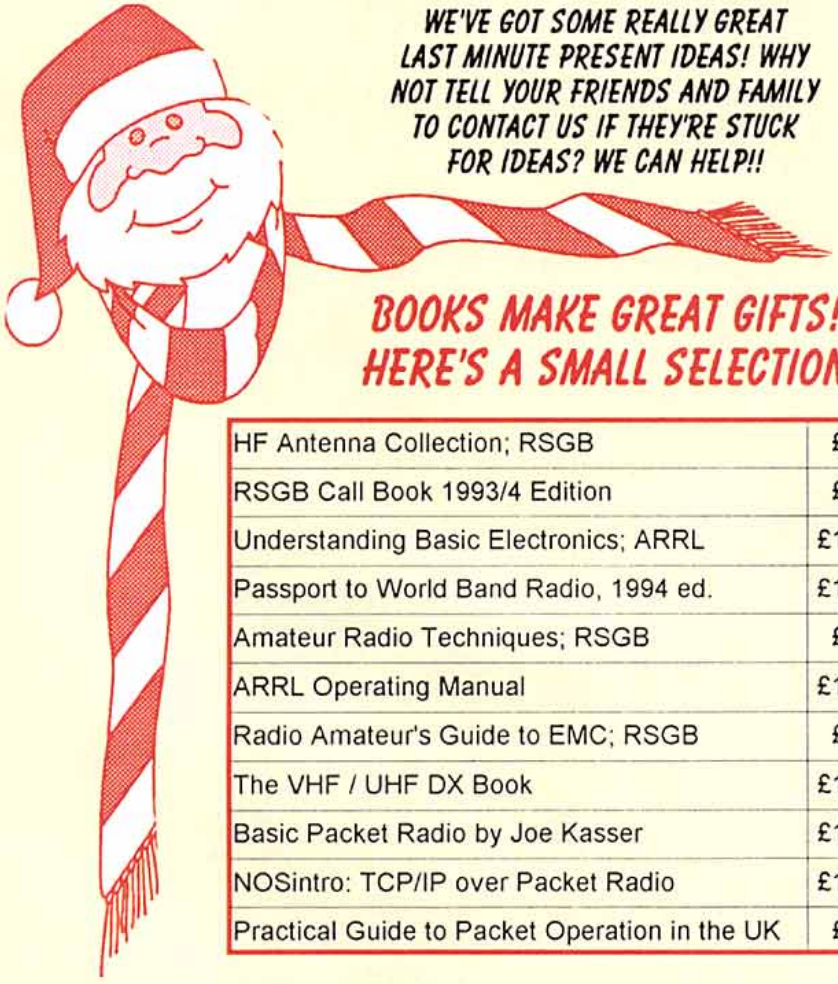
It's been almost a year since we relocated our Bristol branch, so on the 11th December, Tony and Dave will be opening the doors to customers old and new. They're planning a bit of a party to celebrate with free refreshments all day and of course lots of special offers. Why not call in and see them?

SAT 11TH DECEMBER!

FREE XMAS CHEER! A GLASS OF WINE AND A MINCE PIE WAITS AT ALL OUR BRANCHES DURING XMAS WEEK!

...AND PARTY TIME AT CAMBRIDGE!

We've moved our Cambridge branch! Not too far though, just a few doors away from the old place, so you'll still know how to get there! Tony, G4NBS, our man on the spot there has got a really nice new showroom for you to visit, and with a lot more space, he's got lots more great gear for you to play with! Pay him a call before your mates buy up all the bargains!



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Pat Hawker's Technical Topics

MAINS ADAPTERS ARE NOT FUSED

GEORGE HOOK, G2CIL, recently reported that a teenaged visitor from the USA used an 'Austin House type 3-300' mains adapter to plug her hair drier into one of his 240V AC three-pin mains sockets. The drier was intended for 117V American mains supplies; the ring-mains had the usual 30A fuse. The inevitable result was that the drier burnt out!

G2CIL suggests that the Hong Kong mains adapter should have been fused (presumably at 2A), but to my mind that is not a valid suggestion since such adapters are intended for use with a variety of appliances etc. While mains plugs attached to an appliance can and ideally should be fused, I do not believe that any of these adapters, including those still used in the UK for converting the old three round-pin sockets into flat-pin sockets, are ever fused. The real problem, it seems to me, is that visitors from or to overseas countries are often unaware of the local mains supply voltage. While the UK is standardized at 240V, most countries in 'Continental Europe' have 220V supplies and North America 117V.

The package in which the Austin House adapter is sold in the USA and Canada carries a warning (although not prominently) "Does not convert electricity" and in French "Il ne s'agit pas d'un transformateur" as well as a note "Use with our converters and with Dual-Voltage Appliances" from which it would appear that the firm also market 'converters' (presumably transformers) to cope with 240/220/117 voltages. But, one can understand that visitors who have lived all their lives in North America come to Europe unaware of the difference in mains supplies. Similarly there are subtle differences in mains practice (including the third pin 'earthing') between UK and Continental-Europe that could in some circumstances be important when using such adapters with amateur radio gear.

The answer thus is not to be found in having fuses in such international adapters, which are useful devices, but in better customer education, ensuring that travellers are made more aware of the different mains voltages and mains practices in different countries. In the continued absence of 'universal' standards, and it is highly unlikely that mains voltages in Europe and America will ever be the same, this need will remain for the foreseeable future. I recall that at the IBA a frequent enquiry from the public was why television sets made for the European 625-line Standard G system would not provide 'sound' on the UK 625-line Standard I and vice versa.

With transatlantic tourism now big business, one hopes that American amateurs bringing over equipment, including battery chargers, should always be aware of the difference in mains voltages. *QST, 73* and *CQ* please note!

IMPROVING SPEECH PROCESSING ON THE FT901/902

GENERALLY, I DO not feel that *TT* is the right place for information on the modification of modern factory-built rigs since this is likely to be of interest to only a limited number of readers and may invalidate guarantees etc. Nevertheless, modifications to equipment can illuminate ideas of general interest.

Jan-Martin Noeding, LA8AK bought a Yaesu FT-902 in 1988 but was disappointed when 'on-air' reports suggested that the RF speech processor had little or no effect. He writes: "I measured the IF after the processor ('Unit board'). With the processor switched in, the audio varied between 60mV (pure whistle, limiting operating) and 240mV (no limiting) whistling shhhhh. The IC is a typical 10.7MHz FM limiter (similar to the CA3028). It may work for a 'single-tone' but it clearly does not work for multiple-frequency bursts such as speech!

"There have been a number of items in the FT-Newsletter about modifications to the FT901 but I have been uncertain whether these are just proposals or are based on actual tests. The circuit boards for the FT-901 and FT-902 are nearly the same, and the circuit diagrams are the same except for a few component-value changes. An extra SSB filter is used for the processor so clearly it is intended to provide a significant facility.

"I connected two anti-parallel-connected diodes at the output from the limiter. The effect was excellent! The RF output from the board was now a steady 60mV independent of whether the input was speech or pure tones.

"There was another strange circuit (labelled 'Processor Level') for which the manual explanation seemed even stranger. This used a BC108-type transistor (Q207) with varying base current and no direct current in the collector circuit. I believe this was intended to vary the drive output from the board (not 'processor level' which should vary IF to the clipper circuit). In practice the circuit arrangement seemed to have no measurable effect. DL1BU has found a similar arrangement on another of the boards (AMGC) with less than 1dB variation.

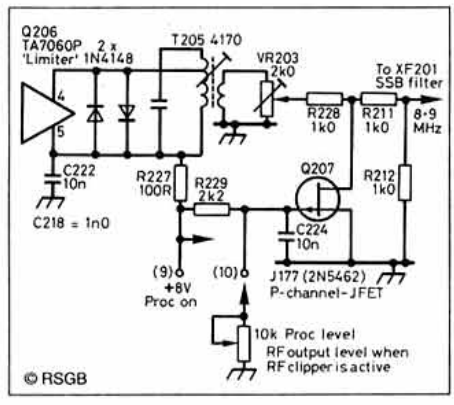

Fig 1: LA8AK's modified RF speech processor on his FT901/902 and possibly the FT101ZE (?). FT902: PB1994. FT901: PB1703c.

"I removed the NPN transistor and replaced it by a p-channel FET (a J177 proved to be the best). The result was that the IF level from the board could be varied, at least 25dB down, using the 'Proc Level' control. With a 2N5462 FET the control was only 15dB down.

"After making these modifications, the 'on-air' reports were very good, with operators on many bands reporting that they had never heard a better RF clipper! Several operators who are known to be quite critical of speech quality considered there was no significant distortion although speech levels were considerably increased. In fact it was found to be an advantage to leave the processor *on* even for local contacts. Of course, there are a few operators who seem to hate any clipping regardless of its quality but they are a small percentage.

"The modified RF processor (**Fig 1**) has been used successfully at LA8AK for almost four years."

HAND-HELDS AND SMALL LEAD-ACID BATTERIES

IT IS GENERALLY recognised that one of the perennial problems when using hand-held VHF/UHF transceivers for emergencies, or where operation in the field is required over an extended period, is the limited capacity of the usual rechargeable nicad batteries, and the relatively high cost of replacement packs if they are damaged by over-charging, etc. There is also the problem that the charge of an unused nicad battery leaks away quite quickly so that it may be found to be 'flat' when needed in a hurry.

This problem is tackled in an article 'A long-haul H-T battery system' by Thurman Smithey, N6QX (*QST*, Sept 1993, pp 23-26) which stresses that sometimes the utility of a hand-held transceiver (H-T) is limited by its standard-issue, (usually) short-duration battery: "If you're providing public-service communications for an all-day event, for example, you may find that your battery has died long before your stint is over. There are many other situations, including emergencies of all kinds, where a portable, heavy-duty H-T power source would prove advantageous."

N6QX's answer to this problem is to use two series-connected, compact, sealed 6V, 2.5Ah lead-acid batteries to provide the 12V needed for his transceiver, together with a charger that enables the batteries to be recharged from any 10-15V DC source. Batteries and charger are portable enough to be carried in a small shoulder-slung bag.

His system is based on the following requirements:

(a) The battery must be chargeable from any 10-15 volt DC source.

(b) The charger must be shut off automatically when the battery is completely charged. An indicator must be provided to signal when charging is complete.

(c) There must be an accurate means to indicate the discharge level of the battery as it is being used.

(d) The battery output voltage must be regulated to suit the requirements of any H-T that can't be operated directly from its 12-volt output.

N6QX stresses the importance of the choice

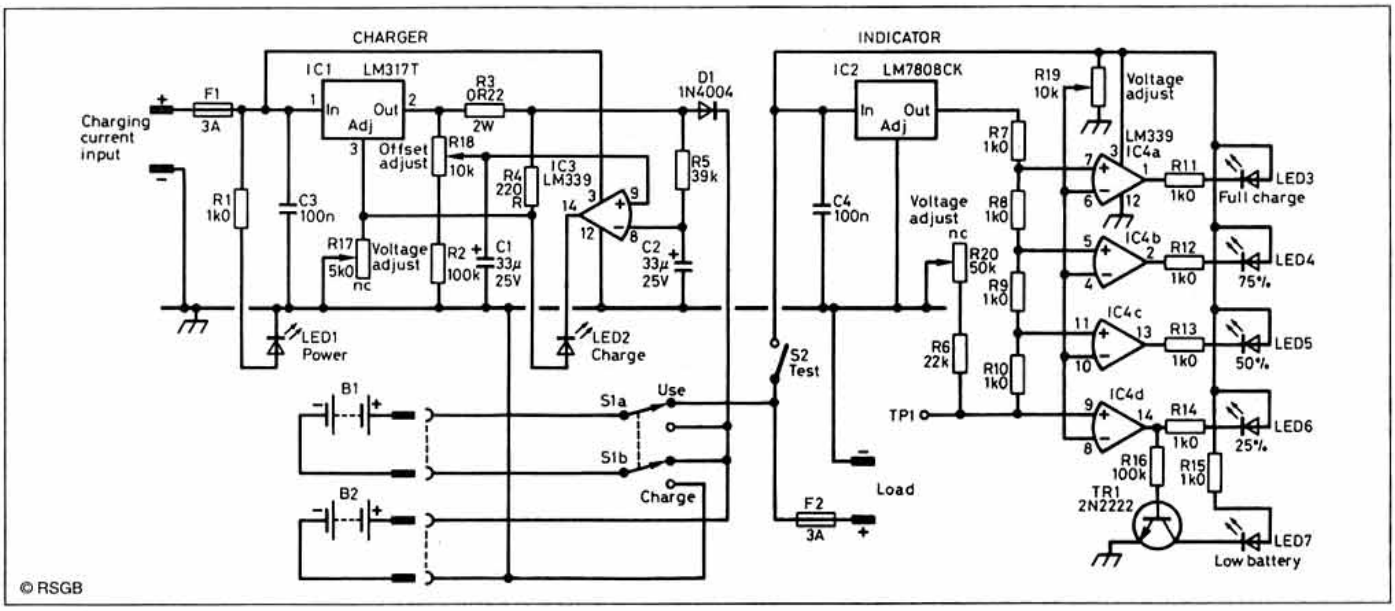

Fig 2: Circuit diagram of the charger/indicator unit for use with small lead-acid batteries providing 'long-haul' operation of hand-held transceivers. BT1, BT2, 6V batteries, eg Panasonic LCR6V2. DS1 T-1.75 LED, yellow. DS2, 3, 4, 5 and 6 green. DS7 red.

of battery: "I selected sealed, paste-electrolyte, lead-acid types. They hold their charge better than Nicads and they're readily available at reasonable prices. I chose two 6-volt batteries which are paralleled for charging, then connected in series to provide a 12V source for powering H-Ts. An added benefit of this switchable series/parallel approach is that it allows the use of either battery to supply 6V loads (video cameras, video lights, portable electric lanterns etc)".

His system, other than the batteries, includes the charger, the battery-condition indicator and the output regulator: "A sealed, 12V lead-acid battery of from 2 to 4Ah capacity is fully charged when its terminal voltage reaches about 15V and the charge current has dropped from its initial value to about 0.25A. This assumes that the charging source maintains a constant voltage at the end of the charge cycle. The charger shut-off circuitry uses this current drop to define the full-charge condition". **Fig 2** shows the system as used for 12V loads and suitable for many popular H-Ts. **Fig 3** shows the voltage regulator system needed for H-Ts designed for operation from lower voltages such as 9V.

The *QST* article provides a detailed description of the operation of the charger circuit (using an LM317T adjustable voltage regulator and LM339 quad comparator), the battery-condition indicator circuit (using an LM780CK voltage regulator and all four sections of another LM339 quad comparator), the output regulator as well as details of constructing and calibrating the charger and battery-condition indicator. N6QX notes that he has found that no single calibration of the indicator unit is truly accurate with several different battery types: **Fig 4** shows the discharge characteristics of four different batteries, all with the same 100Ω load, all having just been charged using the charger. He considers the variations to be great enough to affect significantly the accuracy of the indicator.

N6QX also provides hints on reconditioning small lead-acid batteries often offered cheaply in an 'as found' condition. He writes:

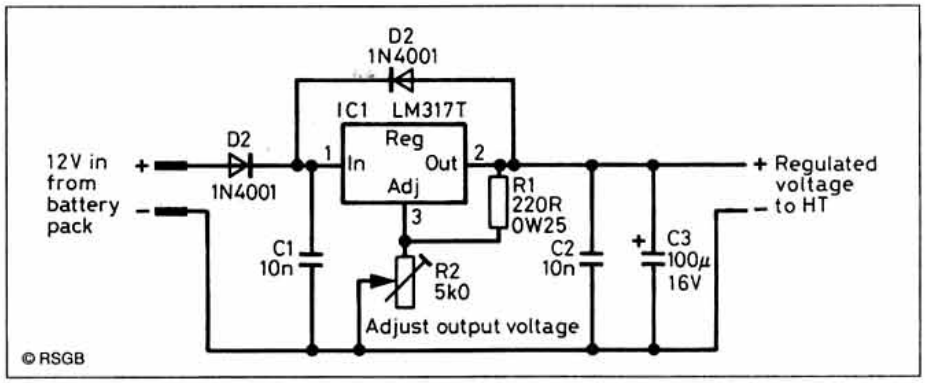

Fig 3: Voltage regulator used for hand-held transceivers requiring less than 12V. R2 .5W linear taper, 15 turns.

"Most of the used batteries appear completely dead, showing no open-circuit voltage at the terminals. A battery in this condition can still be returned to a portion of its original capacity, but it takes a bit of doing and may not be worth the effort.

"When you first place such a battery on charge, it appears for all intents and purpose to be an insulator. If checked with a milliammeter, however, there will be a small current flowing, which increases with time. If possible apply a higher voltage. I have put up to 50V on a 6V battery to get the current started, but be warned and include a suitable resistor to prevent excessive current which could melt the battery if it comes 'alive' when you are not around.

"If this is not enough to start current flowing, try applying the charging voltage in reverse for about 30 seconds, allowing no more than 0.5A to flow – a process often recommended by the manufacturers. The rationale is that when the battery is inactive for a long time, one of the electrodes becomes surrounded by a film of distilled water, which prevents current flow. Charging in reverse for a brief time has the effect of mixing some ions with the distilled water.

"Once current flow has started, it can be increased by repeated charging and discharging until it behaves much as a normal battery. However, the capacity is unlikely to be more

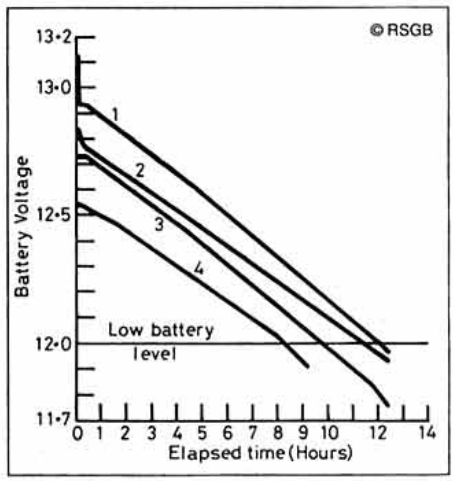

Fig 4: Battery discharge test results on various new and rejuvenated batteries. No 1 new Panasonic LCR6V2.4P. No 2 used Gates 2V. 2.5Ah, D-cell array. No 3 as No 2. No 4 used Yuasa 4Ah. All discharged through 100Ω load.

than about 60% of its original rating. When shopping for second-hand lead-acid batteries, take along a small load, eg a bulb. If the bulb lights there is a good chance that you have a winner. If the battery is completely flat, it will need a lot of work to bring it back to life and results may be mediocre.

"D-sized cells are popular on the surplus

'TWO-CLICK' PTT SWITCH

TREVOR DAY, G3ZYY, originally developed a double action switch to activate a digital voice recorder for contest use, but then realised that it could equally well function as a push-to-talk switch for repeater tone-burst operation. He writes: "All converted PMR rigs and a large number of factory-made amateur transceivers have their toneburst buttons/switches, if fitted at all, mounted on their front panel. When operating at home, this is not a problem, but it tends to be annoying, if not dangerous, particularly if the panel is not easily reached while operating mobile.

"The circuit shown in **Fig 6** will enable you to send a brief toneburst at the start of transmission simply by 'double clicking' the push-to-talk switch. A single click has no effect other than to switch the transmitter on; a double click switches on the transmitter but also adds the toneburst to the start of the transmission. The circuit comprises three NE555 timer chips operating in a standard configuration but with the interconnecting wiring determining whether or not the third 555 (IC3) will operate. The first closure of the PTT switch starts IC1 and would start IC3 if its supply line were powered. However, IC3 is powered by the output of IC2 which is still 'off'. Meanwhile, IC1 remains operating for about 100 milliseconds and on completion triggers IC2 which is set to operate for about 500 milliseconds during which it provides a supply for IC3. A second click of the PTT during this period will trigger IC3, which then provides an output of 12V for about 250 milliseconds; this output can be used to power a toneburst circuit directly or used to operate a small 12V relay which can activate an existing toneburst.

"In brief, activating the PTT once in the normal fashion will not produce an output from the circuit; but if operated twice within less than half-a-second will provide an output that can be used to activate a toneburst (or equally well used for some other application).

"The device can be built externally and added to any existing rig without modification. Most converted PMR rigs and some of the older 144MHz rigs will usually have enough space internally that will accommodate the small circuit board. The prototype was built on double-sided copper-clad PCB using one side as ground, but it could equally well be built using Veroboard, etc, since the layout is not critical."

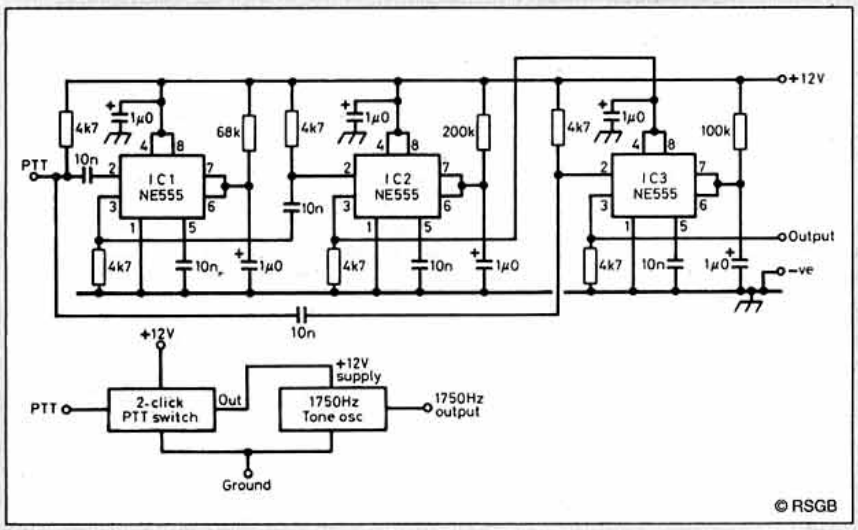

Fig 6: G3ZYY's 'two-click' push-to-talk switch giving toneburst with the second click.

market, either as individual cells or packaged assemblies. If the price is right it may be worthwhile to buy say 20 cells and then discard those found to be substandard. I recently purchased 20 individual D cells all of which showed 2V or more at the terminals but eventually discarded 12 as substandard. However, despite the time involved, I still wound up with one good battery set for very little cost."

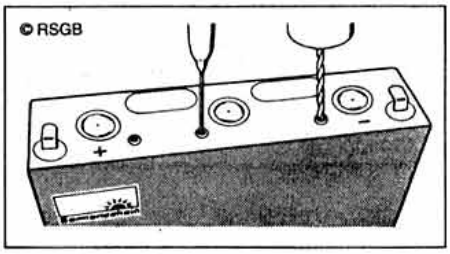

Fig 5: Rejuvenating the three cells of a 6V Druyfit rechargeable battery by drilling a hole into each cell and injecting a little distilled water by means of a syringe, and later sealing the holes with Uhu-plus or similar adhesive.

Earlier items in *TT* have described a rather different method of rejuvenating sealed lead-acid (gel-electrolyte) batteries such as the 12V 1.1Ah and 6V 2.6Ah batteries marketed under the brand names 'Dryfit' or 'Sonnenschein'. For example *TT*, Feb 1988 showed how such batteries could often be rejuvenated by drilling a hole into each cell and injecting a little distilled water by means of a syringe; later sealing the holes with a suitable adhesive, **Fig 5**. It was noted that although these are 'sealed' units (eliminating acid spillage) and with a 'solid' electrolyte, for safety reasons they include pressure vents to deal with any excessive build-up of pressure due to over-loading or over-charging.

The procedure, based on an article in a German magazine, was given as follows: "First carefully drill into the top cover of the battery (just clear of the cell vents) with a 2-3mm diameter drill. Three cells in a 6V battery, six in a 12V one. Then, with the aid of a syringe, inject into each cell some distilled water, approximately 1.5ml/Ah of normal capacity. Leave the battery for some hours and then re-seal the holes with an adhesive such as Uhu-plus. After a couple of charge/discharge cycles, the capacity of the battery should then be restored to nearly its original value, although one cannot guarantee success."

AN EARLIER SINGLE-COIL Z-MATCH ATU

INTEREST IN SINGLE-COIL Z-match ATUs – as initially described by Tom Seed, ZL3QQ, and then taken up by a number of Australian amateurs – continues to be widespread. For example Bill Orr, W6SAI, has featured this ATU in the August and September issues of *CQ*, including a report on his experience in constructing and trying out an ATU based on the circuit shown in the August *TT* (Fig 1). He gives ten practical suggestions to help those building or using this design, from which these brief notes have been extracted: ". . . .

(2) The fibreglass coil form is mounted in the clear, in a vertical position. The coil is 'hot' so keep it clear of the capacitors . .

(3) The 4-turn pickup coil (L2) is a loose slip fit over the main coil. I used high-voltage hookup wire wound by hand into a coil with five plastic cable ties used to hold the coil in shape . . . .

(4) Tuning is sharp and interlocking. A dual-needle SWR meter that registers forward and reverse power, plus SWR, will simplify tuning. Tune for minimum reflected power at the same the maximum power output is obtained. One eye on the ATU dials and the other on the SWR meter does the trick! Once you have found the correct dial settings, log them for future use . . . .

(6) The 'tune' circuit is high-Q and plenty of circulating current flows in the coil and the leads to the capacitors. I first tried a commercial air-wound inductor of No 16 tinned wire. It ran quite hot. Substituting a coil of No 12 enamel-coated wire resulted in much less heat loss . . . .

(7) With the values given, the unit tunes from 3.5 to 11MHz and 13 to 30MHz with a gap between 11 and 13MHz . . . .

(10) There is an intense RF field around the coil. Leave plenty of air and don't cram it in a small metal box . . . ."

A useful technique for making secure taps to ATU coils was indicated by G4XPP, in *TT* May, 1993, p57, Fig 10. Although intended for air-spaced coils, it could be adapted for large diameter wires wound on formers.

Tom Seed, ZL3QQ, has kindly sent me a copy of his original three-page article 'A single coil Z-match antenna coupler' as published in *Break-In* (March 1992), including two corrections to the type-setting of the

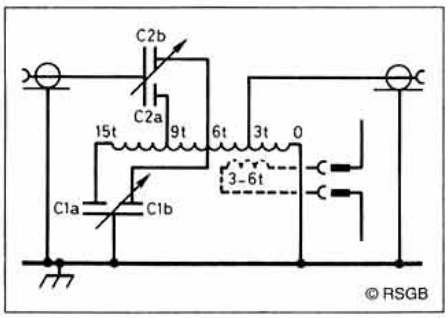

Fig 7: PA0FRI's 3.5/28MHz 'single-coil' Z-match-type line matching unit as described in *TT*, July 1989 and suitable for use with resonant antennas, some non-resonant antennas but should not be expected to cope with a very wide range of reactive impedances.

mathematical expressions. This recognises that the genesis of virtually all antenna matching circuits is the basic 'L-section' network of which there are four possible arrangements including one using a series capacitor and a shunt inductance. He provides the fascinating information that the combination used in the conventional two coil Z-match circuit, exhibiting parallel resonance at two different frequencies and a series resonance between them, was described as early as 23 March, 1918 (yes, 75 years ago!) in *Circular C74* of the Bureau of Standards, which includes reference to the use of the series resonance condition to suppress unwanted harmonics!

And although ZL3QQ appears to be the first to have published a detailed explanation of the theory of operation of a single-coil Z-match ATU together with practical designs, a basically similar approach was used by PA0FRI as a line matching unit and featured in *TT*, July 1989. Surprisingly, it seems to have attracted relatively little attention at the time. In view of the current interest in this approach it seems worth repeating this pioneering 1989 item:

"Frits Geerlings, PA0FRI, whose PL509 linear design appeared in the June [1989] *TT*, also contributes details of his 'Freematch' line matching unit (LMU) for reducing the SWR seen by a transmitter on the coaxial cable feeder to resonant antennas (see **Fig 7**). It is a modified version of the well-known Z-match and is designed as the results of experiments in flattening the SWR on the five HF bands between 3.5 and 28MHz (plus the WARC bands) without the necessity for switching coils and with a minimum of knobs. It is essentially a 'kiss' approach, cheaper and faster than an automatic ATU provided that the calibrated settings on each band for minimum SWR are known so that the capacitors can be quickly reset.

"PA0FRI writes: 'The Freematch has been devised as an unbalanced tuner for improving the SWR at the transmitter end of coaxial feeders to resonant antennas (eg verticals, dipoles, trapped dipoles, G5RVs, Yagis, loopquads, etc). In practice it has proved more flexible than expected and in some cases permits matching to non-resonant antennas. With an extra 3-6-turn bifiliar winding over the earthy end of the coil (as indicated) a 'balanced' output for 75Ω twin wire or 300Ω ribbon feeder is feasible. However, it should be noted that this design cannot satisfy all possible matching conditions (eg random length wires), though it is possible that this can sometimes be overcome by increasing or decreasing the length of the coaxial feeder and/or reversing the input/output terminals of the Freematch. To meet all possible matching conditions a more complex arrangement would be necessary.

"Component information: Coil 15 turns of 2.5mm diameter enamelled copper wire on 5cm (2-in) inner diameter. For powers lower than 200 watts, a T200-2 toroid can be used with 15 turns on 0.75 of the body covered with plumbers' PTFE tape. Taps 3, 6 and 9 turns from earthy end. Variable capacitors can be receiver-type twin-gang (10-490pF per section) for powers up to about 100 watts or for higher powers if power is reduced during tuning. For QRP operation a T200 toroid and two air-dielectric variable capacitors discarded from transistor radios can be used. If random sized coils are used the taps should be ratio n, 2n, 3n for a coil having 5n turns."

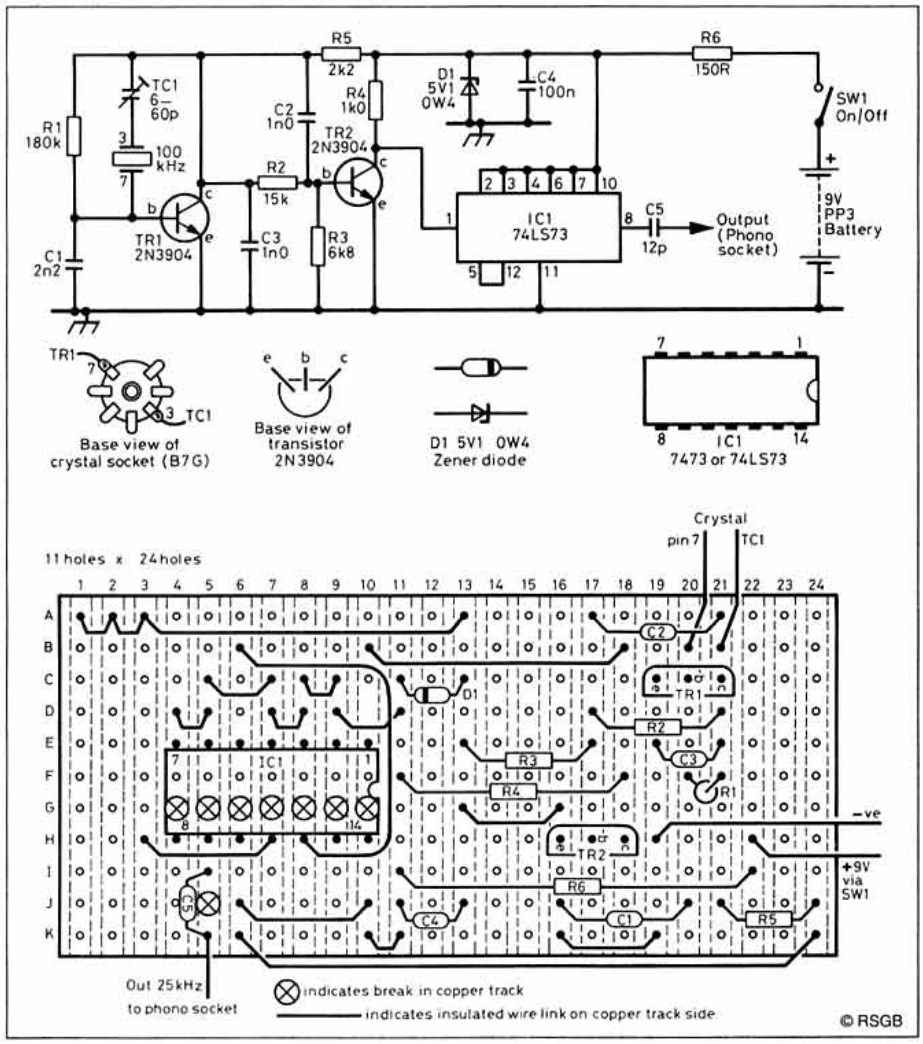

Fig 8: The 'Tuna Checker' providing 25kHz marker signals up to at least 30MHz and using easily obtainable components. Typically, it may be constructed on a piece of stripboard such as Veroboard. (*D-i-Y Radio*, September-October 1993). [Turn to page 59 for *D-i-Y Radio* Christmas offer price – *Ed*].

25KHZ CRYSTAL CALIBRATOR

IT IS A LONG time since *TT* has included circuit details of one of the ever-useful crystal calibrators that provide marker signals up to or beyond 30MHz, and those given in *ART7* are based on dated components. It therefore seems well worthwhile to reproduce the circuit diagram (**Fig 8**) of the Tuna Checker fully described by Steve Ortmayer, G4RAW in a constructional feature of the RSGB's *D-i-Y Radio* (September-October, 1993, pp6-7). This provides marker signals spaced at 25kHz intervals derived from a 100kHz crystal (suitable crystals in glass envelope and B7G socket obtainable from J Birkett of Lincoln, price £2.55 including post & package) using a 74LS73 divide-by-four IC. The calibrator is powered from a 9V PP3 battery but note the requirement for the 5.1V Zener diode to reduce the voltage applied to the chip.

The name 'Tuna Checker' derives from the fact that G4RAW constructed his in a tuna tin on which the crystal is mounted externally with a stripboard such as Veroboard (11 holes by 24 holes) held inside by the stiff wires connecting the socket. The battery is held with a bracket bent from a strip of aluminium. For fuller details including a component list keyed to the Maplin Electronics catalogue, see *D-i-Y Radio*. If you tend to be forgetful, battery consumption would probably be reduced by using a push-button switch rather than the small toggle-type switch specified by G4RAW.

OUR DEBT TO ARTHUR, G2MI

The sad news of the death, after nearly 70 years as an active amateur, of that 'grand old

METAL FATIGUE & ANTENNA ELEMENTS

ON A NUMBER OF occasions, *TT* has noted that tubular antenna elements often fail after they have been fluttering, or vibrating, over a long period even in a relatively low wind speed, and has suggested that this is due to a combination of metal fatigue and vortex shedding. Medium speed winds, at well under 35MPH, when they strike an elongated cylindrical object create vortices or swirls of air; if these are shed from the object in a regular, orderly manner related to a natural resonance of the object, they constitute an exciting force. A commonly cited example is the pronounced low-frequency hum that comes from overhead telephone wires when the wind blows at a specific speed.

As explained in *TT*, November 1989, p30, when aluminium is flexed at levels below its yield-stress, while no permanent bend results, the damage accumulates and if the flexing is repeated sufficiently often there will be a fatigue failure. In effect metal fatigue is the weakened condition induced in metal parts of machines, vehicles or structures by repeated stresses or loadings, ultimately resulting in a fracture under a stress much weaker than that necessary to cause fracture in a single application,

It was suggested by K5IU that antenna-element fatigue failures can be minimised in a number of ways, including filling the inside of tubular elements with the type of foam intended for sealing and insulating cracks and holes in buildings, or by fitting energy absorbers at the ends of the antenna elements to reduce flutter-type oscillation.

Energy absorbers, of a type suggested many years ago, can be made from a sheet of flat rubber or pliable plastic material 1/8th to 1/4-in thick by 5-6in long, If this is made just wide enough to wrap once round the element, the damping will be matched to the size of the element. This material is cut lengthwise to make four taps and positioned so that the free end of the tabs are about 2in from the ends to prevent changes in the electrical length or impedance of the elements: **Fig 9**. Roger Bunney, for many years the DX-TV columnist in *Television*, noticed the earlier reference to fatigue failures in *ART7* and comments as follows: "Some years ago I was involved in a partnership with South West Aerials and made a number of aerials for Band I (41-68MHz) TV-DX enthusiasts. The problem of flutter metal fatigue was noticed and quickly rectified. At these frequencies, resonance tends to occur on very warm still days and can cause a loud buzzing/rasping noise. I found that climbing a mast to examine a 50MHz element will show the points of resonance: on a reflector cut to Channel E2, there are usually two points of vibration in each element (ie the two elements comprising the one reflector) one very close to the boom and another near the extreme end. Touching the point of vibration can be very uncomfortable, almost painful.

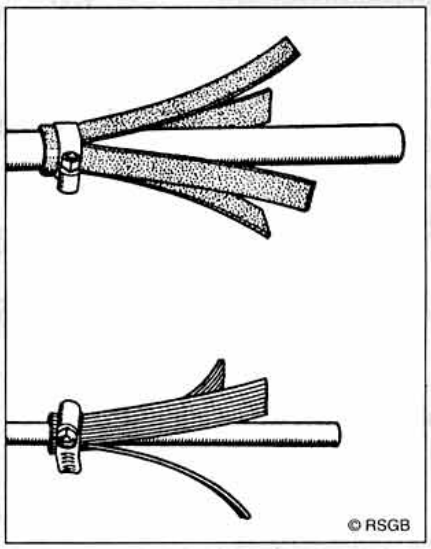

Fig 9: Energy absorbers fitted at the ends of antenna elements to reduce flutter-type oscillation brought about by vortex shedding at specific, low wind speeds.

