# RadCom

THE RADIO SOCIETY OF GREAT BRITAIN MEMBERS' MAGAZINE. WWW.RSGB.ORG

OCTOBER 2011
VOLUME 87
NUMBER 10
£4.75


## Biggest Radio Communication Handbook yet!

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One-man Commonwealth Contest DXpedition

### VLF Experiments
8.97kHz Earth mode gear to build

### PicoKeyer Plus
Tiny kit-based Morse keyer reviewed

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**UX-9100** 23cms **£599**. **UT-121** D-Star board **£129.95**. **FL-430/1** Roofing filters **£52.95**.

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**Take a closer look!**

This HF-6m transceiver is the successor to the IC-756 series. It takes features from the flagship IC-7800 and the more recent IC-7700, putting them into a package that brings the price within reach of many more hams. The central display is pure joy with its easy to read & informative screen.

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| | | |
|---|---|---|
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^IC-E80D

| | | |
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**AD-1** Rig adaptor leads £22.95 C

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**Pro-Set-6 Elite IC** £189.95 C
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**HF-6V** 80,40,30,20,15,10m self support 7.9m **£399.95 D**
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* 600W max above 30MHz * 2x SO-239

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* 140 - 525MHz * 0 - 30 / 300 / 600W
* 2x SO-239

**WCN-600** £89.95 C
** 1.8 - 525MHz * 0 - 30 / 300 / 3000W*
** 600W max above 30MHz * 2x SO-239*

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**Carriage Charges: A=£4, B=£5, C=£8.50, D=£11**

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| FT-DX5000MP | Adds above + 300Hz Roofing Filter | £5369.95 D |

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*"When I switch my FT-2000 on I never cease to be amazed at what this radio offers in terms of value for money. I love the filtes and the variable IF - it always seems to be able to pull the weakest of signals out of the noise. For me it is both my DX machine and chat box - you guessed it, I love it."*

| | | |
|---|---|---|
| FT-2000 | 100W 160m - 6m | £2259.95 D |
| FT-2000D | 200W with AC PSU | £2899.95 D |

## The FTM-350E *SPECIAL OFFER!*

The 50W FTM-350E is a 2m/70cm transceiver from Yaesu with Bluetooth GPS APRS 50/50W. Dual Receive Mobile Radio APRS® and Bluetooth® .

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^ FT-1900E

^ FT-7900E

^ FT-8900R

| | | |
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| FT-1900E | 2m Mobile 65W | £129.95 D |
| FT-2900E | 2m Mobile 75W | £142.95 D |
| FT-7900E | 2m/70cm Dualband Mobile 50/45W | £239.95 D |
| FT-8800E | Dualband Mobile 50W / 30W | £343.95 D |
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| VX-6E | 2m/70cms handy, 5W Wideband Receive | £249.95 C |
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- *Head up compass display to the GPS Screen*

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# RadCom

THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

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Notices to readers concerning errors and omissions and advertisments can be found at www.rsgb.org/radcom/notices.

*RadCom* is published by the Radio Society of Great Britain as its official journal and is sent free and post paid to all members of the Society. **The November edition of *RadCom* is expected to arrive with most members by 24 October, although this can take up to a week longer in some cases; international deliveries can take longer still.**

All material in *RadCom* is subject to editing for length, clarity, style, punctuation, grammar, legality and taste. No responsibility can be assumed for the return of unsolicited material (if in doubt, call us first!)





Original concept, layout and design by Imotea Creative Mediadesign.
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The Radio Communication Handbook 11th Edition is more comprehensive than ever!

**Image:** Kim Meyern

Figure of Eight kit for 20m-10m – p16

## News and Reports



G2AS/P on the GHz Bands – p64

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Special offer on this Heil headset – p10

## RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

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# The New Generation

I write this just before the RSGB Board is due to consider the proposals from the Advisory Group about the future direction for the RSGB. I expect the November *RadCom* to carry details of the Board's response and plans. So whilst this work is underway, I'd like to take a few moments of your time to ask for your help on another matter. It concerns the future of the hobby that we all love so much.

How often do you hear an amateur station on the bands – perhaps one of the many DXpeditions or a leading contest operator – and think 'that's great operating'. Or hear an on-air discussion on some technical topic and think – 'I'd like to join in'. There are some 'stars' around who have trained themselves to use a crisp, welcoming and professional operating style on the bands.

Conversely, the 'Have your Say' mailbag has included many comments about poor operating standards. Some claim a link between this and the 'new' licensing structure that has been in place for nearly a decade. I don't subscribe to this.

Yes, I do believe that there is a problem of diminishing operating standards, but I can't find a causal link to the licensing structure. What I can find is plenty of evidence that we are bringing this problem on ourselves.

Think back to your early days in amateur radio. Who was your role model ? Our US colleagues call this an 'Elmer' – someone who coaches, offers advice and leads by example. Here in the UK we tend to use the word 'mentor'. We are short of mentors today. There are some outstanding examples (including amongst the better clubs) of heroes in this area. There are dedicated people around the country who work tirelessly to nurture and grow new radio amateurs. But, in general, mentors are becoming scarce. There are too many examples of those amongst us who sit back and complain, rather than do something to put things right.

Amateur radio has changed. Decades ago, the new generation of amateurs was drawn from ex-services men and women, many with good technical qualifications, and from those who had become fascinated with 'wireless' at school. Nowadays, our newcomers come from all walks of life, all drawn to the amateur licence because of the unique privileges it brings to experiment, learn, compete, develop and communicate by radio. Surely, amateur radio needs to be welcoming and supportive to all newcomers?

Amateur radio is often described as a 'broad church'. From those who enjoy microwave experimentation to those who rag-chew; from those who compete in contests to those who exploit digital modes; from those who work with amateur television to those whose joy is QRP; they all have equal rights to the amateur spectrum, and we must welcome them to our ranks. Amateur radio can be seen as a microcosm of today's society. Are we going to allow factional disputes to run rife, or should we say 'you are welcome on our bands, but please respect the basic ground rules of peaceful co-existence, mutual support and respect'.

Despite the examples of outstanding operating technique, how many times have we heard 'I won't have QSOs with a Foundation licensee'. How many times on web amateur radio newsgroups have we seen plain dumb and offensive language? How many times have we heard experienced amateurs criticising another amateur, instead of speaking to that person in a constructive and positive way? How many times do newcomers visit a club once, find an attitude of disinterest in them, and never return? How many times on a repeater is there abuse, perhaps in an attempt to stop use of the repeater by a particular person or group?

Don't these examples suggest that we need to place 'mentoring'and encouragement at the heart of everything we do?

The new Foundation licence syllabus (July 2011) includes a section on operating technique as one step to helping the situation. But this is not specifically a Foundation level issue – the problem exists at all levels and we've all heard it. The RSGB has endorsed the *DX Code of Conduct* (relevant to us all, even if we don't set out to work DX). Clubs play their part in encouraging good operating technique. But this is something we should all try to do.

I would suggest that, as individuals, many of us do not do enough. Perhaps it's because we are too busy, perhaps because "it's not our job" or perhaps because we can't see the importance of it.

Of course the responsibility for poor operating standards does not rest solely with the UK amateur. It's a global problem, has deep societal roots and is prevalent in countries that have not changed their licensing structure. But there is a lot of help we can and should be offering – leading by example.

**Don Beattie**
Acting General Manager

# Power Line Adapters

Those Members who have been keeping up to date with debate surrounding Power Line Adapters (PLAs) will know that the RSGB has been active in the standardisation committees developing Draft Standard EN50561-1 to regulate these devices.

The RSGB and a number of EMC specialist groups have been unhappy with progress and regard the Draft developed as providing inadequate protection to the HF spectrum. The Draft Standard was put out to vote and RSGB and IARU ensured that all European Member Societies were in a position to provide informed input to their National Standardisation Organisations prior to voting. In the UK a substantial number of members of the BSI committee (including RSGB) were opposed to the draft and the Committee abstained from supporting the draft standard.

The outcome of the vote in CENELEC (the European Standards Organisation involved) is that the Draft Standard has narrowly failed to secure the required level of support.

We are hoping that European Regulators and Standardisation Organisations will now recognise that there are serious difficulties with the direction that the proposed standard was taking and will embrace constructive discussions with spectrum users to reach a more acceptable way ahead. The RSGB and other EMC professionals are ready and able to help in these discussions.

# QSL Matters

**DESPATCHES.** Large 10kg boxes for Bulgaria, Croatia, Czech Republic, Netherlands, Serbia and Russia were packed during the month and Germany again tipped the scales with more than 20kg. Smaller packets and boxes were sent to a range of countries including, Albania, Colombia, Dominican Republic, Ivory Coast, Macau, Qatar and Thailand.

**ROYAL WEDDING AND ANNUAL SCOUT / GUIDE JAMBOREE.** We are beginning to see the first of the R cards, from the Royal Wedding coming in and going out to popular destinations and guess that many more will come in the next couple of years. The experiment of requesting a large, R on member's packages has proved very helpful to us. Thanks to those who have done this.

It made us think of the annual Jamboree on the Air which takes place on 15 and 16 October. It has long been a source of frustration world-wide that many Jamboree cards often receive replies after the Scouts or Guides have moved on. If active stations would like to write, JOTA on the back of their packets, this might help us. Please keep your young people busy by pre-sorting the QSL cards into prefix order and the UK cards into sub-groups. Clear handwriting please!

**SUB MANAGER CHANGES M6 & JERSEY.** Dr Andy Thomas, G8GNI who has given several years of valiant service to members as both the M6 and G4G sub manager is stepping down as a sub manager. All of his M6 responsibilities have been transferred to Roy Taylor, MORRV. Roy's details can be found on the members website and he is QTHR. Details of the new G4G manager will appear next month.

Jersey has a new sub manager, replacing Michael Brown, 2J0SZI, to whom the bureau extends its thanks. Mathieu Roche, MJ0ASP, (F5SHQ) himself a keen QSLer and operator is stepping into the hot seat. Jersey visitors are advised to visit his QRZ.com on how to collect cards for Jersey operation.

**FINALLY.** We are hoping to see as many of our 'regulars' and volunteers as possible at the National Hamfest this month. If you want to know more or have a query, stop by and say 'Hello'.

**CONTACTING US.** The RSGB QSL bureau operates a 24-hour message line for Members' QSL enquiries, 01422 359362. When calling, please leave contact details, a brief message and, if possible, an e-mail address. You can e-mail the RSGB QSL bureau at qsl@rsgb.org.uk, please put your callsign in the subject box.

# President 2012

A full report of the Board discussions on the Advisory Group proposals, which took place as RadCom went to press, will be included in the November issue.

However, under the RSGB Constitution (Memorandum and Articles), the Society needs to notify Members of the National Council's decision on President for 2012.

The Society is at a turning point in its affairs. It is facing the need for transformational change that will touch many parts of the Society's organisation and activities, in order to offer enhanced member services into the future and improve aspects of its day to day running.

The National Council has therefore decided that, in these turbulent times, a degree of continuity is appropriate in the choice of President for 2012 and has asked Dave Wilson, M0OBW to continue for a third year (as is permissible under the Constitution).

More details of the Board's deliberations will appear in the November RadCom.

## CONGRATULATIONS

**To the following members whom our records show as having reached 50, 60 or 70 years continuous membership of the RSGB.**

**70 years**

| | |
|---|---|
| Mr I T Haynes | AB4SW |

**60 years**

| | |
|---|---|
| Dr G R Sutherland | GM0UPE |
| Mr F Watson | G3HRE |
| Mr PC Hayward | G3JMX |
| Mr J Burgess | G3KKP |
| Mr T W Mitchell | G3LMX |

**50 years**

| | |
|---|---|
| Royal Signals ARS | G4RS |
| Mr C D Stephens | G3MGS |
| Mr B S Collins | G3MXA |
| Mr J J Morris | G3PHA |
| Dr R G Fenby | G3PLS |

# RSGB Board and Regional Vacancies

## Are you the right person to stand for election to the RSGB Board or Regional Council for 2012-2014?

Vacancies exist on the Board and on the Regional Council for the term 2012-2014 as follows: Board: three vacancies, Regional Council: seven vacancies.

**REGIONAL COUNCIL.** Regional Managers for Region 3, Region 6, Region 7, Region 10, Region 11, Region 12 and Region 13. Candidates for the Regional vacancies must be resident in the Region concerned, and be nominated by Corporate Members resident in that Region. All retiring Regional Managers are available for re-election.

**BOARD VACANCIES.** Whilst any member may seek nomination to stand for election to the Board, if you are an active amateur, have good experience of business management and the time to commit to a demanding role, your skills would be particularly valuable. The RSGB needs a strong Board and so candidates of the highest calibre are encouraged to put themselves forward.

**HOW TO APPLY.** If you wish to seek nomination please email GM.dept@rsgb.org.uk for the nomination papers. Completed nomination papers, with supporting signatures of ten RSGB Corporate Members (for a Board nomination) or five Corporate Members (for a Regional nomination), must reach RSGB Headquarters by **1 October** latest.

The list of candidates seeking nomination will be published in the November *RadCom* and a ballot held during that month.

# Band Plan changes

The official Final Plenary Recommendations from the recent Region 1 General Conference held in Sun City, South Africa are now available Region 1 website (www.iaru-r1.org). The 78 recommendations cover a wide range of subjects that will strengthen efforts to protect amateur allocations, develop new amateurs and accommodate growing activity and innovation. Some of those that affect our Band Plans will need to be carefully reviewed to see how the recommendations might apply within the UK. This will be led by our Spectrum Managers and Emerging Technologies Committee (ETCC) and discussed within the Spectrum Forum during the autumn with an aim of meeting the deadline for production of the February 2012 *RadCom*. Your views and thoughts on the Band Planning recommendations should be channelled to either the relevant Spectrum Manager, ETCC or special interest groups represented on the Spectrum Forum, contact details of which can be found at www.rsgb.org/spectrumforum.

# Welcome

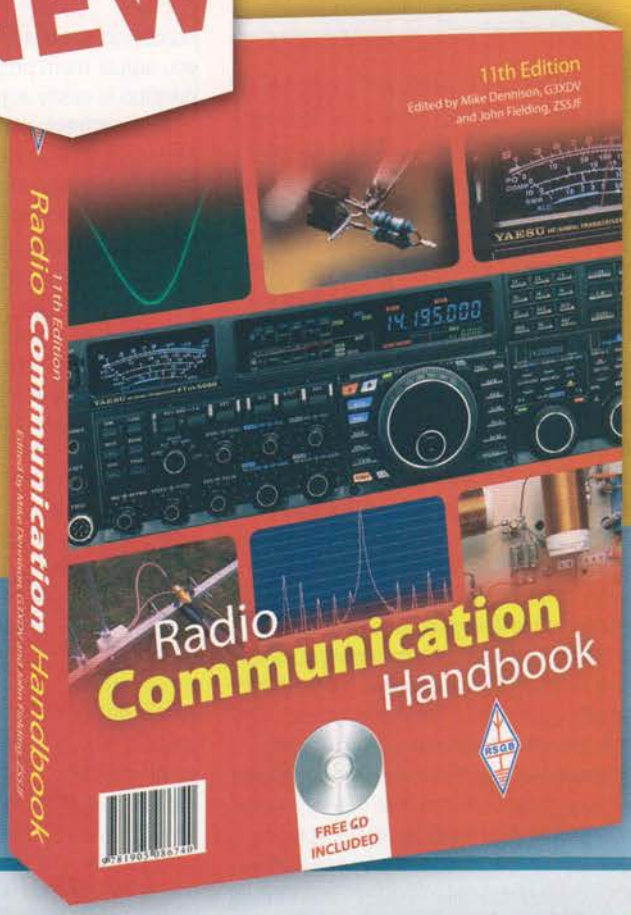
**The RSGB would like to welcome to the RSGB family the following new Members who have joined their voice to ours and are helping to keep the RSGB strong.**

Mr C T Wale, 2E0MUG
Mr A E Smithies, 2E0SMI
Mr M Strachan, 2M0LEW
Mr R C Garcia-Sanchez, EA2EIE
Mr P Walkinshaw, G0EUT
Mr C Wood, G0KMX
Mr D Rudd, G1MSE
Mr W A Bamford, G1STO
Mr N Bardell, G3WKA
Mr G Robinson, G4KXU
Mr A K Thompson, G4MJO
Mr G A Rowntree, G7DKY
Mr A Bruring, G7MJD
Mr A Bevington, G8IYH
Mr B Crellin, G8NNA
Mr G Dobson, G8OFQ
Mr K Fox, GW0GOT
Mr M Rossano, IK8NUO
Mr K D Taylor, KH6QJ
Mr G Evans, KJ7UM
Mr S Solberg, LA6UT
Mr E T Fosse, LA8OSA
Mr N Darley, M0GIR
Mr S Wade, M0SVV
Mr D Ramos, M0TGF
Mr S Lesson, M1BJR
Mr J Woodman, M1PRO
Mr B Mc Vanemy, M3FTT
Mr J C Stone, M3HNL
Mr P J Gale, M3SSM
Mr M C Muspratt, M6ASU
Mr W A Abbott, M6AYS
Mr M Biadon, M6BHM
Mr C Watkins, M6CGW
Mr D Chebsey, M6DDC
Mr D K Maton, M6DHU
Mr MAW Bartlett, M6EEP
Mr F Clements, M6FRC
Mr K Nickson, M6KSN
Mr L Mikolka, M6LMI
Mr M Statham, M6MCS
Mr I Learmonth, M6MVQ
Mr P R Noquet, M6MYA
Mr R Mclachlan, M6ROS
Mr T Atkin, M6TJA
Mr S J Smith, M6TSD
Mr M Dunchar, MDMDU
Mr L D Leech, MM0LOZ
Mr ATJ Hearty, MM6AHB
Mr H B Hunt, NG8P
Mr B G Echols, NI5F
Mr J Dam, OY9JD
Mr E Vink, PA3ELN
Mr RM Chroston, RS206747
Mr A J Talbot, RS208758
Mr G Sandin, RS208759
Mr P M Troth, RS208782
Mr M J Cotton, RS208797
Mr S K Marshall, RS208820
Mr S Halliday, RS208821
Mr J Kirwan, RS208842
Dr P Shaw, RS208843
Mr K Smart, RS208863
Mr C Aanonson, RS208869
Mr J Perrins, RS208904
Mr C Lobb, VK2YY
Mr M C Power, VK4NGW
Mr R D Wilson, VK4TV
Mr R Beck, VK6BEC
Mr R Valler, VP8BFH
Mr M J Shannon, WA7BDK

**The RSGB would like to welcome back the following Members who have rejoined the Society.**

Mr S Wright, 2E0LXH
Major C J Ratcliffe, 2E0TEC
Mr S Hall, 2E1HTG
Mr G Scannell, EI5KF
Mr D Gullick, G0DGA
Mr K P Mayes, G0EBL
Mr P Hunter, G0GSZ
Mr A Aspinall, G0NDM
Mr WES Davey, G0THI
Mr M Fairweather, G0TOV
Mr F J Pover, G1FVF
Mr B G Martlew, G1NXS
Mrs D M Broad, G1PVT
Mr H K Wilkins, G3TBF
Mr S Halfyard, G4EIS
Mr R M Broom, G4LFE
Wirral & DARC, G4MGR
Col M L Ayres, G4OQG
Mr N Jarvis, G4SPD
Mr M Barlow, G6MMA
Mr M Jaques, G6WKZ
Mr N Frederick, G6YXX
Dr J S Collins, G8JHG
Mr L K Baddeley, G8LXI
Mr P Moore, G8MKS
Mr L V Barker, G8NJJ
Mr G Lenihan, G8YQU
Mr F Hunter, GI4NKB
Mr D Calder, GM4WHD
Mr I Macdonald, GM8AVM
Mr L Sciboz, HB9ELS
Mr W Terry, K4BYR
Mr M Scobie, M0IME
Mr M D Smith, M0MTJ
Dr S Smith, M0ZAR
Mr C R Leviston, M6AYY
Mr A Burns, MM0CXA
Mr R Glassner, N0EAX
Mr J Ginever, RS203803

NEW




RSGB shop

## Special RSGB Members ONLY Offer

Buy an **RSGB Yearbook 2012** with your copy of the **RSGB Radio Communication Handbook** for only

**£39.99**

*And FREE UK P&P!*


## RSGB Radio Communication Handbook

from £27.99

Edited by Mike Dennison, G3XDV and John Fielding, ZS5JF

**Fully updated and revised, the *RSGB Radio Communication Handbook* is a massive 864 pages of the very latest amateur radio technology. There is so much more material than before that some chapters have even been moved onto the accompanying CD.**

The *Radio Communication Handbook* has everything you need to build or understand amateur radio equipment. There is enough theory to give you a good grounding, but the main emphasis is learning by doing so the book includes a huge number of practical circuits. Receivers are explained from the simplest crystal set right up to ultra-modern DSP radios. There are practical antenna projects for all amateur bands, together with advice on erecting masts and measuring performance. For the portable operator there are details of light-weight equipment and power sources - even waterproof log books and walking sticks that double as an antenna mast. Projects are included that cover frequencies literally from audio to light, with an emphasis on the popular amateur bands. Computers are shack essentials nowadays and chapters deal with how to make the best use of them, and what data mode is most effective on what band.

This new edition of the *Radio Communication Handbook* contains significantly expanded chapters covering HF Transmitters and Receivers, LF, Microwaves, VHF/UHF Antennas, Computers and whole lot more. There is major new material covering transmitting SSB on light frequencies and long distance transmission and reception below 10kHz. It does not stop there either with more digital theory, IF amplifiers, back ground noise, ceramic filters, antennas and much more than can be listed here.

**Features**

- 864 A4 pages
- 25 chapters and two appendices
- 600,000 words!
- Over 1700 illustrations
- Bonus CD
- Projects for audio to light

**Free Bonus CD**
As an extra, a free CD is included packed with bonus material. There is a full PDF version of the RSGB Radio Communication Handbook allowing detailed searching and printing at the touch of a button. There are more bonus chapters that are not in the book, along with SDR video and audio files and other bonus material. There is even a huge selection of the latest amateur radio software.

**If you only ever buy one book on amateur radio, this should be the one!**

Size 210x297mm, 864 pages, ISBN 9781-9050-8674-0

**Non Members' Price £32.99** **RSGB Members' Price £27.99**

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# Heil Pro Set Elite

**HEADSET OFFER.** This headset from Heil is a great way to unclutter your desk and improve your audio quality! Designed for broadcasters and radio amateurs alike, the Pro Set Elite is an uncompromising headset that delivers top quality audio whilst also being remarkably comfortable and rugged.

**HEIL BACKGROUND.** What's so special about Heil? Well, Bob Heil has been around in the music and broadcast business since the 1960s and pioneered the sound reinforcement systems that are used in concerts today. The company has won many awards over the years and it was Bob that built the sound system for The Who's famous Quadrophenia tour of the USA and Europe as well producing audio equipment for other stars such as Grateful Dead, Peter Frampton and many more. In addition to his professional audio work, Bob has been a keen amateur since his teens and has helped improve audio quality for amateurs by developing specialist microphones and headsets.

**WHAT YOU GET.** The headphones are supplied with a 6ft coiled lead with a 3.5mm mono jack for the microphone connection and a 3.5mm stereo jack for the headphones. Heil manufactures a range of adapter leads to enable the Pro Set Elite to interconnect directly with all the popular rigs, plus there are also foot switches available for hands-free operation.

The headphone speaker units employ efficient 32Ω drivers that have -3dB points at 10Hz and 22kHz, making them excellent for general audio monitoring as well as amateur radio. A novel feature was the provision of a phase reversal toggle switch on the right speaker that switched the phase of the speaker – more on this later. The microphone unit is Heil's latest HC6 dynamic element that has a sensitivity of -57dB at 600Ω and a -3dB frequency response from 100Hz to 12.5kHz. This element was designed specifically for commercial broadcast use and is excellent for amateur radio as the response is particularly flat over the communications speech band. The microphone is supplied with a wind screen to help attenuate breath blasts but this can easily be removed if necessary. There's even a spray microphone sanitiser included in the box!

**ON THE AIR.** The most important first step it to get the fitting right as these are substantial headphones that are very comfortable providing you adjust them properly. The headband position is easily adjustable and the speaker units pivot freely so I found it quite easy to obtain a comfortable fit. If the pressure on the ears is too great you can pull the speakers apart and bend the stainless steel headband to adjust the pressure. I tried the Pro Set Elite on the air with a Yaesu FT-897 and it worked a treat, with very positive comments on the audio quality, which was encouraging. I found that the output from the Heil mic was a little down on the standard fist mic but that was easily corrected by winding up the audio drive a tad. On the receive side the audio quality from the Heil speakers was very good with clean, uncoloured audio and a useful rejection of local noise without completely isolating you from your surroundings. I tried them with and without the cotton covers and there was little to choose in terms of audio performance but to me they were slightly more comfortable without the covers. The phase reversal switch was an unusual extra and did provide a change of perspective when activated. The reversal might help dig out stations from a pile-up but at least it will provide some welcome relief when operating for extended periods! When not in use the speaker assemblies fold back in making them very compact for storage.

## D-Star Digital Workshop

A D-Star Digital Workshop will be held on 13 November in County Hall, Atlantic Wharf, Cardiff from 10am to 5pm. If you want to learn more about D-Star, whether that's radio programming, operating or data use, Simplex Gateway advice or help navigating your radio, the organisers want to help. If you bring a copy of your licence they will help you operate the D-Star station on the day. For more details e-mail dave.2w0ruh@ntlworld.com.