"In all my aerials only the reflector would display this resonance. Elements made of seamed alloy generally do not display this problem which occurs primarily in seamless tubing. We always used hard-drawn seamless tubing for maximum strength so as to avoid bending or damaging the elements during erection. The solution was simply to insert about 12-in of sash cord into each element. this will damp the resonance and prevent vibration. If the elements are plugged then normal sash can be used; otherwise use waxed sash to prevent water soaking up and producing a heavy weight that will cause the ends of the element to sag. Elements should be plugged, in any case, as a precaution against wind whistle! Another TV-aerial firm of yester-year, Telerection of Weymouth used to make numerous Band 1 arrays, filled their elements with sawdust – this tends to soak up water but the general principle is the same."

On the topic of antenna metalwork, a rather different tip comes from Peter J Cott, G3BDV. He suggests that when the household needs a new rotating 'washing line', have a good look at the old one before it is thrown away. In his case he found that by turning it upside down, it became an instant antenna support for experimental purposes, as shown in the illustration. But don't be tempted to use one that has not been discarded or this could provoke domestic discord!

man' of Amateur Radio, Arthur Milne, G2MI, has been reported elsewhere, but it seems appropriate for *TT* to recall how much the original *T&R Bulletin* of the 1930s and then the *RSGB Bulletin* of the 1940s owed to him.

By 1931 he was a member of the Society's small editorial committee which in those 'non-professional' days was responsible for actually putting together the monthly journal – with Arthur acting as the draughtsman, redrawing most of the hundreds of circuit diagrams etc submitted by contributors. One of the first of his own contributions was 'The preparation of circuit diagrams for publication' (*T&R Bulletin*, October 1933) followed a few months later by a detailed description of an ingenious automatic Morse sender. This was based on a surplus uniselector as then used in Strowger automatic telephone exchanges (*T&R Bulletin*, March 1934) that he built long before the time when such auto-keyers could be based on electronic memory. By wiring suitably the eight arcs of 25 contacts, his mechanical device could key a transmitter to send at choice repeated sequences of 'TEST de G2MI', 'TEST BERU de G2MI', 'TEST 56 de G2MI' or a string of 'VVVs', noisy but effective!

In July, 1939 while Honorary Editor, Arthur took over from HAM Whyte, G6WY (post-war for many years VE3BWY), 'The Month on the Air' which all too soon became 'The Month *off* the Air'.

As a Council Member in 1939, he was one of the first Voluntary Interceptors for the Radio Security Service (M15/M18). A few years ago he told me how in Spring, 1940 he received urgent 'broadcast transmissions' from the SIS/diplomatic transmitter in Norway helping this to regain contact with the Whaddon base station in time for arrangements to be made to bring King Haakon VII to the UK. As a result, he was invited to Wormwood Scrubs prison, temporary wartime HQ of MI5, to receive personal thanks from Colonel (later Brigadier [Sir]) Richard Gambier-Parry, ex-2DV, head of MI6 Section VIII and Special Communications.

He gave a lifetime of unstinting service to the Society and to amateur radio. We should honour his memory. [A full obituary of Arthur Milne can be found on page 89 – *Ed*].

HERE AND THERE

N D N Belham, G2BKO, writes: "I have been using the MSM6322 in connection with some hearing-aid research and have found that the signal-to-noise problem can be almost eliminated by discarding the internal microphone amplifier. Using the Maplin board the output from an external microphone is fed into pin 9 and the link LK2 cut.

A common 8 volt supply was used with a 7805 IC regulator, mounted on pins 1 and 2 and connected to pins 3 & 4, to supply the Maplin board with 5 volts." [The OKI MSM6322 integrated circuit was featured in 'Simply Silicon', *RadCom*, Sept '93 – *Ed*].

The May *TT* item 'Radiating light bulbs' included a report on Tom Saxton's, G3LJR, experiences with the new ranges of compact bayonet-socketed fluorescent lamps in which he reported that while his Osram lamps did not result in any significant RFI problems, the lower cost Mazda range did.

Further confirmation comes from George Clarkson, G3RHM, who found that his long-life 60 watt equivalent (actual consumption 13 watts) Mazda "LOWenergy" lightbulb generated radio frequency noise that peaked around 2.2MHz, extending downwards but falling off around 3MHz: "It is a positive loud horror on 1.8MHz . . . . designed for places where lights are left on for long periods!" ***G3VA***

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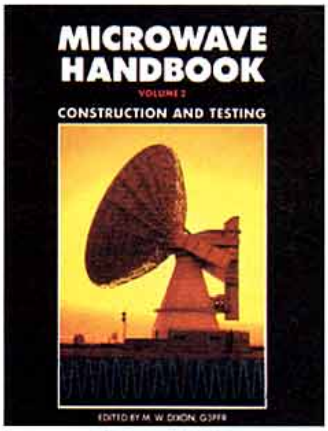

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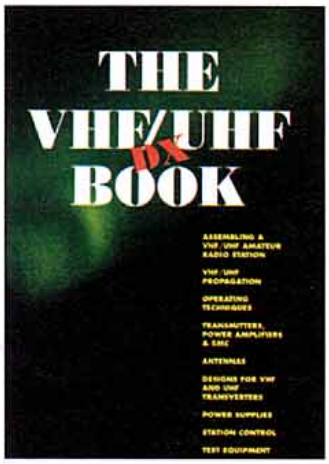

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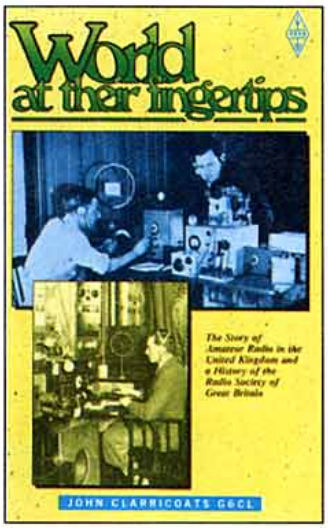

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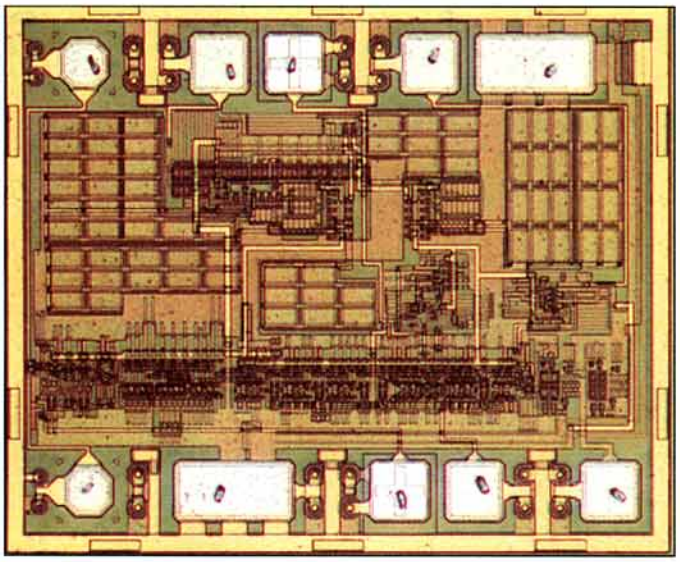
see page 95 for details. Special offers are available to members only and are valid until 31 December 1993.

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.

ANYTHING WHICH reduces power consumption on VHF/UHF portables has got to be welcome. Often, nearly half of the case is the battery compartment! Two new prescaler ICs from Plessey are intended for the cellular telephone market, but could also have applications in amateur band synthesizers. Frequency response of the **GEC-Plessey SP8714** extends to 2.1GHz and it's a dual modulus divider with selectable ratios of either 32/33 or 64/65. Operating current is just 6.8mA. The **SP8715** operates to 1.1GHz and has divide ratios of 64/65 or 128/129. The makers claim typical power consumption for this device of 3.6mA. In standby mode, consumption is less than 30μA. GEC Plessey Semiconductors have adopted a new 'push-pull' output stage rather than the usual emitter follower type, which enables a near 50:50 mark:space ratio.

Contact: Ruth Harrison, Action Desk, Lenvale House, Hollingworth Court, Ashford Road, Maidstone, Kent ME14 5PP



WE'VE RECEIVED a number of enquiries recently concerning continuous tone-coded squelch system (CTCSS) encoders and decoders. Therefore it was most interesting to learn of a module which could be incorporated into VHF/UHF transmitters and receivers. This is the **Consumer Microcircuits CM1482** sub-audible signalling module for CTCSS and DCS (Digitally Coded Squelch) operations.

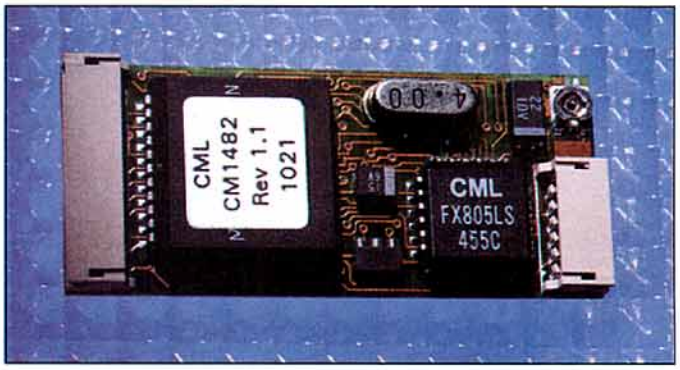
The unit has a host of different operating modes, which are very straightforward to set up using an IBM-PC compatible computer.

Average power consumption is approx 5mA from a 6 to 26V supply, and the module measures just 50 x 22 x 8mm. The facilities offered by this board should make it highly attractive to repeater groups, and although designed primarily for the PMR market it has obvious benefits for amateurs who use repeaters.

Contact: Joseph Electronics Ltd., 2 The Square, Broad Street, Birmingham B15 1AP. Tel: 021 643 6888.

MANY READERS enjoy a little weekend construction, and if you like experimenting with antennas then the new **C.M. Howes CTU150** Antenna Matching Unit could be your kind of kit. This ATU covers all bands from 1.8 to 30MHz and has a power rating of 150W PEP RF for SSB or CW operation. Thus it should be fine for the 100W commercial transceivers, in common amateur use.A dual capacitor 'T' matching network is used and all components are mounted on the PCB. A 12-way switch with 5A silver plated contacts is used for band selection, and this matching unit is fine for either coax fed or long wire antennas. An optional hardware pack gives the ATU a really smart appearance, and the CTU150 is also available as a ready-built PCB module.

Details of this and the many other Howes kits can be obtained from: C.M. Howes Communications, Eydon, Daventry, Northants NN11 6PT. Tel: 0327 60178.



Leicester Show

A COUPLE of photographs from the recent Leicester Show provide us with the opportunity of introducing Mike Ellis (top picture) of Specialist Antenna Systems showing his new 'Eagle' range of high quality VHF/UHF antennas.

The bottom picture shows Peter Rodmell, G3ZRS, of Peter Rodmell Communications, arguably Britain's leading manufacturer of linears. In this picture he is demonstrating the 1000 watt 'continuous' output capability of his latest model.

● HAVING SOUGHT a suitable British partner through the advertising columns of *Radio Communication*, antenna and tower manufacturers Vargarda Radio AB of Sweden have announced the appointment of Jaytee Electronic Services of Herne Bay (0227 375254).

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For more details contact: Waters and Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: 0702 206835.

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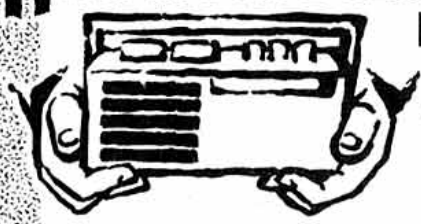

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RADCOM TECHNICAL FEATURE

The New HF Data Mode: Clover

The second of a three-part feature by Jack Hollingworth, ZF1HJ

IN ORDER TO DEAL with wide variations in ionospheric conditions one of Clover's strategies is to utilise a total of ten different modulation methods. This is achieved by applying different levels of phase and/or amplitude modulation to the pulses, in various combinations. Phase modulation ranges from binary, representing 1 bit for each pair of tones in each 32mS frame, to 16 levels (of 22.5°) describing the state of 4 bits for each tone in every 32mS frame, a total of 16 bits per frame. Amplitude modulation ranges from none through 2 levels to 4 levels.

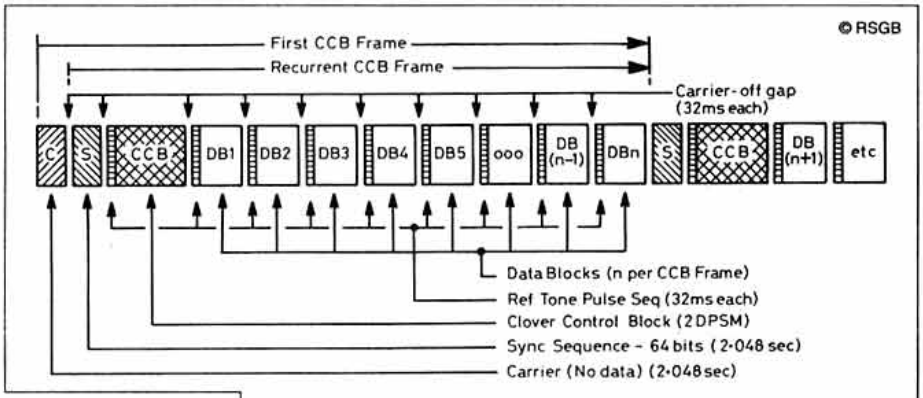
At one extreme, a form of frequency shift modulation is used, in which channels 1 and 3 are paired to send data by shifting the phase of the pulses in a binary manner; the same data is sent in the same way on channels 2 and 4, thus providing two-channel diversity at a rate of 31.25 bits per second. (We are considering here the raw data throughput, not the amount of data carrying useful information.) This is the most robust, and of course the slowest, modulation method.

At the other extreme, when ionospheric conditions are very stable, it is possible to reliably detect much smaller degrees of phase modulation and also to detect pulse amplitude changes. Using a combination of 16 levels of phase shift and four levels of amplitude shift on each channel, a raw throughput of 750 bits per second can be achieved. Between these extremes there are eight more levels of modulation that can be selected. All the combinations available are listed in **Table 1**, together with the raw data throughput in bits per second for each mode.

CLOVER DATA BLOCKS

IMPULSE NOISE CAN easily destroy one or more bits in a stream of data. The longer the block, the higher the chances are that at least one bit will be subjected to such a 'hit'. This is why HF packet requires so many repeats – an error in one bit requires that the entire block be repeated. (As each packet data block includes a large overhead of bits carrying system data rather than useful traffic, even a 'short' Packet block is relatively long, as well as being inefficient.) It also explains why AMTOR in ARQ mode opts for a short, three character block; it is a good compromise between the inefficiency of sending a single character and the increasing chances of sustaining a 'hit' in a longer block.

Clover can send blocks of 17, 51, 85 or 255 bytes. Where the error rate due to damaged bits is high, a shorter block would be selected and if the error rate is low, a longer block can safely be utilised. Blocks are assembled into 'frames', such that, in ARQ mode, the total frame time is always the same – 19.488 Sec. (See **Fig 6**). In FEC mode the frame time (that is, the time between the recurring control blocks in a transmission) varies slightly depending upon the mode, but is always close to 30 seconds (see **Fig 4**).



Rate	Mod	Block	Effic.	CCB Time	Block Frame	Blks/ Time	FEC Frame (sec)	Thru-put Bytes/Sec
58	16P4A	255	75%	2DPSM	2.720 sec	9	29.376	57.6
39	16PSM	255	75%	2DPSM	4.080 sec	6	29.184	38.7
30	8PSM	255	75%	2DPSM	5.440 sec	5	31.840	29.5
20	QPSM	255	75%	2DPSM	8.160 sec	3	28.992	19.5
10	BPSM	85	75%	2DPSM	5.440 sec	5	31.840	9.4
5	2DPSM	51	75%	2DPSM	6.528 sec	4	30.688	4.7

Fig 4: FEC mode format and characteristics.

Clover also includes a form of error correction known as 'Reed-Solomon' coding. We do not need to go into the detailed theory of this. Suffice it to say that by including redundant information in each block, it is possible to both detect *and* correct errors, at the receiver, without requesting re-transmission of that block of data. For a brief overview of error correcting techniques, see [2].

Note the distinction between a Clover frame, which is always the same length, and the blocks that are strung together to make up a frame. The blocks can vary in length depending upon the level of encoding and each is complete in itself. If an error that cannot be corrected by the Reed-Solomon coding occurs in one block in a frame, only that block need be repeated.

Not surprisingly, the more redundant information is included, the more errors can be corrected. For example, by transmitting an 85 byte block with no Reed-Solomon encoding, Clover could (due to other system overheads) achieve a throughput of 82 useful bytes – but would be unable to correct any errors that might occur. By including a high degree of Reed-Solomon encoding, the efficiency is reduced to 60% (48 useful bytes out of 85 transmitted) but up to 16 byte errors can be corrected – ie if errors occur in one byte out of every five, the transmitted data will be reconstituted without error or repeat. The system provides for the pre-selection (in ARQ mode) of 90, 75 or 60% efficiency – the 'fast', 'normal' and 'robust' modes. The performance of these three levels of coding efficiency is detailed in **Tables 2 and 3**.

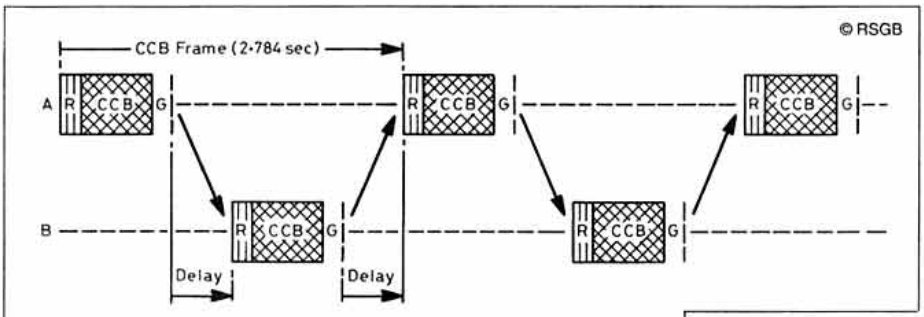
CLOVER MODES AND EFFICIENCY

WITH FOUR BLOCK lengths and four levels of encoding efficiency, a total of 16 possible

CLOVER MODULATION MODES

Name	Description	In-Block Data Rate
16P4A	16 Phase, 4-amplitude Modulation	750 bps
16PSM	16-level Phase Shift Modulation	500 bps
8P2A	8 Phase, 2-amplitude Modulation	500 bps
8PSM	8-level Phase Shift Modulation	375 bps
QPSM	4-level Phase Shift Modulation	250 bps
BPSM	Binary Phase Shift Modulation	125 bps
2DPSM	2-Channel Diversity BPSM	62.5 bps
FSM	Frequency Shift Modulation	62.5 bps
4DPSM	4-Channel Diversity BPSM	31.25 bps
2DFSM	2-Channel Diversity FSM	31.25 bps

Table 1: Note the variety of modulation modes avalable.



TIMING DELAYS

R	= Reference Sequence	= 0.032 sec.	t(prop)	= Propagation	= 0.096 sec (max)
CCB	= CLOVER Control Block		t(filter)	= Filter Delay	= 0.032 sec.
	= BPSM/17/60	= 1.088 sec.	t(coder)	= R-S Coder	= 0.080 sec.
G	= No-Signal Gap	= 0.032 sec.	t(PTT)	= PTT Delay	= 0.032 sec.

CCB FRAME TIMING

Parameter	Time	TPS Frames
Ref(A)	0.032	1
CCB (A)	1.088	34
GAP (A)	0.032	1
t(A-B prop)	0.096	3
t(B-fil)	0.032	1
t(B-coder)	0.080	2.5
t(B-PTT)	0.032	1
REF (B)	0.032	1
CCB (B)	1.088	34
GAP (B)	0.032	1
t(P-A prop)	0.096	3
t(A-fil)	0.032	1
t(A-coder)	0.080	2.5
t(A-PTT)	0.032	1
	2.784 sec	87.0 TPS Frames

NOTE: 'TPS' = Tone Pulse Sequence (32mS)

Fig 5: Timing of a typical exchange of CCBs during an ARQ contact.

combinations is available. Combined with the 10 levels of modulation, this gives a total of 160 different modes. The performances of many of these overlap and in practice six combinations are used for FEC transmission and three groups of six combinations are used for ARQ. Thus, unlike all other digital modes, Clover has a wide selection of modulation and encoding strategies to deal with changing propagation conditions, and is also able to initiate repeat requests in the ARQ mode. Consequently the data throughput is always maximised. In poor conditions, robust modulation modes and short blocks with high levels of encoding are used. Under good conditions however, less robust but faster modes combined with longer blocks and more efficient coding levels are selected.

This brings us to another key feature of Clover, the Clover control block or CCB. In both FEC and ARQ modes each data frame is preceded by a CCB. The CCB includes the callsign of the sending station, waveform synchronisation parameters for the following data blocks (if any) and connect, disconnect and repeat requests when in ARQ mode. In addition, when time permits, keyboard entry text and channel performance statistics are included in the CCB, in ARQ mode.

Finally, the CCB is used to call CQ when in ARQ mode (unlike AMTOR, it is possible to call CQ in ARQ mode and it is not necessary to transmit CQs in FEC). As might be deduced, the CCB is very important and in FEC is always sent in a very robust mode, usually in 17 byte blocks with 60% encoding efficiency, using a modulation mode that is one or two levels more robust than is used for the following data.

CLOVER FEC

SINCE THERE CAN be no adaptive control in the FEC (or 'broadcast') mode, the sending station operator must manually select a level of encoding, based upon his judgement of probable conditions at the receiving station(s). An encoding efficiency of 75% is always used in FEC. It should be noted that until all data in a block has been received and evaluated, nothing can be passed to the display, so the transmission times give an indication of how frequently the display will be updated. In comparison, whilst AMTOR FEC includes a comparable form of correction, the level is fixed and cannot be changed to suit different propagation conditions. The Clover FEC format is illustrated in Fig 4, and the accompanying table shows the various combinations of modulation mode and block length available. Note that the three most robust modulation modes shown in Table 1 are not currently utilised, but are available for possible future use.

CLOVER ARQ – UNIQUE FEATURES

THIS IS THE CLOVER mode most likely to be used. At the lowest level an ARQ contact may consist only of an exchange of CCBs between the two stations (since a limited amount of keyboard text can be carried within the CCB, as noted above). The Clover ARQ CCB is always transmitted in the same mode, binary phase shift modulation or BPSM (the fifth most robust mode with a raw throughput of 125 bits per second) and uses the minimum block size of 17 bytes with the highest level of Reed-Solomon encoding, giving an efficiency of 60%.

At the receiving station various measurements are carried out. For example the signal-to-noise ratio is measured, using the no-signal gap. The degree of phase dispersion of the incoming pulses is assessed and the amount of Reed-Solomon error correcting capacity utilised to correct any errors is calculated. The frequency off-set of the received transmission is also measured. This information is included in the next CCB sent, so the other station is made aware of the reception conditions being experienced. This continuous assessment of conditions, together with the exchange of such information between stations, is unique to Clover.

It should also be noted that communication between ARQ linked stations is, to all intents and purposes, full duplex. There is not, in Clover ARQ, any 'over' signal equivalent to AMTOR ARQ's '+?' command and both stations may send data either within the CCB or in subsequent data blocks without any formal procedure being carried out. This virtual full-duplex feature is again unique to Clover – Packet has this capability but it is not normally implemented.

THE CLOVER ARQ PROTOCOL

THE TIMING of a typical exchange of CCBs during an ARQ contact is shown in **Fig 5**. Each CCB starts with a reference sequence, for synchronisation purposes. This is of course essential, as demodulator timing is critical, particularly when decoding Clover pulses which may have as little as 22.5° of shift in the more efficient modulation modes – the receiver demodulator must be very accurately synchronised. The reference sequence is followed by the control block proper, a no-signal gap and an interval allowing for propagation, filter, encoding and Tx/Rx switching delays.

In ARQ mode, Clover has three basic strategies to deal with signal distortion problems. Firstly, Reed-Solomon encoding is used on all transmissions and a pre-selection of Robust (60% efficiency), Normal (75% efficiency) or Fast (90% efficiency) may be made. With Normal bias, errors in approximately 1 bit in every 6 transmitted can be repaired without resorting to a repeat request. It should be noted that neither AMTOR ARQ or packet can correct *any* errors without a repeat request.

Secondly, a selective repeat protocol is utilised. When errors occur which cannot be corrected by the Reed-Solomon decoding, *only* those blocks that have sustained irreparable damage are repeated. Pactor employs a similar protocol to request repeats of damaged blocks only but has no capability to repair damaged blocks without a repeat. In contrast AMTOR must repeat the entire three

DATA BYTES TRANSMITTED PER BLOCK

Block Size	Reed-Solomon Encoder Efficiency 60%	75%	90%	100%
17	8	10	12	14
51	28	36	42	48
85	48	60	74	82
255	150	188	226	252

TABLE 2

CORRECTABLE BYTE ERRORS PER BLOCK

Block Size	Reed-Solomon Encoder Efficiency 60%	75%	90%	100%
17	1	1	0	0
51	9	5	2	0
85	16	10	3	0
255	50	31	12	0

TABLE 3

character block and packet requires that the damaged block *and* all subsequent blocks be repeated.

The third strategy is adaptive modulation waveform control. Where more data must be sent than can be accommodated within the CCB, a series of data blocks is sent after a CCB. This usually occurs when sending large files or when the type-ahead buffer is filled beyond a critical level. For the average typist, the data rate supported by the CCB alone is, as currently implemented, somewhat slow at 20WPM. These data blocks are sent in a mode that the sending station has, by assessing data measured and sent on by the other station, determined to be the most suitable for the prevailing path conditions.

By looking at the data returned by the distant station in its next CCB, the sending station can determine how well the data blocks were received and use this data to weight the selection of an appropriate mode for the next frame, or for a repeat if one has been requested. Selecting Robust, Normal or Fast bias also effectively determines the speed with which the system will respond to changing conditions. The multi-block ARQ signal format is illustrated in **Fig 6** and the six rates available in each of the three bias modes are detailed in the accompanying table. Note that the transition from an exchange of CCBs to the multi-block format is performed automatically, based upon how much data is in the transmit buffer – no action is required on the part of the operator.

It is appropriate to mention at this point that, if the facility is enabled by *both* operators, each station can control the power of the other (by adjusting the level of the Clover tone ensemble fed to its transmitter). Thus, only as much power as is required to maintain contact, with a reasonable fade margin, is actually used. The effects of this facility are most illuminating; on many occasions signal strengths are such that power at both stations will be turned down to a few watts, yet ionospheric dispersion is such that a high error rate is experienced and robust levels of encoding are selected by the system.

This graphically illustrates the point made previously – that under such conditions, running higher power effects no improvement in the error rate experienced.

OTHER CLOVER ARQ FEATURES

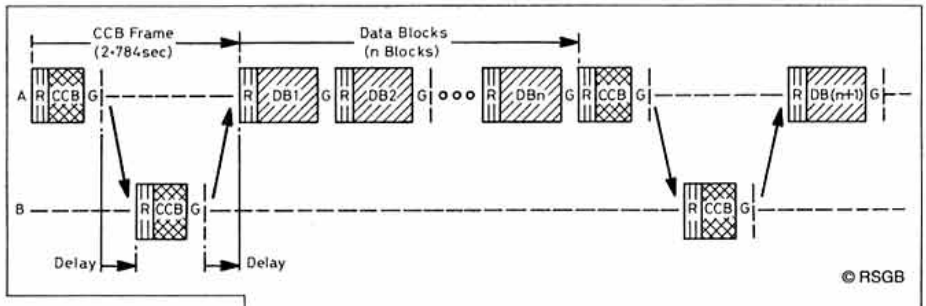
IN THE DESCRIPTION of the CCB above, it was indicated that it included ARQ connect and disconnect requests and was also used for ARQ CQ calls. A Clover ARQ connect may be made in either Normal or Robust modes, Normal being useful for future implementations of scanning BBSs, since it gives a connect time of less than two seconds and is therefore compatible with existing scanning BBSs. Robust mode takes up to five seconds but it is possible to achieve a connect in adverse conditions in this mode.

When a CQ call is made, the receiving station(s) are immediately aware of the identity of the calling station, since the callsign is embedded in the CCB. Similarly, when a CQ is answered, the caller is automatically aware of the identity of the station replying, as its callsign is also embedded in the CCB it sends. A selective ARQ call may also be made and again the called station is aware of the caller's identity and vice versa, from the information in their respective CCBs.

The Clover hardware also includes a Selcal output. This is simply a switched transistor output that may be set to give either a continuous low whilst the station is connected during an ARQ contact, or it may be set to pulse once at the start of a contact and once when contact is terminated. This facility would typically be used in a scanning BBS to indicate that a selective call to the BBS had been received and is functional only in the Normal connect mode.

CLOVER LISTEN AND BINARY FILE TRANSFER MODES

AT THE TIME OF WRITING the ARQ Listen mode is not fully implemented and only the callsigns of the stations monitored are displayed. FEC transmission may be monitored but, as with AMTOR FEC, only the degree of error correction afforded by the encoding of the transmitted signal is available – the monitoring station may not of course request a repeat of any data that cannot be corrected by the level of Reed-Solomon encoding selected by the transmitting station. Binary file transfer is not currently implemented but will be made available later.



R = Ref. sequence = 0.032 sec.
G = No-Signal Gap = 0.032 sec.
CCB = BPSM/17/60 = 1.088 sec.
DBn = Data block = var. sec

ROBUST BIAS (60%)

Rate	Mod	Block Frame	Bytes/ Errors	Max Time	Block Frame	Blks/ Time	ARQ Frame Bytes/sec.	Thru-put
46	16P4A	255	900	300	2.720 sec	6	19.488	46.2
30	16PSM	255	600	200	4.080 sec	4	19.488	30.8
30	8P2A	255	600	200	4.080 sec	4	19.488	30.8
23	8PSM	255	450	150	5.440 sec	3	19.488	23.0
15	QPSM	255	300	100	8.160 sec	2	19.488	15.4
8	BPSM	255	150	50	16.320 sec	1	19.488	7.7

NORMAL BIAS (75%)

Rate	Mod	Block Frame	Bytes/ Errors	Max Time	Block Frame	Blks/ Time	ARQ Frame Bytes/sec.	Thru-put
58	16P4A	255	1128	186	2.720 sec	6	19.488	57.9
39	16PSM	255	752	124	4.080 sec	4	19.488	38.6
39	8P2A	255	752	124	4.080 sec	4	19.488	38.6
29	8PSM	255	564	93	5.440 sec	3	19.488	28.9
19	QPSM	255	376	62	8.160 sec	2	19.488	19.3
10	BPSM	255	188	31	16.320 sec	1	19.488	9.7

FAST BIAS (90%)

Rate	Mod	Block Frame	Bytes/ Errors	Max Time	Block Frame	Blks/ Time	ARQ Frame Bytes/sec.	Thru-put
70	16P4A	255	1356	72	2.720 sec	6	19.488	69.6
46	16PSM	255	904	48	4.080 sec	4	19.488	46.4
46	8P2A	255	904	48	4.080 sec	4	19.488	46.4
35	8PSM	255	678	36	5.440 sec	3	19.488	34.8
23	QPSM	255	452	24	8.160 sec	2	19.488	23.2
12	BPSM	255	226	12	16.320 sec	1	19.488	11.6

Fig 6: Multi-block ARQ signal format with specification of three bias modes.

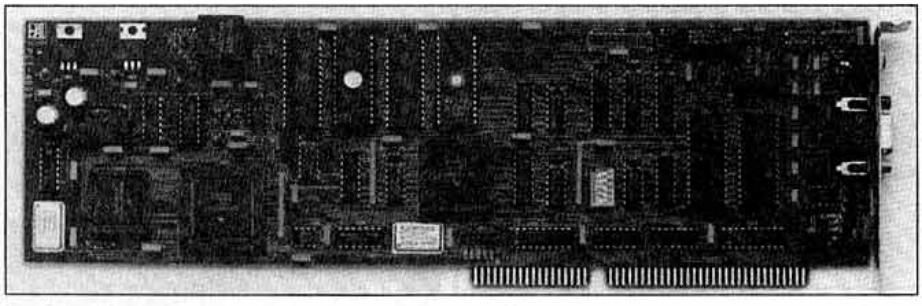
DATA COMPRESSION

UNLIKE PACTOR, CLOVER does not currently employ data compression techniques. Work is continuing to determine the most appropriate way to implement compression and it will be made available in due course, effecting a significant improvement in efficiency when sending text files.

REFERENCES

[1] McLasky, 'The Coherent Ten-Tec: A Practical CCW Station Assembly.' *CCWN* 1975:12

[2] D Bacon, 'FEC, CRCS and Error Correction', *Electronics & Wireless World*, May 1991



The HAL Communications PC interface board for Clover. More on this next month.

NEXT MONTH

SO MUCH for the theory. Part 3 shows how Clover is implemented in practice.

RADCOM USER REVIEW

YAESU FT-2200 2m Mobile Transceiver

A review by the *RadCom* team

EVERY NEW VHF transceiver on the market seems to have more 'bells and whistles' than it's predecessor, although the usefulness of some of these for the average user is open to question. However the new FT-2200 from Yaesu appears to offer a nice combination of facilities, combined with ease of use. It's also a powerful rig with three selectable RF output levels up to 50W.

FACTS AND FEATURES

FRONT PANEL CONTROLS have a dual function, and three are located along the top left corner. The first switches between dial and memory tuning modes, and the alternative function enables channels to be skipped during scanning. The next selects a programmed call channel or DTMF facility, and the third allows tuning in 1MHz steps - useful for the version of this set which has an extended frequency range. Priority monitoring is also enabled by this switch.

To the right of the main tuning knob is the amber LCD display, which indicates most of the switchable functions plus the operating frequency. The 13-bar S-meter is large enough to be read while mobile, and indications of memory channel and power level are also provided. The lower row of six buttons cover features such as repeater offset, step size and reverse-repeat operation. The volume control is not particularly well placed above the squelch knob, and it would be easy to turn the wrong control while driving. At the top right, the power selector is located alongside the main on/off switch. Below this is an eight pin microphone socket, which also has connections for a combined speaker/mic or packet TNC. The connections are clearly explained in the manual.

Yaesu have put a great deal of electronics into the FT-2200 which demonstrate the benefits of surface mount technology. The circuit is based around a Hitachi microcontroller and Fujitsu MB1504 phase locked loop.

NEAT OPERATOR

THE FT-2200 WAS TESTED using a car magmount whip, and home station trials were also carried out into a vertically polarized 2m dipole. In both cases, results were most satisfactory with the extra power proving useful under marginal conditions. Good receive sensitivity combined with a nice audio response made the FT-2200 a pleasure to use. The downward facing speaker might limit the choice of location in some mobile applications, but a 3.5mm jack for an external speaker is located at the rear. Up/down buttons on the microphone enable channels to be stepped one by one or scanned.

Another useful feature is the automatic repeater shift. This simply means that the transmitter operates 600kHz lower in frequency on channels between 145.6 and 145.85.

It is possible to program offsets into individual memory channels, but it's nice to have the facility pre-programmed.

Note that this feature is only present in the B1 version, which is restricted to 144-146MHz on both transmit and receive. For mobile use, the various scan facilities are useful. The upper and lower limits can be programmed, and the rig instructed to skip channels if required, or monitor a priority channel.

HELPFUL HANDBOOK

AS WELL AS A comprehensive 56-page manual, a quick reference card is included. The manual is well illustrated and contains a full circuit diagram, and functions are explained in a clear manner. Included with the FT-2200 are a mic, 12V power lead and mobile mounting bracket.

An interesting option for the Yaesu is the digital voice storage (DVS) unit. The set can be left in receive mode on a specific channel, and a remote user can leave a message of up to 128 seconds duration. The remote user must have a rig equipped with DTMF to access this facility.

If you're looking for a state-of-the-art 50W mobile rig which combines performance with versatility then this Yaesu is well worth considering. Price is £369 inc VAT at 17.5%. Our thanks go to South Midlands Communications Ltd. for the loan of the review model.

MANUFACTURER'S SPECIFICATION

GENERAL (Version B1)	
Frequency coverage (Transmit)	144 - 146MHz
Frequency coverage (Receive)	144 - 146MHz Note that a version of this transceiver with extended receive coverage of 140 - 174MHz is also available.
Channel steps	5, 10, 12.5, 15, 20, 25 or 50kHz
Emission Mode	G3E
Supply voltage	13.8V DC ± 10%, negative ground
Current drain (typical)	Transmit: High 10A, Med 6A, Low 3 Receive: 700mA
Dimensions	140(W) x 40(H) x 160(D)mm excl. knobs Weight: 1.25kg (2.8lb)
TRANSMITTER	
Output power	Low 5W, Med 25W, High 50W
Modulation type	Variable reactance
Maximum deviation	± 5kHz
Spurious Radiation	less than -60dB
Microphone impedance	2kΩ electret type
RECEIVER	
Circuit	Double conversion Superhet
IFs	455kHz and 17.7MHz
Sensitivity	Better than 0.21μV for 12dB SINAD
Selectivity	12/30kHz (-6/-60dB)
Image rejection	Better than 65dB
Audio output power	1.5W into 8Ω at 5% distortion
AF output impedance	4 - 16Ω

RADCOM USER REVIEW

ICOM IC-707 HF Transceiver

A review by the *RadCom* team

A GROWING number of HF transceivers seem to be equally at home in the car or sitting alongside the hi-fi in the living room. The ICOM IC-707 is just such a radio, and although not as small as Kenwood's TS-50S, at just 4.1kg it's certainly a very neat package at a budget price.