## RAFARS

The autumn edition of *QRV*, the Journal of the RAF Amateur Radio Society, contains 14 pages with full colour illustrations, including the front and back covers – a first for the magazine. The aims of the RAFARS are to promote and foster amateur radio activities within the Royal Air Force and, through amateur radio, to maintain and foster the close bonds that exist between radio amateurs who are serving in the Royal Air Force and those who have retired from, or have close links with, the Royal Air Force. More information at www.rafars.org.

## Six News

*Six News*, the quarterly magazine from the United Kingdom Six Metre Group (UKSMG), is now available in three electronic formats. It has been available in .pdf format for several years but now each issue is also published in both .epub and .mobi format compatible with mobile devices including the Kindle.

The hard copy magazine is still posted to members but a new 'internet only' discounted membership with access to download Six News in all file formats is available at only £10 per annum. Details at http://uksmg.org/content/uksmg_applicsubs_cs.php.

*Six News* contains a plethora of information for anyone interested in 50MHz with articles on antenna design, propagation, equipment, operating, DXpeditions, data modes, EME and detailed band reports.

## GS4/7WAB Fair Isle

On Monday 15 August, Dave, G4IAR, Bob, G4GEE, John, G8SEQ and Judith, G4IAQ set off from Loughborough to drive to Aberdeen. They activated the WAB squares along the way. Steve, G0SGB made his way independently to Aberdeen and met them at the North Link Ferry Terminal.

They activated Trondra, East and West Burra for the benefit of the WAB net and arrived at Grutness to catch the *Good Shepherd IV*. Their base was at the South Lighthouse, otherwise known as 'Skadan'. On Friday, the school children came to visit. Bob, G4GEE's rig was dedicated to the 17 metre band. John, G8SEQ's setup was dedicated to 6 metres. That band conveniently opened on the Saturday morning of Lighthouse Weekend.

On Saturday, radio took full control of events. 6 metres opened up for John, Bob continued to work the world on 17 metres, Steve went up to North Lighthouse (Skroo) and they activated Skadan on 40 and 20 metres. Many happy contacts were made. They made contact with 55 countries. Furthest contacts were the Falklands, West Coast of America, Argentina, Canada, Bahrain and Japan – approximately 2,000 contacts overall.

The operators would like to say a sincere thank you to all who helped in any way to make it so.

Left to right: John, G8SEQ, Bob, G4GEE, Dave, G4IAR, Judith, G4IAQ, Steve, G0SGB.

## *Six and Ten Report*

The latest edition of the *Six and Ten* report is now available at http://g7kse.co.uk/6and10/. It is a bumper edition. The Six and Ten Reporting Club is an informal group of radio amateurs, mostly from the UK, who are interested in propagation studies at frequencies around the HF-VHF boundary (mainly the 6 and 10 metre amateur bands). The club produces a monthly newsletter (the Six and Ten Report) that includes analysis of 28MHz propagation based on beacon monitoring, analysis of 50MHz activity reports broken down by propagation mode, reports and discussions on unusual propagation events, compilations of solar and geomagnetic data, lists of activity world-wide, beacon news and results of ongoing experiments.

## QRO in Ireland

After two years of deputations to ComReg – the telecommunications regulatory body in Ireland – they agreed that EI licensees would be allowed to run high power in specified contests. The news was broken in an IRTS News item a few months ago. Everything then went quiet for a couple of months, but ComReg has now published a document on their website implementing the change. Consequently, suitably equipped Irish contesters are now able to run 1500 watts in major HF contests and 1000 watts in VHF/UHF contests. The list of permitted events is similar to the one in which UK stations may use short contest callsigns, although more contests could be added to the list in due course. Interestingly, the increased power limit applies to 4m and the whole of the 160m band, but, curiously, not the 10m band.

## The Best Five Hundred Quid's Worth...

Did you know that a real life radio amateur was involved in the famous 1961 recording of Tony Hancock's "The Radio Ham"? His name was Alan Florence. He was just 18 years of age and was working as a recently appointed sound engineer at Star Sound Studios off Baker Street in London. These days he is also known on the bands as G7CDK and although he wasn't licensed back in 1961, Alan claims that the experience did have some influence on him taking the RAE in later years.

Saturday 1 October will be the 50th anniversary of the Pye recording that was released as a long playing record (LP) about six months after the episode appeared on television. 'The Radio Ham' was never made for radio but, not to be outdone, the digital station BBC Radio 4 Extra will be broadcasting 'The Radio Ham' and the equally famous 'Blood Donor' (recorded in the same session) between 1400 and 1500BST on Saturday 1 October 2011. The shows can also be heard online at www.bbc.co.uk/radio4extra and on the BBC Radio iPlayer for seven days after transmission.

Last year RSGB member and BBC presenter Jim Lee, G4AEH, brought Alan, G7CDK together with the show's iconic writers Galton and Simpson, to remember the events of the 1 October 1961. Extracts from the interview, in which the writers reveal why they chose the radio ham scenario will be broadcast as a series of 'shorts' or fillers between the pre-recorded announcements, throughout the day.

### NEWS IN BRIEF

- JOTA station GB5OFS for One Ferring Scouts will be on the air 15 and 16 October from Ferring, West Sussex.

## Earth Moon Earth

This summer, Spiros Chimarios, SV8CS managed a low power Earth Moon Earth contact with Lance Collister, W7GJ. What makes this contact special is that in addition to just 150W being used by SV8CS, this station is entirely powered by green energy. Wind and solar power keep the 12V batteries topped up within the SV8CS shack, powering the TE-Systems 150W amp that is fed into a 7-ele WOS LFA Yagi by InnovAntennas.

SV8CS finalising the installation of his 50MHz 7-ele WOS LFA Yagi at his green station.

## Shack Power Supply

ML&S has introduced another shack power supply to their range, the MyDEL MP-50SW111. It's a 50A DC power supply that weighs in at only 2.2kg and measuring 940mm wide x 950mm deep – including chunky rear terminals and front panel knobs – and it's only 90mm high. This shack supply is styled along the lines of an SWR meter with back lit display, variable voltage (9-15V DC) with a fixed position 13.8V output, 'noise-offset' control for the removable of any birdies that may be present within a band, large, easy to tie-in DC rear terminals and a switchable voltage/current meter. The current price is £169.95 but is on a special introductory offer of £149.95 including VAT. Its baby brother, the MP-30SW111 30A version is still available for £86.75. Details at www.hamradio.co.uk.

### NEWS IN BRIEF

• A DXpedition to Western Islands of Scotland (North and South Uist and surrounding Islands) in the first week of July 2012 is being planned and the group are looking for assistance and sponsors. Full details found on QRZ.com under the callsign 2E0LSR.

### NEWS IN BRIEF

• M0CVO Antennas now has a new website URL, www.m0cvoantennas.eu and new e-mail address for all enquiries: sales@m0cvoantennas.eu. The products and after sales service are not affected in any way.

• CASAHOTA is welcoming a new representative who has been appointed for Wales. Andrew, M6ADB will now process and issue activation numbers for any Welsh historical or heritage sites. As normal anybody wishing to activate a site should go to www.cashota.co.uk to complete an activation form, where you can also find Andrew's contact details, if required.

• The dates have been set for CASHOTA's annual Castles weekend in 2012. The event will be held over 2 weekends on 18-19 May and 25-26 May 2012. The organisers would like to invite both last year's participants and any new persons to apply to be an award station. The award is open to any individual, groups or clubs who wish to chase castles or activate them. More details can be found at www.cashota.co.uk, or by contacting Chris, M0DOL on 07720 580 968.

## Watching the Wind

As the autumn fast approaches, radio amateurs turn their attention to the weather and especially the winds. The new Nevada 1080PC weather station has a solar powered radio controlled sensor to send all weather data (including wind speed and direction) to a central monitor. Apart from monitoring all the common weather data, the unit also has a radio controlled clock linked to the MSF time transmissions. A USB output allows all data to be downloaded to a computer where data can be stored and monitored graphically. The weather station will sell for £99.95. Details at www.nevadaradio.co.uk.

## CASHOTA

Due to the rising awareness of Royal Observation Corp (ROC) Bunkers and facilities with amateurs, Castles And Stately Homes On The Air has compiled a UK ROC Location List within its website. It was thanks to the efforts of G0ABY and G0TRB that this came about and they have agreed to continue their excellent work and become CASHOTA's ROC Representatives. All contact details and the list, if you wish to activate a site can be found at www.CASHOTA.co.uk.

To launch CASHOTA'S new section on ROC Bunkers and facilities, they will be hosting an ROC (Royal Observation Corp) month throughout October. This event is to highlight the numerous ROC locations and allow amateurs the opportunity to gain the new ROC award, which will be published shortly. To activate a site and participate complete an activation form at www.cashota.co.uk/activationform.htm. If you require further information you can contact the G0TRB or G0ABY, the ROC Reps, whose details are on the website.

## Louis Varney G5RV Cup Awarded

AMSAT UK has awarded the Louis Varney G5RV Cup for Space Communications to Paul Robinson, 2E1EUB. The presentation was made by RSGB President Dave Wilson, M0OBW. www.uk.amsat.org/2011/09/05/louis-varney-g5rv-cup.

## The FOC QSO Party

Here is a special invitation for you to join in the fun during the First Class CW Operators Club QSO Party, formerly known as the Bill Windle QSO Party (BWQP) that FOC schedules twice a year. Many operators throughout the world have reported this is one of their favourite operating events. The idea behind the FOCQP is to offer a stress-free opportunity for FOC members to meet and greet both other members and non-members alike.

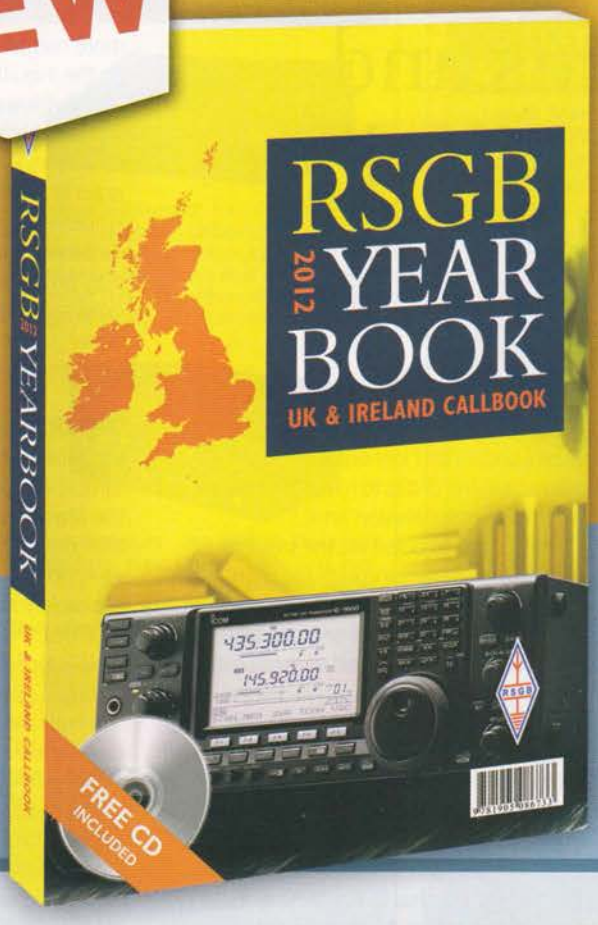
Each one of us can make this event what you want it to be – some get on for a few casual QSOs, others spend several hours on different bands and still others treat it like a min FOC Marathon Contest. The basic concept is to work as many stations as you can over the 24 hour period. All of the contacts made during the FOCQP count for the FOC awards if you are a member. So if you are chasing club points this is a good opportunity to fill in the stations you still need to work. As a non-member you will be welcomed as a worthy contact and you could be eligible for an award, depending on your score.

The FOCQP runs for 24 hours from 0000Z to 2359Z. Call 'CQ BW' from 015 to 040kHz on all bands, excluding the WARC bands, on 22 and 23 October. The exchange is RST, name, and FOC number (non-members send RST and name). Many also engage in longer QSOs; it is entirely up to you! Please note we still call 'CQ BW' to initiate a QSO, a tribute to Bill Windle, G8VG who did so much to foster activity in the club. Please send your exchange as 'G4FOC de KZ5D 599 ART 1761' if you are a member and if you are a non-member your report and name in your reports.

## 50MHz IARU Region 1 Contest

The organiser, VERON, is pleased with the logs received: 325 single and 88 multi stations sent their logs, a further 20 checklogs were very useful. In the multi section, the team of GJ6YB/p was beaten by EF7X, mainly because the latter made many multi hop contacts over large distances; their average km/QSO was 3358. Runner-up GJ6YB/p average km/qso was 1324; most of their QSOs were made into Western Europe.

NEW

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# PicoKeyer-Plus and MasterKeyer MK-1

## Two powerful Morse keyers under the microscope

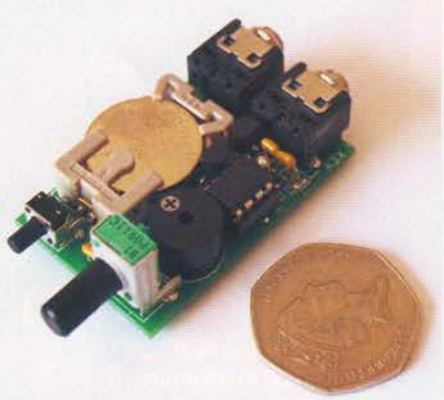

PHOTO 1: The HamGadgets PicoKeyer-Plus board.

**INTRODUCTION.** I was provided with a PicoKeyer-Plus Morse keyer kit from HamGadgets of Omaha, USA and asked to build and evaluate it. Over recent years there seems to have been very few electronic Morse keyers on the market, particularly as a kit, so it was good to see such a product.

Using only a handful of standard components, building the kit was simple, although two capacitors of incorrect value were supplied (but were quickly substituted by HamGadgets). Thereafter the keyer worked first time.

The first thing I noticed about this unit is its very small package size, about 2" x 1.5" (51mm x 38mm) excluding projections, which makes it ideal for integrating into a homebrew (or any other) rig. Its power consumption is infinitesimal and is supplied by an onboard lithium coin cell battery. Furthermore the use of FLASH and EEPROM eliminates any need for battery backup of settings and memories.

Despite its small dimensions, this keyer is no lightweight in its facilities and specifications. A lot of functionality has been integrated into this tiny package, providing a wide range of adjustment to the parameters of the Morse being sent and including a variety of applications. The Morse it generates can be modified to your preferences with the usual features such as weight, mode (including semi auto), auto character spacing, dot/dash memories, paddle sense switching and QSK keying compensation. It also incorporates a basic side tone monitor from which the audio can also be fed externally to form a practice oscillator. There is also a versatile 'tune' facility that offers standard key on/off and also the option of a string of dits to minimise the amount of key down transmission time.

Settings are selected via the single push button, which scrolls through the menu, denoting each parameter using a letter sent in Morse code. Whilst this seemed a little tedious during testing, most of these settings need only be set once to suit the station and operational preferences. Setup does assume that you already know the code at a sufficient level to identify it and understand the reply as well as send the appropriate code to it in order to make the changes. The first few pushes of the switch address the four memory banks, each holding 60 characters, which can also be chained together. To send an auto CQ only requires one press of the switch each time to send. For contesters it has the ability to transmit incrementing serial numbers with cut numbers and leading zeros as options. With a simple add-on transistor switching it will key older transmitters with high voltage keying circuits and will support beacon operation.

This keyer also has other useful facilities such as automatic detection of a straight key for non-automatic sending and a programmable setting allowing a return to a fixed speed at one end of the speed control after using the normal variable speed facility. Should all of these settings prove overwhelming a factory reset can be invoked to get back to square one!

Connections to the key and rig are via standard 3.5mm stereo sockets. The rig outputs can switch up to 60V. The PicoKeyer-Plus manual includes full constructional information, a circuit diagram and a full description of the user interface. I found it comprehensive and easy to follow.

**HOW DID IT PERFORM?** It immediately felt 'right', with nicely formed code. It was nice to see auto character spacing available in such a small, moderately priced keyer. This is usually found only in more complex models and generally not even on the inbuilt keyers of modern transceivers.

By virtue of its small size and internal battery, it lends itself ideally to QRP portable operation, even retrofitting into an existing radio or use in the role of a main station keyer. However, the sequential access to the various parameters through the single push switch may prove a limitation in the case of being used as a main station keyer where more direct, faster access may be preferred if changes need to be made.

**OTHER PRODUCTS.** HamGadgets also produces a full specification self-contained Iambic Morse code memory keyer known as the MasterKeyer MK-1. Whilst no doubt using the core technology of the PicoKeyer-Plus it goes on to form a fully functioned electronic Morse keyer with an expanded range of facilities. Provision has been made, using a USB type B port, for direct connection to the USB port of a computer so that it can transmit the macro derived messages from compatible logging/contesting software. K1EL *WinKey* emulation has been incorporated, thus any software with *WinKey* facility should be suitable. A USB (type A) port is also provided for connection to a storage device or to a USB keyboard for the direct generation of Morse code.

The range of settings and adjustments is almost too numerous to list but covers the usual modes, memories, keying element adjustments and high voltage keying as well as amplifier PTT control.

Access to the settings on this keyer is direct using Morse via the paddle. The various parameters can be quickly changed followed by a return to normal operation.

A 60 page manual covers extensive operating instructions as well as technical details associated with computer communication directly with the unit.

**CONCLUSION.** Overall I was very impressed with both these units and would have no hesitation in recommending them. Thanks to HamGadgets for the review items; you can find out more on the website at www.hamgadgets.com. The PicoKeyer-Plus costs US$17.99 plus post; the MasterKeyer is US$179 plus post.


PHOTO 2: The MasterKeyer MK-1 is extremely versatile.

# Antennas

## The Figure of Eight Loop

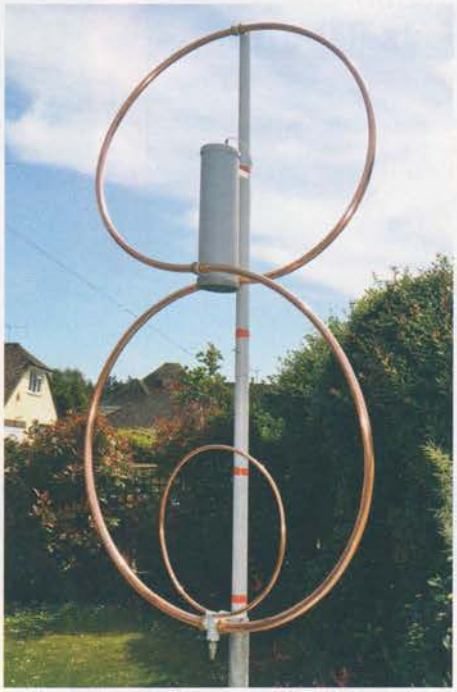

PHOTO 1: GM0SDV's figure of eight loop HF antenna.

**NOVEL LOOP.** This month I will be describing a rather unusual antenna that was built by Victor Borisov, GM0SDV. The antenna, shown in **Photo 1**, comprises a figure of eight loop constructed from 22mm copper tube. Each loop is one metre in diameter and the total size of the antenna is 100 x 200 x 19cm. It covers a frequency range of 13.5 to 31MHz and therefore includes all bands from 14 to 28MHz. It is tuned with a capacitor in a manner similar to a conventional magnetic loop. The capacitor is controlled using a conventional motor control box as shown in **Photo 2**. Initial tests showed that this antenna's characteristics are very similar to a conventional loop. Some other issues were raised while trying to obtain comparative data and some of these will be discussed.

**EUROTEK.** This figure of eight loop design is not new. Last month I described an antenna designed and built by Erwin David, G4LQI. What I omitted to mention was that Erwin used to write the Eurotek column for *RadCom*, using his linguistic skills to translate work from Dutch, German and French radio magazines. One of these items was an article by Fritz H V Geerligs, PA0FRI, published in the Dutch magazine *Electron* in January 1997. This gave details of a figure of eight loop antenna, which was described as a 'Meight' (magnetic 8) antenna. A VHF version of this antenna is shown in **Figure 1**. The objective of the design was to improve the SWR bandwidth and efficiency compared to a single loop antenna.

**PA9OK.** At a later date Otto Kühn, PA9OK [1] worked on the PA0FRI eight-shaped magnetic loop. Many experimental designs were tested to gain experience for building a double loop for HF.

PA0OK went on to say "The reason for using a double loop is that two magnetic fields enhance each other, and because the two loops are in parallel, the impedance at the tuning point will be lower and the bandwidth greater compared to a single loop. The narrow bandwidth of a single loop, just a few kHz, makes tuning difficult. A loop's perimeter, in this case the sum of both perimeters, determines the antenna's inductance. This should be borne in mind when calculating the size of the coupling loop. The two loops, exactly equal in size and calculated for a certain frequency, are tuned to the frequency band by a capacitor. The loops are 180° out of phase relative to one another. The experiments with the small eight-shaped VHF loop have shown that its practical behaviour is in reasonable agreement with theory".

**LOOP MODEL.** I wasn't all that sure about all of the above statement so I constructed a computer model of this antenna (**Figure 2**) to see what EZNEC had to say about this strange configuration. The purpose of the model was to see how the azimuth field strength pattern and the SWR curve compared with the real world. There were two considerations: first of all, it was free space model. Secondly, the model does not use a transmission line matching arrangement.

The free space model is the simplest method of determining the relative gains of antennas. The gain of a free space dipole is 2.14dBi but, with resistive losses, it is probably just over 2dBi. By comparison, a model of the GM0SDV antenna on 18MHz resulted in a free space gain of 1.08dBi, ie a loss of 0.92dB relative to a dipole, see **Figure 3**.

The transmission line matching is, for simplicity, overcome by using a transmission line impedance that matches the antenna. In this case the model exhibits an impedance at resonance of just over 1Ω so, in the simulation, I used a transmission line with an impedance of 1Ω. You won't find any of this material in the real world but it is fine for making a model and it allowed me to plot an SWR curve, as shown in **Figure 4**, without having to worry about a suitable matching arrangement. EZNEC calculates the impedances around resonance, which are then converted into SWR readings.

**CONSTRUCTION.** The antenna arrived as a kit of parts, as shown in **Photo 3**. It is comprises pre-formed semicircular sections of 22mm copper tubing. This arrangement means that the tube connections are made simply by using straight compression couplings. The preformed half loops mean that the antenna can be dismantled easily for installing into a restricted opening loft space or for transporting by car to a portable site.

The capacitor is specially designed and constructed by GM0SDV and is housed in the grey cylindrical plastic container shown in Photo 1. It comprises a butterfly arrangement as shown in **Photo 4** and has a capacity range of 16 to 126pF with a fixed-to-variable plate spacing of 3mm. Because a butterfly arrangement is used the total fixed-to-fixed plate spacing is 6mm. The butterfly capacitor arrangement overcomes the problem of rotating connection resistance that would occur if a conventional tuning capacitor were used. The capacitor is driven by a DC motor through a reduction gear. The capacitor tuning speed from minimum to maximum is 17 seconds on the control box HIGH setting and 40 seconds on the LOW setting.

The loop is matched to the transmission line using the small loop that can be seen in Photo 1.

**OPERATION.** Initial checks showed that the matching arrangement was good over most of the frequency range, being less than 1.05:1 on most bands and rising to 1.5:1 on the 10m band. Interestingly, the SWR curve at 14MHz (**Figure 5**) has a similar V shaped characteristic to the computed one shown in Figure 4, although the SWR bandwidths are different.

Tuning is quite straightforward. The loop is tuned for maximum receiver noise using

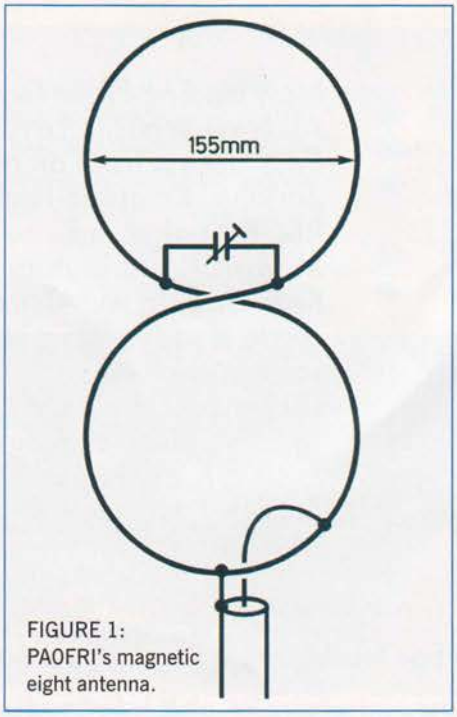


FIGURE 1: PA0FRI's magnetic eight antenna.


PHOTO 2: Control box for the GM0SDV antenna.

TUNING switch with the SPEED switch set to HIGH, then tuned for lowest SWR using the LOW speed setting.

I tested the antenna running 200W from an FT-990 with no obvious problems. GM0SDV tells me that he tested loop with 400W for 20 minutes without any arcing or SWR drift.

**COMPARATIVE TESTS.** The initial tests were done with the feedpoint of the loop around 1.5m high. I used this antenna to make QSOs around Europe. I found no difficulty in tuning the loop when QSYing to different frequencies and bands. The loop exhibited 14dB nulls on 14MHz in field strength tests. Improved SWR figures, see **Figure 5**, resulted when the loop was placed on the flat roof of the house extension (about 3m high).