ALL IS DISPLAYED

FOR ANYONE FAMILIAR with a modern HF rig, the front panel should be easy to understand. At the top left is the main power on-off, and below this a switch for the optional automatic antenna tuner. Then there are the usual sockets for 'phones and push-to-talk microphone.

The LCD backlit display is nicely balanced, with indicators for Tx/Rx, switched functions such as noise blanker, and an eight segment bargraph 'S' meter. This doubles as an indicator of power output on transmit. Memory channels and split frequency modes are displayed next to the main frequency readout which has 100Hz resolution.

Other front panel controls are conveniently located below the display, with the receive incremental tuning (RIT) on the top left. The RIT range is specified as ± 1.2kHz which seemed just about right. Concentric AF gain and squelch controls are situated alongside the mic gain, RF power and other function controls. The VFO and memory controls to the right of the main tuning knob are remarkably straightforward, which will no doubt please readers who are used to the more sophisticated VHF hand-helds.

A most unusual feature for a small HF radio is the IC-707's forward facing speaker. This gave a good clean sound, and the audio output of over two watts should be especially effective for mobile operation. Rear panel connections were conventional and clearly labelled. A multi-pin connector enables remote control via an optional interface.

ON THE AIR

WE WERE INTERESTED to see whether any performance compromises had been made in order to reduce the price, but in practice these seemed minimal. The receiver lacked the dynamic range of ICOM's more sophisticated transceivers, but selecting either the pre-amp (10dB) or attenuator (20dB)

MANUFACTURERS SPECIFICATION

GENERAL	
Frequency coverage (Transmit)	1.800 – 1.999 3.500 – 3.999 7.000 – 7.300 10.100 – 10.150 14.000 – 14.350 18.068 – 18.168 21.000 – 21.450 24.890 – 24.990 28.000 – 29.700
Frequency coverage (Receive)	500kHz – 30MHz
Modes	SSB (USB/LSB), CW, AM, FM* * With optional UI-9 FM unit
Memory channels	Normal channels: 25 Split channels: 5 Scan edge channels: 2
Current drain (at 13.8V)	Transmit: 20A Receive (squelched): 1.3A Receive (max. audio o/p): 2.1A
Dimensions	240(W) x 95(H) x 239(D)mm Weight: 4.1kg (9.0lb)
TRANSMITTER	
Output power	SSB, CW, FM: 5-100W AM: 5-25W
Carrier suppression	Greater than 40dB
Unwanted sideband suppression	Better than 50dB
Microphone impedance	600Ω
RECEIVER	
Sensitivity (pre-amp on)	1.8-30MHz SSB,CW Better than 0.16uV for 10dB S/N
Selectivity (SSB/CW)	More than 2.1kHz at –6dB Less than 4.0kHz at –60dB
Spurious and image rejection ratio	More than 70dB
Audio output power	More than 2.6W into 8Ω load
RIT variable range	±1.2kHz

usually gave a quite acceptable signal to noise ratio. Spurious responses were found to be few, and at a very low level. The noise blanker seemed to work better than most of those fitted on budget rigs.

A CW Filter was not supplied with the review model, but there is a choice of two types available as optional extras – the FL-52A (500Hz) and FL-53A (250Hz). While on the subject of options, an FM unit may also be fitted to the rig, and there is a wide choice of desktop microphones, speakers and power supplies.

Frequency range of the receiver is specified as being continuous from 500kHz to 30MHz, though the frequency range extended below this possibly at reduced sensitivity. Within the range quoted, the sensitivity of 0.16μV was quite adequate.

Audio quality from the built in speakers was very clear. The selectivity is quoted as 4kHz at –60dB, which appeared to give a crisp audio response. The main tuning knob has a very light feel, with tuning increments selectable from 1MHz down to 10Hz.

On SSB, we received reports of excellent transmit audio quality, with good carrier and unwanted sideband suppression. Output is adjustable between 5 and 50 watts using the front panel control, and frequency coverage is limited to the UK and US amateur bands. A hand microphone is included – as well as the normal push-to-talk (PTT) it has UP/DOWN buttons. CW sidetone is pleasant and under the control of the volume knob.

ALL IN THE MANUAL

ICOM SUPPLY A MOST comprehensive 45-page instruction manual. It has many explanations which would prove useful to the newly licensed operator, such as squelch operation on FM, but unfortunately there is no circuit diagram. Split frequency operation using the two VFOs took a little while to master as the handbook is rather ambiguous about the VFO A = VFO B function. Actually, this is the only part of the manual which most owners will need to read in depth, as the function of most of the other controls is quite obvious.

At the back of the manual is a list of the many options available to purchasers. The IC-AT500 automatic antenna tuner includes an automatic selector for up to four antennas, and can handle the power of the IC-2KL 500W linear amplifier – itself another option.

SUMMING IT UP

WE FOUND THE IC-707 a very efficient budget transceiver, with a good range of facilities and satisfactory performance. For mobile operation there will probably be fierce competition with the Kenwood TS-50S, but for those wanting a rig which doubles up for home station use the ICOM should be an excellent choice. The current list price is £895, plus £129 for either of the optional CW filters and £245 for the PS55 power supply unit. The UI9 FM unit is £55 extra. All prices include VAT at 17.5%.

Our thanks to Icom (UK) Ltd for the loan of the review model.

TECHNICAL UPDATE

Super-Duper Contest Log Review

GOOD NEWS FOR contesters who are interested in this program, which was reviewed in the Sept '93 issue of *RadCom*. The two program authors, Paul, EI5DI, and John, G3WGV, have worked closely to ensure that TurboLog can import the files generated by Super-Duper. This facility has now existed for over a year, and was the result of regular co-operation between the authors of the two programs.

The G4HUV Inductance Meter

THE MEASUREMENT range of this useful piece of test equipment, extends from 0.2 microHenries (μH) to 3 milliHenries (mH). This is considerably greater than stated on page 41 of the article in last month's *RadCom*. Our apologies for this slip.

Ten Tec Scout transceiver

WATERS AND STANTON Electronics have received many enquiries about the Scout 555 transceiver, following our reveiw in *RadCom* (Nov '93). They ask us to point out that an RF dummy load should be connected to the output while adjusting the CW sidetone volume level by means of the access hole in the side panel. The transceiver should be switched to 'tune' during this operation.

Simple Spectrum Analyser

THIS PROJECT BY Roger Blackwell, G4PMK, was featured in the Nov '89 *RadCom*, and remains popular with constructors. However, we gather that some readers are having trouble obtaining the Motorola MC3356 VCO/First mixer IC for the RF board. We have made enquiries and understand that Mainline Electronics of Leicester (Tel: 0533 777648) can supply the device. Phone them for ordering details.

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

Vertical dipoles are capable of multiband low-angle radiation. **Karl H Hille, DL1VU**, used one on all bands, 7 - 28MHz, while on DXpedition in the Pacific; he described his exploits in *cq-DL* 9/93. **Erwin David, G4LQI,** uses one as a base station antenna for 29, 51 and 70MHz with G5RV feed.

ON DXPEDITIONS one needs a low-angle radiator which is easily transported and quickly erected; over the 'ideal earth' of a beach location, a vertical antenna promised good DX.

Upon arrival on Canton Island in 1991, Karl catapulted a line over a coconut palm and hoisted one end of a 10.6m wire dipole; its lower end was 0.5m above the beach. The antenna was centre-fed with 15m of 240Ω TV line which was run horizontally to the shack. A balun and a Transmatch to a 100W transceiver completed the set-up of **T31AF**.

Comparisons were then made between the vertical dipole and an 85m longwire 10m above the beach, aimed towards Europe. DL7AV consistently reported equal signal strength on 14MHz. Japan and the USA were worked on the vertical even on 7MHz. During his 1993 visit, Karl used the same vertical dipole with the same satisfactory results.

EXPERIENCE CONFIRMED

HAVING RETURNED HOME, Karl found a good treatise of vertical dipoles in W8JK's book *Antennas* [1]. Making the reasonable assumption of sinusoidal current distribution, he developed a simple computer program for the performance of his Canton Island dipole. **Table 1** and **Fig 1** are the result. Note that the field strength scale in Fig 1 is voltage-linear, as is common in the MF broadcast industry; it makes the patterns look better than would be the case on the logarithmic (= dB-linear) scales more often used in amateur work or the log-periodic scales used in ARRL publications since 1982 [2].

The greatest field strength on the ground at a distance of 1km was produced if the dipole is 2 x 0.64λ long with its centre 0.96λ above perfect earth. This super-dipole has a gain of 6.3dB over a λ/4 monopole, the usual standard of comparison for vertical antennas.

That 'five-eighth-over-five-eighth' makes an excellent vertical is well known, but that the height over earth shows the specific maximum of **Fig 2** will be news to most readers. [This maximum may benefit those blessed with perfect earth – eg the lagoon of Canton Island; for others the old dictum 'the higher the better' probably holds true – *G4LQI*].

Freq MHz	Length λ	Height* λ	Rad Res Ω	Fieldstr mV/m‡	Gain dB_{ISP}
7.0	0.125	0.137	11.7	325	0.3
10.1	0.180	0.197	38.6	351	1.0
14.0	0.250	0.273	93.9	392	1.9
18.1	0.323	0.353	159	435	2.8
21.0	0.375	0.410	198	461	3.3
24.9	0.444	0.486	222	494	3.9
28.0	0.500	0.547	210	524	4.5

* Centre of dipole to earth
‡ @ 1km from a 1kW transmitter

Table 1: Calculated data for DL1VU's vertical dipole over ideal earth.

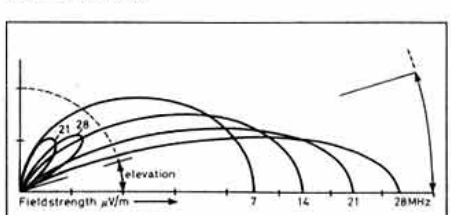


Fig 1: Calculated voltage – linear field strength plotted against elevation angle of the DL1VU vertical dipole over ideal earth, ie salt water.

GOOD FOR VHF TOO!

TO PUT G4LQI ON 29MHz FM, a wooden pole was fixed to the side of the house; a 4.81m dipole just fitted between the top and the gutter. It was centre-fed with 15m of 75Ω twinlead and the rig was tuned up for maximum output. The results were fine.

Then Kent Raynet started using 70MHz, with vertical polarization; the 29MHz vertical dipole would be an attractive five-eighth over five-eighth on that band. When the restriction on 50MHz vertical polarization was lifted and some mobile activity developed, the vertical dipole could now serve on three bands, but a new feed system was needed.

A THREE-BAND SOLUTION

THE IMPEDANCES AT THE dipole centre vary widely, but might there be a point along the feeder where *current maxima on all three bands coincide* and one can switch from a resonant open wire line to coax with a reasonable SWR, say <3:1? That maximum would have to be at a distance *l* from the current minimum at the end of the dipole, so that *l* is some odd multiple of λ/4 on all three bands. It turns out that 3λ/4 @ 29.6MHz ≈ 5λ/4 @ 51.5MHz ≈ 7λ/4 @ 70.4MHz, within 25cm! **Table 2**.

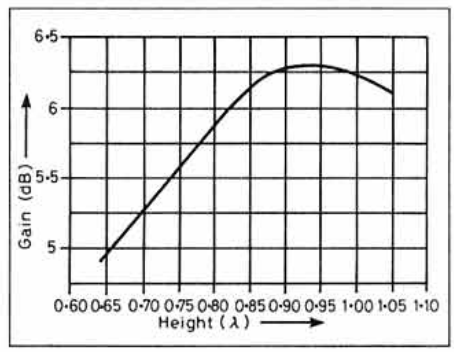


Fig 2: Gain (over a λ/4 monopole) of a 2x0.64λ vertical dipole vs the height of its centre above ideal earth.

Fig 3 shows the set-up. The resonant line is made of 1mm dia. wire spaced 25mm with plastic spacers every 15cm; nominally, Z_0=450Ω and the velocity factor 0.95. Aiming for *l*=7.41m, and half the dipole being 2.40m, the open line was made 0.95(7.41-2.40)=4.76m long. From its end, an existing run of RG58C/U coax to the shack was used. The coax-to-open-line junction was moisture-sealed and strain relieved. If new coax were to be bought, 75Ω satellite cable would give less loss and a better match. Just below the junction, a choke balun is made by coiling the coax into three turns of 8cm diameter.

IT WORKS AS INTENDED

THE ANTENNA WORKS FINE on all three bands. On ten metres, the frequency of best SWR, 1.6:1, is at 29.3MHz. The automatic ATU used with the transceiver will handle SWRs up to 3:1, permitting proper matching anywhere from 28.0 – 29.7MHz. On six metres, the SWR is 2.8:1, and a small box with an L-match is used. On four metres, the PA tuning in the modified PMR can cope with the 2.3:1 SWR on that band.

REFERENCES:

[1] John D Kraus, *Antennas*, 2nd edition 1988, pp 218-222. McGraw-Hill, NY.

[2] *The ARRL Antenna Book*, eg 15th ed. pp 2-13ff.

Freq MHz	λ/4 cm	Multiple of λ/4	*l* (elec) cm	End eff cm	*l* (mech) cm
29.6	253	3x	759	13	746
51.5	146	5x	728	7	721
70.4	107	7x	746	5	741

Table 2: Figures for G4LQI's 3-band vertical base-station dipole

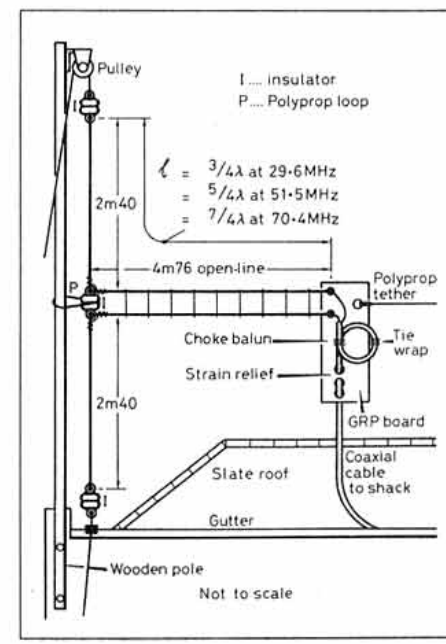


Fig 3: G4LQI's vertical dipole with G5RV feed on 29, 51 and 70MHz.

RADCOM CONSTRUCTION FEATURE

Top Band on the G3TSO 80m Transceiver

by Mike Grierson, G3TSO

IN MY ARTICLE 'A Miniature 80 Metre SSB Transceiver'(*RadCom* June, July and August 1991) I indicated that it could also be adapted for use as a single band transceiver on the 160 metre band [Reprints of the original articles and a full circuit diagram of the 160m version are available to members from the *RadCom* office at RSGB HQ, price £3.50].

The major changes necessary to effect operation on 160 metres are:

a) Change VFO frequency to cover the range 2.255 – 2.455kHz.

b) Change band pass filter to cover the range 1.8 – 2.0MHz.

c) Lower the low pass filter cut off frequency to 2.1MHz.

Whilst these fundamental changes only require changing specific L/C values some additional modifications were found necessary. Firstly, the gain of the transmitter was found to be lower on 160 metres than it was on 80 metres and some circuit modifications were called for. A number of minor problems had come to light during the construction of several 80m versions necessitating a close look at the overall design.

MODIFICATIONS AND ENHANCEMENTS

THE MOST TROUBLESOME problem to occur has been 'hang-up' of the relays when returning from transmit to receive. Some sensitive relays were remaining activated by the small current permanently drawn through them by the diode switching circuit. This had not been a problem on the prototype, which had used two 6V relays in series, but had occurred with most 12V types.

The initial modification was to raise R6 from 470R to 2k2. In most cases this affected a cure, however, in the 160 metre version several other values were also changed. R4 was raised to 2k2 whilst R5 and R7 were replaced with 1mH axial chokes L12 and L13. In the unlikely event of continued hang-up, R3 could also be raised to 2k2, however, this has not been found necessary.

In difficult cases it may pay to operate the relays in series, but do not add series resistors to the relays, as this will change the bias voltages on the switching diodes.

The S-meter has never performed consistently well in this design and varies from one SL6700 IC to another. Some produce a reasonable voltage swing whilst others are fairly static. Most are affected as the device temperature rises and this is noted in the Plessey application notes. A modified circuit (**Fig 1**) which requires only a few changes produces slightly better results.

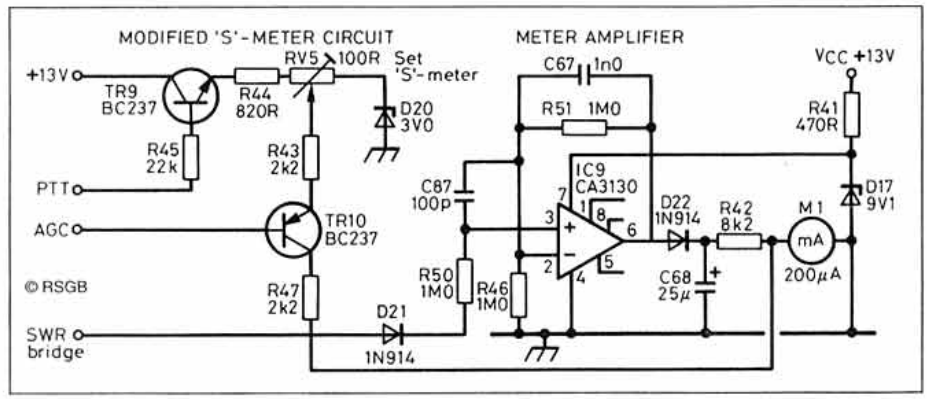


Fig 1: Slightly better results are obtainable with this modified S-meter circuit.

D20 is removed, R47 is isolated from earth and connected directly to the S-meter. The IC amplifier is now only used as a buffer amp on transmit. The collector of TR9 is connected to +13V instead of +6V, RV5 is reduced to 100R and is connected to ground via a 3V zener diode. RV5 is adjusted to make an S9 signal read S9 (approximately 3/5 FSD).

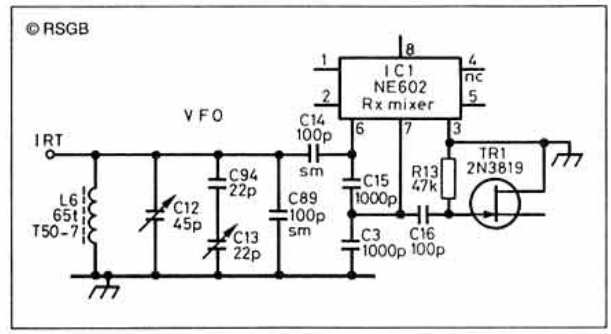


Fig 2: Revised VFO circuit to give full coverage of 160m.

In the original drawings (Fig 10), both TR4 and TR10 were shown 180° out. R37 shown mounted vertically is actually R59 and C12 located adjacent to IC2 is actually C17. C10 which is missing on the drawing is located above L5. RL1 should be shown connected to +13V, and Pin 4 on IC3 should be shown as grounded.

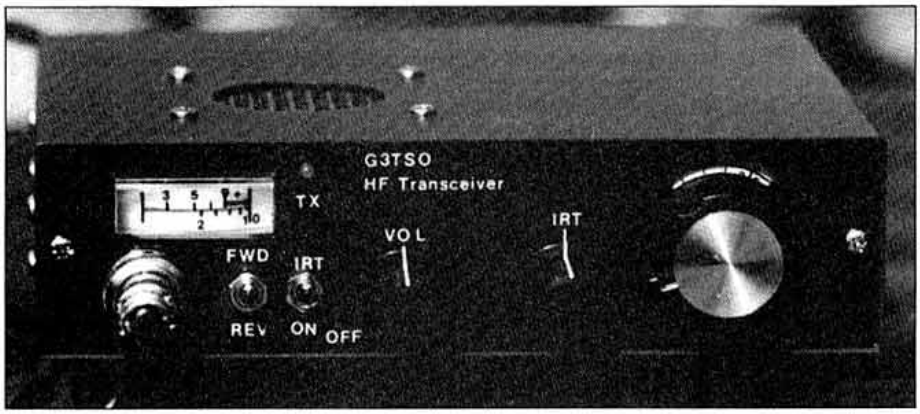
In addition R12 was shown connected to the +6V transmit line, this caused pulling of the VFO on transmit, and is easily rectified by connecting R12 directly to the +6V permanent line. Issue-5 PCBs are modified to do this.

An error occurred on the transceiver drawing (Fig 6) which was incorrectly labelled 'receiver'. C58 and C78 should be grounded, R53 should not be grounded and should go only to the mic socket to provide a DC voltage for use with 3-wire electret mics. The PCB has some redundant pads to facilitate the wiring of a 2-wire electret mic if preferred.

By accident, it was discovered that improved transmit audio could be achieved by limiting the VOGAD action of IC4. When R59 was reduced to 100k from 1M, the attack is less vicious and more audio output was available from IC4, providing some compensation for the reduced gain on 160 metres.

VFO VARIATIONS

EXPERIMENTS HAVE SHOWN that the Amidon T50-7 core is more suitable than the T50-2 core for VFO applications. 65 turns of 0.375mm enamelled copper wire were wound onto a T50-7 core and held in place with beeswax. C14 and C89 were raised to 1000pF, and can be either polystyrene or miniature silver mica types. C89 is a single 100pF silver mica type. The original tuning capacitor was used and required careful adjustment of the L/C ratio to provide full coverage of the 160 metre band. A series capacitor C94 was added to reduce the range of C13, the VFO setting capacitor. A tuning range of 2263 – 2458kHz was achieved providing full band coverage plus a few additional kilohertz at either end. The band-width can be limited to provide more bandspread over only part of the band by reducing the number of turns slightly and eliminating C94 with C15 connected directly across L6. The revised VFO circuit is shown in **Fig 2**.



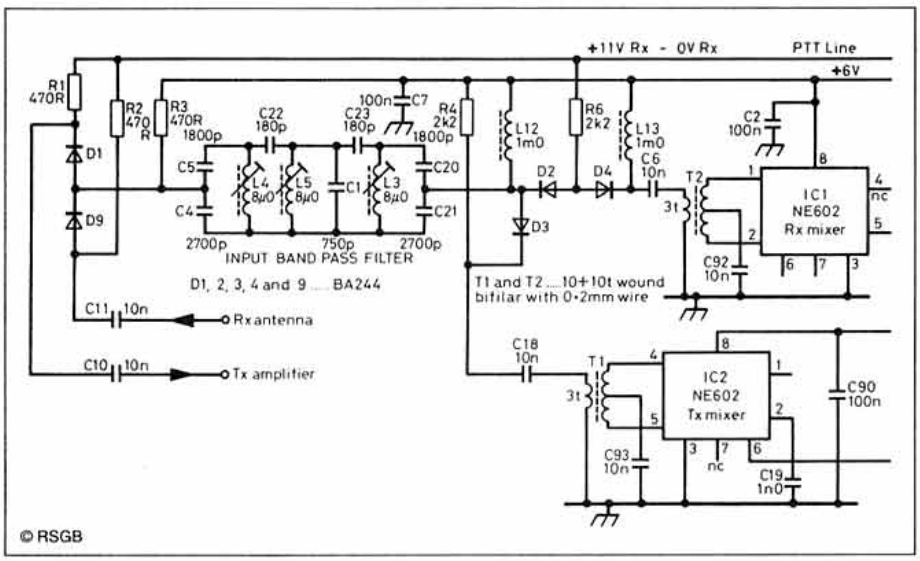


Fig 3: the band pass filter is modified with re-wound coils and new capacitors.

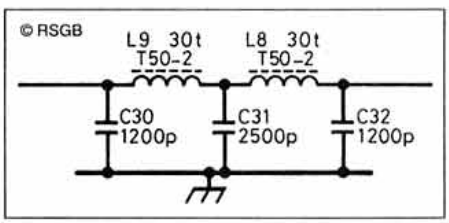


Fig 4: The modified low pass filter.

BAND PASS FILTER MODIFICATIONS

IN ORDER TO TUNE the 1.8 to 2.0MHz band, L4, L5 and L6 must be raised to approximately 8µH. Unfortunately, there do not appear to be any suitable TOKO coils readily available of this value so modification of the KANK3334R was undertaken. The coils were opened and rewound, and this is rather like breaking glass – easy when you have mastered the knack. Lightly prise the can at the base especially if there are signs of crimping, then pull the former from the can by gripping the pins tightly with a pair of pliers, the two should literally pop apart. However, if too much force is used the pins come out or the former breaks. Practise with a few old redundant cores before working on one you have purchased new.

Strip all the existing wire from the former, it is located in small plastic grooves. Break the wire at the pins using a knife, then heat each pin and slide the wire off the end. Rewind with 24 turns of self-fluxing wire of approximately the same diameter as that removed (approx 40SWG). Wrap the wire 2 or 3 turns around the pins and solder directly allowing the self fluxing enamel to melt. Replace the pot core into the can if it has come out, and then pop it back onto the former, resulting in a TOKO coil of the required inductance. The values of polystyrene tuning capacitors to resonate the filter are given in **Fig 3**.

LPF MODIFICATIONS

THE TRANSMITTER LOW PASS filter (**Fig 4**) is modified by changing the values of the three polystyrene capacitors C30, C31 and C32 and winding the toroids L8 and L9 with 30 turns of 26SWG enamelled wire.

TRANSMITTER MODIFICATIONS

THE GAIN OF THE transmitter section was found to be lower on 160 metres than for the 80 metre version and it was considered that the efficiency of the wideband transformers was beginning to fall off quite rapidly. In a single band design this can easily be remedied by doubling the number of turns on the transformers to raise the inductance. This requires the use of thinner wire and the transformer construction becomes slightly more difficult. T3, in **Fig 5**, was wound with a primary of 12 turns of 0.2mm wire, the secondary comprised 2+2 turns of the same wire.

T4 also used 0.2mm wire with 3+3 turns on the primary and 2+2 turns on the secondary.

COMPONENTS LIST

Component differences for the 160 metre version

C1	750pF Poly
C4, C21	2700pF Poly
C5, C20	1800pF Poly
C22	180pF Poly
C13, C15	1000pF Poly
C30, C32	1200pF Poly
C31	2500pF Poly
C89	100pF Silver Mica
C92, C93	10n Ceramic
C94	22p Ceramic
L3, L4, L5	(23t approx) 8µH. Rewind TOKO KANK3334R
R31	470R 0.25W
R34, R35	1R2 0.25W
Delete R25, R26, R23, R24	not used.
T1,T2	10t+10t bifilar 3t sec Siemens core as above.
T3, T4	Have extra turns, see circuit schematic Fig 5.
T5	1+1 turn of 0.8mm enamelled copper wire (primary) 6 turns of 0.5mm enamelled copper wire (secondary) – see text.
L6	65t (0.2mm) Amidon T50-7 (White)
L8, L9	Increase to 30 turns T50-2.

Additional Components Required (Not supplied in kit)

M1 'S-Meter'	200µA (Cirkit)
Toko 10mm screening can to fit over L2	
SP1	2" 8ohm speaker
J1	Antenna socket SO239
Mic socket	4 pin audio
C12	3 gang 15pF VHF (total 45pF) Tuning Cap (Mainline)
VR1	5k lin pot ('IRT' tune)
VR6	20k pot + DPST switch ('AF Gain On/Off')
SW1a,b	Switch DPDT, IRT 'On/Off'
SW2	Switch SPDT, SWR 'Fwd/Rev'
D10, D25	Red and green LEDs
Power Socket	3-pin audio type
Tuning drive	10:1 Maplin type(HB42V)
SW (Fig 6)	Push-On spring loaded switch 'TUNE'

Kits of parts including the tuning capacitor are available from Mainline Electronics, PO Box 235, Leicester LE2 9SH (0533 777648) who can also supply the case and hardware to complete the project. The improved Issue-5 PCBs are now available from G3TSO for £12 plus 50p p&p, and also from Mainline Electronics.

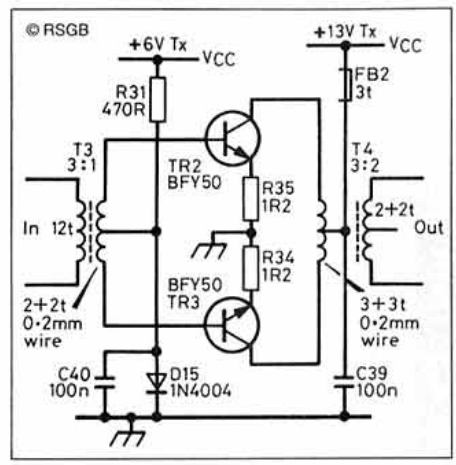


Fig 5: Achieving the necessary higher gain.

The PA output transformer requires the major change as it is not possible to wind on more than one turn of coax braid, therefore it will have to be replaced with wire. The primary consists of 1+1 turn of 0.8mm enamelled copper whilst the secondary is six turns of 0.5mm enamelled copper.

The PCB layout has been designed to mount this transformer as well as the 80 metre version. The major difference is that the +13V connection is now at the opposite end of the transformer as the primary centre tap is now at the input end.

The driver stage (Fig 5) has been modified to increase the stage gain slightly, the emitter bias resistors have been reduced to 1R2 and the by-pass capacitors removed. Do not attempt to reduce the value below 1R2 or fit by-pass capacitors as instability will most likely destroy the driver transistors. The negative feedback has been removed and biasing is provided by D15 via R31 (470R) connected to the +6V Tx line. R31 is located under the PCB track.

In the process of modifying the transmitter, the matching transformers to the mixer were altered to provide more inductance and a more balanced input/output. The primary was wound as a 10 + 10 turn bifilar winding (0.2mm), the centre being decoupled to ground using a 10n C92, C93 decoupling capacitor soldered directly from the transformer to the ground plane. In order to preserve the 7:1 ratio, the secondary now has 3 turns (0.375mm) which can be wound over the top of the primary if space is at a premium.

AUDIO TUNE-UP OSCILLATOR

TO AID ANTENNA matching, an audio oscillator has been provided. A tone input to the transmitter provides this useful facility (**Fig 6**). The circuit is a 'twin T' phase shift oscillator requiring a minimum of components, a single spring loaded push switch activates the oscillator such that a 1kHz signal is injected into the mic input of the VOGAD via a capacitive potential divider (C97 and C98) which ensures that the AF signal will produce an RF output in the order of 2 watts, this is quite sufficient for antenna tuning. The output can be increased by raising the value of C98, and if CW operation is contemplated, keying of the oscillator can be achieved by placing a key in parallel with the push switch. The audio oscillator was constructed on a 1 x 0.75in PCB fastened to the side of the case adjacent to the mic socket using a double sided sticky pad.

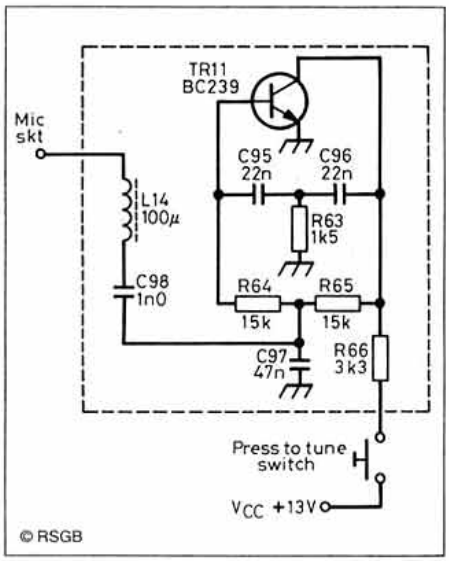


Fig 6: A tone oscillator for tune-up.

TESTING AND ALIGNMENT

THE ALIGNMENT PROCEDURE for the transceiver is identical to that described for the 80 metre version outlined in the original article. 20 watts PEP output power has been achieved on both versions of the transceiver, however, there are gain variations between devices that may limit the output to 10 watts ie the initial design level.

CONCLUSION

THIS MINIATURE transceiver is perhaps more suitable for operation on 160 metres than 80 metres because of its low power output, however a number have been successfully constructed for operation on both bands. It is a design that offers possibilities for Novice operation, although construction may require the assistance of someone with a little more constructional experience. Also it may well be of interest for a club project where knowledge can be pooled. The latest PCB (Issue-5) has been redesigned with thicker tracks and can accommodate both the 80 and 160 metre versions.

Emergency!

GREG REILLY-COOPER, G0NAM
PO Box 98, Northwich, Cheshire CW9 5SZ.
Telephone: 0606 783270.

GREG REILLY-COOPER, G0MAM, the Society's Emergency Communications Officer, will be writing the quarterly *Emergency* column with effect from February 1994. The column will carry on the format previously adopted by Ronnie Cowan.

This month's contribution is a special one which aims to introduce members, especially those involved in emergency communications, to Greg and to his way of thinking. *Mike Dennison, Editor.*

PROFESSIONALISM

IT IS NO SECRET that the last several months have been a trying time for many RAYNET volunteers. There has been uncertainty about the status quo, argument about the merits of linking with Radio Amateurs Emergency Network Limited, argument about remaining autonomous, concern for the future and perhaps saddest of all, discord among ourselves. I offer this observation not as a deliberate under-statement of the obvious but as a reassurance that the RSGB is aware of it. The Society is as unhappy about it as any of us.

What are you and I to do about it? The Society has appointed me its Emergency Communications Officer, to replace John Irving who has felt obliged to stand down due to steadily increasing pressures of work. If I thought last month that I was aware of the extent of the problem, I have already been sadly disabused. We are all volunteers and I can tell you that, in my view, it is only the inherent professionalism of each and every RAYNET volunteer which has kept the RAYNET standards as high as recent emergencies have shown them to be.

If we are all of us working, without pay and in sometimes arduous conditions, toward the common goal of providing an emergency communication service to our fellow citizen in his time of need, do we really need to be bickering among ourselves? I think not and I can confirm, too, that our Society is of the same view. I will not preach. Many of you have been actively involved in this valuable part of our hobby for much, much longer than I. However, I am privileged to have been afforded an overview which is somewhat wider than many of you will have had and I do just ask that you consider my comments with that in mind.

FOCAL POINT

IN ADDITION TO introducing myself to you, therefore, I would like here to ask for your help. Becoming upset and muttering to friends in dark corners is a natural reaction when we feel something which we prize is being placed in jeopardy, but it seldom achieves anything positive. I offer myself as a focal point for those worries and suggestions. I have already received some interesting suggestions and I am sure that if we pool the best of our ideas and all pull together to make them work matters can only improve.

I believe passionately that the core RAYNET principle is far more important than the issues which are dividing us today. In unity there is strength and in strength there is achievement. I hope to play my part by coordinating up-to-date information about what resources are available to us all and by trying to keep *all* Groups informed of developments and ideas from elsewhere.

This is the first area in which I shall need your help. If you have an idea which you, as a valued RAYNET volunteer, feel should be considered by a wider audience, tell me. I might not always agree with you (and wiser counsel might disagree with us both when I do) but come on, think about it: If your idea could work and if RAYNET is important to you, it deserves a hearing and it will probably be easier for me to pass your idea around than for you to do it alone.

If you believe that something is wrong and can help identify why, tell me that too. If you do not, you will have missed an opportunity to educate me and I, in my ignorance, may be busily spreading what I naively believe to be good ideas about the right way forward.

I hope it will be possible for me to travel between groups and, eventually, to meet most of you. I am currently trying to organise some sort of 'calendar' to fit in with my own family and domestic commitments. If any Group would particularly like me to come out and meet you now, would you please have your Group Controller contact me and suggest suitable dates? In the meantime, I shall organise myself according to current priorities.

I would be particularly grateful for notice of, and maybe even an invitation to, any emergency at which RAYNET is asked to assist or for which you are placed on Stand-By. My presence in the early days would be as an observer, offering support where I can. As the information becomes available, however, I would hope to be more helpful, perhaps by telling you where the nearest generator is if you need one, for example, or having someone bring you that extending mast you feel would help.

CLOSER TOGETHER

MY ROLE IS SPECIFICALLY non-partisan and I would like to close with a few words about that.

Whether your Group is affiliated to the RSGB or to Radio Amateurs Emergency Network Ltd is about as important to me as whether you prefer tea or coffee at breakfast. Seriously! Until it can be shown that it is any more important than that to the people whom we have all volunteered to serve, I intend to hold firmly to that view – and I have our Society's full support in this.

I am only too painfully aware that something needs to be done to bring us together again and I know you are aware of it too. It must be equally obvious that nobody can solve our problems in isolation. Let's be honest – we have to come together and work together, not just in the fact of operational necessity, but between times too. The guys next door didn't suddenly lose all their operating skills and good intent just because they decided to affiliate to this organisation or that – did they? They're the same operators who were next door last year and the year before – aren't they?

Let's work together and find ways to improve our service and our enjoyment of its provision.

This is not a recruitment campaign and it is not a competition. You can use me as a focus for your ideas and constructive criticisms even while I am gathering fuller and better details of the resources available. Tell me how you think we should go forward and maybe, just maybe, yours could be the suggestion that clinches it. If you think there's a weakness somewhere, add a suggestion for improvement to your report of it.