These tests coincided with very poor DX conditions (late July and early August). Additionally the weather took a turn for the worse, with some very heavy rain. The SWR on all bands increased to greater than 1.5:1 so, at the time of writing, the antenna has been dismantled for inspection. The surfaces of the copper elements of this antenna have tarnished very quickly in the sea air around here so I need to see if this is a factor.

GM0SDV claims that he obtains a 1 to 2 S-point improvement on receive and transmit (particularly on DX) using the figure of eight loop compared with a conventional loop. I have not been able to verify this because of the difficulties described above but I hope to have more information for the next month's Antennas. His figure of eight antenna is to be distributed by KMK UK Ltd **[2]**.

I note that PA9OK found that a VHF figure of eight antenna was 3dB better than a conventional VHF loop.

**ENGINEERING.** Constructing antennas for HF normally requires fairly modest engineering facilities. Most of us get by with just a screwdriver, hacksaw, a set of spanners, an electric drill plus a selection of bits and a vice. When I was writing the RSGB Mobile Handbook I really wanted to test out a mobile 'screwdriver' antenna but had neither the money to buy one or the engineering facilities to make one.

While visiting a local rally I came across GM0SDV's antenna stall and bought a screwdriver antenna that he had constructed – for around a third of the price of what was currently available. GM0SDV's hobby is apparently building antennas that require some engineering skill and selling them to finance further experimental work. The quality of the workmanship can be seen in the motorised capacitor shown in Photo 4. He also has facilities for forming thick copper tubing into semicircles, see Photo 3.

I have suggested that he provides an engineering service for building antenna and linear amplifier components. For further discussion he can be contacted via **[3]**.

PHOTO 3: The kit of parts for the GM0SDV antenna.

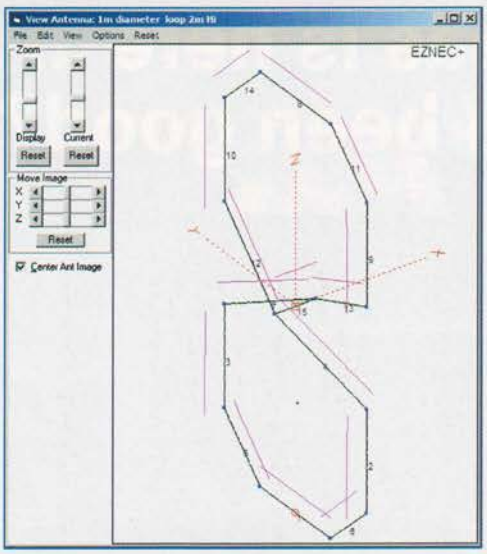


FIGURE 2: EZNEC free space model of the GM0SDV antenna. All the wires used to make up the model are straight so the model is constructed as a hexagon.

PHOTO 4: The loop tuning capacitor.

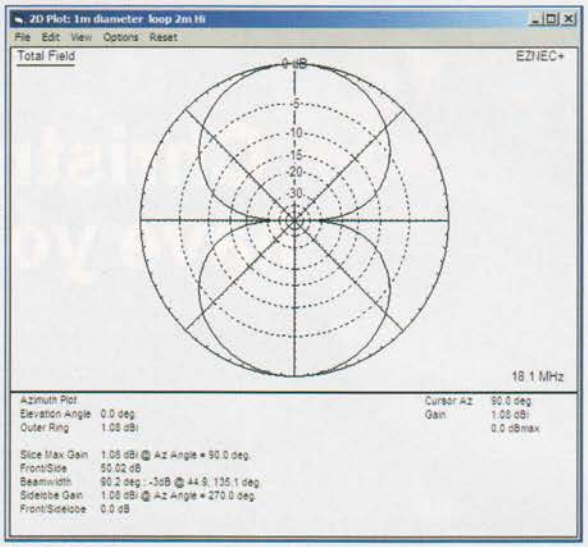


FIGURE 3: Free space azimuth field strength diagram of the GM0SDV antenna.

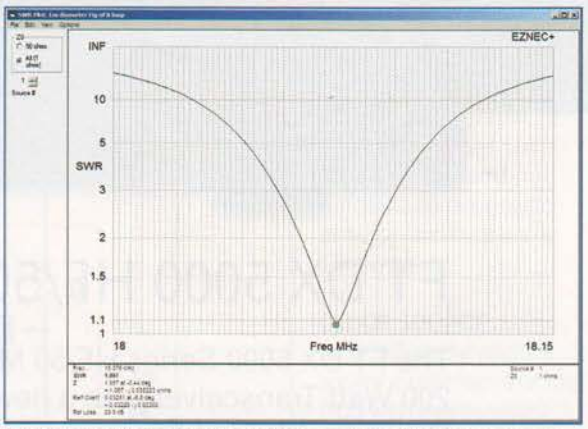


FIGURE 4: The modelled SWR curve of the GM0SDV antenna.

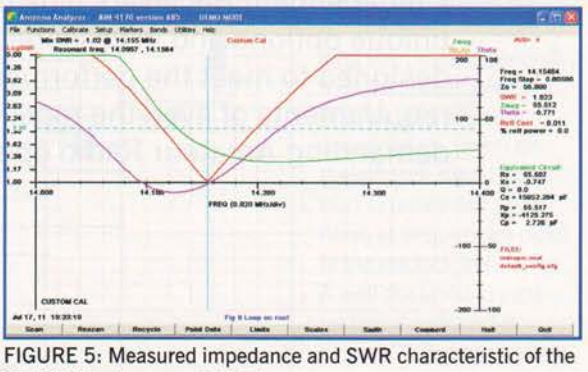


FIGURE 5: Measured impedance and SWR characteristic of the GM0SDV antenna on 14MHz.

WEBSEARCH

[1] PA9OK's website – http://pa9ok.nl/pages/magnetic-loop-for-hf.php
[2] KMK UK Ltd – www.mixw.co.uk
[3] gm0sdv@gmail.com


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# Homebrew

## Continuing the AD9951 DDS project

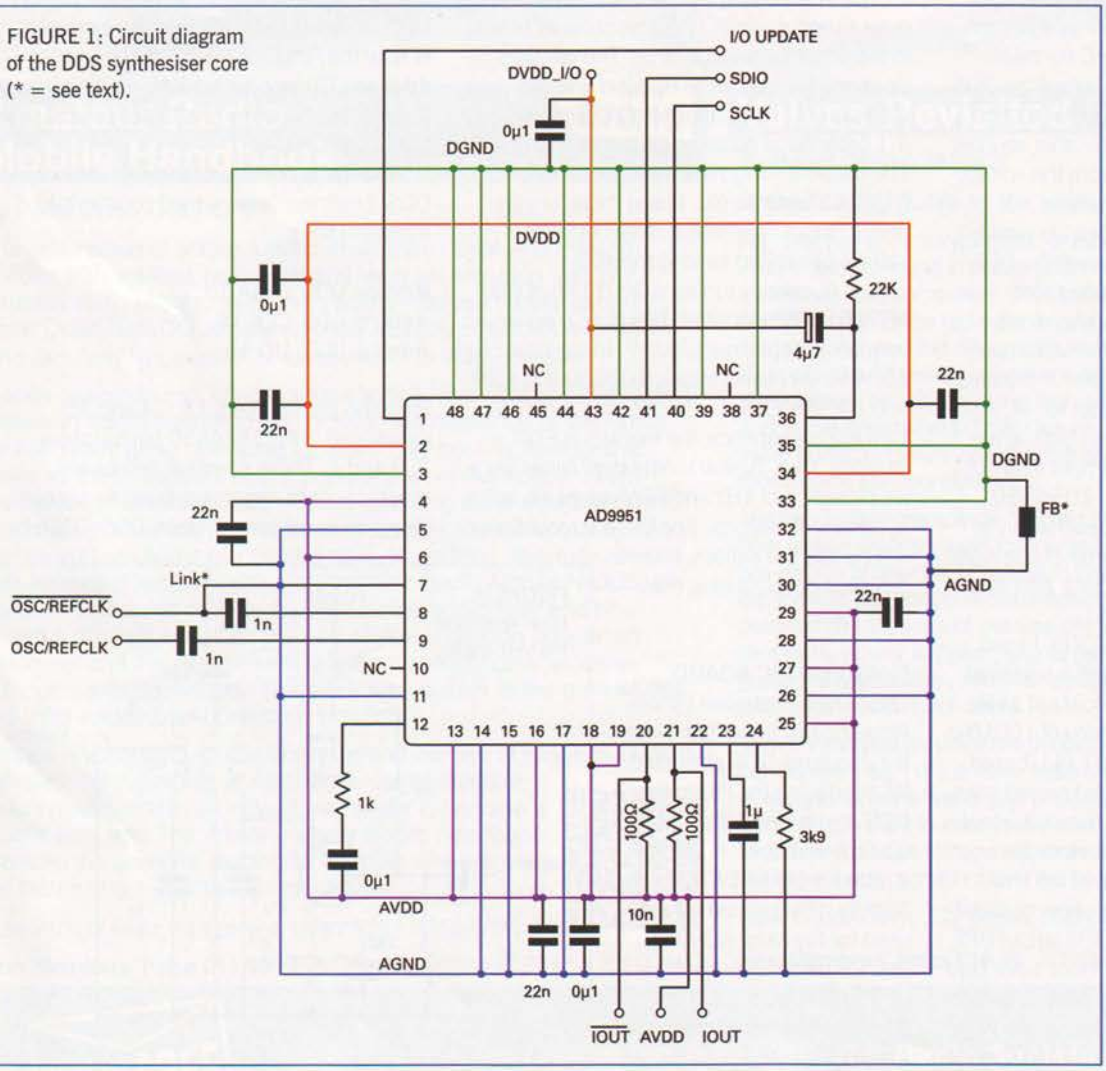
**INTRODUCTION.** Last month, I took a slightly risky decision to publish the construction details of the new direct digital synthesiser (DDS) before the prototype was properly tested. With this in mind, I approached the programming and testing of the DDS with some apprehension. If the prototype didn't work as expected, I didn't have a spare AD9951 IC and there was no way of acquiring one at short notice. Happily, I didn't run into any problems and the DDS worked perfectly. The prototype is now up and running, performing very well. The PCB artwork is available at [1]. See last month's Homebrew for detailed information about the DDS power supply unit and PCB.

**Figure 1** shows the DDS schematic. This covers the DDS PCB only. The power supply voltage regulators, DAC output transformer (if required) and LPF are not included. The five main power rails have been colour coded as: AVDD (+1V8) = magenta, AGND = blue, DVDD (+1V8) = red, DGND = green, DVDD_I/O (+3V3) = brown. I have followed the usual practice of placing a choke (inductor) between the AGND and DGND copper ground planes on the back of the PCB. This ensures that the two independent ground systems are at the same DC potential, even in the event of a failure in another part of the system. The choke consists of a ferrite bead (FB) threaded on a single wire as shown in **Photo 1**. This relatively large bead gives a choke inductance of 1.2μH. If a large FB is not available, you can stack two or more smaller beads instead.

There are a few differences between the AD9951 and the AD9851 used in some of our previous DDS projects. The refclock input to the AD9951 is via a pair of balanced complimentary clock inputs instead of the single-ended refclock input of the older DDS ICs. The DAC output of the AD9951 is referenced to AVDD and not to AGND. Serial data communication between the PIC controller and the DDS is essentially the same as with the older devices, although the DDS pin names are slightly different.

The DDS-carrier PCB component overlay is shown in **Figure 2**. The light blue line shows the point where the ground plane is cut in half on the bottom side of the PCB. As I am using a single-ended refclock source, the clock signal is applied to the OSC/REFCLOCK input only. The open end of the complimentary $\overline{\text{OSC/REFCLOCK}}$ input coupling capacitor is tied to AVDD using a short wire link. This is shown in green on the left side of the overlay. To allow maximum flexibility, I have not included conventional PCB pads for the DAC output transformer. Instead, there are three generic pads connected to IOUT, $\overline{\text{IOUT}}$ and AVDD. These pads can be used to mount the DAC output resistors and/or DAC output transformer. The connection points are marked with green dots on the overlay. The DAC bypass capacitor (pin 23) is a non-polarised 1μF SM capacitor and not a polarised electrolytic as suggested by the silk screen layer.

FIGURE 1: Circuit diagram of the DDS synthesiser core (* = see text).