I have no doubt at all that if, God forbid, there should ever be a major disaster every RAYNET volunteer would stand shoulder to shoulder with the next and give of his best. I only suggest – no I ask, that we start to do this now.

If your Group would like me to come out and meet you, please have your Group Controller contact me. If you are placed on Stand-By or called to assist in an emergency, please let me know as quickly as possible. In the meantime, I look forward to working with you all towards our common goal.

EMC

HILARY CLAYTONSMITH, G4JKS
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Herts AL1 4UU

SINCE THE LAST features on alarm systems in the April and June 1992 *EMC* Columns, the EMC Committee has been involved in an increasing number of cases where burglar alarm systems are susceptible to false triggering by amateur radio transmissions, and an effective solution is required. We have produced an information leaflet entitled *Radio Transmitters and Home Security Systems* which is intended for owners and installers of security systems which are susceptible to false triggering by radio frequency signals but should also be of general interest as well. Copies are available by sending me an A5 size SASE.

DOES IT MEET BS4737?

With an alarm immunity problem, the first thing to find out is whether the system was installed in accordance with BS4737. Part 1 of the 1986 edition of BS4737 covers installation requirements for intruder alarm systems. Clause 3.2.3 makes the following reference to "environmental" conditions, "The system shall comply with this part of BS4737 in the environmental conditions to which it is likely to be exposed at the protected premises, including mechanical damage, weather, dampness, corrosion, heat, oil, electrical interference and adverse industrial atmospheres."

If any type of radio transmitter is known to be situated near the protected premises, then it could be argued that its radio transmissions form part of the "environmental conditions" to which an alarm system is exposed and that a system which complies with BS 4737 should not suffer from "electrical interference" due to nearby radio transmitters.

PIR ALARM SENSOR IMMUNITY

A common cause of poor immunity of alarm systems is the Passive Infra-Red (PIR) sensors. These contain infra-red photo-diodes with a sensitive detector circuit and usually have an LED indicator which shows when the sensor is being triggered either by someone moving or by a strong RF field. Another less common cause of triggering by RF is poor immunity of the alarm control panel.

The PIR sensor at the top of the photograph above is an Elkron IR 15 type which was mentioned in the April 1992 *EMC* column. This model is quite a few years old and although the IR 15 model tested already had a six hole ferrite bead choke in its supply rail, (see also April 1992 *EMC* column, p 59), its immunity to RF pick-up on the cable at 144MHz was improved by fitting an ACT/6030 filter close to the sensor. These filters, which are shown in the centre of the photograph, are available in 4-way and 6-way versions with the 4-way version being little larger than a postage stamp! They contain four or six 47mH chokes and four or six 1nF capacitors. They provide effective filtering from 14MHz upwards but are progressively less effective at 10MHz and below. They can also be used to improve the immunity of alarm control panels if necessary.

A filter can only improve immunity of PIR sensors to pick-up on the cable, not to direct pick-up in the amplifier and detector circuit. In many cases, the only solution to insufficient PIR immunity is to replace the affected PIRs with more immune types. Sensors which are approved by the Loss Prevention Council (LPC) have to meet the LPS 1169 specification which involves various tests including RF immunity at 10 volts per metre. The carrier frequency is varied from 1 to 500MHz and is 50% modulated with 1kHz AM. As of September 1993, the list of LPC approved types of PIR sensors is as follows:

Alarmcom Ltd, IR210C and IR212C.

Racal-Guardall (Scotland) Ltd, Apollo D/10 and S/10.

Aritech UK, EV225, EV226, EV228, EV235, EV238, EV635, EV645.

The following models used to be on the list but have been withdrawn on a temporary basis: Pulnix Europe Ltd, models PA 7012E and PA 7030E.

We do not have any first-hand experience of the performance of any of the above sensors near amateur radio transmitters but we do have a report on the Texecom 'Medusa' PIR which claims RF immunity of 20V/m from 20 to 1000MHz. This level may not be comparable to the LPC 1169 tests as we do not have details of the test method used by Texecom.

ACT meters supply a special PIR sensor, model ACT/111S which is shown in the lower half of photo 1. It is a Canadian product which is designed for use where a high level of RF immunity is required and is able to recognise the difference between RF pick-up and wanted signals. When it detects high levels of RF, this PIR sensor flashes its LED rapidly but it does not give a false alarm and can still detect intruders! The price of the ACT/111S is £39.95 + VAT retail or £29.95 + VAT trade price.

ACT Meters Limited have a new address: Rainford Civic Hall, Church Road, Rainford, St Helens, Merseyside WA11 8HB: Tel 0744 88 6660, fax 0744 88 6661.

ALARM IMMUNITY PUT TO THE TEST

Ron, G4YRR, had a problem with the alarm system which had just been installed in his neighbour's house across the road about 30 metres from Ron's HF beam antenna. The alarm installer knew that there was a radio amateur nearby and said that the PIR sensors which he was fitting had good immunity to RF. They were 'Medusa' types from Texecom. The alarm went off if Ron pointed his 4 element KLM HF beam in that direction and transmitted 100W on 14, 21 or 28MHz. Ron, an electrician, had previously installed an identical alarm system in his own house, with 'Medusa' PIR sensors and an 'Optima' XM control panel, and this provided a very useful test bed. He established that it was not the control panel but the PIR sensors which were susceptible to RF, particularly the one at the top of the stairs which was connected to about 8 metres of cable. He tried screening the cable to this PIR but it was still triggered by RF. He also tried fitting an ACT/6030 filter at each end of the cable but without success.

PIR sensors and alarm RFI filters: Top Elkron IR 15 PIR sensor, centre ACT/6030 filters, and bottom ACT/111S PIR sensor.

He then tried an ACT/111S PIR sensor which ACT meters had provided to the EMC Committee for evaluation. He could generate enough RF field strength to make the LED flash rapidly but it didn't give a false alarm and it still detected movement. He then tried it out in his neighbour's house and found that even when using a 400W linear and beaming straight at the alarm system, there was no problem.

At VHF, a 'rough and ready' test by Dave Lauder, G0SNO, on the ACT/111S with a 144MHz 1 watt hand-held showed that its helical antenna had to be almost touching the case before the LED started to flash rapidly.

PIR SECURITY LIGHTS

There seems to have been an outbreak of PIR operated security lights around the UK recently. DIY chains are selling many types of these security lights from around £20 but unfortunately, some radio amateurs have found that when they transmit at night, half the street lights up! We are looking into solutions for this problem and hope to 'cast some light' on things in a future *EMC* column.

INTERNATIONAL EMC

At the last IARU Region 1 EMC Working Group (WG) meeting in 1992 at Friedrichshafen, I noticed that a great deal of emphasis was placed on producing papers for international symposia on professional EMC and that very little was being done at a practical 'nuts and bolts' amateur level. Although symposia have their place, I think they should only be part of a much broader picture. I was therefore very pleased at the IARU

Region 1 Conference in De Haan this year to hear Christian Verholt, OZ8CY, say that he thought that there needed to be an extension to the Group's work programme. A second meeting was called to discuss his proposals.

The outcome of these meetings was agreement on the aims of the IARU Region 1 EMC WG for the period 1993-96. The Group will be an active group responsible for the coordination of EMC and related activities within IARU Region 1. Its activities should strengthen the ability of national societies to:

- support the development of EMC standards
- influence the technical content of EMC standards in order to obtain the right level of equipment immunity and an adequate low limit on emissions from equipment

It was further agreed that the Group should:

- collect and distribute the information necessary to support the above
- cooperate with the EMC community, eg. by attending EMC symposia and submitting papers
- be a forum for discussions on EMC legislation
- be the coordinating body for information on equipment not complying with mandatory EMC standards
- be a competent partner for discussing EMC problems with national and international equipment manufacturers
- encourage and support the EMC education of radio amateurs by the distribution of information, examples of practical EMC counter-measures and educational programmes.

The RSGB has been raising the profile of EMC in amateur radio for many years. It has been involved in BSI and ETSI standards committees and has been in contact with many manufacturers of products which have inadequate immunity or excessive emissions. Papers have been written for international meetings informing other societies of the work being done within the RSGB in this field. We look forward to contributing to the broader brief of this working group.

Henryk Cichon, SP9ZD, felt that after 15 years of driving the EMC WG it was time to stand down as Chairman and he proposed Christian Verholt, OZ8CY, for the position, which he accepted. Tom Sprenger, PA3AVV, paid tribute to the work done by Henryk and proposed that this should be recognised by making him Honorary Chairman. It was hoped that he would continue his valuable work on EMC symposia within the group.

EMC REGULATIONS TO COVER KITS

AS YOU MAY remember, the RSGB responded to the *Electromagnetic Compatibility Draft UK Regulations Document* in September 1992. One of our submissions concerned amateur radio kits. We requested that certain kits should be exempt from the regulations which would require them to meet the relevant EMC standards and be CE marked (see Feb 1993 *EMC* column pp 60-61) but this proposal was rejected by the DTI. Following a meeting between manufacturers and the RSGB in June 1993, the kit manufacturers present decided to set up the UK Kit Manufacturers Association (KMA) to make representations to the DTI for exemption of kits from EMC regulations.

Clearly, the effectiveness of this association will depend on the number of members. Any manufacturers or suppliers of kits related to amateur radio who wish to join the KMA should contact the Honorary Secretary, Derek Pearson G3ZOM, c/o 6, Fellows Ave, Kingswinford, West Midlands DY6 9ET. His telephone number is: 0384 288900.

BRIEF CASE

IN OCTOBER '92 *EMC* column it was reported that Frank Claytonsmith, G3JKS, was receiving interference from a neighbour's central heating controller containing a microprocessor. G0SNO has been in contact with the designers Ener-Tech Electronics who put forward the following text.

"Further to the report in October '92 *EMC* column about RFI on the 3.5MHz band from a Potterton EP 3000 central heating controller, we have heard from Roger Piper, G3MEH, who has a Potterton EP 3001 and has checked it for RFI between 3.4 and 3.8MHz and found it to be quiet. EMC Committee member Dave Lauder has been in contact with Ener-Tech Electronics who design and manufacture electronic controls for Potterton. They told him that this was the first reported incident in over 750,000 installations, of an EP 3000 being cited as an RFI source.

The EP 3000 was superseded by the EP 3001 some four years ago and was designed by Ener-Tech Electronics in conjunction with an approved EMC test laboratory. The emission levels of the EP 3001 are significantly within the levels set in BS EN 55014, this is just one of the standards designated in the EMC Directive to which Ener-Tech design all of their products.

We are pleased to report that Ener-Tech have exchanged the EP 3000 in Frank Claytonsmith's neighbour's house for an EP 3001 free of charge and that this has solved the interference problem."

Ferrite components salvaged from scrap TVs. Top left: TV Scan coil assembly. Top right and centre: ferrite deflection yoke cores. Bottom: TV Line output transformer dismantled.

FERRETING AROUND IN A SCRAP TV

IF YOU COME ACROSS any scrap TV sets, monitors or VDUs, or know a friendly TV service engineer, then you could salvage some useful ferrite cores which can be used instead of ferrite rings for EMC purposes such as reducing breakthrough in audio amplifiers due to RF pick-up in loudspeaker leads. The advantage of these ex-TV ferrite cores is that they are split and can be fitted to cables which can't be threaded through a ring core. Some are quite large and have much more room for winding cables than a 25mm i/d ferrite ring, so you could easily wind your station mains cable through one to reduce the amount of RF fed into the mains earth.

First, some words of warning for anyone who is not familiar with the inside of TV sets etc. Breaking the glass of the cathode ray tube would be dangerous as it can implode and send broken glass flying, so take care not to hit or drop the tube. Do not exert any force on the tube neck as this is the weakest part. The tube forms a capacitor which is charged up to about 12 to 18kV and can stay charged up for weeks or months after being switched off! Do not remove or cut the thick EHT cable to the tube unless you know how to discharge the tube capacitance safely before doing so.

At the top left of the photograph below is a scan coil assembly from a small screen monochrome portable TV with a 20mm diameter tube neck. With colour TVs, apart from very old sets, the scan coils are normally bonded to the tube and cannot be removed. On a monochrome tube, the scan coil assembly can normally be removed easily by loosening a clamp bolt and carefully sliding it off the tube neck. After stripping off the windings and removing the plastic mouldings (not always an easy task!) you will be left with a ferrite yoke ring as shown at the top right of the photograph. The top right ring is about the smallest you'll find with an inside diameter of 29mm, whereas the larger one in the centre has an inside diameter of 40mm. These ferrite yoke cores are made in one piece and then cracked into two halves which fit together perfectly as a pair but are not interchangeable with other core halves of a similar type. They are normally held together by a clamp or by clips.

At the bottom is a small line output transformer (LOPT) dismantled. Most LOPTs are larger than the one shown and can be quite difficult to remove from the PCB and dismantle. The ferrite core on the right consists of two 'U' core halves clamped together. If there is a thin plastic spacer between the core halves, this should be removed.

For EMC applications, we want the maximum impedance for a given number of turns (12 – 14 recommended for HF) and we don't mind if it's lossy. Yoke rings normally give good performance in EMC applications at 7MHz and above, whereas the higher permeability ferrite used in LOPT cores gives best results at lower frequencies such as 1.8 and 3.5MHz.

Brief details of the characteristics of ferrite rings and split cores can be found in the EMC section of the *1994 RSGB Call Book*.

TURN TO PAGE 45 for part one of 'Filters and Ferrites for EMC'.

Q R P

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

IT MAY SEEM ODD to some radio amateurs if I suggest that a lot of the most interesting items and ideas in QRP come from the USA. So often we identify that area of the world with the strictly commercial aspects of our hobby. Large expensive stations complete with kilowatt linear amplifiers and impressive amounts of metal rotated on top of large towers. Over the years many of the best articles on building QRP equipment have come from American authors. The classic commercial QRP Transceivers, the Heath HW series and the Ten Tec Argonaut series, both came from the New World. In more recent times several kit manufacturers in the USA have begun to offer an interesting range of equipment.

TEJAS RF TECHNOLOGY

WHEN I FIRST visited Texas in 1983 perhaps I was not surprised to meet someone called Bill Hickox. Bill, K5BDZ, has been involved in low power operation and construction for many years. He has now formed a company using the old Red Indian name 'Tejas' which produces an interesting range of kits.

The 'flagship' kit is a popular single band CW transceiver called the Backpacker. The latest version, the Backpacker II is sold as a complete kit, including all of the parts, a case, hardware, instruction manual and even the solder. It is available for any single band from 40-15 metres and is described as "rugged for backpacking yet attractive for brief casing".

The circuit is a DC design based on the W7EL 'Optimised Transceiver' ideas. It has full break-in, a 200kHz linear VFO, full RIT, a built-in CW filter and adjustable power to 2W. Changing bands requires the replacing of 11 components, the VFO is not touched, and band conversion kits are available. The Backpacker kit sells for around US$160 plus shipping and handling costs.

Tejas also produce kits for a variable peaking Bandpass Filter, a deluxe Mini-Keyer, a Field Strength Meter, a Gelled Cell Charger and an RF Monitor Inline Sensor. Information can be had from Tejas RF Technology. PO Box 720331, Houston, Texas 77272-0331, USA. Telephone (7130 879 – 9300 or FAX (713) 879 – 9494. Tejas do ship their kits world-wide but it is probably best to check the charges before placing an order. I hope to have a Backpacker to review in a future issue of *RadCom*.

OAK HILLS RESEARCH

OAK HILLS RESEARCH was originally founded by my favourite American, Doug DeMaw, W1FB, when he retired as Technical Editor of *QST*. Although Doug sold the company long ago, it continues to produce a very interesting range of kits. In the last two months I have seen excellent reviews on three Oak Hills Research kits in the American amateur radio press.

Oak Hills offer a direct conversion single band transceiver kit called the Sprint, again based on the W7EL design. The kit includes all parts, a silk screened printed circuit board, pre-wound coils and a painted cabinet. For those who prefer a superhet transceiver, Oak Hills also produce the Spirit. This single band transceiver is sold in complete kit form and has a built-in Curtis keyer. The Sprint sells for around US$110 and the Spirit for just under US$200.

Two very useful Oak Hills kits which have received fine reviews are the SCF-1A Switched Capacitor Filter and the WM-1 through-line Wattmeter. The filter is from the design by Sam Ulbing which appeared in the QST of October 1992. The filter offers audio bandwidths of 2440, 574, 459, 383, 230 and 180 Hz, all that is likely to be required for amateur radio work. The Wattmeter uses a bi-directional coupler of the type made popular by David Stockton, GM4ZNX, and meter amplifier circuit based upon the design by Roy Lewallen, W7EL, in the *ARRL Handbook*. It has three full scale ranges of 10 watts, 1 watt and 100 milliwatt.

Information about these kits can be obtained from Oak Hills Research, 20879 Madison Street, Big Rapids, MI 49307, USA. May I suggest that you send a dollar bill or three IRCs with any request for the catalogue.

FAR CIRCUITS

I mentioned above that many good circuit designs have appeared from the USA for easy to build equipment. The *QST* magazine, the American equivalent of *RadCom,* has a fine tradition of publishing reliable and popular circuits. Many of these have been gathered together in the book *QRP Classics*. Two other popular American books are the *W1FB Design Notebook* and the *W1FB QRP Notebook* by Doug DeMaw. These books are available from the RSGB, see pages 93/94.

Some constructors prefer to use ready etched printed circuit boards rather than attempt to make their own boards. FAR Circuits is a company in Illinois which manufactures printed circuit boards for projects which have appeared in the above books and in other American sources. Their stock is extensive and includes popular circuit designs going back to the early 1970s. A full list of their boards, with prices and reference to the sources, can be had from Far Circuits, 18N640 Field Court, Dundee, Illinois 60118, USA.

PREPARING FOR PORTABLE

ONE OF THE MOST enjoyable aspects of QRP is the ability to operate as a portable station. The size and low power requirements of QRP equipment lends it well to operation in the field, on holiday or from a temporary location. I have enjoyed portable operation for many years, often using home-made equipment in makeshift locations. I have also enjoyed QRP from our rather ageing caravan in various parts of Europe.

My favourite band is 20m. It is a good compromise band for making a range of interesting contacts with two or three watts. I have often used a dipole with thin co-axial feeder. A 20m dipole may be fitted into the smallest of spaces, hung from local trees, or down the side of a holiday home. One summer I enjoyed many QSOs with a dipole thrown onto the slate roof of a cottage in Wales.

In more recent years I have used loaded whip antennas. Some of these have been home made. There is an interesting range of compact and portable antennas in the *G QRP Club Antenna Handbook*. About five years ago I bought a Hustler Whip Antenna, with a full set of Band Loading Coils from the flea market at Dayton and this has given me excellent results, including working W and JA stations with 5 watts of CW on 20 metres when I was operating as LX/G3RJV/P.

An important point about portable working is the preparation. If you intend to work portable next summer prepare for it this winter. This is especially so with small tuned, or whip, antennas. Their results depend upon a great deal on painstaking setting up and experimentation. This is best tried at home with plenty of time to get it right before finding oneself in the portable location. Do try portable QRP operation this coming summer but a few hours of experimentation during the winter can save a lot of time and frustration.

Einar, SM5CBC, operated as SM5CBC/4P in Laen with a Heath HW8,SuperBug II and a 12 volt 5AH Battery. Antennas were Delta Loops for 7, 14 and 21MHz.

RADCOM NEWS FEATURE

To Key or Not to Key?

A report on the Code Free Licence consultation exercise for the RSGB Council and Licensing Advisory Committee prepared by the HF Committee.

THIS ARTICLE does not represent RSGB policy – it represents the views expressed in the survey regarding a Code Free HF licence.

It is of interest to note that at the recent Region 1 IARU Conference in September the Conference was in favour of retaining the Morse requirement. Council's current opinion is in agreement with the Region 1 decision but recognises that the situation may change in the next 5-10 years.

IN 1992 THE Radiocommunications Agency (RA) had become aware that some UK licensees and SWLs held the view that a Morse test should not be a requirement for access to the HF amateur bands. To obtain a wider viewpoint the RA asked the RSGB, through its Licensing Advisory Committee (LAC), if it would conduct a consultation exercise. The Society has carried out many such exercises in the past and indeed it is the job of the RSGB to examine any relevant issues within the hobby which require attention. The task of seeking views, by requesting input, was passed to the HF Committee by the RSGB Council and LAC. Clearly without a Morse test the likely increase in HF activity would affect HF operators.

To activate this consultation process the Committee produced a Press Release, in conjunction with the LAC, which was sent to *RadCom* and by RSGB HQ to other UK amateur radio magazines. By the closing date for input of 8 March 1993 a total of 1413 replies had been received from the UK and 86 from overseas. Although 1413 replies is a small percentage of the number of UK licensed amateurs, currently over 60,000, nevertheless more replies were received than expected. Indeed the numbers themselves illustrate a high level of interest in this topic.

Every single letter received has been read, indeed some 200 plus hours of volunteer and HQ effort has gone into this whole task. While a few replies were a simple Yes or No, or words to that effect, on the back of a QSL card, most of the letters received gave lengthy arguments (many running to six or seven pages) either for or against a Code Free Licence. Literally hundreds of points were raised through this correspondence and the Committee thanks each and every person for taking time to record their opinion. Widely different views were received about Morse code from the 'soul of amateur radio' to 'completely irrelevant to the hobby'. While it will be impossible to mention every single point raised, it is intended that this report be a fair summary of the views expressed.

The Raw Results

THE RAW data which gives the numerical result of the consultation exercise is given in **Table 1**. The data shows that on this occasion there is a two-to-one majority in favour of retaining the Morse test as a means of access to the amateur bands below 30MHz. No doubt this topic should be reviewed by the RSGB Council from time to time to see if opinion changes. It is interesting to note that the majority of those wanting to retain the Morse test were Class A licensees and the majority wishing to do away with the Morse test were Class B licensees. Perhaps this result is not altogether unexpected. Of the 86 letters received from overseas there is a much higher proportion in favour of retaining the Morse test.

Retain the Morse Test

THOSE WHO wish to retain the Morse test, rightly or wrongly, put forward the following points:-

a) to do away with the Morse test would be a retrograde step for amateur radio. It would reduce the status of the amateur service, especially in the eyes of those who we need to support its future development.
b) a number commented that they thought the standard of the RAE had dropped and did not wish to see any further dilution of the qualifications required to obtain a licence.
c) that to abandon the Morse test would lead to an inevitable erosion in the value and challenge of amateur radio to the individual which would lead to the lowering of standards. It is argued that any educational or training process requires some degree of struggle which is a measure of the commitment of the individual involved. Many believe that the best radio amateurs are those who put more effort into amateur radio and that passing a Morse test demonstrates such additional commitment. It is argued that more commitment tends to equate to better on air behaviour because there is more to be lost.
d) Morse is also considered an essential part of the heritage of amateur radio. There is a view that Morse is very fundamental to the spirit of amateur radio and to abandon the Morse test would indicate a shift in the understanding of the purpose of amateur radio, which could lead to its demise. Many also think that those who call for change to make any licence easier to obtain have less interest in amateur radio and simply wish for more privileges for less work.
e) that Morse code has significant communications advantages, especially for those on low budgets, including beginners and those in developing countries, using simple low power equipment.
f) that Morse provides the only true common language between radio amateurs which can be used at a basic technical level which all can share. Some say that the real advantages of Morse cannot be appreciated until Morse is used on the air.
g) by far the biggest single point made in favour of retaining the Morse test is by those who believe that without it the HF amateur bands would become overcrowded. The argument for the potential overcrowding of the HF amateur bands is that for much of the 11 year sunspot cycle HF activity is crammed into the few hundreds of KHz that happen to be providing communication over a particular path at a particular time of day. Of the HF spectrum available to amateurs in the UK, some of it shared with other services and the 21, 24 and 28MHz bands are unreliable for much of the 11 year Sunspot cycle. Already useful spectrum at HF is crowded especially at the peak times in the evenings and at weekends. Contrast this with the amateur bands above 30MHz, which although overcrowded at times, are larger and have the virtue of frequency reuse because of the relatively short ranges involved. The argument is that because of the scarce and

therefore rather precious nature of the HF amateur bands that it is necessary to have some restraint on their use.

h) a further point which is made in relation to the HF amateur bands is that as with roads, overcrowding tends to lead to bad behaviour because of frustration. Currently the World amateur population is some 2.4 million with a growth rate of 7% per annum.

i) that using Morse code is an enjoyable art form akin to sailing, riding a bicycle or gliding. Morse may not be the fastest means of communication but to use it skilfully is very worthwhile for the individual. The use of this skill has given amateur radio great status in times of war (The Secret Listeners of WWII) and all over the World in times of emergency.

j) many SSB operators who do not use CW are firmly in favour of retaining the Morse test. They believe that without it SSB operation would become much more difficult with increasing overcrowding. Many CW operators believe that if the Morse test were abandoned, overcrowding of the SSB bands would lead to a loss of usable CW spectrum which is presently maintained through voluntary band plans.

k) that should the UK unilaterally abandon the Morse test, then almost all reciprocal operating privileges in other countries, including CEPT, would be lost.

For a Code Free Licence

AGAIN, RIGHTLY or wrongly, those who wish to see the introduction of a Code Free Licence put forward the following points:-

a) that a Morse test at any speed is seen as a barrier to those wanting to take up amateur radio and eventually transmit. It is argued that there is an urgent need to increase the number of licensed radio amateurs. Eliminating the Morse test for HF would open up the hobby to far more people who in turn would ensure its future growth. Increased numbers would strengthen the position of the radio amateur, National Societies and would help to gain more spectrum space.

b) that the Morse test puts off many young people who otherwise would bring their computer and associated interests to the hobby.

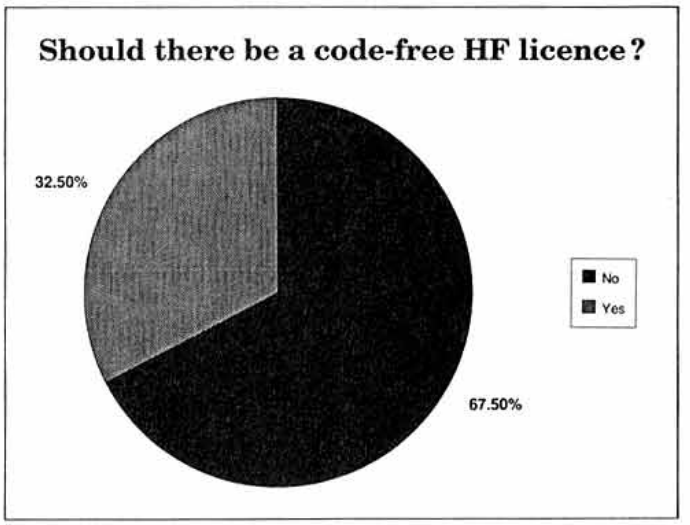
c) In the early days of radio Morse code was a necessity but the demise of Morse code in the commercial world of radio indicates that Morse is no longer relevant in the amateur environment. Advancing technology eliminates the need for a Morse test, after all Morse code can be sent and received completely automatically. Some digital methods of communication can achieve better results than Morse code.

d) Crowded bands, possibly brought about by dropping the Morse requirement, could lead to advances in technology. In any case the HF amateur bands are not that overcrowded, it is the pressure points which need to be avoided.

e) Forcing people to learn Morse code to gain access to the HF bands, is bad for them and the hobby. It is an artificial barrier. There should be no need to qualify in something which an individual never expects to make use of. The time spent learning Morse could be put to better use if it is simply to be forgotten after the test. Morse code, like any other mode should attract people by its merits. If it works well people will naturally learn Morse code and use it on the air.

f) Why should there be a practical test for one mode of operation without there being a test for other modes. Dropping the Morse test does not prevent those so inclined from learning it, passing a test and using it. The mastery of CW may make you a more complete operator, but it need not necessarily make you a better operator.

g) Some people simply have no aptitude for Morse code or are too old to learn it. Morse code can also present difficulties to some disabled people. Because it is difficult for some individuals to learn Morse they are denied access to the HF amateur bands. The Morse code examination discriminates unfairly in favour of certain people which denies others freedom of choice and from enjoying the hobby to the full.



h) Some other Countries, notably Japan, operate Code Free Licenses on HF, with reduced privileges. This has given rise to a very large amateur population in Japan.

i) Many believe that the CW test is being retained simply because those who have already passed the Morse test do not want to feel that something can be had for nothing and who appear to believe in the 'cold baths are good for you approach', as one writer put it.

j) An amateur licence should incorporate compulsory band plans, so that in the event of the Morse requirement being dropped CW operators would have their spectrum space protected. In any event it should be possible to obtain a licence for certain modes only, having passed an appropriate test for that mode.

UK replies received	1413	
A 'No' or 'Yes' view was expressed by 99.43% of those that replied		
Of those expressing a view	67.5%	voted 'No' to a code free licence
	32.5%	voted 'Yes' to a code free licence
Of those voting 'No'	88.6%	were full class A licensees
	6.4%	were full class B licensees
	3.8%	were SWL's
	0.8%	were novice class A licensees
	0.4%	were novice class B licensees
Of those voting 'Yes'	78.5%	were full class B licensees
	14.0%	were full class A licensees
	7.2%	were SWL's
	0.3%	were novice class B licensees
Overseas replies received	86	(All expressed a view, namely)
	94.2%	voted 'No' to a code free licence
	5.8%	voted 'Yes' to a code free licence

Table 1: Code Free Licence Consultation – the raw data.

Ideas for the Future

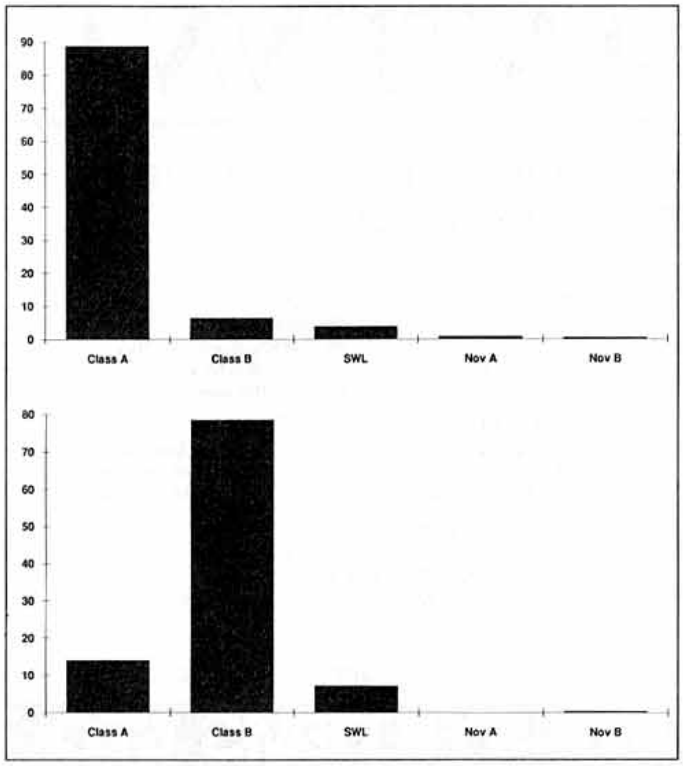
A SIGNIFICANT number of people said they would welcome some form of incentive licensing system.

That is, additional grades of licence, each with its own set of qualifications so that each individual could decide what facilities they required.

Although the UK already has two grades of licence (Novice and Full) many advocate a more developed scheme as they feel it would provide greater scope for progressive self-training. Comments of this nature were rather evenly split amongst both camps but with more coming from those who had opted for a code free licence.

Many welcomed the Novice training approach as a step in the right direction for developing future radio amateurs. Indeed many ingenious and inventive proposals were put forward for new licensing systems. Ideas were also put forward for new qualifications and ways of permitting Class B licensees to use SSB on the HF bands. These included; probationary periods on VHF, 5WPM Morse test to allow Class B licensees access to HF with certain restrictions, proof of home construction, collection of QSL cards, certified periods of Short Wave Listening, QSO instruction at a radio club, etc.

Readers may already know that incentive licensing is to be considered by the RSGB Council and that currently two RSGB Committees are studying the topic to assist Council's future deliberations.



Licence categories of those voting; above "no", below "yes".

Learning Morse Code

ANOTHER ASPECT which was raised in the correspondence is that of learning Morse code. Most believe that learning Morse code is not difficult. Some cite stories of great perseverance followed by success and a few say that despite their best efforts they could not achieve a pass in the 12 wpm Morse test.

The question as to how long it might take someone to learn Morse code for the 12WPM examination was put, along with some other questions, to all of the UK Morse examiners. While opinions do differ, the consensus is that it would take a motivated beginner some 72 hours of work, usually spread9 over a period of some months, to reach the 12WPM Morse standard. Some will take more time, some will take less, depending on ability and learning method. Some younger people may be quicker and some older people may not be as quick. Daily practice is considered better than a long session once a week. The point is made that the right attitude of mind is very important to the learning process and the analogy is made that most people who want to drive a car will end up passing the driving test. There can be a barrier to overcome at around 8-10WPM, but the Farnsworth method (characters sent at 12WPM with longer than normal gaps to reduce the overall speed) helps to overcome this. Farnsworth sending is in fact used in the UK Novice 5WPM test.

A special mention must be made disabled and elderly people who, depending on their circumstances, can experience difficulties acquiring practical skills. Large numbers of disabled and retired people have taken up the challenge and have been thrilled to pass the Morse test. Special examinations are held for disabled people; details are available from the Chief Morse Examiner.

In conducting this consultation exercise no real disadvantages were put forward for Morse code. However, it is apparent that while the greatest disadvantage to Morse communication is the necessity learn the code, there are many perceived advantages in its use. Summaries of the advantages which have been put forward are shown in the table on the right.

Final Remarks

GONE ARE the days when a knowledge of Morse code was considered essential for communication between radio amateurs. However, CW has been used, even in recent years, by other Services to communicate with amateurs and it is used, for example, to identify marine and aviation beacons. For a long time it has been accepted that the Morse test does provide a limiting effect on the number of radio amateurs using the finite resource of the HF amateur bands. Given that the amount of spectrum available to the Amateur Service(s) below 30MHz is unlikely to increase at the rate of growth of amateur operators (currently 7% per annum World-wide), it does seem that some limit must be placed on access to these bands, to avoid overcrowding. Presently this is achieved by the Morse test, but if this traditional method is to be questioned then suitable alternatives must be considered and studied in some depth. It is the way in which numbers are limited to avoid intolerable levels of interference that is being questioned.

An ability in Morse code demonstrates a practical skill, which is certainly relevant to amateur radio, but acquiring this skill will put some at a disadvantage. However few would dispute the fact that practical skills are an important facet of amateur radio. On the other hand the ability to retain knowledge for a written multiple-choice examination, may not favour other individuals; especially if a higher standard of the written examination takes the place of the Morse test, as some advocate. We have to ask if there are viable alternatives to Morse code which might test practical skills, which are useful to the radio amateur. Keyboard and computer skills, practical tests for all modes and foreign languages were suggested as alternatives; but each may well present its own new form of challenge.

Although it was suggested, most radio amateurs would not approve of handing out amateur licences to passers by with no qualifications. Bands would rapidly saturate to the point of becoming unusable which would lead to social consequences that many would find unacceptable. As such, some examination or form of assessment is considered necessary. Everyone wants to see on-air standards of behaviour as high as possible and as a starting point this must be addressed in the training process. The correct mix of practical skills, application of acquired knowledge and attitudes which are required to make a good and responsible radio amateur may need to be re-established within the amateur radio movement. But if changes to qualifications are made then some individuals may well benefit at the expense of those, with other qualities, who might be put at a disadvantage.

There are some useful arguments both for and against a Code Free Licence. It is primarily up to the amateur community World-wide, and its elected representatives, to determine what qualifications are necessary and what standards need to be met to gain different types of transmitting licence. National Societies must persuade National Licensing Authorities, and in turn the ITU, to accept whatever values and qualifications are deemed to be in the best interests of the future of amateur radio. Probably an appropriate mechanism for future discussion is the IARU. The HF Committee has prepared this report in good faith as a summary of the views received from the consultation exercise. The Committee stresses that the views expressed do not represent RSGB Council policy but hopes that the report will provide the RSGB Council both with the numerical results of the consultation plus guidance and an insight into current thinking.

Perceived Benefits of Morse Code

a) Morse code transmissions occupy a narrower bandwidth than speech transmissions. Morse thus allows more stations to use a given amount of spectrum space and thus enables radio amateurs to make more effective use of their frequency allocations.

b) Being a narrow bandwidth transmission it is possible to copy a Morse signal at lower signal strength, with possibly more interference, than a speech transmission.

c) Morse is, and always will be, ideal for the beginner because simple home made, low power, equipment can provide a low cost entry point into amateur radio.

d) Morse code does not require the component complexity of either SSB or digital modes and so there is less to go wrong.

e) Morse QSO procedures are an ideal basis for contacts on other modes.

f) Morse is an ideal mode for communication using low power.

g) Morse is used by amateurs in many developing nations, allowing them to participate in the hobby.

h) It is easier to become World competitive using Morse code than on other modes.

i) Because of the use of internationally accepted abbreviations and Q-codes there are no language difficulties when using Morse code.

j) Morse code is the lowest common denominator for emergency communication.