**CLOCK SOURCE.** Using an OCXO as the refclock source guarantees that the DDS will have excellent medium to long term frequency stability. For our purposes, medium to long term means seconds, minutes, hours and days. Shorter term phase variations (or 'jitter') on the refclock signal will lead to unwanted phase noise at frequencies close to the refclock frequency. A well designed crystal oscillator as found in most OCXOs can produce a very clean signal which is relatively free of phase noise. A typical OCXO will produce phase noise at a level of around -140dBc/Hz at 1kHz from the carrier frequency. Some OCXOs that are specifically

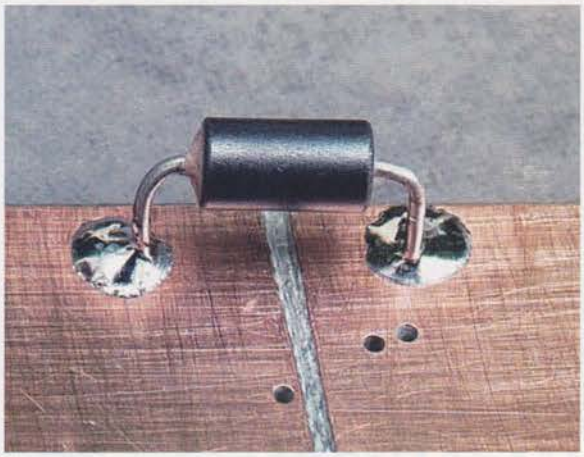


PHOTO 1: A ferrite bead on a wire link provides a DC link but AC isolation between the analogue and digital grounds.

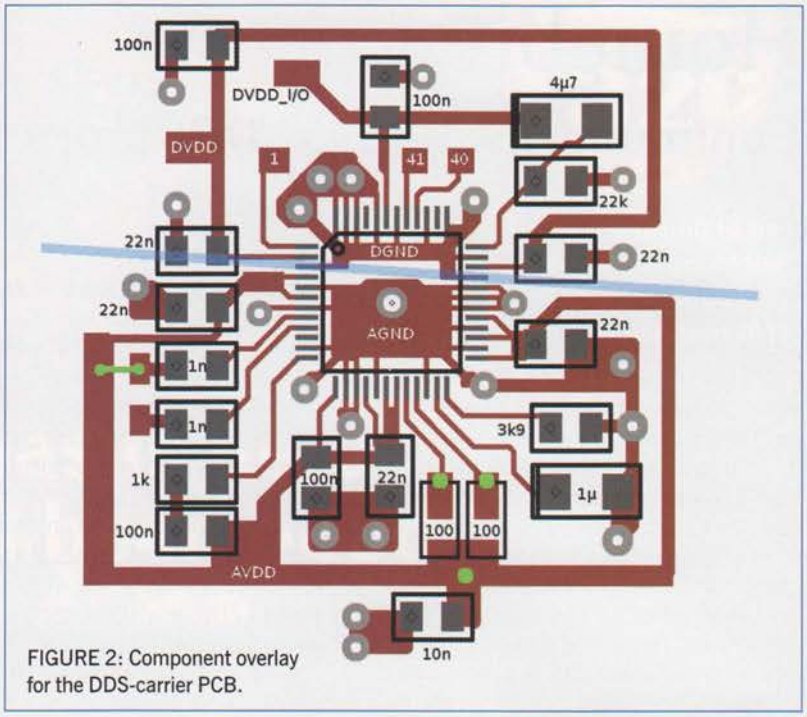



FIGURE 2: Component overlay for the DDS-carrier PCB.

designed for very low phase noise can achieve -160dBc/Hz at 1kHz. Such an oscillator would make an ideal refclock for a DDS.

In an ideal world, a DDS would act as a perfect frequency divider, which would reduce phase noise at the theoretical rate of 20LOG(N)dB, where N is the frequency division ratio. This would result in an output signal which always had less phase noise than the refclock. Unfortunately, a real world DDS is far from perfect. There are many sources of phase and amplitude noise in the DDS and its associated circuits. The DDS and its output DAC have limited precision, some distortion due to imperfections in the DAC hardware, noise within the analogue section of the DDS, noise leakage from the noisy digital section of the DDS, noise leakage from other sources like the PIC controller, noise from the voltage regulators on the power supply rails...

Some of this noise will appear as random phase and amplitude variations of the DDS output signal. The AD9951 data sheet specifies residual phase noise of typically -132dBc/Hz at 1kHz for a 40MHz output signal when the refclock multiplier is disabled. When the refclock multiplier is set for 4X, phase noise increases to -115dBc/Hz. Setting the refclock multiplier to the maximum value of 20x increases phase noise to -105dB/Hz. The 'Residual Phase Noise' specification is noise generated by the DDS *after* phase noise from external sources like refclock jitter and power supply noise is excluded.

For the initial testing of the DDS, I used a Greenray 100MHz OCXO with a specified phase noise output of -140dBc/Hz at 1kHz. This allowed a refclock frequency of 100MHz (or 400MHz using the AD9951 PLL-based refclock multiplier). The finished project uses a 300MHz refclock based on the OCXO/tripler circuit described in the August Homebrew. **Figure 3** shows the schematic of the final version of the frequency tripler. The modified circuit has a triple tuned 300MHz output BPF. L1, L2 and L3 are each four turns of 1mm bare copper, wound wide spaced on a 5mm former. The output tap on L3 is 0.8T from the grounded end. Each coil is about 11mm long and spacing between L1/L2 and L2/3 is about 2mm. The 20pF trimmer capacitors from the original circuit have been replaced by 10pF ceramic trimmers. The 300MHz output is only 500mV peak-peak. This has proven to be more than sufficient to drive the AD9951 refclock input.

The initial configuration of the DDS DAC output used a pair of 100Ω resistors as shown in the schematic and overlay. The voltages developed across these resistors was fed via a pair of 10nF capacitors to a simple 4:1 broadband balun as shown in **Figure 4**. The balun is six turns, trifilar wound on an FT37-43 ferrite toroid. I used three lengths of 0.375mm enamelled copper (Maplin YN86T or similar) twisted together.

The frequency tuning word (FTW) of the AD9951 is 32 bits wide. This gives a minimum frequency step of refclock/$2^{32}$. In the case of a 100MHz clock this step is $100000000 \div 2^{32}$ = 0.023283064Hz. To calculate the FTW for a given frequency, the formula is FTW = fout/min_step. Typical tuning step values are a small fraction of 1Hz and FTW values are in the hundreds of millions. The PIC microcontroller will handle the tedious business of calculating the FTW value.

## PINGUINO PIC BOARD.

The DDS is controlled by the Pinguino PIC board **[2]**. Note that the three DDS pins used for interfacing the PIC to the DDS are named Serial data = SDIO, Serial clock = SCLK, Update = I/O UPDATE. Slightly different names are used for the older AD9851 used in previous projects.

The Pinguino board is based on the well known Arduino board. Both boards can be programmed using the C language or by using a set of simple Arduino-style instructions. In either case, the code for the PIC18F4550 is generated by the SDCC (small device C compiler) **[3]**. The PIC board project (November 2009) and the AD9851 DDS project (March 2010) gave examples of how the Pinguino board can be used to drive an LCD display module, read a numeric keypad, read a rotary shaft encoder and drive the AD9851 DDS.

In order to communicate with the new DDS, I defined three named constants to represent the pins:

```
#define DDS_DATA 13
#define DDS_CLK 14
#define DDS_UD 15
```

Pinguino pin numbers 13, 14 and 15 correspond to PIC18F4550 pin numbers 2, 3 and 4. These constant names are much easier to remember than the obscure Pinguino numbering system. DDS_DATA is

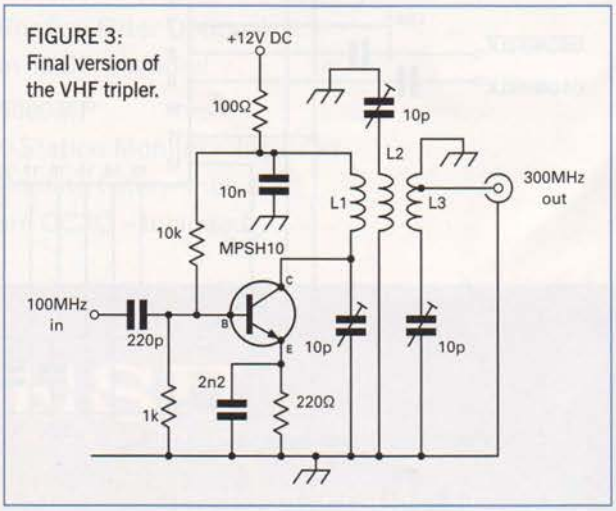



FIGURE 3: Final version of the VHF tripler.

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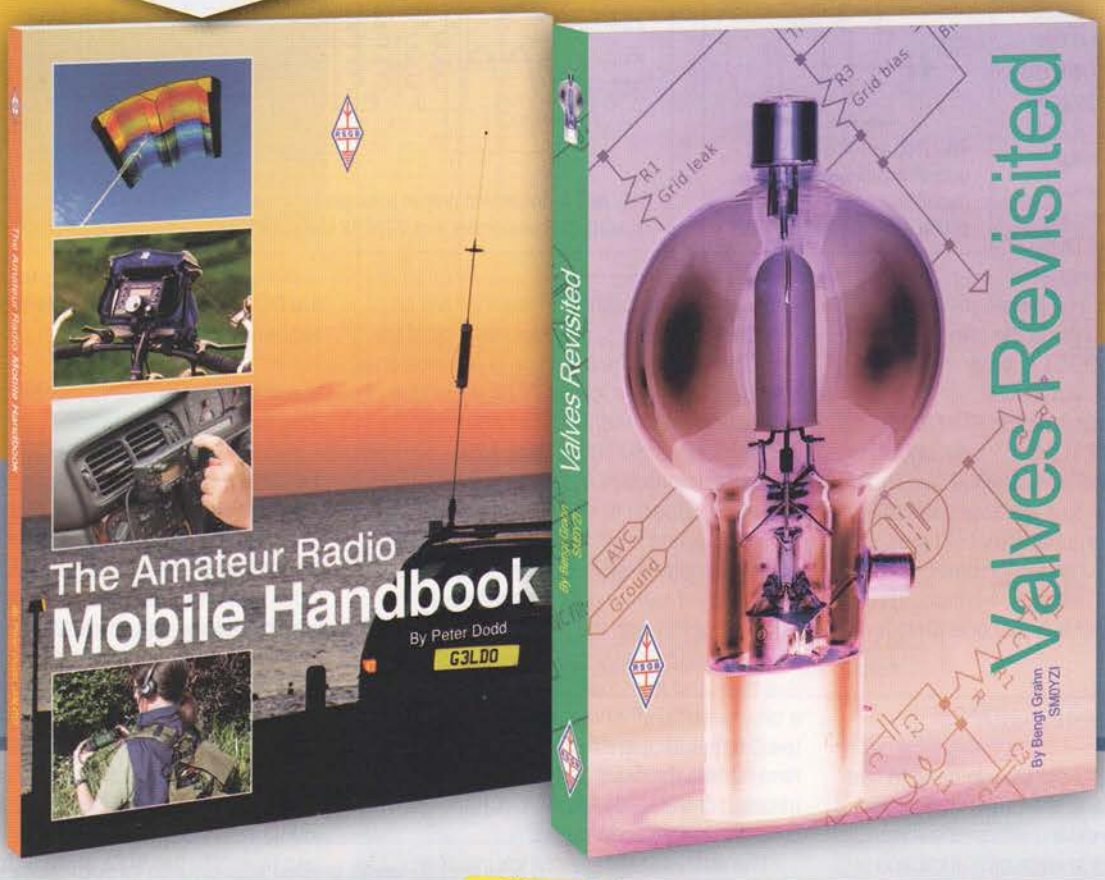


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By Peter Dodd, G3LDO

The fascination of taking a radio away from home and making contact with stations both near and far is an enduring one in amateur radio circles. Written by acknowledged mobile expert Peter Dodd, G3LDO *Amateur Radio Mobile Handbook* is for those who regularly "go mobile" or simply want to start doing so.

Mobile operation can offer a great escape from EMC problems or restricted home operation and provide the challenge of the quest for that really good operating location. This book is designed to cover all these aspects of this popular part of the hobby. From the basics of amateur radio mobile, installing radio equipment and antennas in a vehicle, maritime mobile, bicycle mobile to pedestrian mobile you will find it all covered here. In addition, this fully revised and extended second edition of *Amateur Radio Mobile Handbook* contains a chapter on antenna measuring equipment and how to use it. You will even find the use of kite or balloon supported antennas and the experimenting with unconventional antenna arrangements described. There are also guides to the possibilities of APRS and D-Star operation.

In spite of a greater use of electronics and the lack of space in modern vehicles, the availability of lightweight, comprehensive radios means that it has never been easier to become a mobile operator. The *Amateur Radio Mobile Handbook* provides the essential reading for all those who want to get the most out of amateur radio mobile.

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connected to the DDS SDIO pin, DDS_CLK is connected to SCLK and DDS_UD is connected to I/O UPDATE.

When I connected the Pinguino board to the DDS, I couldn't resist the urge to apply power to the circuit, just to see what would happen. The Pinguino board was programmed to work with the old DDS project. Not surprisingly, nothing happened. The physical interface is just the same as it was on the previous DDS project, but the AD9951 is programmed in a completely different manner.