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2M8s, 8 element, 11.0dBd, 3.6M boom
2M6s, 6 element, 9.5dBd, 2.5M boom
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70CM18dx, 18 element, 15.0dBd, 3.7M boom
70CM12s, 12 element, 12.9dBd, 2.0M boom
70CM6s, 6 element, 9.5dBd, 1.0M boom

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RADCOM NEWS FEATURE

VHF National Field Day 1993

by VHF Committee Member Andy Cook, G4PIQ

THE FORMAT of this year's contest was based upon the results of a questionnaire sent out to all groups who competed in 1992. The resulting relative lack of changes appears to have been well received, and I am very pleased to report that, for the second year running, overall entries were very slightly up on the previous year. Only the new Low Power, Unrestricted Antenna section was not well supported and will not be run again next year. It was very pleasing to see a good number of Novice callsigns as operators on this years' logs, and we hope that this trend will continue. Indeed, the Christchurch & Purley ARS station was operated almost entirely by Novices. This is just the sort of encouragement which is needed to promote activity and contesting amongst new blood, and we are already beginning to see Novices get their own full licences and enter other contests in their own right.

Weather

PREVIOUS VHF NFD write-ups have started by mentioning the weather. There is good reason behind this, since it is comments such as: 'That was the one where my feet got so wet they stayed wrinkled for weeks afterwards', or 'We abandoned site in that one when the adjacent hill-top was struck by lightning' which differentiate between field-days in people's memories. The other trait of field-day weather is that it almost never deals out equal treatment to the different parts of the UK, and this year was no exception. Much of the country basked in sunshine, and operators began to realise just how like a sauna a tent can become with a couple of amplifiers running inside and the sun beating down on the outside. On the other hand, those up in the north-west of England and most, but not all of Scotland experienced the more traditional field-day accompaniments of rain, wind, and cold. G4ATH/P in North Yorkshire asked "Who ordered the horizontal rain", GM0MVZ/P had to close-down overnight since they were concerned about the safety of their tent in the gales, but perhaps it was all summed up by GM6FPX/P who just said "I thought that early July was supposed to be Summer".

John Quarmby, G3XDY, operates G4MRS/P on 23cm.

Because of its direct link to tropo conditions, particularly with weather fronts being able to attenuate propagation significantly across them, the state of the weather can have a great effect on performance in the event. The Warrington Contest Group, who had travelled from the Manchester area up to near Edinburgh said "Blown it this time (that means two front-ends as well) – on the wrong side of a front all contest." On the other hand, G4JAR/P, sitting only a couple of hundred metres from the east coast in Clacton were able to take advantage of the fragile marine ducts which often form with warm sunny weather, and which sometimes extend only a very short distance inland. This enabled them to turn in a 23cm score which looked more like a 70cm one, and was vastly in excess of that achieved by anyone else. Incidentally, their comment on conditions was "Not bad at all".

Entries

THE CLOSE competition was once again at the top of the Open Section. Colchester and Havering Radio Clubs combined to enter this year's event for the first time, and with excellent results for a first entry. Before adjudication began, they were ahead of the Loadsamoney Contest Group, but as checking continued the gap narrowed until they were within less than one normalised point of each other. At that point two unmarked duplicates were found in Loadsamoney's log which sealed the result. This is the third year running when the leader in one of the sections has been decided or almost decided by unmarked duplicates. Last year was only an exception since there were unmarked duplicates found in both the winners' and the runner-ups' logs!

In the other three transmitting sections, we have the very unusual situation of each of the section winners having won not only the overall contest, but also each of the four bands. Many congratulations to them for pulling off this unusual achievement.

Log quality was variable – as usual most were very good, but one group's were the worst we have ever seen, with coffee stains, mostly pencil entries with many crossings out, half the signal reports missing, and much of the writing illegible! G0RDI/P missed a block of 10 serial numbers in their log which is not a problem if you mark it on the sheets – they apologised and said they were unsure if the operator was tired or just plain stupid! One group's logs were scored with a very generous algorithm which appeared to mark up most of the contacts by about 50% – this log has had a correction factor applied to it, and the group has been asked to take a more careful look at their software!

Yet again we had a few problems with registrations and the paperwork required with the logs. Some groups tried to change sections without telling us – they have been restored to the section in which they registered, and have had 10% deducted from their score. Also, some groups did not include 4422 summary sheets – they have also lost 10%. These sheets are essential to the checking process since without them, we cannot easily cross-check the final tables for consistency.

70MHz

AS USUAL, the 4m CW section sorted the sheep from the lambs in terms of accuracy, though looking at some of the logs, you would have been forgiven for thinking that is was the actual sheep who were doing the operating at some stations! One station didn't log the distance in any of the QTHs which were sent – this obviously lost them most of their points!

It is surprising what can be done from favourable sites on this band with a very small station. Apart from the obvious band leaders in the low power section, GW3SON/P was particularly successful in working 112 stations across the two sections with only 5W and a 4-element. On the other hand, stations located nearer to the corners of the country find that a fairly big system is essential to make headway, and there were some very long yagis in use. The king of this category was undoubtedly G3XBY/P's 15-ele NBS yagi, which I reckon must mean that it is 4.2 wavelengths long, or 59 feet – quite a monster!

GM0GAS/P had a new 10-ele yagi which they found too sharp to just fix in one position from Scotland! However – this was not for long, since the wind shook the bolts loose, and the whole thing

The Aberdeen VHF Group's 4m station GM0FRT/P; GM4AFF operating.

came crashing down. This group did however get their own back on the rest of the entrants by sending their QTH as 6 km NE Moscow – this caused many problems for those on the receiving end since they didn't expect UA3 to have 4m permission!

144MHz

AS ALWAYS, 2m provided the bulk of QSOs during the event, and as usual, opinions on conditions were divided. Generally, it appears that there was a small amount of tropo enhancement from time to time, but not enough to have a significant impact on scores, although some reasonable DX was worked by many stations. Several worked into Denmark late on Saturday night, but the best DX by far was made between GM4ZUK/P and SM2CEW's EME station in KP15 in the North of Sweden. This contact was made on Sunday morning by what is assumed to be either ionoscatter or residual auroral-E; but the path is often covered by well equipped stations, and this propagation definitely seems to favour the more northerly latitudes. Long antennas were also in evidence on this band, and G4DSP/P used one of the new 8-wavelength (53 feet long) M2 yagis which only arrived on site from the importers on the Saturday morning. G3ZTT/P felt discretion was the better part of valour when, having dropped their 2 x 19Y array three times in trying to get it up to 50ft, they reverted to a 30ft mast. G3WGC/P staged a single band entry, allowed for the first time in this year's rules.

432MHz

NOTHING SPECTACULAR to report on this band in spite of the warm weather, although, as often seems to happen, conditions did begin to show signs of improvement during the last hour, with Syledis getting louder on the east coast. Some people however thought that the band was enhanced for the whole event.

The situation was probably summed up by the open section band leader, G8KQW/P who said "Slightly more QSOs than usual from this site, but at a slightly shorter average distance". Some good DX was worked with low power on this band also with, amongst others, G3JRM/P working DF3BU/P over 396km with 1W, 25ft of RG58 coax and a 2 element – I guess that's about 1W ERP! On the other hand, GM0MVZ found the band very poor with signals just popping their heads out of the noise before diving back into the mire.

1296MHz

THIS BAND showed just how important location can be under certain conditions. G4JAR/P used their extreme proximity to the coast to take advantage of some excellent localised propagation, and the big station which they had assembled to work a huge total on this band. This comprehensively forced the previous two years' band leader G4MRS/P (who had moved to a larger site further inland in order to enter the open section) into second place. Many of the stations worked by them were simply missing from any other logs, with no sign of the OKs, or distant Germans. G4MRS/P was called by OK1KIR/P (the 2nd year running), although they faded into the noise before a QSO was completed.

Equipment is still continuing to improve – this time G4CCH/P had 400W at the antenna, through 60ft of LDF4-50 from a 6 x 2C39BA water-cooled amplifier, and a number of TH328s were in use generating similar powers. G3GRO/P used an interesting rectangular dish, and G4IEV/P with their unusual pillbox omnidirectional antenna found things much better than last year. In the north, things were not so rosy again – GM6PHJ/P said "A hard time was had by all", and G4NXO/P had a lot of equipment problems that suggested that Murphy was an optimist.

OPEN SECTION

Pos	Group Name	Loc	70MHz	144MHz	432MHz	1296MHz	Total
1	Colchester & Havering RCs	01PU	463	733	942	1000	3139
2	Loadsamoney CG	01KJ	611	993	1000	460	3064
3	Martlesham RS	02PA	531	1000	874	566	2971
4	Parallel Lines CG	03BF	588	839	867	279	2573
5	Warrington CG	85PS	1000	708	424	183	2314
6	Windmill CG	01LD	620	725	686	222	2253
7	Flight Refuelling ARS	80WP	642	850	525	194	2210
8	Crawley & Reigate Clubs	01OC	476	431	436	268	1612
9	De Montford Univ ARS	92NP	497	535	313	177	1522
10	Clifton ARS	01DH	450	404	370	260	1484
11	Surrey Radio Contact Club	91XH	398	566	320	190	1473
12	Aberdeen VHF Grp	86RW	749	384	117	25	1275
13	Thornton Clevelys ARS	84VB	544	368	158	0	1071
14	Cousin Jacks CG	70PP	699	258	76	0	1033
15	Guildford & DARS	91TF	408	253	187	128	976
16	Reading & DARS	91IH	465	262	95	125	947
17	11th Hour CG	91XG	364	189	260	99	912
18	Farnborough & DARS	91OF	347	188	304	0	840
19	South Devon RC	80FJ	379	182	160	62	783
20	Mid Cheshire ARS	83PF	423	164	126	0	713
21	Welwyn & Hatfield ARC	94MJ	0	335	0	0	335
22	Highland CG	75DH	0	178	51	2	231
23	Two Counties CG	74BS	0	117	63	0	180
24	Hull & DARS	93RS	0	114	0	0	114
25	Bredhurst RTS	01HH	0	91	19	0	110

RESTRICTED SECTION

Pos	Group Name	Loc	70MHz	144MHz	432MHz	1296MHz	Total
1	The Northern Lights	89VR	1000	1000	1000	1000	4000
2	Bracknell ARC	80ST	573	409	596	636	2213
3	A1 Contest Group	94WC	634	724	527	255	2140
4	Splinters CG	91GI	455	469	609	495	2028
5	Spalding & DARS	03AD	476	367	664	507	2014
6	Scunthorpe VHFCG	94SB	428	440	389	530	1787
7	Hornsea ARC	93PV	514	269	276	384	1443
8	Telford & DARS	82NN	489	232	364	353	1439
9	Leicester RS	92MO	377	243	210	237	1068
10	Goole R&ES	93PW	367	218	280	0	865
11	Aberystwyth & DARS	82CJ	419	243	109	0	771
12	Melton Mowbray ARS	92MT	340	201	168	0	709
13	Weston Super Mare ARG	81MH	297	108	169	0	574
14	Edgware & DARS	91VO	310	93	104	0	507
15	Harwell ARS	91FN	0	447	0	0	447
16	West of Scotland ARS & YAGIS	75UQ	184	172	25	5	387
17	CARSCOG 'Gearboxers'	92HE	0	81	104	166	352
18	Lowestoft RC	02UL	0	272	61	0	333
19	Darwen ARC	83SQ	81	137	0	0	219
20	Leiston ARC	02RG	0	165	0	0	165
21	Dartmoor RC	80AM	0	51	99	0	150
22	Christchurch & Purley ARC	91VJ	0	85	30	0	115
23	Carrickfergus ARG	74BW	0	103	0	0	103
24	Banff & DARC	87SP	6	37	23	0	66

Disqualified:
Lagan Valley RS (Late Entry + Postage Due) & Aylesbury & Chesham RS (Registered Delivery - General Rule 1)

LOW POWER SINGLE ANTENNA SECTION

Pos	Group Name	Loc	70MHz	144MHz	432MHz	1296MHz	Total
1	Sutton & Cheam RS	93AC	1000	1000	1000	1000	4000
2	RSGB Bristol Group	81QJ	735	795	546	921	2997
3	South Birmingham RS	82XJ	689	968	532	742	2931
4	Basingstoke ARG	91KG	747	958	566	133	2405
5	Mainenhead & DARS	91OS	735	723	731	0	2190
6	Torbay ARS	80FP	576	767	592	0	1935
7	Salop ARS	82IP	397	594	528	314	1834
8	Cambridge & DARC	02AD	476	808	0	421	1706
9	North Kent RS	01BH	531	423	264	391	1610
10	Wirral & DARC	83JA	0	611	475	403	1489
11	Westmorland VHFCG	84UR	0	0	633	649	1283
12	Mid Sussex ARS	90WV	0	751	506	0	1257
13	Kidderminster & DARS	82SK	502	297	364	77	1239
14	Wythall RC	92BJ	228	531	347	84	1190
15	Mexborough & DARS	93KM	315	422	190	0	928
16	Bishops Stortford ARS	01DW	0	397	446	0	843
17	Cockenzie & Port Seton ARS	85RU	0	579	0	0	579
18	West Bromwich Central RC	92BM	0	275	119	0	394
19	Sheffield ARCCG	93GI	0	242	0	0	242
20	Vernon Park RS	83XI	0	192	5	0	197

Disqualified: Crowborough & DARS (No notification of site change)

LOW POWER UNRESTRICTED ANTENNA SECTION

Pos	Group Name	Loc	70MHz	144MHz	432MHz	1296MHz	Total
1	Sth Manchester RC	93EH	1000	1000	1000	1000	4000
2	Shefford & DARS	92XA	900	649	949	322	2820
3	Doncaster ARS	93JK	919	437	555	166	2077

SWL SECTION

Pos	Group Name	Loc	70MHz	144MHz	432MHz	1296MHz	Total
1	Martin Parry	83LT	1000	1000	1000		3000

Checklogs gratefully received from G3HJF/P, G7HLU, G3BPM, G0MLY/P, G8VOI/P, G8DWD/P, G3NKS & 2E1AQS/P.

BAND BY BAND RESULTS

Winners

AS EVER, congratulations go to the winners and runners-up in each section, and certificates will be sent to the section, band and country leaders and runners-up. Special congratulations are extended to the Colchester and Havering Radio Clubs who take the Surrey trophy; to the Northern Lights, who travelled to Alderney to swap their open section title for the Martlesham Trophy; to the Sutton & Cheam Radio Society who retain the Arthur Watts Trophy; to the South Manchester Radio Club who win the Low Power Unrestricted Antenna Section; to the Aberdeen VHF Group who claim the Tartan Trophy as the leading Open Section resident Scottish entry; to the Cockenzie & Port Seton ARSs who take the Scottish Trophy.

Congratulations also to Martin Parry who won the SWL section.

CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest News* January 1993

VHF RULES

144MHZ CW SINGLE OP FIXED/ ALL OTHER

Date: 16 January, 1994

Time: 1000-1600GMT

Rules: General Rules apply, plus rule 14A. County & Country Multiplier.

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

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

70MHZ CUMULATIVES

Dates: 23, 30 Jan
13, 27 Feb
13 Mar

Time: 1000-1200GMT

Rules: General Rules apply, plus rules 10 and 24 (1994). Full QTH and Locator. Please include a single 4422 summary sheet to show scores for each day and single 427.

Three sections: F Fixed station single operator; O Open (all others); L Listeners

Best three logs of possible five, please send all logs for checking purposes, normalisation will decide the best three.

Adjudicator: A Cook, G4PIQ, Fishers Farm, Tendring, Clacton-on-Sea, Essex C016 9AA

432 MHZ FIXED/ AFS/SWL

Date: 6 Feb

Time: 0900-1500GMT

Rules: General Rules apply.

The contest is open to individual entrants (who must be RSGB members), or teams made up of a number of operators who must all be members of the same affiliated society (but do not have to be RSGB members themselves). All members of a team must operate from within 50km of the normal meeting place of the society. No station may represent more than one society. No operator is allowed to use more than one callsign during the contest. In the case of national societies each team must define a separate meeting place and each team member must operate within 50km of that designated meeting place. Multiple teams are encouraged from both national and local societies. The best three scores of each team will be used to form the entry, all team members' logs must be included as the 'best' results may be downgraded if logging errors occur, ie the fourth placed member may well have higher points after adjudication, than those notionally above.

Sections: S Single operator fixed; M Multi operator fixed; L Listeners; A AFS team scores will be tabulated separately.

Please include RSGB Zone letter on each entry.

Each team entry must also include a signed declaration that each operator is a fully paid up member of the entering affiliated society. The address of the meeting place is also required as is a summary of team members, callsigns and respective scores.

Awards: Certificates will be awarded to the following:

a) Leading single operator in each RSGB Zone

b) Leading multi operator station in each RSGB Zone.

c) Leading AFS in each RSGB zone.

d) Leading SWL

Adjudicator: D Johnson, G4DHF, 65 West Street, Bourne, Lincs PE10 9PA

VHF National Field Day (continued from p82)

70MHZ OPEN SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Score Total	QSO CW	QSO SSB	QSO Pwr	Ant	Best DX	km
1	GM0CDA	85PS	917	1262	2179	62	87	100	2 x 8Y	GU4UJS/P	672
2	GM0FRT	86RW	632	999	1631	37	54	80	7Y	GU4UJS/P	801
3	G4ADV	70PP	591	933	1524	56	75	80	2 x 7Y	GM0FRT/P	713
4	G3PFM	80WP	549	849	1398	61	101	160	2 x 12Y	GM0FRT/P	700
5	G3GRS	01LD	582	768	1350	64	87	80	2 x 4Y	GM0FRT/P	683
6	G3XBY	01KJ	531	801	1332	62	95	100	15Y	GM0FRT/P	655
7	G4THB	03BF	545	736	1281	63	89	160	12Y + 5Y	EI7M/P	477
8	G0GDA	84VB	586	600	1186	56	66	25	2 x 4Y	GU4UJS/P	482
9	G4MRS	02PA	475	681	1156	54	78	125	8Y	GM0FRT/P	600
10	G3ORY	92NP	458	626	1084	68	103	160	2 x 3Y	GM0FRT/P	489
11	G3KAU	01OC	424	614	1038	49	72	120	9Y	GM0FRT/P	693
12	G0RSR	91IH	422	591	1013	62	86	100	9Y	GM0FRT/P	631
13	G4ZTR	01PU	394	615	1009	53	74	100	2 x 5Y	GM0FRT/P	617
14	G3JKY	01DH	378	602	980	56	83	100	5Y	GM0FRT/P	652
15	G4ZTT	83PF	344	577	921	42	74	50	4Y	GM0FRT/P	413
16	G3PJX	91TF	343	545	888	45	77	50	4Y	GM0FRT/P	650
17	G4FUU	91XH	402	466	868	54	67	30	2 x 4Y	GM0CDA/P	526
18	G7FDC	80FJ	166	659	825	18	72	25	9Y	GM0CDA/P	600
19	G3NAT	91XG	255	538	793	45	77	120	2 x 5Y	GM0CDA/P	530
20	G4FRS	91OF	261	496	757	43	72	160	3Y	GM0CDA/P	521

70MHZ RESTRICTED SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Score Total	QSO CW	QSO SSB	QSO Pwr	Ant	Best DX	km
1	GU4UJS	89VR	839	1407	2246	79	127	140	8Y	GM0FRT/P	801
2	G4VVZ	94WC	574	851	1425	61	94	160	6Y	GU2HML	547
3	G4BRA	80ST	523	763	1286	61	97	150	6Y	GM0FRT/P	681
4	G4IGY	93PV	467	688	1155	51	78	40	10Y	GU4UJS/P	475
5	G3UKV	82NN	443	656	1099	64	101	80	8Y	GM0PYC/P	565
6	G4DSP	03AD	381	689	1070	50	87	120	8Y	EI7M/P	471
7	G4CIZ	91GI	385	638	1023	55	95	160	6Y	GM0FRT/P	624
8	G3VIP	94SB	507	455	962	55	50	125	6Y	GU4UJS/P	497
9	GW3SON	82CJ	401	541	942	46	66	5	4Y	GM0CDA/P	383
10	G3HYH	92MO	419	427	846	65	84	130	9Y	GM0FRT/P	492
11	G4DBN	93PW	398	427	825	48	47	8	6Y	GU4UJS/P	480
12	G4PZQ	92MT	365	398	763	55	58	25	5Y	GM0FRT/P	469
13	G4IUZ	91VO	348	348	696	59	59	25	5Q	GM0FRT/P	
14	G4WSM	81MH	128	540	668	57	70	65	5Y	GM0FRT/P	626
15	GM0GAS	75UQ	110	304	414	13	24	140	10Y	GU4UJS/P	677
16	G4JS	83SQ	14	169	183	34	25	10	3Y	GM0FRT/P	361
17	GM0PYC	87SP	11	3	14	3	1	12	6Y	G3UKV/P	565

70MHZ LOW POWER SINGLE ANTENNA SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Score Total	QSO CW	QSO SSB	QSO Pwr	Ant	Best DX	km
1	G2XP	93AC	490	671	1161	68	99	25	5Y	GM0FRT/P	428
2	G3ZOI	91KG	369	498	867	52	74	10	6Y	GM0FRT/P	636
3	G6YB	81QJ	336	517	853	46	75	25	6Y	GM0CDA/P	486
4	G3TWG	91OS	373	480	853	58	78	25	4Y	GM0FRT/P	586
5	G4OHM	82XJ	393	407	800	59	72	20	6Y	GM0FRT/P	506
6	G4VUD	80FP	311	358	669	37	36	15	4Y	G4VVZ/P	448
7	G4CW	01BH	340	277	617	50		20	6Y	GM0CDA/P	529
8	G4SND	82SK	281	302	583	41	48	18	3Y	GM0CDA/P	371
9	G2XV	02AD	239	314	553	38	47	12	5Y	GI4TVV/P	467
10	GW0RVE	82IP	237	224	461	34	36	23	7Y	GM0FRT/P	460
11	G3WGF/P	93KM	94	272	366	16	36	20	4Y	GU4UJS/P	428
12	G4WAC	92BJ		265	265		47	10	4Y	GM0CDA/P	379

70MHZ LOW POWER UNRESTRICTED ANTENNA SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Score Total	QSO CW	QSO SSB	QSO Pwr	Ant	Best DX	km
1	G8APB	93EH	345	417	762	43	61	14	5Y	GM0FRT/P	407
2	G1XTN	93JK	320	380	700	38	52	20	4Y	GU4UJS/P	418
3	G4YRF	92XA	199	487	686	57	69	25	6Y	GM0FRT/P	570

70MHZ SWL SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Score Total	QSO CW	QSO SSB	QSO Pwr	Ant	Best DX	km
1	BRS52543	83LT		329	329		33		HB9CV	GU4UJS/P	458

144MHZ OPEN SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G4MRS	02PA	10253	786	400	4 x 18Y	OZ6OL	814
2	G0RDI	01KJ	10178	813	400	4 x 19Y + 2 x 17Y	OZ9EDR/P	920
3	G4RFR	80WP	8712	644	400	2 x 19Y	OZ9EDR/P	1094
4	G4LIP	03BF	8600	648	400	6 x 17Y	F2BF/P	934
5	G6CMS	01PU	7520	602	400	2 x 15Y	DL0HS/P	797
6	G0FBB	01LD	7433	623	400	4 x 9Y	F6HRE/P	916
7	GM3CKR	85PS	7257	505	400	140 el	F2RB/P	880
8	G6LX	91XH	5802	596	400	2 x 18Y	DL0SF/P	916
9	G3SDC	92NP	5487	558	400	4 x 17Y + 2 x 14Y	F1FNX/P	835
10	G3WSC	01OC	4423	406	400	18Y	OK1KYY/P	844
11	G0GQT	01DH	4147	449	400	2 x 19Y	DK1KO	724
12	GM4ZUK	86RW	3942	258	400	17Y	SM2CEW	1624
13	G4ATH	84VB	3773	389	300	4 x 9Y	F2RB/P	734
14	G3WGC	94MJ	3437	355	400	4 x 14Y	DF0OL/P	877
15	G0TFU	91IH	2687	367	200	2 x 9Y + 12Y	HB9S/P	
16	G0HXO	70PP	2643	236	100	8/8Y	GM4ZUK/P	713
17	G5RS	91TF	2599	337	400	4 x 9Y	DF0CB	729
18	G6CTU	91XG	1941	263	350	2 x 17Y	HB9S/P	694
19	G1FRS	91OF	1931	294	200	9Y	F1SVF/P	703
20	G4SSD	80FJ	1869	199	300	2 x 12Y	F6FZS	846
21	GM0FRG	75DH	1826	137	100	14Y	F2RB/P	876
22	G3ZTT	83PF	1685	217	150	2 x 19Y	F6HPP/P	606
23	GI7JYK	74BS	1199	106	25	13Y	G0RDI/P	
24	G8GBY	93RS	1167	174	350	18Y	DF0RI	673
25	G0BRC	01HH	930	138	100	2 x 12ZL + 12ZL	GM3CKR/P	542

144MHZ RESTRICTED SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	GU4APA	89VR	10666	790	400	18Y	DF0CB	920
2	G4ZAP	94WC	7718	548	400	17Y	HB9WW/P	933
3	G3WOI	91GI	5004	477	400	17Y	F6FZS	927
4	G3PIA	91FN	4766	504	400	17Y	DK0UE/P	831
5	G4ERG	94SB	4693	375	400	15Y	DG3FCT/P	
6	G4BRA	80ST	4358	439	400	17Y	DL8CMM	1006
7	G1DSP	03AD	3912	367	400	8WL Y	HB9S/P	
8	G4KDL	02UL	2901	265	80	17Y	DL3AMA/P	684
9	G4EKT	93PV	2873	328	150	22Y	F1FHI	
10	G8FCQ	92MO	2597	321	140	17Y	DF0CI	
11	GW0ARA	82CJ	2591	278	50	10Y	DL3EBM	687
12	G3ZME	82NN	2472	343	200	18Y	DL3EBM	627
13	G0OLE	93PW	2329	230	100	17Y	DL8PC/A	775
14	G4FOX	92MT	2149	287	180	19Y	DL0WU	585
15	GM4AGG	75UQ	1831	210	150	8/8Y	FF5KD	731
16	G6FS	02RG	1757	186	200	17Y	DF0CI	614
17	G1ECC	83SQ	1462	194	80	17ZL	FF1LQC/P	672
18	G8WSM	81MH	1147	136	150	17Y	G8PNN	554
19	GI0LIX	74BW	1095	91	25	10Y	G0GQT/P	618
20	G3ASR	91VO	997	135	25	17y	EI5CRC/P	590
21	G7NXQ	91VJ	906	158	60	19Y	DL1EK/P	
22	G2ASF	92HE	864	120	10	9Y	GM4ZUK/P	533
23	G1RCD	80AM	542	96	25	17Y	DF0AA/P	
24	GM0IRB	87SP	393	44	25	18Y	G0HXO/P	792

144MHZ LOW POWER SINGLE ANTENNA SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G4FKA	93AC	1989	275	25	17Y	DF7KF	633
2	G1OHM	82XJ	1925	247	25	17Y	DF0OL/P	741
3	G3TCR	91KG	1906	296	20	17Y	DL0WAE	671
4	G8EVY	02AD	1608	165	25	13Y	DL0VEL/P	651
5	G6YB	81QJ	1582	206	25	14Y	F5RZJ	726
6	G3NJA	80FP	1526	201	25	17Y	HB9S/P	849
7	G3ZMS	90WV	1493	224	25	13Y	F2BF/P	710
8	G3WKX	91OS	1439	205	25	16Y	DF0OL/P	652
9	GW4MGR	83JA	1215	186	25	13Y	ON6VB	520
10	GW3SRT	82IP	1182	152	11	14Y	F6HPP/P	580
11	GM4UYZ	85RU	1152	126	20	4Q	GU4APA/P	681
12	G1WAC	92BJ	1057	175	25	13Y	PI4GN	598
13	G3WMR	01BH	841	127	10	14Y	GM4ZUK/P	649
14	G4BTS	93KM	840	86	15	19Y	DL1ER/P	619
15	G5ZG	01DW	789	108	25	13Y	FC1MOZ/P	612
16	G4GXP	82SK	590	88	25	11Y	PI4KGL	471
17	G4WBC	92BM	547	100	10	12Y	ON7GI/P	427
18	G0INF	93GI	481	59	10	8Y	F6HPP/P	570
19	G0HAC	83XI	381	47	3	5Y	F2RB/P	608

144MHZ LOW POWER, UNRESTRICTED ANTENNA SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G3FVA	93EH	2252	237	15	14Y	DF0AA/P	783
2	G3FJE/P	92XA	1461	203	20	2 x 12Y	DL0WAE	581
3	G0ITW	93JK	983	119	25	13Y	F2RB/P	616

144MHZ SWL SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	BRS52543	83LT	663	67		12ZL	F2RB/P	728

432MHZ OPEN SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G8KQW	01KJ	4096	361	400	3 x 4 x 19Y	DL1SUN	756
2	G4VIX	01PU	3859	300	400	8 x 21Y	DL2JDX	791
3	G4MRS	02PA	3580	294	300	8 x 17Y	DL0UL/P	708
4	G4CLA	03BF	3552	268	400	12 x 21Y	OK1KIR/P	935
5	G4FAM	01LD	2811	266	200	4 x 21Y	DK2GR	727
6	G0FRR	80WP	2150	204	400	2 x 24QLY	DL0OU/P	900
7	G5LK	01OC	1785	171	400	2 x 2 x 21Y		
8	GM8XVJ	85PS	1735	127	400	8 x 21Y	DL4LE	835
9	G0NTP	01DH	1514	174	180	2 x 18Y	HB9MIN/P	679
10	G3ZPB	91XH	1309	163	400	4 x 21Y	DG3FK/P	662
11	G7AYI	92NP	1280	161	360	8 x 17Y + 2 x 17Y	DK9VD/A	644
12	G6FRS	91OF	1247	163	100	4 x 21Y	GM0JKF/P	645
13	G8MNY	91XG	1066	158	400	27QLY	GD4XTT	538
14	G6GS	91TF	764	113	100	4 x 21Y	PI4GN/P	550
15	G0CDB	80FJ	657	65	120	2 x 18Y	PA0PLY	632
16	G6GMW	84VB	649	76	110	4 x 19Y	FF5KD/P	508
17	G8ZTT	83PF	516	72	50	2 x 21Y	PA3BPC/P	482
18	GM0JKF	86RW	479	31	100	4 x 21Y	GU4GCM/P	801
19	G0PUB	91IH	389	80	25	4 x 17Y	EI7M/P	
20	G3YJX	70PP	310	30	100	88Y	G8XLL	469
21	GI8FLQ	74BS	258	32	20	19Y	G8KQW/P	586
22	GM0FRG	75DH	208	19	10	21Y	G4VIX/P	600
23	G7BRC	01HH	79	21	40	2 x 17Y	GU4GCM/P	267

432MHZ RESTRICTED SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	GU4GCM	89VR	2949	238	400	28Y	GM0JKF/P	801
2	G8ZHP	03AD	1958	168	400	44Y	DF6NA	782
3	G4UHF	91GI	1796	196	400	88Y	DF9QX	699
4	G4BRA	80ST	1757	167	400	21Y	DK0SM/P	834
5	G6APZ	94WC	1554	141	350	21Y	DG3FK/P	730
6	G0JRB	94SB	1146	108	400	21Y	DK0VK/P	580
7	G6ZME	82NN	1074	140	150	24Y	DK9VD/A	763
8	G8HSG	93PW	825	92	100	48Y	DL0AAN	599
9	G4YTV	93PV	813	95	250	21Y	ON7WR/A	500
10	G3LRS	92MO	620	102	120	21Y	DK9VD/A	647
11	G1KHX	81MH	499	63	50	22Y	PA3BPC/P	
12	G7FOX	92MT	495	77	100	21Y	DK9VD/A	658
13	GW3UYH	82CJ	320	34	10	11Y	PA3BPC/P	541
14	G7ASF	92HE	308	49	25	12ZL	ON4CP/A	444
15	G4RMD	91VO	307	59	10	21Y	DK9VD/A	556
16	G1RCD	80AM	292	37	20	88Y	PA3BPC/P	584
17	G3JRM	02UL	179	19	1	2Y	DF3BU/P	396
18	G7NXQ	91VJ	88	29	60	19Y	GU4GCM/P	233
19	GM0MVZ	75UQ	75	15	70	35Y	G7AYI/P	405
20	GM1ESQ	87SP	69	8	20	19Y	G4CLA/P	517

CONTEST CLASSIFIED CONTINUES ON PAGE 84

VHF NFD (from previous page)

432MHZ LOW POWER SINGLE ANTENNA SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G4CQR	93AC	968	142	25	30Y	DK9VD/A	732
2	G1RDX	91OS	708	98	25	21Y	DK9VD/A	603
3	G4RCD	84UR	613	54	25	19Y	GU4GCM/P	
4	G8NJA	80FP	573	71	25	23Y	GM8XVJ/P	572
5	G8JYN	91KG	548	87	10	19Y	DK9VD/A	613
6	G6YB	81QJ	529	75	25	48Y	PA0PLY	536
7	G8OHM	82XJ	515	78	25	21Y	GM0HBK	579
8	GW0EIY	82IP	511	73	25	14Y	PA3BPC/P	490
9	G1ZMS	90WV	490	93	25	48Y	G4RCD/P	
10	GW0MGR	83JA	460	57	25	21Y	PA0PLY	561
11	G0PQF	01DW	432	64	25	17Y	DK9VD/A	574
12	G0KRC	82SK	352	51	18	19Y	PA0PLY	509
13	G0EYO	92BJ	336	56	10	15Y	PA0PLY	470
14	G8TNK	01BH	256	40	25	19Y	G4RCD/P	412
15	G7MEX	93KM	184	32	10	18Y	GU4GCM/P	428
16	G4WBC	92BM	115	30	2.5	13Y	EI7M/P	338
17	G0HAC	83XI	5	1	2.5	5/8 Vert	G6ZME/P	104

432MHZ LOW POWER UNRESTRICTED ANTENNA SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G3UHF	93EH	628	86	15	4 x 21Y	DK9VD/A	723
2	G4LOO	92XA	596	82	25	2 x 21Y	DK9VD/A	563
3	G8JJR	93JK	349	49	25	21Y	GU4GCM/P	418

432MHZ SWL SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	BRS52543	83LT	106	14		19Y	GU4GCM/P	458

1296MHZ OPEN SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G4JAR	01PU	2821	209	300	2.5m	OK2BRS/P	1033
2	G4MRS	02PA	1597	147	200	8 x 23Y	DL0UL/P	708
3	G4IEV	01KJ	1298	139	400	1.8m + 3.6m Pillbox	DL0UL/P	702
4	G4HWA	03BF	787	75	250	20 x 23Y	DF0CI	717
5	G3GRO	01OC	756	83	75	4.5m x 2.5m Dish	DF0RB	650
6	G4ALE	01DH	734	95	400	2m	GM6PHJ/P	534
7	G0FDZ	01LD	626	78	120		PI4GN	476
8	G4JNT	80WP	546	73	120	4 x 50Y	PA0WWM	
9	G8TB	91XH	535	92	45	1.8m	DK2MN/P	518
10	GM6PHJ	85PS	515	35	300	16 x 23Y + 2.4m	GU4XUM/P	672
11	G4OQR	92NP	498	84	120	1.8m	PI4GN	530
12	G4YPC	91TF	361	63	50	4 x 23Y	GM6PHJ/P	527
13	G3ULT	91IH	354	71	100	Dish	F1FHI	500
14	G4WGZ	91XG	279	60	100	65QLY	G3JYP/P	412
15	G6ZRM	80FJ	175	21	40	2 x 15/15Y	G4CCH/P	458
16	GM8MJV	86RW	70	6	120	2 x 55Y + 1m	G4NKC/P	486
17	GM0FRG	75DH	6	2	1	23Y	GM6FPX/P	98

1296MHZ RESTRICTED SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	GU4XUM	89VR	1112	100	400	1.5m	GM6PHJ/P	672
2	G4BRA	80ST	707	82	150	2m	PI4GN	700
3	G4CCH	94SB	589	61	400	47QLY	PA0WMX	492
4	G4SIV	03AD	564	66	150	2m	DL4VCG	684
5	G3UAX	91GI	550	78	150	2m	DK0MU	612
6	G8EQZ	93PV	427	58	250	48QLY	GU4XUM/P	475
7	G4NKC	82NN	393	53	150	39QLY	GM8MJV/P	486
8	G4NXO	94WC	284	48	150	55Y	GU4XUM/P	506
9	G3TQF	92MO	264	50	100	2m	GM6PHJ/P	370
10	G1ORG	92HE	185	19	10	37Y	GM6PHJ/P	408
11	GM6FPX	75UQ	6	4	10	55Y	GM0FRG/P	98

1296MHZ LOW POWER SINGLE ANTENNA SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G4WGE	93AC	442	70	25	49QLY	PE0MAR/P	430
2	G6YB	81QJ	407	53	25	55Y	GM6PHJ/P	486
3	G3OHM	82XJ	328	54	25	55Y	PA0PLY	481
4	G3JYP	84UR	267	24	25	2m	GU4XUM/P	557
5	G6KWA	02AD	186	38	2	55Y	PA0EZ	351
6	GW0MGR	83JA	178	24	10	23Y	PE0MAR/P	509
7	G8BHD	01BH	173	33	10	54Y	PA0WWM	314
8	GW0JIX	82IP	139	23	21	15/15Y	G4JAR/P	310
9	G8FMH	91KG	59	17	12	55Y	GU4XUM/P	189
10	G0ICJ	92BJ	37	11	1	55Y	G0FDZ/P	239
11	G6KRC	82SK	34	8	1	QLY	GU4XUM/P	302

1.3GHZ LOW POWER UNRESTRICTED ANTENNA SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G8SMR	93EH	457	59	10	8 x 23Y	ON4CP/A	558
2	G1GSN	92XA	147	37	25	4 x 23Y	PA0EZ	359
3	G4CYA	93JK	76	16	15	4 x 12Y	G4IEV/P	267

RSGB 1993 VHF/UHF CONTESTS CALENDAR

29 Nov	432MHz Cumulative
5 Dec	144 AFS / Fixed /SWL (Apr 93)
6 Dec	1.3/2.3GHz Cumulative
14 Dec	432MHz Cumulative
26,27,28	
29 Dec	70/144/432MHz Fixed (Apr 93)
16 Jan	144MHz CW Single Op Fixed/All Other (Dec 93)
23/30 Jan	70MHz Cums (Dec 93)
6 Feb	432MHz Fixed/AFS/SWL (Dec 93)
13/27 Feb	70MHz Cums
5/6 Mar	144/432MHz
13 Mar	70MHz Cums
27 Mar	70MHz Fixed/SWL
10 Apr	1st 23cm & 13cm Fixed/SWL
7 May	70cm Trophy
7/8 May	432MHz to 24GHz
21/22 May	144MHz/SWL/Single/All Others
22 May	1st Pack Packers 144MHz
4 Jun	50MHz Trophy
4/5 Jun	IARU 50MHz
12 Jun	70MHz CW
12 Jun	2nd Back Packers 144MHz
18 Jun	432MHz FM Fixed & Open
3/4 Jul	VHF Field Day
4 Jul	3rd Back Packers 144MHz
23 Jul	144MHz Low Power/SWL
24 Jul	432MHz Low Power/SWL
21 Aug	432MHz Fixed/SWL
30 Aug	144MHz CW Cums
3/4 Sep	144MHz Trophy/SWL
4 Sep	4th Back Packers 144MHz
14/29 Sep	144MHz CW Cums
25 Sep	70MHz Trophy/SWL
1/2 Oct	RSGB 432MHz-24Ghz
2 Oct	1.3GHz Trophy/SWL
2 Oct	2.3GHz Trophy/SWL

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

HF RULES

LF CUMULATIVE CONTESTS 1994

There are five sessions on each band, the best three of which will count. Each band is regarded as a separate contest. Entrants must operate from the same location for all sessions on a particular band.

1. The General Rules for RSGB Contests, as published in the January 94 edition of *RadCom*, will apply.

2. Dates and Times:

1.8MHz - Mon 3 Jan, Tue 11 Jan, Wed 19 Jan, Thu 27 Jan, Fri 4 Feb. All sessions 2000 - 2200GMT.

3.5MHz - Sun 2 Jan, Sat 8 Jan, Sun 23 Jan, Sat 29 Jan, Sun 6 Feb. All sessions 1600 - 1800GMT.

7MHz - Sat 1 Jan, Sun 16 Jan, Sat 22 Jan, Sun 30 Jan, Sat 5 Feb. All sessions 1000 - 1200GMT.

3. Frequencies and Mode: 1835-1865, 3520-3550 and 7015-7040kHz, CW only.

4. Contest Exchange: RST + Serial Number, commencing with 001 *FOR EACH SESSION*. Any station may be worked **once** in **each session** for points.

5. Scoring: 3 points per QSO. The final score for each contest is the sum of the best three sessions on that band.

6. Logs: Only one cover sheet is required for each band. Entrants should submit logs for every session that they are active. Address for entries as in General Rules.

7. Closing Date for Logs: 24 February 1994.

8. Awards: Merit Certificate to the leading station in each contest. Certificate of Merit to the entrant with the highest aggregate score from all three contests combined.

HF RESULTS

LOW POWER FIELD DAY 1993

This event was not blessed with good conditions, and several entrants commented that the best propagation on 40m occurred just as the lunch break started. Nevertheless, the break remains one of the most popular features of this contest! For those who were able to put a reasonable signal into the continent, additional contacts were available from the German low power contest. The logs which claimed ten points for those sending "MP"' in the exchange have been rescored.

G6KQ/P seemed well placed on the east coast to work into the continent and post a big score on 40m, while in the three watt section competition was much closer between G4ARI/P in Leicester and G3LX/P in Stockport. A suggestion was made for a rule change to increase the sub-band on 80m so as to include Novices, which will be done. More contentious perhaps is the request from GI3PDN/P to modify the scoring system to help stimulate outlying regional participation. This will be discussed by the Committee, what do entrants think?

Comments: I have always been an 'orange anode' man but recently purchased a TS130V (G3HEJ at G4FRS); Felt sorry for G3KEV/P who was obviously in another contest. At lunch break the whole world decided to tell him to stop (G4JKS); Weather man forecast rain so it was dry, thank goodness (G4ARI); Very poor conditions or very few stations. Probably both! (G3BPM); LP FD is a most worthwhile social occasion involving minimum of complexity. Please keep it in the calendar (GI3PDN); Tried everything - lowered antenna, shortened it, even turned it by 90 degrees but still hard to make contacts on 40m (G4EKT); Had fun and learned a lot. Managed to get the tent packed up five minutes before it rained (G0OGN); Where were all the G-QRP Club members - we need more publicity in *Sprat* (G3JKS). *G4BUO*

3W SECTION

Pos	Callsign	County	80m	40m	Total
1	G4ARI/P	LEC	720	555	1275
2	G3LX/P	CHS	700	545	1245
3	G3JKS/P	HFD	575	620	1195
4	G0OGN/P	WKS	700	430	1130
5	G4OGB/P	HBS	575	390	965
6	G4RCC/P	LEC	660	270	930
7	G4HUV/P	CHS	520	285	805
8	G0KZO/P	CHS	515	170	685
9	GI3PDN/P	ATM	360	365	725
10	G2FKO/P	DVN	430	250	680
11	G3LHJ/P	DVN	335	340	675
12	G0HIN/P	SRY	485	180	665
13	G4EKT/P	HBS	320	335	655
14	G3BPM/P	SOM	215	340	555
15	G0JIT/P	CHS	430	50	480
16	G3IIU/P	LDN	310	115	425

10W SECTION

Pos	Callsign	County	80m	40m	Total
1	G6KQ/P	SFK	550	975	1525
2	G4FOX/P	LEC	735	560	1295
3	G4BLX/P	SXE	570	680	1250
4	G4JKS/P	BUX	520	690	1210
5	G4FRS/P	SRY	625	565	1190

Checklogs from G4UOL, GW4KVJ, G0ATR, G3CQR, G2AFV, G0LKX acknowledged with thanks

HF CONTESTS CALENDAR

27/28 Nov	*COWW DX (CW)* (Nov 93, P16)
4/5 Dec	*ARRL 160m* (Dec 93, p13)
11/12 Dec	*ARRL 10m* (Dec 93, p14)
1994	
1 Jan	LF Cums 7MHz (Dec 93)
2 Jan	LF Cums 3.5MHz (Dec 93)
3 Jan	LF Cums 1.8MHz (Dec 93)
8 Jan	LF Cums 3.5MHz
9 Jan	AFS (CW)
11 Jan	LF Cums 1.8MHz (Dec 93)
16 Jan	LF Cums 7MHz
15 Jan	AFS (SSB)
15/16 Jan	*HA DX CW*
15/16 Jan	*AGCW-DL QRP*
16 Jan	LF Cums 3.5MHz
19 Jan	LF Cums 1.8MHz (Dec 93)
22 Jan	LF Cums 7MHz
23 Jan	LF Cums 3.5Mz
27 Jan	LF Cums 1.8MHz (Dec 93)
30 Jan	LF Cums 7MHz
29/30 Jan	*CQ WW 160m (CW)*
29/30 Jan	*UBA SSB*
29/30 Jan	*REF CW*
30 Jan	LF Cums 3.5MHz
4 Feb	LF Cums 1.8MHz (Dec 93)
5 Feb	LF Cums 7MHz
12/13 Feb	1st 1.8MHz CW (Aug 93)
12/13 Feb	*PACC*
19/20 Feb	*ARRL CW*
25/27 Feb	*CQ WW 160m (SSB)*
26/27 Feb	7MHz DX (Sept 93)
26/27 Feb	*REF SSB*

SUMMER 1.8MHZ CONTEST

An encouraging increase in entries from both the UK and Overseas was received for this year's event. By all accounts conditions for the time of year were good with low static levels allowing several stations to work 9M2AX, although as in last year's event no Stateside activity was recorded. The main comment made by entrants was on the duration of the contest which made the last hour very unproductive. Consideration will be given to this for future events but it must be borne in mind that for the first hour it is still daylight in the north of Scotland.

The majority of logs were well presented and gave the adjudicator a reasonably easy task with the top three stations in the UK section only losing one point apiece. All entries were entered into a computer for checking this time and hopefully if enough people submit disks this can become the norm for future events.

Congratulations to Ron Stone, GW3YDX, who won the UK section and EI6GF the leading Overseas entrant.

G3VHB

UK SECTION

Pos		Call	Points
1	*	GW3YDX	782
2	*	G4BUO	723
3	*	G3SJJ	714
4		G3RBP	712
5		G4BJM	704
6		G0IVZ	702
7		G6KQ	672
8		GM3POI	670
9		G3XTT	654
10		G3TBK	649
11		G3UFY	646
12		G3HEJ	617
13		G4BVH	610
14		GW3JSV	608
15		G4OFR	606
16		G3VYI	602
17		G4FNL	588
18		G3RSD	585
19		GM0MYV	585
20		G0JNZ	538
21		G4CZB	538
22		G3PDL	532
23		G2HLU	515
24		G0JQN	514
25		GM0RHP	510
26		G3KNU	507
27		G0ORH	498
28		G0LZL	479
29		G3ZBU	460
30		G3IZD	448
31		G0OPB	426
32		G3AWR	421
33		G4TLS	419
34		G5MY	418
35		G3JSR	399
36		G3GMS	393
37		G0ADH	390
38		G0JZE	379
39		G4NOK	368
40		G3LIK	356
41		G2AFV	354
42		GM3UM	346
43		G3ZGC	317
44		G3ZDD	315
45		G3WRR	265
46		G3SQX	245
47		G4EBK	239
48		GD0LQE	209

OVERSEAS SECTION

Pos		Call	Points
1	*	EI6GF	438
2	*	ON6CW	394
3	*	DK8LV	365
4		OK1DRU	352
5		OK1DFF	341
6		LA1IE	286
7		DL9WH	266
8		DL4VAD	236
9		DF3OL	227
10		OK1HCG	226
11		OM3TQX	205
12		OK2BWJ	203
13		YO3AC	177
14		DL5MHC	173
15		EA6ZY	164
16		SP3WYI	160
17		YO2CJX	118
18		YO8FR	89

* = Certificate winners

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

1000+ ITEMS. Emigration Sale, final clearout. Boxes of components, boards, motors, spares. Many items of older Computer Equipment, switchboard, cables, printer, electronic typewriter, 19 inch Cabinet, small parts storage, new copper clad boards, magazines, books, 3 colour TV's and 2 Videos (some need attention) chassis for parts, tool cases etc. Enough stuff to fill a transit van. Absolute bargain: £300 the lot. (Birmingham) 021 472 3688.

COMMODORE AMIGA Colour Monitor model 1081: £85. Atonce - Amiga A500 AT - Emulator: £75. G6UJI, QTHR. (Cheltenham) 0242 584696.

CUSHCRAFT R7 Multi-Band Vertical as new: £275. Bought for Portable use, part assembled, used three times. (Shrewsbury) 0743 350310.

DRAKE R4 separates with all accessories: £450. Hammarlund 180A Comm Receiver: £100. Trio TS120V with matching TL120 Linear plus Spkr, Mic, handbooks: £420 may split. KW2000 needs power supply: £60. HRO Rx, new valves: £80. HRO Power supply: £25. Yaesu Switched mode 20A PSU: £75. All above ex condx, plus can demonstrate. May swap for 486 Computer, SW Rx WHY. (Gosport) 0705 589560.

DXERS/SWLs. Having difficulty tracking changing World prefixes? Send for copy my Country/Prefix Data Base, entered on DOS Windows Cardfile facility. 350+ files. Enter one get other instantly. Add own notes changes etc. Saves you days of tedious input DIY time. 3.5inch Floppy only. £7.50, incl Disc/P&P. PO preferred. Bargain. G3OLH, QTHR. (Chertsey) 0932 563610.

FT101ZD All bands covered, FM board fitted, also spare driver, AM board and Yaesu Mic, all in good and working condx. Bargain at: £350. Phone (Swindon) 0793 814280.

FT102, ex condx together with matching Speakers and ATU. Offers. G3SHL. (Rochdale) 0706 713434.

GOING QRT. Towers; 85ft HD, with elec winch: £750. Self-supp 25-35ft: £50-100 each. Beams; TH3: £200. TH5: £350. 402BA: £200. Bird Wattmeter & elements; 2-30MHz 50, 500W and 5000W. also 25W 100-250MHz. PK232: £200. HAM2 & 4 Rotators: £200 ea. Azden PCS3000 2m FM: £120. Vacum Variables & Relays, Linears, transformers, components etc. Ring/FAX for details Dave, G3SZA, QTHR. (Southampton) 0703 266369.

ICOM R72E Rx: £495. Sony PRO80 Rx: £150. Microreader Mk2: £125. Hewlett Packard 95LX Computer, connectivity Pack, PSU, leather case: £150. All boxed with manuals and hardly used. Spectrum 48K, ZX Printer, PSU: £25. Datong AD370 Active Antenna: £35. Minolta Nikon Compact Cameras: £20 each. Philips 285 Dictaphone: £25. Toshiba DM Printer Friction Tractor sheet feeders, manuals and spare ribbon: £50. (Nr Preston) 0995 61539.

ICOM R9000 Receiver, 0.1Khz to 2Ghz, all Modes with Spectrum Scope, as new: £3000. No offers. BNOS Power Supply 40Amps 13.8V metered with sensing output: £185. Tono 5000E Communications Terminal CW, RTTY, AMTOR modes: includes carriage. G8WYT, QTHR. (Haywards Heath) 0444 450265.

KENWOOD R2000 Communication Rx, all mode, 150Hz - 30MHz, virtually unused as I got licenced within a year and now use the Tx/Rx. Boxed, manual, cost £600: £475 Post Free. Also Datong Active Aerial: £20. (Gillingham, Kent) 0634 379140.

KENWOOD SM220 Monitorscope with Pan Adapter for TS830: £200. AEA PK232 MBX mint, boxed, leads and manual: £200. Radio-Shack PRO34, 200 channel Scanner, includes Nicads and charger, boxed, little used: £110. Various large QRO EHT Transformers. Contact for more details. WANTED: Collins Mechanical Filters. 455KHz Symmetrical(non offset) 1.8 - 3.0KHz. Also 8 - 12KHz Bandwidth. Any case outline accepted. Contact Peter, G4HSB, QTHR evenings. (Cleveland) 0642 816608.

KENWOOD TS830S c/w YG-455C, 500Hz CW filter and DC converter Unit. AT230 ATU, SP230 Spkr and DFC230 Freq Controller. All items vgc with manuals and orig packing: £700. Prefer to sell as complete package with buyer collecting. Contact Peter, G3XTC anytime. QTHR. (Cheam) 081 644 3698.

PSION Series 3 Palm Top Computer, 256K RAM plus Spread Sheet, VGC: £140. G0LNV. (Sheffield) 0742 553103 (evenings).

ROTATOR KR400RG : £40. And Archerotor: £20. Sandpiper 2 metre Vertical Colinear, 28MHz mobile Whip with magmount, all plus postage. GW4PRP, QTHR. (Port Talbot) 0639 890260.

SHACK CLEARANCE. Sony PVM9020 9in PAL Professional Colour Monitor, mains or battery: £250. Tono 5000E CW, RTTY, AMTOR etc Communications Terminal: £300. Telereader FXR550 FAX Decoder: £150. Palomar VC300 Voice Recorder, unused: £50. Grundig Dual channel Oscilloscope 0-20Mhz: £175. All equipment in gd condx with operations manuals. Call or FAX Steve. (Nr Woodbridge) 0986 798524.

TRIO TS530S WARC, CW filter, vgc, new PA valves and overhaul by Lowe. Mic, operating Manual, boxed: £475. GM0PSQ, QTHR. (Dundee) 0382 78559.

TRIO TS700 144MHz M/mode (with Mutek front end conversion inc spare boards), Mic and manual: £290 ono. Cushcraft AV-3 Trap Vertical as new with instructions: £40. Jaybeam LW10/2M boxed: £15. Cushcraft A144-7 boxed: £20. (Holsworthy) 0288 81289.

VALVES New boxed at £1 each. Several available of each type: EB91, EBC81, EBF89, EC90, ECC81/2/4, ECL80/83, ECL84/5/6, EF42, EF80/85/89, EF91/95, EF183/184, EL42, EL81/85, EM87, EY51, EZ80/81. Also at £3 each: 5R4GY, 5U4G, 5Y3GT, 6V6GT, 6X5GT, AC/P, AC/P1, D63, DH30, DH63, GZ32, GY501, PL509/519, 12BH7, 5763. Please add £2 Postage. Cheques to:- K Bailey, 40 Seymour Close, Selly Park, Birmingham B29 7JD. (Birmingham) NO Tel: noumber.

VERSATOWER 40ft (LESS ground post). Free but must be collected. Gd condx, owner moving house. G4BAU, QTHR. (Gravesend) 0474 533428.

YAESU 902DM Complete line-up, FC902, FTV901R, FV901DM, YD148. 902DM Tansceiver Frequencies HF, 6m, 2m and 70cm, all in good working order. Buyer must Collect, seen working all frequencies, NO Offers, and will not split so do not ASK. First come to take away. Unwanted owing to updated Tcvr. This is a gift for a quick sale: £750 YES!! £750. NO time wasters Please. (Basildon) 0268 550496.

YAESU FT101ZD Mk 2, 6 bands, new driver and PA valves fitted, one owner from new, mint condx: £350. Yaesu FRG7 Comm Rx 0.5 - 30MHz, VGC: £100. Ham International Concorde Converted CB Multimode with DTI Authorisation: £75. Phone Tony, G4JCZ, QTHR. (Birmingham) 021 429 5027.

2 ELE QUAD Fibreglass Arms and Aluminium Spider: £100. Buyer collects. Brian, G3NSU. (Leeds) 0532 630661.

2 METRE 8 Ele Quad: £50. Spectrum +3, Multiface 3, games etc: £75. Fleet Radio Control XP/FM Tx/Rx, 7 servo's, battery charger. Peter, G7MMW after 6.30pm. (Gravesend) 0474 533454.

ACEPAC3 Computer Controller for AOR3000A: £60. GX2 FAX/SSTV Transceive for BBC-B: £40. PK232 S/ware for BBC-B: £10. Capco Receive Loop Antenna 10-16Mhz: £30. 50+ Original 5.25 Shareware Discs: £20. G8SEE, QTHR. (Camborne) 0209 716526.

ALINCO ALM203 2m H/held also Rx 150-160Mhz, case, Spkr/Mic, mains Charger, mobile mount with supply and/or charge from car battery: £155. Pair Toshiba 3-Way Speakers, unused: £20. Garrard 865B Record Deck: £5. GW6MNC, QTHR. (Cardiff) 0222 842774.

ALINCO DJ-1FE 2meter Tcvr, extended receive to 172Mhz, plus Air Band, illuminated LCD, keypad, boxed with manual and charger: £210. G3OHV, QTHR. (Crowborough) 0892 664960.

ALINCO DJ500T/E D/band H/held, extended receive, 20 mem, c/w two Nicads, charger, Mobile charger cord, case, all boxed, manual, as new: £275. Waveco W4010 Data Decoder, manual: £530 ono. Microreader Mk2 vers 4.1 Backlit LCD, new: £130. (Kenilworth) 0926 54556.

ALINCO DR112EM 2m Tcvr 25W, extended Rx 130 - 170Mhz: £175. (Hornsea) 0964 534365.

ALTRON 3 ele AQ6-20 Beam, some spokes missing, hence only: £14. (Ashbourne) 0335 344573.

ALTRON AQ6-20 3 elm Mini Beam 10, 15, 20 and 6 metre Bands, vgc: £100 Buyer collects. (Kent) 0474 823797.

ALTRON D455 Four Section Telescopic Tiltover 55foot Tower: £450 buyer arranges collection. G3OLU, QTHR. (Diss) 0953 818292.

AMSTRAD 6128 Disk drive, 17 games, 4 educational, Mini Office 2, Stop Press (DTP), plus Morse Tutor: £130 ono. (Southend) 0702 230727.

AMSTRAD DD8900 Double Decker VCR with long play. Tape to Tape Recording, complete overhaul, bargain: £180. Prefer collected. G4MAQ, QTHR. (Oxford) 0865 718430.

AMSTRAD PC1640 3.5/5.25 Drives, EGA, Modem, 20M H/Disc, Amateur S/ware, MSDOS 5, W/perfect, LX400 Printer: £400. PPC640 Laptop, twin 3.5" drives, Modem, carry case, Mains/12v adaptors, MSDOS 3.3, Amateur S/ware: £150. Sell pair for £500. BNOS LPM432 10/50W Linear, immac: £120. (Yeovil) 0935 28341.

AMSTRAD PC1640 Computer, 640k ram, twin 5.25 floppy drive, Colour Monitor, Mouse, C/with MS-DOS 3.2, GEM 2.0, Wordstar Express, Supercalc 3.21. Immac condx: £250 the Lot. G4GTR, QTHR. (Bakewell) 0629 640475).

AMSTRAD PC1640 Computer, Colour Monitor, twin 5.25 Floppy D/Drives, Mouse and Manuals. S/ware includes MS-DOS, GEM, bargain: £150. Also self contained Double D/drive with Power supply for the BBC Computer: £50. G4NNB, QTHR. (Biggleswade) 0767 314813.

AMT3 AMTOR/RTTY with S/ware, ex condx: £110. Admiralty Handbook Vol 1 & Vol 2: £10. G3GGK, QTHR. (Cambridge) 0954 210374.

BBC-B, ROM Board and ROMS, BBC Data Recorder, Twin 40T D/Drive, all vgc. Best offer secures. G3PCT, QTHR. (Nr Chelmsford) 0245 321086.

BUTTERNUT HF5B 5 Band 2 el Beam: £130 ono. Cushcraft 3E2 10m Monobander: £40 ono. H/B 2ele Tribander(as per article in HF Antenna collection book), built but not Tested: £35. If possible buyer collects. G0FQX, QTHR. (Milton Keynes) 0908 667250.

BUTTERNUT HF5B 5 Band Beam, brand new and boxed: £200 ono. Cushcraft R7 Vertical, brand new, boxed: £325 ono. (Runcorn) 0928 715604.

CAPCO MAGNETIC Loop Antenna. Pair covering 80m to 10m, including Control Unit and 25 metres of Coax and control cables. Latest type motors. W/proofed from new. Prefer buyer collects: £225 plus packing and carriage if necessary. Malcolm, G4XLX, QTHR. (Nr Crewe) 0477 532523.

COLLINS KWM2A Tx/Rx with 516F2 PSU: £350. Hallicrafter SR400A Cyclone Tx/Rx with AC PSU: £300. Watkins Johnson Signal Monitor: £150. (Bury St Edmunds) 0284 753049(office) or 0379 783657 (home).

COLLINS R390A good mechanical/electrical condx, fully overhauled: £350. Apply Nick, evenings. (Newcastle) 091 274 5844.

CUSHCRAFT R7(HF) Vertical, 6 months old, good order: £170 ono. Buyer collect. Philip, G0KUE, QTHR. (London) 081 682 1163.

DATONG FL3 Filter, little used, with instruction book, boxed. Surplus to requirements: £95, list price £149.95. G3IY, QTHR. (Burnley) 0282 424087.

DATONG M/mode Filter FL3: £90. Daiwa SWR/PWR Meter CN-101 1.8-150Mhz: £45. Racal VHF Freq Counter model 9914: £45. Sony 7 Band SW radio ICF-7600A: £45. Avo Meter: £20. Panasonic Microcassette Recorder RN-125, two speeds, auto start, new, unused: £35. All items immaculate. (Royston, Herts) 0763 262443.

DATONG PC1 Gen Cov'g Converter: £80. BBC/RTTY Set-up: £175. Levell TG150DM AF Osc: £18. Hanimex Rondette Projector, virtually unused: £30. G0OZK. (Stockport) 061 477 5303.

DECODER CD660 Communications Decoder. Decodes CW, RTTY, ASCII, TOR, AMTOR new condx, perfect working order: £80. GW4DYY, Not QTHR. (Aberdovey) 0654 767367.

DIAMOND CP5 HF Antenna 3.5/7/14/21/28Mhz, ex condx, boxed, as new: £100. G0KSL (Pinner) 081 868 6815.

DL800 Friction Brake Winch, brand new: £40. WANTED; Kenwood SW2000 SWR Power Meter HF Amplifier. (Bristol) 0272 642867.

EDDYSTONE 1650, current model, AV/MAV Scanning, Direct entry. Racal 1792 Direct entry, 100 channel memories, top range, Offer. Drake R7, updated to R7A, mint condx, bargain: £550. Icom IC-R71E, very little used, boxed, like new: £550. Hamerland SP-600, vgc: £80. Racal 17W, vgc: £175. Grundig Internal 650, almost new: £260. WANTED; Collins 390A 51-J4 in first class condx. (London) 081 813 9193.

EDDYSTONE EC10 :£85. 940, boxed in mint condx: £250. Drake R4C, boxed, mint condx: £275. Codar AT5 with Mobile PSU, VGC: £40. Hallicrafters HT32B Tx: £100. Mutek 230C 2m to HF Transverter: £175. Goldstar SVGA Colour 14 inch Monitor NI/LR, hardly used, boxed: £150. (Basingstoke) 0252 844248.

EDDYSTONE EC10 Receiver, Excellent condx: £55. G0KTZ. (Stockport) 0663 763102.

EX ARMY Field Telephones type TELE-F and TELE-J, Offers please to G3OZE, QTHR. (York) NO TELE No.

FL2100Z, vgc, little use, boxed, manual: £400. Mutek SBLA144E Masthead Pre-Amp: £50. Wanted S-Band OSCAR Equipment and Epsom LQ Printer. (Yeovil) 0935 28341.

FR101 DIGITAL Rx all amateur bands, including 6Mhz and 2Mhz, matching Spkr, perfect: £250. Hammarlund HQ170A Rx Amateur bands: £50. Marconi CR100 Rx: £35. Collins R278 Rx 225-400Mhz: £60. Philips PM3220 Scope S/beam: £35. Avo9 Mk2: £20. (Ilford) 081 554 6631.

FREE MAST and Antennas when you buy my Detached House. 4/5 Bedrooms, one with ensuite Bathroom plus separate shower room. Double glazing, cavity and loft insulation. Two garages plus ample parking and spaceous gardens. 600ft ASL with excellent VHF/UHF location on outskirts of Telford, Shropshire. Offers around: £120,000. (Telford) 0952 613871.

FT101B with Shure Desk Mic and Spare Matched Pair of PA valves and Driver, GWO: £200. Buyer collects. (Truro) 0872 79922.

FT101Z fitted CW filter and fan with Mic, manual, mint: £350. FC707 ATU with Dummy Load:

£60. Multiterm TU: £40. Hi-Mound Paddle Key: £15. IBM Compatible 80286, 40Mb HDD, 3.5 FDD, SVGA: £390. Panasonic 24pin Printer: £140. (Darlington) 0325 359091.

FT101ZD FM, fan, Mic, H/book: £350. Heathkit HW101, Stand Mic, matching Spkr, PSU, many spare Valves: £150 ono. Buyer inspect and collect. G4BZQ, QTHR. (Much Wenlock) 0952 727024.

FT101ZD, FV101DM, FC902 - Complete HF station: £650. FRG7700 with FRT7700 ATU: £250. Pioneer FT707 Reel to Reel Tape Deck: £50. Advance Signal Gen Q1 7.5/250Mhz: £20. BBC-B Computer, two complete with Disk drives, Large RGB Monitor, much S/ware incl Wordwise, View etc: £200. The Pair, Bremi BRL200 Linear: £30. G0DLR, QTHR. (Meopham) 0732 823483.

FT2777ZD (same as FT101ZD 3) comes with matching FV101DM external Digital VFO. SP901 Speaker also matching. Plus Kenwood AT230 ATU and Kenwood MC50 Desk Mic. All in ex condx: £600 including Insured postage. (Shotts) 0501 825111.

FT290, 100W Amp, 2X PSUs, ATU, 8-XY Yagi, Telescopic Tilt-over Mast, GDO. 5/8 Whip Aerial, Digital Multi-meter, Lowe SRX30 HF Rx. 1000s of Electronic components in storage cabinets. Buyer collects. Ill-health forcing sale. All items ex condx. Phone G6DJO with Sensible Offers. (Stockton on Tees) 0642 608823.

FT301 6 Band HF Tx/Rx, FP301 PSU, FC301 ATU, boxed with manuals: £325 ono. Silent Key Sale. G4XRV, QTHR. (Chesham, Bucks) 0494 783557.

FT708 boxed, VGC, Spkr, Mic, Base adaptor, spare battery etc: £180. Racal RA17L, GWO: £160. RA1772 HF Rx: £800. Clarke Ark Welders 140 & 180 Amp: £45 each. (Braintree) 0376 321315.

G4MH Mini Beam 10, 15, 20 metres, ex condx: £70. Rotary Dipole 12 and 17m, ex condx: £50. Both :£100 + P&P. Bob, G4UYI, QTHR. (Workington) 0900 67226.

GAP VERTICAL Antenna 80 - 10 metres and 2 metre: £50. Buyer collects. Also 20ft Aluminium Pole - Offers. Tel: (Burgess Hill, W Sussex) 246463.

GOING QRT. QTH including 2 Towers, HF & 40m Beams (with full planning consent). Comprising 4 Beds, en-suite study, 2 bath util room, 2 garage, 2 recs sun room, nearly 0.5 acre, quiet cul-de-sac, woodland on two sides. Located Chandlers Ford near Winchester/ Southampton: £175,000. For details Dave, G3SZA, QTHR. (Southampton) 0703 266369.

HALLICRAFTERS SR400 Cyclone 2, CW/ SSB 10-80m, valved Tcvr, 6HF5's final, 100w o/p, good cond, currently in use, complete with AC PS and manual. Prefer buyer inspects and collects: £275. GM3TBV, QTHR. (Blairgowrie, Tayside) 0250 872520.

HEATHERLITE Explorer HF QRO Linear Amp: £750. Would consider SWAP for 386/486DX with Co-Proc, SVGA Colour Monitor. (Grimsby) 0472 871999.

HEATHKIT HW101 Transceiver + PSU, Spkr, Mic and manual: £100. G3NYX. (Sussex) 0273 832910.

HEATHKIT SB101 HF Tcvr 150W, PSU, Spkr, Manuals, spare Valves and Scope: £90. Prefer buyer collects. G4GRN, QTHR. (Waltham Cross) 0992 631698.

HOWES Tx/Rx. Unfinished project 160/80 comprising VFO Rx, Dual filter, S Meter hardware: £50. Diawa Co-axial Switch, new: £10. Yaesu YM48 Scanning Mic, new: £20. Pair G2DYM 40m Traps, unused: £20. Pair G2DYM 20m Traps, unused: £20. G3AGT. (Taunton) 0823 288359.

IBM Compatible - NCR286- 6MHz, 21mB H/ Drive, EGA Colour Monitor, 3.5in x 720 Floppy Drive, perfect working order: £225. Transformer 18 Volts at 83 Amps: £20. Various Home constructed 13.8V fully Regulated, Metered, Protected PSUs: £50 - £100. EHT PSU 2000V x 350ma, ideal 2 x 813: £40. Phone G4KDZ, QTHR. (Essex) 0375 390268.

IC745 + FM, as new: £700. Yaesu 221R or Mutek: £350. FT23R FM: £150. IC2E H/held: £85. 40ft 3 stage Trailer Tower with Rotator: £500. (Clows Top) 0299 832279.

ICOM 2SE H/held, spare battery, case, charger, boxed: £175. Kenwood TH27E H/held, charger, spare battery, case, boxed: £180. (Ashford, middx) 0784 259149.

ICOM AH-2A Auto ATU as new: £325. Datong Active Antenna AD370: £45. Fuller phone Mk4 - offers. (Derbys) 0246 234885.

ICOM IC R7000 Communication Rx, remote controller, Voice Synthesiser: £650. Yaesu FRG8800 Comms Rx: £350. Both original condx. G0PJI, QTHR. (Plymouth) 0752 775375.

ICOM IC-2E with charger, extra battery pack, H/Mic: £100. Kenwood TR2500 with case, charger, spare battery case: £75. AR88 Spares, new and boxed, main dial assembly, vernier dial assembly, full dial window, 7 bandswitch wafers. Offers? G3TGF, QTHR. (Heathfield) 0435 830484.

ICOM IC260E 2 Metre M/mode Tcvr, mobile mount and Scanning Mic, handbook, GWO will include 5A PSU: £250. (Guildford) 0483 233396.

ICOM IC290E M/mode 2m Tcvr, boxed, Mobile mount, manual: £195. Microwave Modules Transverter MMT432/144 2m/70cm 10w: £50. Buyers collect. G3OGP. (Horsham) 0403 822275.

ICOM IC3210E Dual band Mobile Tcvr, handbook and mobile bracket: £295 ono. G0GQP, QTHR. (Milton Keynes) 0908 366285.

ICOM IC505 6 Metre Tcvr 3-10W, plus 4 ele J-Beam Antenna: £365. G0SLR, QTHR. (Warrington) 0925 725402.

ICOM IC735 with PSU and Spkr, ex condx. Bargain: £750. Trio TS520S only: £230. Tel anytime. (Grantown on Spey) 047 985254.

ICOM IC740 HF Tcvr 160-10m Ham Bands, Dual VFO, FM option fitted, 250Hz CW filter, Mains/12v DC, Internal Mains PSU, Hand & Desk Mic, original boxes, service manuals, vgc: £495. Pye AM25T Vanguard, on 2m FM Raynet, control gear, "Hot" front end, 25Khz: £7. Pye AM25T Vanguard, low Band, Missing PA Tube, front end: £2. Tektronix RM45 Oscilloscope, BIG, HEAVY: £10. (Birmingham) 021 747 2438.

ICOM IC761, immaculate, 2 manuals, Mic: £1200 incl carriage UK. Box. Any test welcome. No Offers. G3RHM, QTHR. (W London) 081 423 2329.

IRCs for Sale: 40p each. Minimum 25, P & P included. CWO Please. Steve Hodgson, G0LII 6 Broughton Road, West Ayton, Scarborough, N Yorks YO13 9JW. (Scarborough) 0723 863962.

JAYBEAM TB3 3el Tribander, stainless fittings, RF choke:£200. Plus Yaesu 600RC Rotator, Controller and cable: £200. Both as new, moved QTH, no room, take: £350 BOTH. Delivered Devon, Cornwall free, carriage extra otherwise. G3KEC, QTHR. (Plymouth) 0752 812904.

JRCJST 125D, CW filter, matching Spkr and PSU, boxed as new: £800. Icom 271E 25w: £400. Icom 471H 75w: £525. (Trowbridge) 0225 753166.

JUNQUE, Junque, Junque! Large amounts of Hernia Inducing Valve Gear. Sig Gens, Tx's etc. Phone or write. G4FUY, QTHR. (Wokingham) 0734 733633.

KENT KEY, hardly used: £30. Datong Morse Tutor, fully working: £40. 3 ele 6 metre Beam, unused: £25. G0RMU. (Surrey) 0932 341439.

KENWOOD 751E, mint, 2 hours operation, first: £500 secures. Lodestar Sig Gen Digital, new, unused, first: £150 no offer. Freq Counter Lodestar 7 Digit, new: £50 no. Off air Freq Standard Advance OFS1: £20 no. 1056A Morse Key: £50 no. FT209R H/held 2m : £150 no. Freq Counter 11 Digits: £175 no. G4IZW. (Hexham) 0434 220636.

KENWOOD SM220 Station Monitor with Pan Adaptor: £230. G4ZFK, QTHR. (Wix, Essex) 0255 870609.

KENWOOD TM732E 2m/70cm FM Mobile with PG4L Remote, purchased Jun 92: £475. 2m/ 70cm Antenna; CA2X4 Base Super 2 6/8.4dB: £30, CL23J Mobile 2.5/3.8dB: £12. CHL 260 Mobile 4.5/7.2dB: £15. MFJ Grandmaster Keyer MFJ484, 12 separate or cont memories: £80. Various Morse Keys; Kent Squeeze: £25, Lowe Squeeze: £15, Kent Straight: £20, RAF Type D: £10, BMK Multiterm with S/ware (PC) AMTOR, RTTY: £25. (Letchworth) 0462 683995.

KENWOOD TS130S 100w, extra filter, noise cancelling Mic, new condx: £375. Yaesu FT75, 5 Band Tcvr with FV50C VFO, all S/state, vgc: £175 Thandar TF200 LCD Counter: £100. Microwave Modules 28-144Mhz Tvtr: £65. Tokyo HX240 Tvtr: £175. G4JXK, QTHR. (Fareham) 0329 230737.

KENWOOD TS440S with Auto ATU, immac condx, inc MC80 Desk Mic: £850 ono. Boxed with manuals. Contact Steve, evenings only. (Dudley) 0902 884107.