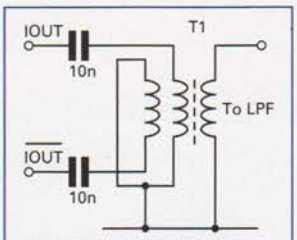



FIGURE 4: Initial DDS output arrangement using capacitive coupling and trifilar wound transformer.

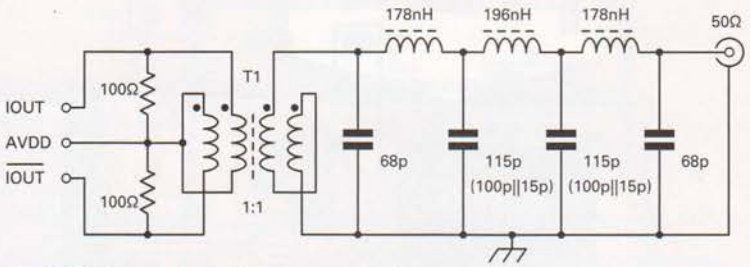



FIGURE 5: Improved output arrangement using quadrifilar transformer and 62MHz low pass filter.

I started by calculating the FTW for an output frequency of 10MHz. For a 100MHz clock, fout/min_step = 429496730. This value was assigned to a variable named 'freq'. The SDCC compiler variable type 'unsigned long' is 32 bits wide and has a maximum value of just over 4 billion. That sounds like a lot, but it is just adequate for our purposes. So,

```
unsigned long freq=429496730;
```

Communicating with the DDS is done in two stages. The first stage is an 8 bit instruction byte. This tells the device whether we want to perform a read or a write operation and which of the several possible registers we will be writing to or reading from. The second stage is the data transfer cycle. The number of data bits transferred will depend on which register we are writing/reading. To send the FTW to the DDS we will need to send the 8 bit instruction, followed by the 32 bit (4 byte) FTW. Once these 40 bits have been clocked into the DDS, an update pulse is applied to the I/O UPDATE pin.

My existing DDS code from previous projects wouldn't work with the AD9951. By default, data is transferred to the new DDS MSB (most significant bit) first. The older DDS takes data LSB (least significant bit first). The first task is to send the instruction byte to the DDS. Going over the data sheet information for the instruction byte bit-by-bit with a pencil shows that the required byte is '00000100'; this is more conveniently expressed as 0x04 in hexadecimal.

The following code is from a C function called dds_inst. The value 0x04 has been assigned to a variable called ctrl.

```
for(count=0;count<8;count++)
{
if(ctrl&0x80)
{digitalWrite(DDS_DATA,HIGH);}
else {digitalWrite(DDS_DATA,LOW);}
digitalWrite(DDS_CLK,HIGH);
digitalWrite(DDS_CLK,LOW);
ctrl=ctrl << 1;
}
```

The first line establishes a loop that will be repeated eight times, once for each bit of the instruction byte. The third line is a conditional test that performs a logical AND of ctrl (the instruction byte) and the binary number '10000000' (0x80 HEX). If the MSB (leftmost bit) of the instruction byte is a 1, the test condition is found to be TRUE and the DDS_DATA line is set high. If the MSB is 0, the test condition is FALSE and the DDS_DATA line is pulled low (line 4). Regardless of the outcome of this test, the next two lines generate a data clock pulse by pulling the DDS_CLK line high and then low. The final line performs a bitwise left shift of the instruction byte using the C left shift operator "<<". This moves the next bit into the MSB position for the next iteration of the loop. After 8 bits have been sent, the loop is terminated.

The next stage of the communication cycle sends the data to the DDS. For writing to the FTW register (FTW0), we will need to send 32 bits. The DDS frequency word is assigned to the variable 'freq'.

```
temp=freq;
for(count=0;count<32;count++)
{
if(temp&0x80000000)
{digitalWrite(DDS_DATA,HIGH);}
else {digitalWrite(DDS_DATA,LOW);}
digitalWrite(DDS_CLK,HIGH);
digitalWrite(DDS_CLK,LOW);
temp=temp << 1;
}
digitalWrite(DDS_UD,HIGH);
digitalWrite(DDS_UD,LOW);
```

This is very similar to the code for sending the instruction byte. The FTW is assigned to a new variable called temp. As with the previous example, a logical AND is used to find the value of the MSB. Note that in this case, we are dealing with the MSB of a 32 bit number. After 32 iterations of the loop, the final two lines send an update pulse to the DDS.

These two blocks of code have been declared as C functions, This makes it trivially easy to re-use them in future code. To show just how easy this is, I can write a new frequency to the DDS by calling the new functions in this sequence:

```
dds_inst(0x04);
dds_data(freq);
```

**TESTING.** My first attempt at testing the DDS was entirely unsuccessful. I had mistakenly assumed I needed to change the CFR1 register bit 12 (Enable SINE Output) to bring the DDS to life. This had the opposite affect and stopped it from working altogether. After much swearing and removing of code line-by-line, I eventually found the cause of the trouble and the offending code was removed.

At the second attempt, a lovely clean sine wave appeared at the DAC current outputs. The output from the transformer in Figure 4 was fed through a 31MHz LPF and then into the 50Ω input of my spectrum analyser. The signal was clean and free of measurable spurs other than the second harmonic at -50dBc. I was pleased to find that the output frequency was correct to within 1Hz. For a second test, the DDS was programmed for the Homebrew Net frequency of 3.727MHz + the IF offset of 10.6985MHz = 14.4255MHz. This time I let Pinguino handle the maths:

```
freq=(unsigned long)
(dial+if_offset)/min_step;
dds_inst(0x04);
// FTW0 register 0x04
dds_data(freq);
// Send 32 bit frequency word
```

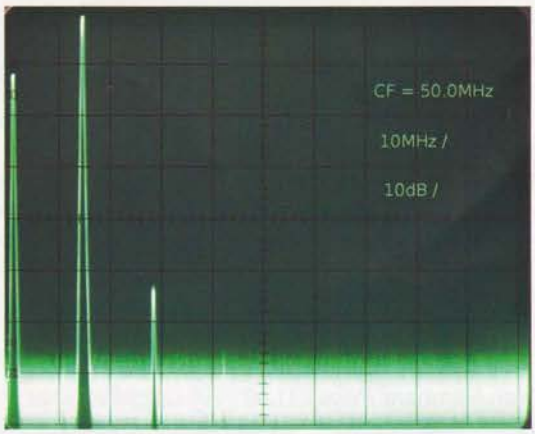



PHOTO 2: DDS output spectrum swept from DC-100MHz. The main output is at 14.25MHz; the second harmonic at 28.5MHz is more than 50dB down.

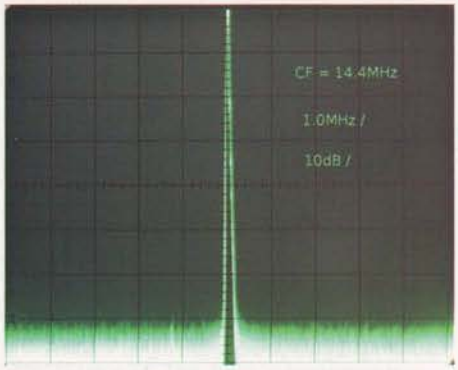



PHOTO 3: A close-in look at the signal, at 1MHz per division, shows that the signal is clean.

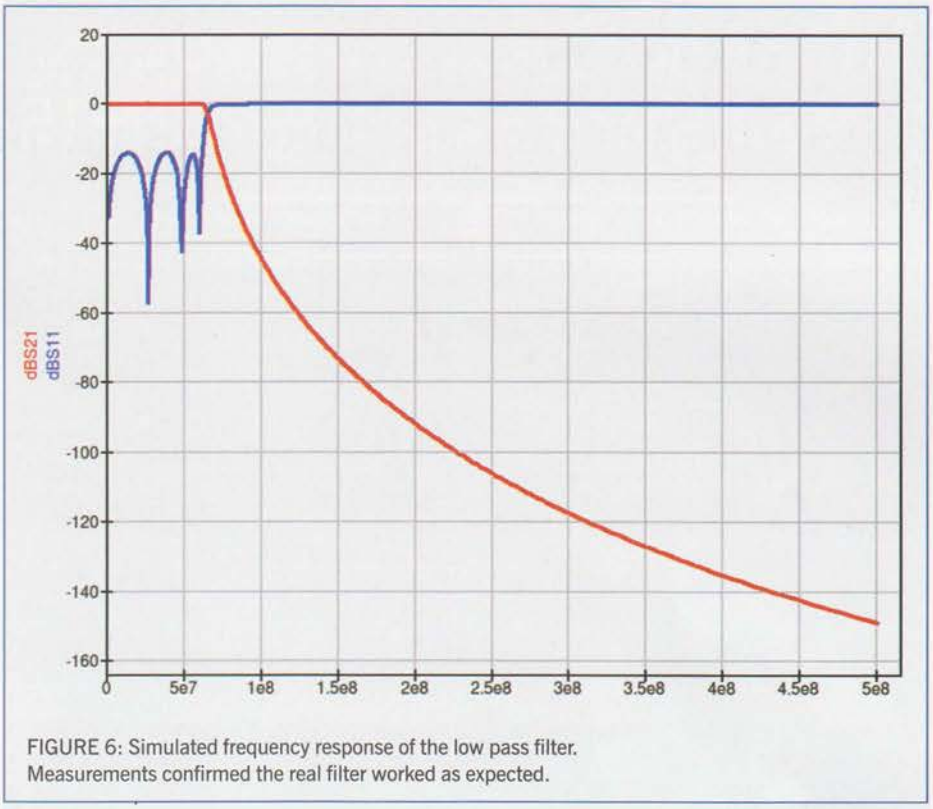



FIGURE 6: Simulated frequency response of the low pass filter. Measurements confirmed the real filter worked as expected.

The output spectrum over a 100MHz span is shown in **Photo 2**. Second harmonic output is more than 50dB down and all DDS spurs are generally below -70dBc. A 10MHz span centred on 14.42MHz is shown in **Photo 3**. There are no measurable spurs within the critical ±1MHz area. This is in line with data sheet claims of narrow band SFDR (spurious free dynamic range) in excess of 80dB. There are also no measurable spurs at or near the RF and IF frequencies.

The simple RC DAC output circuit seems to work quite well in practice. The low harmonic and spur level suggests that it is quite linear, but there may still be some room for improvement. I replaced my simple output network with a broadband transformer that is directly connected to the DAC current outputs and AVDD. The transformer is a centre-tapped 1:1 type. The schematic of the new output network and its LPF are shown in **Figure 5**. This circuit is based on the AD99xx evaluation board schematics from Analog Devices. The value of the two DAC resistors has been reduced from 100Ω to 50Ω. Instead of replacing the 100Ω resistors on the DDS carrier PCB, I left them in place and placed a pair of 100Ω resistors in the output transformer primary. These are effectively in parallel with the on-board 100Ω resistors. The transformer is 6 turns quadrifilar wound on a FT37-43 ferrite toroid. I used four lengths of 0.375mm enamelled copper twisted together. As the new arrangement has a direct DC connection to the DAC outputs and AVDD, it is important to check that it is wired correctly and there are no inter-winding shorts.

The LPF cutoff frequency is 62MHz. L1 and L3 are each 5T of 1mm enamelled copper on a T50-6 toroid. I had to bunch the turns until they occupied about 60% of the core circumference to achieve the required inductance of 178nH. L2 is 6T evenly spaced on a T50-6 toroid. **Figure 6** shows a QUCS simulation of the filter response. Measurements of the filter confirm the accuracy of the simulation.

The new output circuit has reduced the 2nd harmonic output to a level between -55 and -58dBc. Spur levels are at least as low as with the previous output network. Side-by-side tests with the old AD9851 DDS show that the new unit has significantly lower spurs. I wrote a simple frequency sweep program for the Pinguino. A YouTube video at **[4]** show how the DDS behaves at output frequencies between 1MHz and 50MHz; I used the 300MHz OCXO/tripler as the refclock. The Pinguino source code can be found on the project web page at **[5]**.

Next month we'll start looking at switching.