KENWOOD TS440S, SSB filter, A ATU, PS50 PSU, MC80 Desk Mic, Station Monitor SM220: £1200 or Deal/exchange for TS930/TS940. Also Wanted: BS-8 Pan Display for the Kenwood SM220. (Hartcliffe) 649257.

KENWOOD TS450SAT c/w PSU and Mic. Mint condx, 9 months old: £1100 ono. Also Westminster, modified for Packet with integral TNC and Xtalled for 144.650Mhz: £75. G0HPJ, QTHR. (Peterborough) 0733 245031.

KENWOOD TS450SAT matching PSU PS53 and Spkr SP23. Bought May 92, little used, absolutely immaculate, all boxed, unmarked: £1200. G0RAN, QTHR. (Bury) 061 796 5296.

KENWOOD TS450SAT. Mint condx with matching Kenwood PS33 20A PSU, SP23 also extra filter 1.8khz SSB and VS2 digital voice Unit and MC43S Mic. All items boxed and in mint condx: £1250. Ask for Mick. (Oldham) 061 626 9275.

KENWOOD TS520E ex condx with 250Hz CW filter: £320. Also R/M metered PSU 24v at 30A: £90. Terry. (Burton on Trent) 0283 821048.

KENWOOD TS530SP mint condx, 500Hz/ 1.8Khz Filters. Yaesu ATU FC902. Both: £575. (Doncaster) 0302 859451.

KENWOOD TS680S HF + 6M, all mode fully featured Tcvr, fitted CW filter, plus Fist Scanning Mic, immaculate: £575. (Cardiff) 0222 56581.

KENWOOD TS680S HF and 6m Tcvr plus Gen coverage receive, mobile Mount, spare power cable and service manual, as new: £575. (Lewes) 0273 473505.

KENWOOD TS850ATS, 500Hz CW filter, Auto ATU, Mic, boxed as new: £1300. Icom IC728 HF, Mic, boxed, still under M/facture warranty: £800. Icom IC R1000, excellent, boxed: £350. OR Exchange for Apple Macintosh "Centris", "Quadra" or "2VX" Computers(Urgently Wanted). (Falkirk) 0324 32594.

KENWOOD TS930S, boxed, manual: £600. (Hatfield) 0707 265025.

KW2000, extended coverage on 15 & 10 metres, Shure 201 Mic, Datong RF Clipper, gwo: £75. Storno CQM713P3 25W VHF-HB Synthesized, Suit Conversion 2m: £25. Wavemeter Class D: £10. Wanted:- 23cm Varactor Tripler. G4EPX, QTHR. (Crowthorne) 0344 780796.

LINEAR AMPLIFIERS. HF FL2100Z, VGC: £495. VHF Daiwa (Mobile) LA2035R, boxed: £35. G4UTG. (Poole, Dorset) 0202 674285.

LK550 Linear Amp. A lot of bottle with 3 x 3-5002 tubes, 1500W PEP. QSK QRO for the Big Time! 3 years old, little used, cost £2132, Serious Offers. Current Balun (New): £35. PL259's, SO239's, N-Plugs, elbow straight & T connectors. Offers. (Bristol) 0272 656783.

MAGNETIC LOOP AMA3 Antenna and Controller, covering 10-20m Bands: £150. (Bristol) 0272 649257.

MAGNETIC LOOPS 3.5 - 30Mhz, 2 loops and Controller: £200. Or Exchange, 70cm Radio or anything interesting. Tel Dave. (Barnsley) 0226 247048.

MARCONI HR24 Receiver. All Units: £10 each. Contact Rob. (Timberland, Lincs) 0526 378685.

MARCONI Instruments. Portable FM/AM Modulation Meter TF2303(25-520Mhz): £165. Electronic Voltmeter (c/w Probes) TF2604: £35. Sensitive Valve Voltmeter TF2600 (Qty 2): £25 ea. H.P. Lab Multimeter 3490A: £65. Racal Dana Lab Microprocessing DVM Series 6000 c/w IEEE488 Interface (Qty 2 to make one working unit): £75 (pair). Time Electronics Programmable Switch (24 port) Manually Prog plus IEEE488: £65. HP 651A Oscillator (1Hz - 10Mhz): £60. Kevin, G4BUW, QTHR. (Bracknell) 0344 862874.

MIZUHO SB2X 2m SSB/CW Tcvr with Interna 10W PA fitted. Mic and power leads: £65. G3XKX, QTHR. (Leicester) 0533 715378.

MORSE Keyboard. Dewsbury Electronic Star Master Morse Keyboard, original price £199 now only: £75. GW4DYY, NOT QTHR. (Aberdovey) 0654 767367.

MOVING! Must sell, best offers. AR88. Cossor D/Beam Oscilloscope. AW10 Morse Callsign senders. SX100 Scanners. 4 Sony Video Cameras AVC3250CE. Sony Video Wiper Brackets, cables etc. PSU BR2 5 & 12 0 12 & 24 volts about 500mA. DC to DC 5v to 12 0 12 10-100mA. Avo Electronic Multimeter. Avo Allwave Oscillator. Fans 18 & 23W. E-Prom Eraser. G3BGA. (Huddersfield) 0484 450982 day, 0484 604546 eve.

OFFERS WANTED for BBC Computer, + GX2 FAX/SSTV, H/R Monitor, +Interword, + S/ ware. Wordwise Plus. TX3 FAX/SSTV, + Interface. Spectrum Computer, + Printer, + FAX/ SSTV, + Interface. G4KTX, QTHR. (Chelmsford) 0245 233233.

PAC COMM M/mode, PACTOR, AMTOR and RTTY Controller, as new five months old, with leads: £230. Evenings. (Northampton) 0604 862130.

PACKET RADIO PK232, Comm 64, Citizen 120 Printer, Comm1541 D/drive, 12inch TV, books: £350. New HS WX2 144/432Mhz G/ Fibre Antenna: £80. New 3 Way Antenna Switch: £15. SME Power Supply: £10. AMU-100 Ant Matching Unit 1.5-90Mhz: £50. New Sargant Antenna for 14Mhz: £35. (Rotherham) 0709 850517.

PANASONIC KX-R194 Electronic Typewriter, very little used since new December 92, original packaging & handbook: £99. G4PNK, QTHR. (Bedford) 0234 825274

PHILIPS F496 UHF Base stations 25kHz Channel spacing, ideal for repeaters: £65. Airtech notch Reject Cavities, in IP65 case: £45 each. Large quantity of cable fixings, hammerscrews, "P" clips etc. Ring evenings or weekend for details. G6HXB, NOT QTHR. (Seer Green) 0494 677823.

PK88 Packet Controller with PC S/ware, boxed with manuals: £100. Also Butternut HF6V with 160m upgrade: £100. G0JXz, QTHR. (Birmingham) 021 748 7851.

PSION LZ64 H/held Computer complete with 64k Datapack, spelling checker, manuals and leather case, boxed, mint condition: £125. G7LUF. (Bromsgrove) 0527 570529.

PYE REPEATER Unit, complete with UHF/ VHF control head, cables, crystals: £150 ono. Also Spare Units at: £40 each. Send SAE for details from G8KVU, QTHR.

RACAL RA1218, new cabinet: £380. Eddystones, EC10, 840C: £70 each. All mint. Wanted:- RA1772 Operators Manual. Loan or Buy. (Glasgow) 041 649 2328.

RACAL RA17L excellent wkg condx, complete with operating handbook and spare valves plus Wooden castored frame: £110 ono. Buyer collects or meet at suitable rendezvous. Phone weekends, or write to home addr G3KMC, 12 Hunters Way, Sawtry, PE17 5SJ. (Cambs) 0487 831245.

RADCOM Magazines, Complete Years 1983 to 1990. £5 per Complete Year or All 96 copies: £25. G4XEN, QTHR. (Wellingborough) 0933 677573.

RADCOM Volumes 78 to 92, lot: £15. Vol 93, Offers? Realistic FM 2ch Plug-in Talk 3 Units: £30. Valves 100 plus, acorn to PX25, Avo8 Mk5 case: £45. Solarton DIGI Meters with RF probe Unit: £30. Another with Lo Ohms Unit: £30. Have BT Merlin (Tonto) Keyboard. Ex any of the above items for Hand Set and Rear plug in items. G3XLC, QTHR. (Stoke on Trent) 0782 311811.

RHODE AND SHWARZ Polyskop 2: £100. Muirhead D30A Test Set Wheatstone Bridge: £80. G4RAW, QTHR. (Halifax) 0422 203062.

ROBOT 400 LOOK-ALIKE. Genuine PCB, H/ brewed case. Use for Colour upgrade or spares at just: £60. High quality 'Guardsman' 525/ 625 Line Camera. Needs attention, but maybe only Auto-Lens feedback loop o/c, with manual: £35. Bargains to adept SSTV/camera users. (Stockport) 061 477 5303.

ROBOT LM9000 Clone, PAL delay line, 4 page Memory, RGB/ Composite o/p, Interface board and S/ware for IBM/Clone: £450. G4VZR, QTHR. (Coaley, Glos) 0453 860773.

SEM Mk2 QRM Eliminator: £45 including postage. (Reading) 0734 722085.

SIG GEN, Service version of Hewlett Packard 10-420Mhz, o/p 0.1 Microvolt to 350 Millivolts: £65. Prefer buyer collects due to WEIGHT. G3BUF. (Melton Constable) 0263 861434.

SILENT KEY Sale, G0JHN. All new unused. Pakratt 232 MBX, manuals, leads and S/ ware: £275. Tono777 Comms Terminal, manual & leads: £125. Kenwood TM241A 2m Mobile 50W, Mic & Manual: £235. Icom IC2AT H/Held, c/w manual: £140. Pace FM-152 H/ Held Marine, c/w Xtals 6Tx + 6Rx: £90. 3 Off, AC volts Stabilizer Claude Lyons 2KW, 150-300v i/p, 230v +/- 1% Output, each: £150 (cost £450). G8KW, QTHR. (Sevenoaks) 0732 883637.

SOMMERKAMP FT277ZD (101ZD) WARC bands, CW filter, ex condx, new PA's, Mic, manual, box: £325. Standard C528 D/band H/ held, as new, Nicads, case, hardly used, extended Receive: £325. Prefer buyer collects. Alan, G4TFU, QTHR. (Manchester) 061 980 7508.

SONY SW77 World Receiver as new: £250. AOR2000 Scanning Rx, excl condx, cost £259 Except: £150. Yaesu FT26 Micro Tcvr: £150 used twice. Yaesu NC15 Charger, new: £25. Phone (Brentwood) 0277 823434.

STANDARD C500 full Duplex 2m/70cm, boxed: £300. Telequipment S54 Scope, vgc: £65. G3XFN, QTHR. (Sutton Coldfield) 021 353 3364.

STANDARD C520 2m/70cm H/held Tcvr, case, Mobile bracket, mint, boxed: £270. (Tunbridge Wells) 0892 547726.

SURPLUS TO Requirement, M/Modules MML-50S Linear Amp: £60. Pye-A200 144Mhz Amp: £20. M/Modules 144/28Mhz Converter: £15. Datong Speech Processor: £50. Eddystone EC10 Mk2 Receiver: £50. 4 x 21ele F9FT, new Splitter, cables, Connectors: £260. BBC-B Computer, Double 80/40 Drives, Printer, ROM expansion, books, S/ware: £200. Pye F460 UHF/Base ideal for Repeater: £45. NAG 144XL Amplifier: £300. Carriage included in Price. Andy, GM4IPK. (Sumburgh) 0950 60312.

TEN TEC Century 22 CW Tcvr, (excl calibrator, keyer): £200. BNOS 2 metre 10-50W Linear: £100. G0MOU, QTHR. (Littlehampton) 0903 723718.

TENNAMAST 40ft Wind-up, galv, vgc, free standing or wall mounted: £225. Yaesu Rotator G400RC, vgc, Controller powerlead: £80. (Westcliff-on-Sea) 0702 346826.

TEST INSTRUMENTS: JDR Dual 35MHz Delayed Sweep Oscilloscope: £190. Dual 0-30V 3A Supply, metered, current limiting: £75. 4.5 Digit Bench Meter 0.05% on DCV: £70. Topward Function Generator 0.1Hz to 2MHz AM/FM: £60. All above items as new and boxed. Marconi TF2015 Generator 10-520MHz AM/FM, Ex Ministry: £90. Many other

items available. Paul Coxwell, RS39369. (Sutton on Sea) 0507 441761.

THIRD SECTION and Head unit for 60ft Tower: £140 plus Carriage. (Hamilton) 0698 289580, between 7am and 1pm.

TINY-2 Mk2, 9 and 25 way Leads for PC and Radio leads: £95. (Derby) 0332 768842.

TONO 2m All Mode Linear Amp, 5W i/p - 50W o/p: £95. G3WAO, QTHR. (Fareham) 0329 665757.

TR751E 2m Tcvr: £480. KR500 Elevation Rotator: £80. Bnos 25/30 Amp PSU: £100. Sangean ATS803A: £75. Baycom Packet outfit for PC: £20. Will Sell or Px for FC107, 50Mhz Module for FTV-107R, SM220/230, MFJ SWR Analyzer. WANTED 40/22 Pin 0.125 Extender Boards for FT107M. (Castleford) 0977 552862.

TRIO 830 ex condx, filter, AEA Tuner, Dee Com Load, 4 long Wire Antennas, complete station: £600, Owner 84 giving up. Key, headphones, other bits and pieces. Come and try. No offer. G4KFW, 87 Dyas Avenue, B42 1HQ. (Birmingham) 021 357 2009.

TRIO TS530S HF Tcvr, Kenwood AT230 ATU, SP230 Spkr, VFO130 Ext VFO, MC50 Base Mic, all mint, boxed, with manuals: £675. Tel John or Dave. (Northampton) 0604 37769.

TRIO TS830S plus VFO230, 500 narrow filter, pristine condx. No Split, no faults: £550 Cash. G3AFR, QTHR. (Nottingham) 0602 312442.

TRIO TS830S superb condx, Mic, manual, original packing: £550, first class rig. Carlton Direct Conversion Rx Kit, bargain: £35. G4ILA. (Stockport) 061 477 6702.

TRIO-KENWOOD TR7930 2m Mobile FM Tcvr 25W o/p. Auto off-set, prog priority Alert, 21 multi-func Mem chans, built-in Tone-gen. Adj quick lock car mounting bracket. Equip as new c/w original packing + H/book. Also includes Kenwood MC55 Mobile Boom Mic with gear box lever mount Box for full Remote Control. Tcvr has back-lit LCD, modern style, would also make good Base station, bargain: £250. G3BBK. (Heathfield, E Sussex) 0435 866129.

TRIO-KENWOOD TS930S mint condx, built in ATU, boxed, manual, little used, deliver 50 miles: £850 ono. G4BGX, Not QTHR. (Bournemouth) 0258 857019.

TS440S fitted ATU and CW/SSB Filters, PSU, Hand & Desk Mic, SP23 Spkr, boxed, manuals, immac condx: £895. G0KPZ. (Sidcup) 081 309 1295.

TS530S, gd condx, with Shure Mic, SWR Bridge, KW Tuner: £400. Brian, G4SDL, QTHR. Tel: after 6pm. (Manchester) 061 748 4010.

TS830S, c/w AT230: £600. JST135, c/w PSU: £800. TS900 with PS900: £400. All in 1st Class condx. Martin, G3ZZS. (Plymouth) 0752 707550.

YAESU FP700 PSU/Speaker, vgc: £65. Spectrum 48K RTTY, CW, SSTV S/ware, H/ware with instructions. Details call John, G3OAZ, QTHR. (Basingstoke) 0256 465126.

YAESU FRG7700 Rx, FRT7700 Tuner, FRV7700 VHF Converter: £295. Also FRV7700: £25. FRA7700 Active Antenna: £45. TS120V Ext VFO: £45. (Leics) 0455 273042.

YAESU FT101E gd condx: £200. SEM Tranz Match: £100. Tel after 6pm. (Wolverhampton) 0902 783299.

YAESU FT101ZD All bands plus FM as new, boxed, manual: £500. Phone G0RXG. (Bristol) 0272 568380.

YAESU FT101ZD Mk 3, FM, fan: £350. Yaesu FC902 ATU: £125. Heathkit SB220 Linear 2Kw o/p, superb DX: £450. Manuals. TB2 Ant: £80. All gd condx - Going QRT. Prefer buyer collect. Could deliver near. Will haggle complete HF Station. G0DRG, QTHR. (Southampton) 0703 666133.

YAESU FT102 HF Tcvr, incl AM/FM CW filt, boxed, vgc, Audo described as BBC quality: £150 ono. Nick. (Sleaford) 0529 414216.

YAESU FT209R 2 metre H/held, spare battery and charger also new memory battery, all good cond: £140. G8TUL. (Nelson, Lancs) 0282 618548.

YAESU FT221R with Mutek front end, gd condx: £300. G8MYK. (Birmingham) 021 430 4904.

YAESU FT290R Mk2 2m M/mode, little used, as new, boxes, instructions and technical supplement, excellent rig: £325. Dave, G4RSR. (Poole) 0202 687248.

YAESU FT480R M/mode Mobile, recently realigned, gwo, mobile mount: £255 ono. FT790 Mk1, boxed with manual, Nicads, charger etc: £240 ono. (Cumbernauld) 0236 726989.

YAESU FT70G, unused: £300. Ten-Tec Century 22, unused: £275. PK232, good condx: £225. Sony 6800W/ICF: £150. GEC/Marconi RC410 Rx, gd condx: £200 ono. Eddystone 730/3: £90. KenRotor 400RC new: £150. Eddystone EP14: £75 ono. Log Perodic Antenna 50/500 Mhz: £60. All above Carrige extra. ***RECEIVERS CALLERS ONLY***. (Llanelli) 0269 871382.

YAESU FT747GX HF Tcvr, PSU 20 Amps, Yaesu Desk Mic MD-1, Daiwa SWR/PWR Meter CN-1OM, Create 730V-1 All Band Antenna. Equipment little used, will accept: £850 the Lot, including various Accessories. Contact G4IFK. (Stourbridge) 0562 883804.

YAESU FT747GX with FM board, very little use, NO Mic, vgc: £475. Buyer collects. (Witney, Oxon) 0993 771424.

YAESU FT747GX, HM-1 B8 Mic, FM, CW filter, Gen cov, mint: £475. G4OQK. (Norfolk) 0842 752748.

YAESU FT757GX CAT System HF all mode Tcvr, MH-1 H/Mic, handbook, vgc: £550. Phone Peter/Sarah working hours only. (Plymouth) 0752 561830.

YAESU FT767GX with SP767 Spkr, fitted 2m, 6m and 70cm Modules, mint, boxed: £1400 ono. Yaesu FT290 Mk1, new Nicads: £210. IC ATU100: £325. PK232 TNC: £180. BNOS 25Amp Stab PSU: £125. Diawa All mode Active Filter: £70. All mint condx. Microwave Modules 10/100 Watt Linear Amp, slight fault: £70. (Nr Chester) 051 339 3433.

YAESU FT77 100W HF Mobile rig, circa 1985, 3.5-30Mhz + WARC, stored unused since 1987, hence: £275. G3ROZ, QTHR. (Sandy) 0767 680828.

YAESU FT790R 70cm and Yaesu FT290R 2m, both vgc: £225 each ovno. (Harrow) Tel: 081 868 1704 day or 081 422 3821 evening.

YAESU FT902DM, FC902 ATU, Spkr: £600 ono. (Worcester area) 0905 424722.

YAESU FT990 Tx/Rx with narrow SSB Filter, plus matching SP6 Spkr: £1750. Cushcraft D3 Rotary Dipole 10, 15 and 20 mtrs: £75. Microset 2 metre Linear 100W: £50. Datong M/mode FL2: £100. AKD6001 6 mtrs FM Tx/Rx: £75. (Ashton-u-Lyne) 061 308 2277.

YAESU FTV901R Tvtr, all 3 Boards fitted, with leads and manual: £225. Tokyo Hy-Power HT180 80m Mobile: £140. Phone G0DFE. (Southend) 0702 202216.

WANTED

AP1086 issue 1 (RAF Radio Stores Ref No's) Also Air Publications relating to Radio, Radar equipment. Exc price offered. Would purchase Post-War to current Magnetrons, Klystrons, T/R cells, Photo-Multipliers, Microwave and special CV types. Required Static or Rotary Inverter, AC or DC I/P with O/P of 80/115v 1500/2000 Hertz. Also Rx Type R1355 10D/13032 unmodified. Please phone any time. (London) 071 511 4786 or 071 790 2846.

HF ATU 1.8-30MHz, Twin feeder input, Coax output. G4PDN, QTHR. (Newcastle on Tyne) 0661 872590.

IC202S SSB/CW 2 metre Tcvr, must be in vgc. Prefer with original packing and accessories. Cash Waiting. (Rugby) 0788 815506.

KENWOOD/TRIO SP230 Spkr, KB-1 De-Luxe VFO Knob, Eddystone EC10 Mk 2 Receiver. Good price for items in gd condx. (Hastings) 0580 830558.

MAST or Tower 60ft. Would consider Clark 73 series Sectional Mast or WT1 Pump-up. Altron H557 4 section Tower also considered. G0TIL. QTHR under G6UGI. (Royston) 0763 243570.

PRINTER HEAD for the Epson LQ2550 and circuit diagrams for the HP9872 Plotter and Tektronix 475 Scope. G8JTJ, QTHR. (Newton Abbot) 0626 331456 evenings.

RACAL 237B VLF Adaptor. Racal 98D ISB SSB Unit. G8YGQ, QTHR. (Stoke on Trent) 0782 534573.

BOOKS, Conference Proceedings, AGARD/DSIR reports, etc on VLF/HF/VHF/ Microwave Radio propagation Antennas and Telecomms. G3REP, QTHR. (Steyning) 0903 879083.

CLANSMAN VRC321 and PRC320. Battery Box and Antenna for Racal TRA967. Looking for Clansman parts/accessories. Andy, G8JAC, QTHR. (Sanderstead) 081 651 2727.

DRAKE TR7 Handbook/Service manual for copying. All postage paid. G3XLU, QTHR. (Saltash) 0752 844168.

EDDYSTONE EC10/Mk2, 870A, 960, 1995, 1001 Series, etc. Some Duplicates for sale. Peter Lepino. For details/requirements, Fax 0372 454381 or Tel. (Surrey) 0374 128170.

EDDYSTONE Receivers and Accessories, Alive or Dead! Any condx considered for Cash by collector Peter Lepino anytime. FAX: 0372 454381. (Surrey) 0374 128170.

FERROGRAPH series Six Three Metal Reels required with or without tape. (Letchworth) 0462 674505.

FT1000, FT736 with 6 mtr and FT790 Mk2 with Clip on Linear and Battery Pack. FT ONE available part Exchange or Sell. (Bakewell) 062 9813369.

FT101Z Ex VFO. Must be in vgc. Phone anytime. John (Pyle, Mid Glam) 0656 741318.

FV707DM Digital VFO for FT707. £60 Offered, contact Richard, GW0DHA. (Cwmbran) 0633 860813.

HB9CV Dimensions and any other Info Please for 144Mhz version. G8ATA, QTHR. (Grange over Sands) 05395 34671.

HRO must be Complete with PSU and Coils, gd condx. Also 19 Set. Tel: Alan. (Staffs) 0538 702187.

IC402 Must be in vgc. Also IC3PS PSU. Mobile Bracket for 202/402. Any spares/accessories. Tel: David, 12 - 1pm and 5 - 7pm. (Bourne) 0778 425367.

KW ATLANTA or KW2000E with KW1000 Linear Amp. (Devizes) 0380 725075.

KW2000A with PSU, gwo a must, preferably with operating manual and Mic. Can collect 100 mile radius. Bill, G0FML, QTHR. (Kidderminster) 0562 741311.

KW201 Rx, circuit etc for KW204 Tx, TW2-120 2m Tx. Any info apreciated. G3RKZ, QTHR. (Derbys) 0332 883035.

MULLARD Metal cased IF Strip, beleived No LP1165 around 1950s. Your price plus post. Frank, G2CVO, 28 Elmwood Drive, West Mersea, Colchester CO5 8RD. (Colchester) 383363.

NATIONAL NCX3 and Power Supply Unit. Will consider NCX5 but prefer Three Bander version. (Caernarfon) 0286 831340.

NEW SESSION, new Kids, new projects. Dr Ken Smith (G3JIX) Youth Radio/ Electronic Club seeks 2nd user Telescopic Mast for HF Antenna. Also any sponsorship for this Club's growth/activities. The Industry or Trusts. Please note Help required. G3JIX, QTHR. (Canterbury) 0304 812723.

PANDA CUB or Labgear LG50 Tx. Eddystone pre-WW2 Coil Sockets / Bases (2) (6 pin), TU5B Tuning Unit, (TU6 or TU7 would DO). G3JWW, QTHR. (Harlow) 0279 436660.

PGA (Not VGA) Board for 8088 PC also KW77 Rx to Compliment my KW Viceroy Tx. G3WDN, QTHR. (Beccles) 0502 715537.

PHILIPS PR710 H/held Tcvr. BC40 or BC41 Charger, Working or Not, can collect. Racal RA217 Receiver. (March, Cambs) 0354 741168.

REEL TO REEL Tape Recorder, 4 track Mono. Preferably NOT Philips, must take 7 inch Reels, would like Grundig. G4VVQ, QTHR. (Nr Chelmsford) 0245 233566.

REPAIR MANUAL or Fault finding info, spare part data WHY? For Hewlett Packard HP35743B Monitor, SN. 8742J28355. G3VQQ, QTHR. (Ossett).

SERVICE and Operating Manual for Type 78M Wobbulator made by Samwell and Hutton Ltd. Racal Units to Match RA17/117, SSB Units, Freq Synth etc. Racal Test Jigs MA89, MA90, MA91 and MA92. Rob, G0HJR, at 11 West Street, Timberland, Lincs LN4 3RX. (Timberland) 0526 378685.

TCS12 TRANSMITTER. Must be in reasonable condx. Would like data on same. G4IZM, QTHR. (Rugby) 0788 811295.

URGENTLY REQUIRED Drake MS4 1E Power Pack and Speaker to drive Drake TR4C. G4KME. (Stoke on Trent) 0782 503444.

WANTED Circuit and layout for PMR Dymar FM 16 channel , model 830 HO, also Nova model 281. GW3UMD, QTHR. (Cardiff) 0222 761813.

WANTED Quad, Leak, Radford etc, Valve Hi-Fi Equipment. Working or Not. Will pay cash and collect. (Chelmsford) 0245 266027.

YAESU FTDX560 with manuals and Mic. Must be unmodified, clean with known history. Ring 0734 693284.

YAESU NC15 Charger or PA3 DC Adapter for FT209. Ken Shaddick, G0TDS, 32 Kings Head Lane, Bishopsworth BS13 7DD. (Bristol) 0272 641362.

EXCHANGE

INFORMATION by Telephone Bulletin Board Systems. No charges, extensive choice of files for download. The wizard radio BBS (0704) 821420. V42bis 24hrs. The Amateur AD BBS 051 524 3407 10pm - 8am. Part of the growing UK +44 HamNet. (Liverpool).

BOXED SET. Thirteen M & W Inside Micrometers 50mm to 300mm as new. Calibrated. New boxed, Mahr German Dial Indicator Gauge 0.01millimetres divisions, with spares. New MiTutoyo Dial Indicator 0.01millimetres Divisions with clamp and various new fittings. Combination Depth Micrometer 0 - 8inch used, accurate. Approximate total value new: £900. Wanted HF Transceiver or WHY? (Stockton) 0642 552598.

ZENZA Bronica Photographic Equipment ETR-5 plus Speedgrip: £400. 150mm Lens: £415. 35mm Film Back: £100. 120 Roll Film Back: £100. Polaroid Back: £95. OR £1000 the LOT, or Exchange + cash for Kenwood TS850S HF transceiver. (Maesteg, South Wales) 0656 738988.

CLUB NEWS

DEADLINE - Items for inclusion in the February 1994 issue must be sent to HQ marked "Club News - DIARY", to be received by 17 December latest. If news is received by the published deadline, it should appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given.

AVON

RSGB CITY OF BRISTOL GROUP - 20, Christmas Party. Details Dave, G4NKT 0272 672124.
SOUTH BRISTOL ARC - 1, Darts evening-Club match; 8, 20m Dx Rx evening; 15, Christmas Party; 22, "Hair of the Dog"; 29, Greetings to old Friends on 2m/70cm. Details 0275 834282.

BEDFORDSHIRE

SHEFFORD & DARS - 2, Activity night; 9, The G4MEO Challenge; 16, Chairmans mince pie night; 24 & 31, Christmas break; 6, Welcome back. Details 0462 700618.

BERKSHIRE

NEWBURY & DARS - Club meets on the 4th Wednesday in the month. Venue Bucklebury Memorial Hall, Bucklebury near Thatcham at 7.30pm. Details 0635 46241.
READING & DARC - 5, Annual General Meeting and G5KV Award with cheese & wine. Details 0734 476873.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 1, G6NB Construction Contest; 15, Talk "Worked All Britain" by John Fitzgerald. Details 0296 81097.
CHESHAM & DARS - 8, Tech Topic - Rig Testing with Terry, G8AHS; 15, Christmas Lecture with Dave, G3WLO; 22, Christmas drink. Details Ian, G0RTF 0494 676391.
MILTON KEYNES & DISTRICT ARS - Details MK & DARS, PO Box 817, Springfield, Milton Keynes, MK6 3LE.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 3, Advanced Driving Techniques by Sam, G0ECL; 10, VHF Propagation by John, G4BAO; 17, Mince Pie & sherry evening. Club reopens on Jan 7. Details from John, G0TIL, 0763 243570.

CHESHIRE

STOCKPORT RS - 8, Annual General Meeting; 10, Computer Group meeting "Radio Operating Procedures"; 15, Christmas Party; 17, Computer Group meeting "Packet Radio" G3SHF; 22, NO meeting. Details 061 439 4952.

CLEVELAND

EAST CLEVELAND ARC - 3, Surplus Equipment Sale. Details 0642 475671.

CLWYD

RHYL & DARC - Club meets every 1st and 3rd Monday of each month, WRVS Centre 116, Vale Road, Rhyl at 8pm. Details 0745 351362.

CO ANTRIM

CARRICKFERGUS ARG - 7, Talk "PACKET" by Hugh, GI3TLT at 8pm. Details 0232 835650.

CO DOWN

BANGOR & DARS - 3, Christmas Surprise Talk by a well known personality!!! Venue - Bangor Tech College Room A13 on ground floor at 8pm. Everyone welcome. Please note this change of venue for future club meetings. Further details (but no clues!) Keith, GI0SSA 0247 883315.

CORNWALL

SALTASH & DARC - 3, Talk "HM Coastguard Services" by John Bailey. Details 0752 844321.

CUMBRIA

EDEN VALLEY RS - Club meets, odd months at BBC Club, Penrith. Details 07683 52106.

DERBYSHIRE

BUXTON RA - 14, Social Evening. Details Derek, G4IHO on 0298 25506.
DERBY & DARS - 1, Surplus Sale; 8, Constructors Contest; 22, Christmas Party; 29, NO meet-

ing - Club Closed; Jan 5, New Year Surplus Sale. Details Hayley, G7PXA 0773 856904.

DEVON

APPLEDORE & DARC - meets 3rd Monday of each month, Appledore Football Clubroom at 7.30pm. Details 0237 477301.
EXETER ARS - 8, Winter Operating night; 22, Christmas cheese & wine party. Details 0392 214204.
EXMOUTH ARC - 8, Winter Operating night; 22, Christmas cheese and wine party. Details 0395 279574.
PLYMOUTH RC - Details D C Perryman, G7NMA, 50 Bellingham Crescent, Plympton, Devon PL7 3QP.
TORBAY ARS - 10, Christmas Party**(Change of date)**. Details Walt, G3HTX on 0803 526762.

DORSET

SOUTH DORSET RS - 7, Talk/Demo "Something Different" by Andy, G3VMZ; 12, Christmas Dinner social. Club meets 1st Tuesday of every month. New members and visitors welcome. Details from Mike, G7HNY 0305 773860.

EAST SUSSEX

CROWBOROUGH & DARS - 10, Christmas Party. Details 0892 661807.

ESSEX

BRAINTREE & DARS - 6, Quiz - visit to Dengie Hundred Club; 13, Cheese & wine Party; Jan 3, Widgets 2. Details 0376 327431.
CHELMSFORD ARS - 7, Talk 'Radiation hazards that the Amateur may experience' by Ron Kitchen. Details 0245 260831.
COLCHESTER RA - 2, Talk "Document Imaging Processing" by Peter Weldon of 4 Sight; 16, Cheese & wine Christmas Party, Institute staff lounge. Details 0206 764034.
DENGIE HUNDRED ARS - meets 1st & 3rd Monday each month. Details 0621 783629.
VANGE ARS - 2, Junk Sale; 9, Television; 16, Christmas Buffet; 23 & 30, NO Meetings. Details 0268 552606.

GRAMPIAN

BANFF & DARC - 3, Club Construction evening; 17, Quiz Night. Details Martin, GM6VXB 03465 82061.
MORAY FIRTH ARS - Club meets every Thursday at 7.30pm. Details 0343 86395.

GREATER LONDON

BROMLEY & DARS - 14, ***SECOND TUESDAY*** Christmas Party; Jan 18, Annual General Meeting. Details 081 658 2988.
CLIFTON ARS - 3, Packet Radio evening; 17, Cheese & nibbles evening. Details 081 859 7630.
COULSDON ATS - 13, Annual General Meeting. Details 081 684 0610.
CRAY VALLEY RS - 2, Meet the members - G4EGU (TBC); 16, **NO MEETING**. Details 081 850 1386.
CRYSTAL PALACE & DRC - 18, Christmas social & Video/film Show. Details 081 699 5732.
EDGWARE & DARS - 9, Junk Sale; Jan 13, Annual General Meeting. Details 081 204 1868.
HOME COUNTIES ATV G - 21, Annual Christmas lunch. Details 081 979 4432.
KINGSTON & DARS - 15, Christmas Special. Club meets on the 3rd Wednesday of every month. Details 081 398 1128.
The R S of HARROW - Dec 3, Christmas Junk Sale & Social evening - bring along & buy plus. Details 0895 632377 eve.
SILVERTHORN RC - 17, Christmas Party - last meeting of 1993. Club meets every Friday at 7.30pm. Details from The Sec, Silverthorn RC, Chingford Adult Educ & Community Centre, Friday Hill House, Simmons Lane, Chingford E4 6JH.
SOUTHGATE ARC - 9, Annual General Meeting. Club meets every 2nd & 4th Tuesdays of each month at the Winchmore Hill Cricket Club Pavilion, Winchmore Hill, N21. Details 081 360 2453.
SURREY RCC - 6, "PCB's made easy" by Peter, G3ZPB & Bernard, G8TB; Jan 3, Oscilloscopes for Amateurs by Phill, G0OHI & Peter, G3ZPB. Details 081 660 7517.
WHITTON ARG - Club meets every Friday evening at Whitton Community Centre. Details 081 995 6553.
WIMBLEDON & DARS - 10, Christmas Social; 31, No meeting. ****Change of Secretary*** now George Cripps, G3DWW. Details 081 540 2180.

GREATER MANCHESTER

ECCLES & DARS - 7, Annual General Meeting. Details 061 773 7899.
SOUTH MANCHESTER RC - 3, RSGB Stand Preparation; 10, AFS & how to prepare for it; 17, Christmas Party; 24 & 31, NO MEETING. Details 061 969 1964.

GWENT

NEWPORT ARS - ***New Secretary*** C D Palmer, GW6AJQ: 3 Chaucer Court, Wordsworth Road, Newport, Gwent NP9 8HZ.
PONTYPOOL & DARS - Club runs Novice Night once a Month on a Wednesday at the Club Station with Class A licensees in attendance to assist with Projects, further development in amateur radio etc. Details GW0FJH 0495 762604.

GWYNEDD

DRAGON ARC - 20, Christmas party. Club meets on the 1st & 3rd Mondays each month. Details 0248 600963.

HAMPSHIRE

ANDOVER RAC - Club meets on the 1st & 3rd Tuesday of the month. Details 0264 339218.
BASINGSTOKE ARC - 6, Christmas Social; 27, 2m DF Competition: "The Turkey Settler" -OS185 (SE) -Fox: Alan, G8FMH. Details 0256 25517.

HEREFORD AND WORCESTER

BROMSGROVE & DARC - 10, Christmas Party. Details 0562 710010.
BROMSGROVE ARS - 14, Christmas Dinner. Meets on the 2nd & 4th Tuesday in the month. Details 0527 546075.
HEREFORD ARS - Club meets on 1st & 3rd Friday of each month. Details G4MET, QTHR.
VALE OF EVESHAM RAC - 2, Christmas Dinner, tickets & club info from Alisdair tel. 0386 41508.

HERTFORDSHIRE

CHESHUNT & DARC - 22, Christmas Social Evening; 29, NO MEETING. Club meets every Wednesday at 8pm. Details 0992 464795.
DACORUM AR&TS - 21, Christmas Dinner. Details 0582 766973.
HODDESDON RC - 9, Annual General Meeting; 23, Christmas Social. Details 081 804 5643.
STEVENAGE & DARS - 7, Running a Packet BBS by Andy, G4SPV; 14, Christmas Dinner - Chicken & chips supper; 21, General Get together night; 28, Closed for Christmas. Details Neil, 2E1ASZ, 0438 350882.
WELWYN-HATFIELD ARC - 6, Annual General Meeting; 20, Christmas Get Together. Details 0920 462241.
VERULAM ARC - 14, Annual General Meeting. Details 0923 262180.

HUMBERSIDE

GOOLE R & ES - 3, "HF On Air" Night, hosted by Ken, G6YYN; 10, Festive Junk Sale; 17, Quiz Night; 27, "Video" look back at 1993, hosted by Jim, 2E1BHL. Details 0405 769130.
GRIMSBY ARS - 9, Christmas Party; 23 & 30, Club closed. Details 0472 825899.
NORTH FERRIBY ARS - 3, Night on Air; 10, "Amateur TV" by Clive, G8EQZ; 17, Christmas Social; 24 & 31, No Meeting. Details 0482 650410.

ISLE OF MAN

ISLE OF MAN ARS - 6, Annual General Meeting. Club meets every Monday at 8.30pm at The Royal Naval Assoc, Regent Street, Douglas. Details 0624 823415.

KENT

DARENTH VALLEY RS - 8, Christmas Dinner. Details 0474 703322.
DOVER RC - *** Formerly the SOUTH EAST KENT (YMCA) ARC*** - 1, Novice Evening; 8, Surprise Talk; 15, Christmas Social. Clubs New Venue:- The Duke of Yorks School for Boys, Dover, Kent. Postal address:- The Dover Radio Club, PO Box 73, Dover CT16 2FD. Details 0304 825030.
MAIDSTONE YMCA ARS - 17, Christmas Social; 24 & 31, CLUB CLOSED. Details 0622 670936.
MEDWAY AR & TS - 17, Christmas Social; 24& 31, Club closed. Details 0634 710023.
SEVENOAKS & DARS - 6, Annual General Meeting and Social. Details The Secretary, S&DARS, c/o Sevenoaks District Council, Council Offices, Argyle Road, Sevenoaks, TN13 1HG.

LANCASHIRE

BURY RS - 14, Annual General Meeting; 22, Ragchew & Christmas preparations. Details 0204 883212.
FYLDE ARS - 9, Christmas Supper & Social evening. Details G7CUL, QTHR.
HESKETH ARC - 10, Christmas Dinner. Details 0704 63344.
NORTH SEFTON ARC - Club meets 2nd Wednesday of each month. Details G1DFT on 0704 579017.
ROCHDALE & DARS - 20, Christmas Talk. Club meets every Monday at 8pm. Details 0706 32502 or 061 653 8316.
THORNTON CLEVELEYS ARS - 6, Discussion "TCARS Silver Jubilee"; 13, Informal evening; 20, Christmas party. Details from G4BFH, QTHR.

LEICESTERSHIRE

CHARNWOOD ARCC - 5, Review of Years Contests; 19, Christmas Meeting; 26, Club Net. Details 0509 232927.

LINCOLNSHIRE

GRANTHAM RC - 7, Christmas Dinner; 21, Wine & cheese night. Details 0476 65743.
SPALDING & DARS - 4, Club Dinner, Springfields Restaurant; 12(Sun), Christmas Social Junk Sale & auction at Spalding Common Cummunity Centre at 10.00am; Jan 14, AGM. Details 0775 750382.

MERSEYSIDE

LIVERPOOL & DARS - 7, Quiz; 14, Club on Air; 21, Christmas Party; 28, Open night. ***New Secretary*** D Dean, 24 Hathaway Road, Gateacre, Liverpool LS5 4JT.
WIRRAL DARC - 8, Talk; 22, Chairmans Night - this years Chairmans surprise Talk. Club meets every Wednesday. Details 051 648 5892.

MID GLAMORGAN

RHONDDA ARS - 4, Christmas Dinner + dance. Details GW4BUZ 0443 432542.

NORFOLK

FAKENHAM ARC - 7, Christmas Party bring the Family for a social evening; 24, Christmas Eve nets, GX4LSF 3.72Mhz +/-QRM at 19.30GMT, 145.375Mhz at 23.30GMT. Club meets on the 1st Tuesday of every month, Trinity Church room, Hempton. Details 0485 528633.
KINGS LYNN ARC - 2, Lecture "The Novice Licence" by G0FLP & 2E1AXZ. All welcome; 16, Christmas Social evening, XYLs especially welcome. New members welcome. 0553 765614.
NORFOLK ARC - 1, Night on Air; 8, Voice Pitch control by Ted, G3CWC; 15, Christmas Party; 22 & 29 NO MEETING. Details 0603 618810.
YARMOUTH RC- 2, Development of TV technology, G3YYQ; 9, informal; 16, Sherry & Pies Evening; 23 & 30, No Meetings. Details 0493 721173.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 2, Night on Air; 9, Annual Quiz Night; 16, Christmas Social evening; 23 & 30, Club Closed. Details 0602 501733.
MANSFIELD ARS - 13, Christmas Social Evening. Details from Mary, G0NZA on 0623 755288.
SOUTH NOTTS ARC - 3, Construction & On Air; 10, Visit to Nunsfield House ARC; 17, Club Christmas Dinner; 24, NO MEETING; 25, 12-noon, Christmas Day net on S21; 31, NO MEETING. Details from Julie, G0SOU on 0602 216342.

NORTH YORKSHIRE

HAMBLETON ARS - 2, RAE Course; 9, Practical/Ops night. Details 0609 776608.

OXFORDSHIRE

OXFORD & DARS - Club meets on the 2nd & 4th Wednesdays of the month. Details 0865 863526.
VALE OF WHITE HORSE ARS - 7, Christmas Dinner. Details 0235 531559.

POWYS

POWYS ARC - 9, Construction Contest(lots of entries please); 19(Sunday), Christmas Fox Hunt, start Car Park, Back Lane, Newtown at 2pm. GW0RJV is the Fox. Details GW3JSW, QTHR.

SHROPSHIRE

SALOP ARS - 2, Dinner at "Beacon" Copthorne; 9, Construction competition, Terry, G8DIQ will be on hand to give advise and guidance. Details 0743 361935.
TELFORD & DARS - 1, Club station on Air; 8, Talk "Surface Mount components" by G7KZB; 15, Morse night; 22, Christmas Festivities; 29, Tuning up Transmitters. Details 0952 588878.

SOMERSET

WEST SOMERSET ARC - 7, Videos including Japanese Amateur Satellites. Details G4AJU, QTHR.
WINCANTON ARC - 6, Talk "Slow Scan TV" by G3UGR; 20, Open Evening - discussion and activation of club station. Details 0963 34360 or 0747 51381.
YEOVIL ARC - 2, Talk "GB3YS UHF Repeater" by G0LHX; 9, Talk "Quartz Crystals" by G3USC; 16, "Club Station On Air" evening; 23, Mince Pies and Goodwill on the Air; 30, tba. Details 0258 473845.

SOUTH GLAMORGAN

CARDIFF RSGB G - 13, Annual Christmas Dinner(Pantmawr Inn). Details 0446 773212.

SOUTH YORKSHIRE

BARNSLEY & DARC - Club now moved to:- The "Three Horseshoes" at Barnsley Road, Brierley, nr Barnsley S72 9JT. Details from the Secretary: Mr J P Caledon-Scott, Flat 1, 165 Dodworth Road, Barnsley S70 6HW.
SHEFFIELD ARC - 6, Talk "All I want for Christmas" by David, G0JJR; 13, Christmas Dinner; 20, The Christmas Toast to the Club; 27, Bank Holiday ***NO CLUB MEETING****. Details 0742 446282.

STAFFORDSHIRE

CANNOCK CHASE ARS - 2, Lecture "Some Military Aspects of VHF Communication". Details 0543 262495.

SUFFOLK

FELIXSTOWE & DARS - 5, (Sunday) Fixed & AFS Contest; 20, Social Video Night. Detail 0394 273507.
IPSWICH RC - 1, Talk "Tuning a Vertical Antenna" by G0OZS & G0JVT; 15, Quiz: Ipswich vs Stowmarket; 29, No Meeting. 0473 742072.

SURREY

DORKING & DRS - 21, Special Christmas meeting, surprise evening with refreshments. Details 0306 631236.

TAYSIDE

DUNDEE ARC - 7, Construction Night; 14, Lectures "Medical Imaging" by Paul, GM0CQL and "Magnetic Resonance Imaging" by Dr Nimmo, GM8JVZ; 21, Construction Night; 28, Holiday. Details from GM4FSB, QTHR.

TYNE & WEAR

TYNESIDE ARS - Club meets on Wednesdays at 7.30pm, St Teresa's Club, 200b Heaton Road. A new Morse tution class will commence at the first meeting in January 94. Non-members are very welcome to take part. Details from Stuart, G0BEV 091 281 0999.

WARWICKSHIRE

COVENTRY ARS - Club meets every Friday at 8pm at Baden Powell House, 121 St Nicholas St, Radford, Coventry. Visitors are always welcome. Details 0203 311468.
MID-WARWICKSHIRE ARS - 14, Christmas meeting; 28, No Meeting. Details 0926 424465.
STRATFORD UPON AVON & DARS - 13, Talk "How to get started on Satellites and work the world on VHF/UHF" by John, G7HIA; 25, "Morning on the Air" 11.00am on 145.275Mhz; 27, ***NO MEETING***. Details 0608 682495.

WEST GLAMORGAN

SWANSEA ARS - 2, Annual General Meeting; 16, Annual Christmas Quiz. Details 0792 403527.

WEST MIDLANDS

RS of BLOXWICH - 13, Christmas Social and Annual Awards evening. Details 0922 683877.
SOUTH BIRMINGHAM RS - 10(Friday), Christmas Party. Details 021 474 3784.
SOLIHULL ARS - 16, Christmas Party. Details 021 777 9965(eve).
STOURBRIDGE & DARS - 6, On Air; 20, 'Packet Radio'. Details 0384 374354.

WEST SUSSEX

HORSHAM ARC - 2, Annual General Meeting. Details 0737 842150.

WEST YORKSHIRE

DENBY DALE ARS - 1, Constructors Competition; 17, Christmas Party evening. Details 0484 429238.
HALIFAX & DARS - 21, Christmas Social. Details 0422 202306.
KEIGHLEY ARS - 2, Night on the Air; 9, Discussion evening; 16, Christmas Buffet. Details 0274 496222.
SPEN VALLEY ARS - 2, Talk by Gerald, G3SDY; 16, RAF ARS by G0JKW. Details 0532 534437.

WILTSHIRE

CHIPPENHAM & DARC - 21, Back to Basics, bring your cans and pieces of string? Details 0225 743352.
TROWBRIDGE & DARC - 1, Christmas Party & 10th birthday celebration; 15, Farewell 93; Jan 19, AGM. Details 0225 864698 (evenings).

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

4 DECEMBER

RSGB ANNUAL MEETING, Manchester Conference Centre, UMIST, Manchester.

5 DECEMBER

LEEDS & DARS (Pudsey Rally). **CHANGE of VENUE**: now Allerton High School, Kings Lane, Leeds 17. Details 0532 552344 or FAX 0532 393856.

12 DECEMBER

CENTRE OF ENGLAND CHRISTMAS Radio, Satellite Computer & Electronics Rally - ***NEW VENUE*** Sports Connexion Centre, Leamington Road, Ryton. On Dunsmore Coventry A45/A423. Doors open 11.00am. Admission £1 (Concessions for RAIBC members & Senior Citizens). Disabled visitors through side door from 10.30am. Bar and hot food served all day. Talk-in on S22. Details from Frank, G4UMF on 0952 598173.

23 JANUARY 1994

OLDHAM ARC Radio Rally - Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open 11.00am, 10.30 for disabled. Features many traders and a bring & buy. Refreshments available from 11.30am. Morse Test available on application, bring two passport photos. Talk-in on S22 via GB4ORC starting at 7.30am. This year will features a Mobile Contact prize for operators on the way to the rally. Details from Kathy, G4ZEP, QTHR or Tel: 061 652 8617 home or 061 633 0550 work.

30 JANUARY

THE 4th LANCASTRIAN Rally - University of Lancaster, Lancaster. Doors open 11.00am, 10.30am for disabled visitors. Trade stands, bring & buy. Ample car parking. Admission £1, children under 14 accompanied by an adult admitted free. Details from G1OHH on 0524 64239.

6 FEBRUARY

SOUTH ESSEX ARS Radio Rally - The Paddocks, Long Road, (A130), Canvey Island, Essex. Doors open 10.00am. Features trade stands, bring and buy and home made refreshments. Free parking with space outside main doors for disabled visitors. Talk-in on S22. Admission 75p. Details from Ken, G0BBN, 0268 755350.

13 FEBRUARY

CAMBRIDGE & DARC Radio and Computer Rally - Addenbrookes Hospital Ambulance Station, Cambridge. (Easy access from M11 & A604.) Doors open 10.30am. All the usual attractions. Trader bookings and information from George, G0OEL on 0954 719273.
NORTHERN CROSS RALLY - Rodillian School, on the A61 between Leeds and Wakefield, near junction M1/M62. Doors open 11.00am, 10.30 disabled and bring & buy. Usual trade stands, bring & buy. Morse Tests on demand, bring two passport-type photographs. Bar and refreshments, ample parking. Talk-in S22. Details Dave on 0532 827883.

20 FEBRUARY

RSGB VHF Convention - Sandown Park Exhibition Centre. Details from Les Hawkyard, G5HD, 0409 281342. (See page 73)
TRAFFORD Rally - G-MEX Manchester. Details 061 748 9804.

26 FEBRUARY

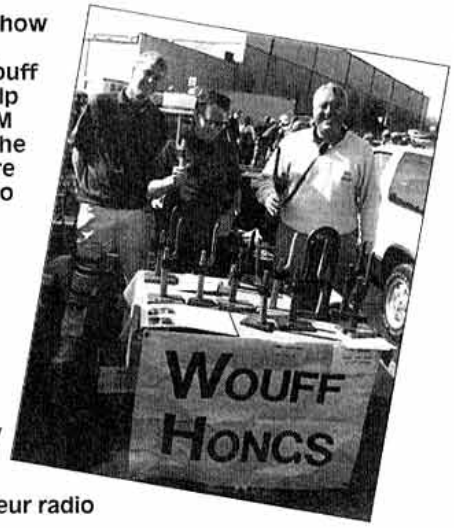
9th RAINHAM Radio Rally - ***NEW VENUE*** Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent. (From M2, jcn 4 take A278 or A2 from Rainham, well signposted, follow the RRR arrows). New venue more space,

The perfect Christmas present!

Come Fly With Practical Wireless to the 1994 Dayton HamVention!

Find out just how the famous American 'Wouff Hong' can help eliminate QRM and QRN on the bands. They're guaranteed to work!

And, by travelling to the HamVention you too can really get down to finding many bargains in the world's largest amateur radio flea market.



Join the **Practical Wireless** party, led by Editor Rob Mannion G3XFD when we fly out from Gatwick on a scheduled Delta Airlines flight on Monday April 25 1994 direct to Cincinatti. From there our private coach will take us direct to the Holiday Inn in Dayton.

We'll be staying for a week, and there'll be several day trips by coach, including a day at the amazing United States Air Force Museum just outside Dayton. There's lots for the whole family to do, and if you're keen on shopping.....make sure you bring an extra luggage trolley!

Book your seat on the **PW** HamVention holiday for only £630 per person sharing a twin-bedded room. Single rooms are available at a further cost of £205. The price includes return flight, meals on the aircraft, transfer, seven nights Hotel accommodation, two day excursions by coach and admission ticket to the HamVention.

The **PW** party returns home on Monday May 2, arriving at Gatwick on the morning of May 3. See the largest amateur radio gathering in the world, come fly with **Practical Wireless** to Dayton HamVention 1994!

Although Rob Mannion G3XFD is leading the party, the complete holiday is being organised by the Bristol based professional tour operator RCT International. Annette Oxley at RCT is waiting for your enquiry and will send you a full itinerary and booking form. Don't delay, send away today and fly with **PW** to the greatest amateur radio adventure of 1994!

I am interested in joining the **Practical Wireless** 1994 Dayton HamVention Holiday, please send me further details.

Name: _____

Address: _____

_____

_____

How many seats required: _____

To Annette Oxley
Practical Wireless
1994 HamVention Holiday
RCT International
44 College Green
Bristol BS1 5SH
Tel. (0272) 230933,
Fax (0272) 226912

EVENTS DIARY

more traders, ample parking, bring & buy, refreshments and snack area with tables and chairs. All on one level, easy access for disabled. Admission £1, children under 16 free. Talk-in on S22 via GB4RRR. Further information from G7JBO 0634 365980 any reasonable time.
TYNESIDE ARS 8th Annual Rally - The Temple Park Centre, John Reid Road, South Shields. Accessable from the A1, A19 both north and south and A69 from west. Doors open 11.00am, 10.30 disabled visitors. Features the usual trade stands, bring & buy stall. Comprehensive catering and leisure facilities at the centre. Ample car parking. Talk in on S22. Details Jack, G0DZG on 091 265 1718.

27 FEBRUARY

7th TAW & TORRIDGE Rally - Details from Mike, G3PGA, QTHR.

12/13 MARCH

LONDON AR & Computer Show - Picketts Lock Centre. Details 0923 893929.

13 MARCH

WYTHALL Radio Club Rally - Details G0EYO on 021 430 7267.

20 MARCH

NORBRECK AR Electronics & Computing Exhibition - Details G6CGF on 051 630 5790.
TIVERTON SOUTHWEST ARS Rally - Trader details from G6SMG 0884 257009.

27 MARCH

BOURNEMOUTH RS 7th Annual Sale - Details 0202 886887.
MAGNUM Rally - Magnum Leisure Centre, Irvine. Details GM0DEQ 0563 40048.
PONTEFRACT & DIST ARS - Spring Rally & Components Fair. Details G0NQE 0977 677006

3 APRIL

LAUNCESTON 8th AR Rally - Details 0409 221624 or 0566 775167.
28th WHITE ROSE ARS Rally - Details G7ELS on 0850 690189.

4 APRIL

CENTRE OF ENGLAND Rally - Details 0952 598173.

10 APRIL

SWANSEA ARS Rally - Details 0792 404422.

17 APRIL

BURY RS Radio Rally - Details 061 762 9308.
MARSKE-BY-THE-SEA Radio Rally - Details 0642 475671.

23/24 APRIL

IRISH R & T Society Dinner/AGM - Details Ken, EI4DW, QTHR or Tel: 010 353 74 31109.

1 MAY

BRITISH AMATEUR TELEVISION CLUB (BATC) Rally. ***NEW VENUE*** The Sports Connextion, Leamington Road, Ryton-on-Dunsmore, Coventry. Details Tel: 0788 890365.

2 MAY(MONDAY)

MID-CHESHIRE ARS Rally - Details G4XUV on 0606 77787.

8 MAY

MARS/DRAYTON Mobile Radio Rally - Details G6DRN on 021 443 1189.
10th YEOVIL QRP Convention - Details G3CQR, QTHR. Tel: 0935 813054.

29 MAY

EAST ANGLIAN Radio & Computer Rally (ESWR) - Ipswich, Suffolk. Details 0394 271257.

12 JUNE

The 25th ELVASTON CASTLE Radio Rally - near Derby. Details G3OCA, 0332 662818. Trader enquiries to G1ZLQ, 0332 662896.
ROYAL NAVAL ARS Annual Mobile Rally - HMS Collingwood, Fareham. Details Clive, G3YTQ 0705 332762l(daytime) 0329 234143(eve).

19 JUNE

DENBY DALE & DARS Annual Mobile Rally - Details 0484 644827.
NEWBURY Boot Sale - Details on 0635 863310

2/3 JULY

HAMFEST-UK - Stafford. 0923 893929.

9 JULY

CORNISH Rally - 0872 222605.

10 JULY

SUSSEX AR and Computer Fair - Details G8VEH, QTHR Tel: 0903 763978

24 JULY

COLCHESTER Radio & Computer Rally - Details Frank, G3FIJ, QTHR 0206 851189.

28/31 JULY(THURSDAY-SUNDAY)

AMSAT-UK Colloquium - The University of Surrey, Guildford. Details G3AAJ 081 989 6741.

7 AUGUST

RSGB WOBURN Rally - Details from Norman Miller, G3MVV, 0277 225563.

29 AUGUST(MONDAY)

SCARBOROUGH AR Electronics and Computer Fair - Details Ross, G4ZNZ.

4 SEPTEMBER

BRISTOL Radio Rally - Details G4YZR 0275 834282.
PRESTON Amateur Radio Society Rally - Details George 0772 718175.
TELFORD Radio Rally - Details 0743 249943.
VANGE Amateur Radio Society Rally - Details Doris Tel: 0268 552606.

25 SEPTEMBER

THE THREE COUNTIES Rally - 0905 773181.

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

G0LVM	Mr J B Kershaw	19.05.93
G0DMZ	Mr G Bowes-Cavanagh	30.08.93
G0HAO	Mr F W Seymour	May 93
G0LAJ	Mr S McGrath	
G0PII	Mr J R Wright	06.07.93
G0RXD	Mr T A Sansbury	
G1EJU	Mr R S Card	23.09.93
G1YKJ	Mr C Neale	05.08.93
G2AGY	Mr R J Ager	02.08.93
G2MI	Mr Arthur Milne	06.10.93
G3ANM	Mr G Wegg	07.08.93
G3BDS	Mr K Whithorn	
G3DHH	Mr A E R Hodges	25.02.93
G3GCB	Prof J D H Alexander	
G3HKP	Rev T G R Hughes	
G3KJU	Mr G E Grimmer	
G3MAA	Mr E Pearson	15.09.93
G3MBA	Mr L S West	25.08.93
G3PER	Mr W E Delamere	13.09.93
G3TWR	Mr N Barnes	05.09.93
G3VNJ	Mr C H Fowler	
G3VPM	Major J Morris	05.09.93
G4CQD	Mr G Strangward	20.09.93
G4ESS	Mr W A Mackay	15.08.93
G4FYN	Mr J B Rayner	12.08.93
G4SNB	Mr T L Tansey	
G4TLI	Mr T Holden	
G4TRO	Dr B W Davy	
G4VXZ	Mr A Cotgrove	07.09.93
G6HZQ	Mr T O'Connor	27.05.93
G6KD	Mr K M Dunsford	13.04.93
G6VMS	Mr K Bright	
G7IKH	Mr W Murray	25.08.93
G7KGE	Mr D S Jack	
G8KI	Mr P C Mortimore, OBE	12.09.93
G8MAI	Mr D Fleet	
GI4LNJ	Mr S J Smyth	28.08.93
GM0HYA	Mr J Smith	
GM0RID	Mr V Wycisk	03.05.93
GM1GGP	Mr R Hadley	24.09.93
GM3HSB	Mr R I Coutts	
GM3HVN	Mr L Littlewood	
GM4TSI	Mr J B Martin	10.08.93
GM8LZF	Mr J A Carter	
GM8ZEH	Mr N J Shillington	10.08.93
GU8GGC	Mr G G Carter	18.08.93
GW0EWG	Mr G O Williams	01.05.93
GW4LTO	Mr P Neal	10.07.93
GW5YB	Mr R Ashton	
OE1MBB	Mr Markus Bayer	10.09.93
RS19618	Mr W Yeomans	09.09.93
RS87503	Mr D Martin	
RS91362	Mr R C B Currie	
RS94066	Mr J E Woodgate	
RS94877	Mr J J Ryan	07.07.93
VE2CT	Mr C G Turcot	30.04.93
VE3AML	Mr R Beardow	13.08.93
VE3THC	Mr H Caudrey	24.03.93

GB CALLS

The list below shows all special event stations licensed for operation during this month. It was taken from the HQ computer on 10 November. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

NOV 4	
GB0AGC	Armagh Golf Club Centenary
NOV 12	
GB5HQ	RSGB HQ Station
DEC 1	
GB0AGM	RSGB AGM 1993
DEC 3	
GB6ASC	All Souls Christmas
DEC 4	
GB8SR	Solihull Radio 25th Annv
DEC 11	
GB4DX	'DX'
DEC 12	
GB0COE	Centre of England Rally
DEC 18	
GB4RN	Royal Navy
DEC 26	
GB0VLP	Very Low Power

Arthur Oswald Milne, G2MI

ARTHUR DIED ON 6 October, 1993, after a long struggle against myelodysplastic anaemia and leukaemia.

He was born in Croydon, Surrey, on 25 August, 1907, and was educated at Dulwich and Ramsgate. His interest in radio was started by a visit to a schoolfriend's house to "see my brother's electrics". He was licensed in 1924, using equipment given to him by Dick Leeves, G2LV, who, aged over 90, travelled from his home in South Molton to attend Arthur's funeral. His first contact was with G5QV all of seven miles across the Thames Estuary.

He started work with Post Office Telephones on the day the General Strike started, and remained with them until his retirement in 1968, as an Executive Engineer in charge of programmes for Senior Staff from Overseas Administration. He wore his silver RSGB lapel badge with pride and found that most of his charges were themselves licensed amateurs. During World War II he was sent to remote PO radio stations in places like the Scilly Isles and Stornoway where his great knowledge of radio was used to maintain communication links with the armed forces in the air and at sea. He was also an early member of RSS, the 'secret listeners'.

Apart from two years in Harrogate, he was a Member of RSGB Council for more than 30 years, serving as Honorary Editor for many years. He was very proud to have written the editorial following the East Anglian floods which resulted in the founding of the RAYNET organisation. He also wrote 'Month On The Air' for the then *Bulletin*, continuing it as 'Month Off The Air' during the war. For many years he drew all the circuit diagrams and had many cartoons published.

Shortly after the outbreak of WW2 the RSGB Headquarters had to move out of Central London and the General Secretary, John Clarricoats, G6CL, said "Arthur you'll look after the QSL Bureau for a short time, won't you?" The "short time" lasted well over 40 years and the Bureau was run from his home in Bromley, Kent, with the invaluable assistance of his wife, Lucy. Between them they handled well over one million cards a year - the Post Office even gave him his own Post Code! When he finally relinquished the office, he received the Society's highest honour of Honorary Member. He always said that this, together with having been appointed President in 1954, gave him his greatest thrill in amateur radio.

He was also Secretary of Region I IARU from 1950 to 1959 and was responsible for setting up all the infrastructure of the Secretariat. He was an Honorary Member of over ten UK radio societies and of many overseas societies.

He held the Empire DX Certificate No 4 for all Telephony, DXCC for CW and Phone with 280 countries confirmed, BERU, was awarded the ROTAB Cup and the Calcutta Key, was a Member of A1 Ops Club, RAOTA, RAIBC and many others. He was responsible for setting in motion the processes which resulted in each of the Channel Islands obtaining their own prefixes and claimed to have coined the word 'transceiver'. He was always a very keen /M operator and even operated /P from his hospital bed. His voice will be missed mostly on Sunday mornings where he was the Senior RSGB News Reader and read the GB2RS News Bulletin on 1710 occasions.

Apart from amateur radio, he was an expert on lepidoptera, church architecture, steam railway engines, trams and airships.

His callsign was honoured all over the world and ensured an open door to him and his family in the most unlikely places. His death brings to an end a rare, if not unique, situation, where three generations of the same family - father, G2MI, son, G3UMI and grandson, G6VMI - all held amateur licences.

73 and 88, RIP Dad

Geoffrey Milne, G3UMI.

The LAST WORD

POSITIVE NOT NEGATIVE

"Packet is the death knell of 2m" (*The Last Word*, Oct) is, to say the least, a rather broad sweeping statement. Of course, it has had some effect on the bands as any new mode would, but to dismiss it as being *the* cause of a supposed demise is somewhat rash.

Your correspondent, Mr Knight, G4NVD, compounds his biased opinion that microphone operation on two metres has suffered because of packet radio by then stating that it is not a chat mode, whilst RTTY and AMTOR are. Quite right, but then they don't involve a microphone either, so just what is this argument about? Is it perhaps another example of the consummate ease with which many people are prepared to condemn something they either don't like or understand, or are not interested in?

One evening shortly after the letter was published in *Radcom*, I heard a local amateur also blaming packet for a "lack of activity on two", so I had a quick listen around the band. Granted there was not much activity below 144.5MHz, but all the repeaters I can normally receive were in action, and all FM simplex channels were occupied; one with Morse tuition, the rest with assorted discussions. In the All Modes section, I was able to hear more chat and Morse tuition, Amateur Television talkback, fax transmissions, and packet on two of its three frequencies.

This was active amateurs doing what *they* wanted to do with their hobby, which is not bad when one considers current circumstances. Ever increasing competition for our leisure time from such as computer games, satellite television, home videos and so on, and a recession limiting most people's resources, have combined to provide formidable opposition for our time and funds.

I wonder if anyone else has noticed that the aspects of our hobby that do create regular activity on the bands seem to come in for the most criticism or derision - Raynet, contests, packet and local nets. Perhaps the moaners should look a little closer to home. Maybe their constant carping about often imagined problems is what restricts the number of contacts they make. There are some old song lyrics that include a suggestion to "accentuate the positive, eliminate the negative". Perhaps we could use that to sing the praises of our hobby instead of running it down all the time.

Keith Johnson G1POW
Secretary, Maltby & District ARS (G4SKM)

TRUE VALUES

For several years I have participated in the annual Jamboree on the Air (JOTA). This year our operation was confined to a single day, giving me the additional opportunity to take part in the event from home.

Apart from the very enjoyable contacts which I made I found the experience of tuning across the amateur bands during the JOTA weekend interesting and genuinely exciting. Our frequencies were full of young people exchanging information as diverse as the local weather, their pets, their hobbies, football results and detailed descriptions of other Scouting activities worldwide. I heard groups talking to their friends in adjacent towns, contacts linking European countries, and even contacts between Scout and Guide groups in different continents.

It is a commonly held view that JOTA is an ideal way to introduce youngsters to amateur radio. This, of course, is true, but the *real* success of JOTA is the way in which true Scouting values are displayed by so many people being brought together in this unique way, crossing all traditional barriers of culture, creed and wealth.

JOTA would not be possible without the dedication and commitment of so many individual radio amateurs. We need to acknowledge their contribution and hope that, for the sake of the Scouts and Guides who take part, amateurs will continue to support this event for many years to come.

Malcolm Bell G4CXT
Scout Leader, 1st Martlesham Scout Troop, GB0FMS

MAKES YOU THINK

This is just a note to say "thank you" for some of the recent technical features in *RadCom*, like 'Spread Spectrum' (August/September) and 'The Shape of Bits to Come' (September/October).

I can't pretend to understand *everything* in every article (especially some of the higher mathematics!), but at least the articles make me *think*, and so are greatly appreciated.

B Harris G3GTF

BURY DOWN UNDER

Earlier this year I decided to return to contest operating from which I received immense enjoyment; the challenge, equipment, aerials etc. CW NFD seemed the appropriate challenge and whilst preparing for the event, being a last-minute entry, I was most pleased to read the article by Hilary Claytonsmith, G4JKS, on a retrospective view of HF Field Day (*RadCom*, June).

In the article was a paragraph on NFD 1936 from the Bury area by ZL1AH (ex G3AH). Being the organiser, and a member, for the Bury Radio Society NFD entry it intrigued me. So after the event I wrote to John, ZL1AH, and was very pleasantly surprised and delighted to receive a wonderful reply. Besides the early NFD history of our area he sent me QSL cards of members, some of whom are no longer with us. Included in the mail were copies of photographs from that era.

I have continued to correspond with John, each time receiving more interesting information on the development of amateur radio and NFD in the Greater Manchester area.

The article rekindled the light and memories of the many past wonderful years of NFD. The progress, whilst still retaining the required skills, is still very much the challenge that it has always been. Whilst we might not have won our category this year, who knows about the future except to say I for one am delighted to see that NFD (CW) is still the event it was in 1936.

May I thank Hilary for her excellent article which has given the members of our radio club and myself a delightful friendship with a radio amateur from across the world.

Keith Kahn G3RTU

SONG OF PRAISE

I think that some praise should be sung for a group of radio amateurs who do sterling work for the RSGB and also give outstanding service to other fellow amateurs. We are honoured to have one such amateur as a member of our club, the Liverpool and District Amateur Radio Society.

Eddie Fox, G3AVJ, reads the *GB2RS* news every Sunday and also does an outstanding service with *GB2CW* Morse Practice four nights a week at 45 minutes each night. I might add that this is an outstanding service for amateurs and Short wave listeners who want to learn Morse code.

Jim Anderson G0TDK
Chairman, Liverpool & DARS

[Here, here! The GB2RS *and* GB2CW *broadcasters are frequently unsung heroes who provide a most valuable service on the Society's behalf - Ed]*

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.

PROTON FLARES DUNNIT

I think that GM0DLZ (*The Last Word*, October) is somewhat confused. If he thinks we have only recently passed the sunspot peak, then clearly he is incorrect. The peak of the present cycle, Number 22, was in July 1989 with a smoothed count of 158.5 and in fact DX propagation was very good at the time as expected. However, it has declined very rapidly since, as I have repeatedly reported on the *GB2RS* news service. In more recent times, HF band conditions have been well down as we would expect with a rapid spot decline.

As to the Ozone layer, this is well below the ionosphere, being about 55km high at the highest level and extending down to around 20km, so we would not expect it to have any effect. The hole was first detected in the 1980s by instruments on NASA's Nimbus 7 satellite, and has been under observation ever since.

One point that seems to have been overlooked by the media is the fact that large Proton Flares deplete the Ozone layer more than anything else. In one flare on 4 August 1972, 16% was knocked out overnight and we are getting more of these events now than previously. So far in cycle 22 we have had 70 such events, this is more than any previous cycle by almost double. If there is any radio effect, and there is no evidence of any to my knowledge, I would expect it to be beneficial to HF DX, as removing this layer would remove any absorption that might possibly occur due to it, even though it would be extremely slight. Of course, what it is doing to the DX operators themselves is another matter.

Charlie Newton G2FKZ
Chairman RSGB Propagation Studies Committee

POOR FORECAST

The poor HF conditions referred to in the letter from GM0DLZ (*The Last Word*, October) seem to be considerably worse up here compared to further south and on several occasions complete blackouts were experienced, including the LF bands.

One thing is certain, however, the monthly HF propagation predictions over the last couple of months at least have been sadly awry. Ten metres, for example, has been shown for September and October as capable of producing signals from practically all areas, including USA. In practice, over the past few months, it is rare to hear any signals DX or short skip on this band, and fifteen metres is not at all good and far short of the predictions.Would it not be a better idea to replace these charts with a forecast in English which would, in any case, take up much less space in *RadCom* and be more comprehensible?

J M Robson GM3CFS

[What do other members think? - Ed]

MR QSL

I was saddened to read of the passing of Arthur Milne, G2MI. Arthur was one of the pillars of Amateur Radio. His greatest contribution perhaps, was that for many years, he *was* the RSGB QSL bureau.

I recall writing to him from Turkey in 1954 where I was working for International Aeradio, and telling him I was to be posted to The Gambia, West Africa. He replied, "Your QSL will be in great demand, past activity from The Gambia has been very limited!" How right he was.

I wrote again from The Gambia on obtaining my licence and borrowing a rig, and Arthur suggested I send him cards in batches carefully numbered to detect any loss in transit, if possible, by hand. For the next four-and-a-half years I did just that. The bureau handled over 10,000 incoming cards from ZD3BFC (now C5) in batches always hand-carried to UK.

It may not be generally known that stamps from incoming cards at the RSGB Bureau were removed and donated to charity. *[Readers will be pleased to hear that this is still the case - Ed]*

Bill Wheeler G3BFC et al

[Details of Arthur's contribution to the history of the RSGB QSL Bureau will appear in next month's QSL *column, See over - Ed]*

CALLSIGN LIST

Would it be possible please for you to publish in *Radio Communication* an up to date list of callsigns and their related countries? I feel sure it would be well appreciated by Novice and experienced licensed radio amateurs, and short wave listeners.

E Chicken MBE G3BIK

[A list is published in each edition of the RSGB Call Book, together with space to tick off countries worked on each of the nine HF bands - Ed]

RSGB BOOK CASE

PRICES NO LONGER INCLUDE POST AND PACKING

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A collection of antenna articles with something for everyone. 175 pages. **(£10.25) £8.72**

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ADVERTISERS INDEX

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The display advertisement copy date for our February 1994 issue will be 1st December, 1993

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2-m/70-cm Mobiles

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  2m Amateur Band
  FT-7200:
  70cm Amateur Band
- 50 Memory Channels
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- Remote Operation w/ Optional MW-2
- Optional Digital Voice Storage System
- Backlit DTMF Mic
- **Accessories:**

FTS-27	CTCSS Decode Unit
DVS-3	Digital Voice System Unit
MW-2	Remote Control/ Wireless Mic
SP-7	External Speaker

"The FT-2200 answers my problem! It fits anywhere, and the 3 power levels are great!"

"Yaesu did it again!"

"I like the FT-2400H!"

"Rugged performance is my answer!"

FT-2400/7400H
2-m/70-cm Mobiles

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  2m Amateur Band
  FT-7400H:
  70cm Amateur Band
- Rugged Mil-Spec Design
- Advanced Track Tuning (ATT)
- 31 Memory Channels
- Selectable Alpha-Numeric Display
- Largest 2-Meter Display Available
- CTCSS Encode Built-In
- Power Output 50/25/5 Watts
- Flip Up Front Control Panel Hides Seldom Used Buttons
- Backlit DTMF Mic
- **Accessories:**

FTS-17A	CTCSS Decode Unit
FRG-6	DTMF Paging Unit
SP-4	External Speaker
FP-700	Power Supply

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Features, performance, reliability – ready to go anyplace. See your dealer for *this* answer to your 2-m needs.

NEW

Yaesu answers your 2-m mobile needs.

YAESU

Performance without compromise.℠

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