WEBSEARCH

[1] http://homepage.eircom.net/~ei9gq/art.html
[2] Homebrew November 2009 and http://homepage.eircom.net/~ei9gq/picboard.html
[3] http://sdcc.sourceforge.net/
[4] www.youtube.com/watch?v=flt-zlzK8yk
[5] http://homepage.eircom.net/~ei9gq/ad9951.html

# PICaYAGI

## Part 4 – the software, user interfaces and performance

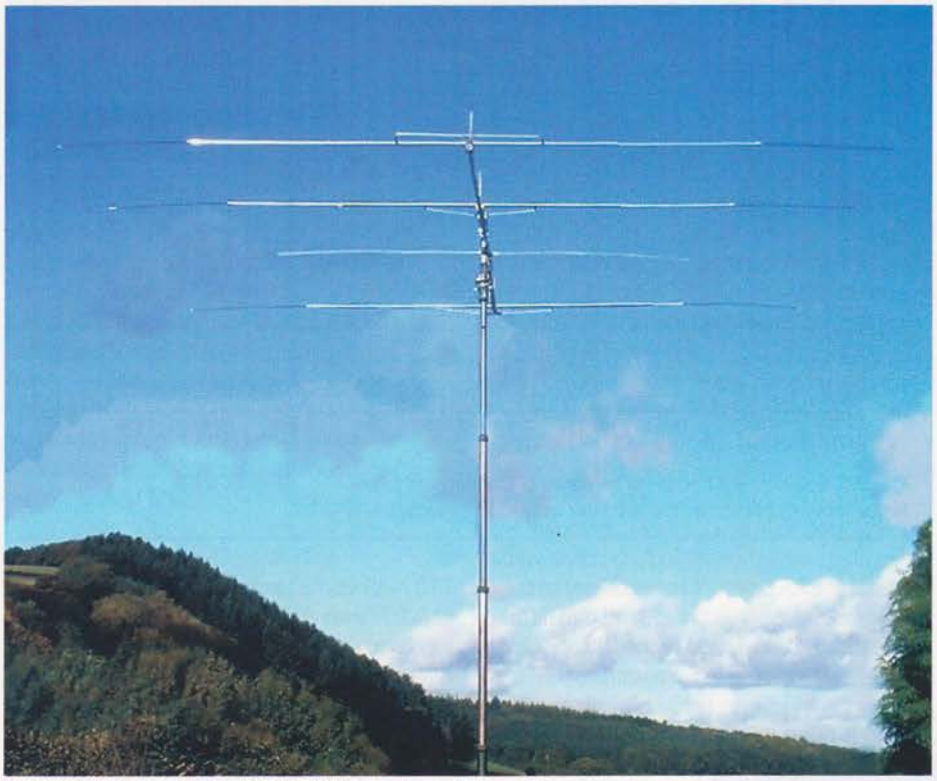


PHOTO 15: My completed PICaYAGI in service on 15m.

**INTRODUCTION.** This final part outlines the User Interfaces, how to tune your PICaYAGI and concludes with the measured performance results.

**USER INTERFACES (UI) SUMMARY.** As mentioned in previous parts, there are two UIs: 1) a Developer UI, to pre-define and save PICaYAGI tuning Solutions by frequency and 2) an Operational UI, for everyday use, which is mostly used simply to recall and apply those Solutions. One significant attraction of the Operational UI is that you don't need a PC for day-to-day operation.

At any one time you can choose to have either or both UIs in use. Further, you can start up the Developer UI part way through an operating session and it will seamlessly pick up the current state of play. This is particularly useful if you suspect something may have gone wrong.

The current state of all the PICaYAGI variables is stored in the Controller. So are all your tuning Solutions, indexed by frequency.

**GENERAL DESIGN FEATURES.** Before discussing the operation of the UIs, I need to explain some general design features for context.

***Park.*** This an important occasion, when the element is fully retracted – because it is also when the element length gets recalibrated to zero.

As the element comes IN towards a mechanical end-stop it slows right down in anticipation until it finally gently bumps into the stop. It then goes back OUT again until the time per shaft encoder slot increases, which corresponds to any backlash in the OUT-braid being taken up. This point is defined as zero extension – and is highly repeatable. My thanks to Peter, OE6ZH for inspiring this approach.

You need to fit a mechanical end-stop to each main element. Its purpose is both to prevent over-retraction and to define zero element length. The end-stop is simply a 4mm screw inserted in a hole drilled in the element very close to the end of the tube that feeds IN-braid to the braid tensioner.

***Element movements.*** Using the Developer UI, element IN and OUT movement commands are executed literally as requested. But using the Operational UI, all IN element movements are followed by an OUT. This is to remove any backlash – and it means that when going IN, there is a small over-travel IN first to compensate for the final OUT. Further, should the IN phase take you near to parked, then the element will indeed Park first – and then come OUT to the demanded position. All this arithmetic is totally transparent to you, as the user, but the result might give you a fright if you weren't expecting it.

***Go mode, Jump mode.*** This choice of operating modes is pre-set by you to determine how PICaYAGI behaves immediately following any detected frequency change.

In Go mode, you have to actively select from a menu to either go to the Solution or to change Solution and then go to that. More detail follows, but the critical feature is that if you don't select anything, absolutely nothing happens.

By contrast, if you elect to use Jump mode, the moment a frequency change is detected, PICaYAGI jumps to it and immediately starts changing to the new Solution with no user permission required. Since changing to a different Solution requires potentially large movements of the elements, you don't want to do it casually by accident. Go mode is therefore definitely the mode of choice when first setting things up and while you are gaining familiarity and confidence.

***X-mode.*** This is a simple ON/OFF switch. When X-mode is ON, the two linear resonators are toggled and the ELF stub switches to the 'wrong' band. The resultant retuning of the elements almost always results in a change of pattern to that of a bi-directional beam with, typically, a modest rise in SWR. Sometimes the pattern will slightly favour the reverse direction, sometimes the forward.

In any event, the ability to take an instant peek off the back of the beam is invaluable at times. If you are literally in the middle of a 3-way QSO, it is the only way that it can be done. On a conventional Yagi it can't be done at all. It is also useful if you are listening to a DX station and want to get a feel for the pile-up behind you. For this to work effectively in real life, the changeover has to be near instantaneous. Even a few seconds of delay would be too long to be useable.

***Solutions v Frequency.*** Your Tx frequency is measured and rounded to the nearest 20kHz within our 20/17/15/12/10m amateur band allocations. Although you could store tuning Solutions at 20kHz intervals, you don't actually need to find and store a Solution for every frequency you may ever want to use. The software will compute a Solution by interpolation from the nearest stored Solutions in the same band. So on the narrow 17m and 12m bands, two stored Solutions are enough. On 20m and 15m you will need more, depending on your mode and operating habits. On 10m you

need several for full coverage, bearing in mind that our 10m allocation is wider than all the others put together.

Any Tx activity determines the current system frequency. The fastest dit or the smallest cough is enough. Frequency is measured twice and, if any change is detected, four times. A change is actioned only if all 4 counts are the same.

Frequency is measured with 2.5kHz resolution and there must be not less than a 7.5kHz change to trigger a change of the 20kHz interval. This built-in hysteresis is so that if, by chance, you are near a 20kHz boundary, since your instantaneous modulation may cause the Tx frequency to be continuously crossing the boundary, this 7.5kHz change requirement means the display does not dither. More significantly, the elements don't cycle in and out if in Jump mode.

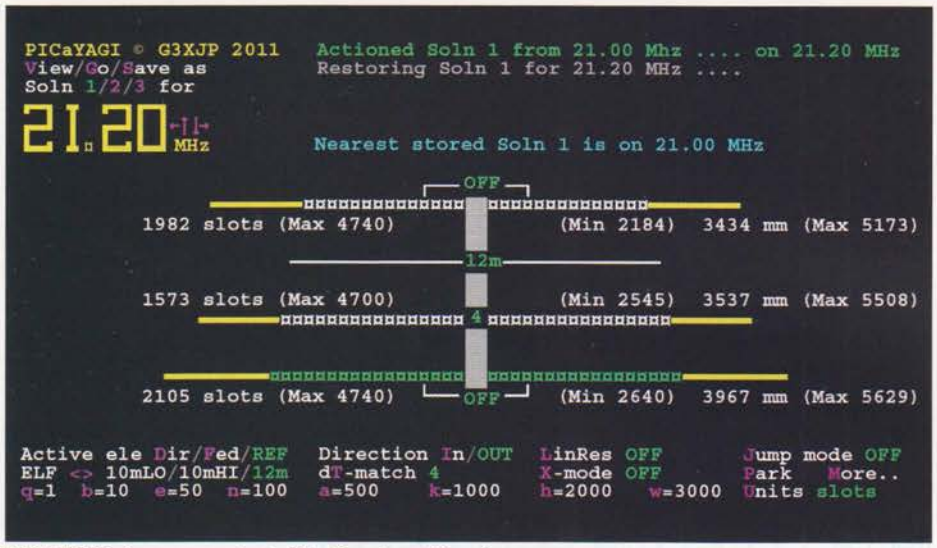



FIGURE 20: Screen snapshot of the Developer UI main menu.

**OPERATIONAL UI.** This gives you the ability to use pre-stored Solutions – but not to create them. If you press the Command switch on the Command Unit, PICaYAGI sends you a short menu sequence of CW characters via your Rx. You make a choice by pressing the Command Switch during or immediately after the character you want has been sent.

The other way to bring up the menu is to transmit after changing frequency while in Go mode. (As already explained, in Jump mode there is no user intervention and therefore no menu).

By design, the menu has only essential choices and the sequences are so simple, they are easily remembered and ingrained. This is important because it allows you to anticipate the menu sequence.

The top level CW menu sequence is G 3 X J P and it works as follows:

G Go to the Solution for the current frequency

3 = current Solution. If selected, the other two options are sent in numerical order – 1 2 or 2 3 or 1 3. To change to a different Solution, just select it as it goes by.

X X-mode toggle ON/OFF (initialises to OFF at power on time)

J Jump mode toggle ON/OFF

P Park – all 3 elements

That's about all there is to it. If you have absolutely zero CW skills, you will have no problem with this interface. I am the living proof. Frankly, it is not CW in the accepted sense. Rather, it is a series of predictable noises – much like a contest QSO.

**DEVELOPER UI.** This runs under QBASIC on your PC and it communicates with the Controller via an RS232 link. The cabling up to the antenna can be up to 100m of cheap 3-core signal cable. Mine is bundled in with some low current rotator cores.

The idea is to tune up PICaYAGI on a given frequency in order to define and save a tuning Solution that can be subsequently recalled for use on (or, by interpolation, near) that frequency thereafter. A tuning Solution comprises:

- An identifying number from 1-3
- The lengths of the DIR, FED and REF
- DIR linear resonator ON or OFF
- REF linear resonator ON or OFF
- ELF stub selection – 1 of 3 choices
- δT- match – 1 of 8 choices

and you can store up to 3 such tuning Solutions per frequency. You can allocate these 3 Solutions for any purpose you want. For example, mine are allocated to Best F/R, Best Gain and the third is for experimental playing.

The general process is to tune the elements like any other Yagi, but from the comfort of your shack. This includes finding the best δT match selection. As mentioned previously, this whole tuning process is highly iterative. More detail follows later. Just be grateful you are not lowering the mast for each and every adjustment!

**Figure 20** shows the main menu to control all this. The principal feature is a scaled mimic diagram of the antenna that shows the current state of the variables. It also updates element size in real time as the element lengths actually change. Below that are the commands for altering the variables.

In the top left hand corner are controls for selecting Solution and frequency. You can manually alter the frequency within the band using the ← and → keys. Band can be changed using the ↑ and ↓ keys. At any time you can View the calculated Solution for the current frequency and then Go to it. Or you can Save the current state of affairs as Sol(utio)n 1, 2 or 3 against the current frequency.

Choosing the More ... command from the main menu gets you a sub-menu. Full details of this are on the project website [1] but, in brief, facilities are provided to:

- Reload the PIC program in situ.
- Define the maximum and minimum lengths by element. The software will always refuse to drive the element beyond these safety stop limits.
- Zero trim. Used to manually calibrate the software and tell it that the element is at or very close to Parked.
- Timeout. A safety feature, this tells the software when to abort, should it encounter an obstruction. (My best one to date was driving the tip of an element into the uphill slope when the mast was fully lowered).
- Parking. Similar in concept to Timeout, this time-constant applies as the element slows up in the final phase of parking.

**FINDING TUNING SOLUTIONS.** There are several prerequisites for achieving your tuning solutions.

***Infrastructure.*** First, you need a reliable radiated signal source. You might want to enlist the help of a fellow amateur within ground wave range (and with a horizontally polarised antenna). But I think you will try their patience if you rely on this too much to start with. Completely useless for this purpose in my experience is any sky-wave signal. The amount and rate of QSB and random shifts in polarisation are inevitably more than the differences you are looking for. That said, you can build up a feeling using a regular sked with another (constant) station. For example Harold, W4ZCB and I have had a regular sked every week-day for years and we just 'know' how my rhombic used to perform. I had to take it down to erect and test PICaYAGI and we both came to the conclusion pretty quickly that PICaYAGI was significantly better. So this and other folklore – like how fast you break a pile-up – may have subjective merit in assessing the finished result. But they are useless as a means of tuning the Yagi to arrive at it.

Ideally, you want a signal source at least 100m away with its antenna horizontally polarised, in the clear and at least the same height as PICaYAGI. You also do not want any other conducting structures such as overhead phone or electricity lines or other HF antennas in the vicinity. This is a counsel of perfection and it is usually called an 'antenna test range'.

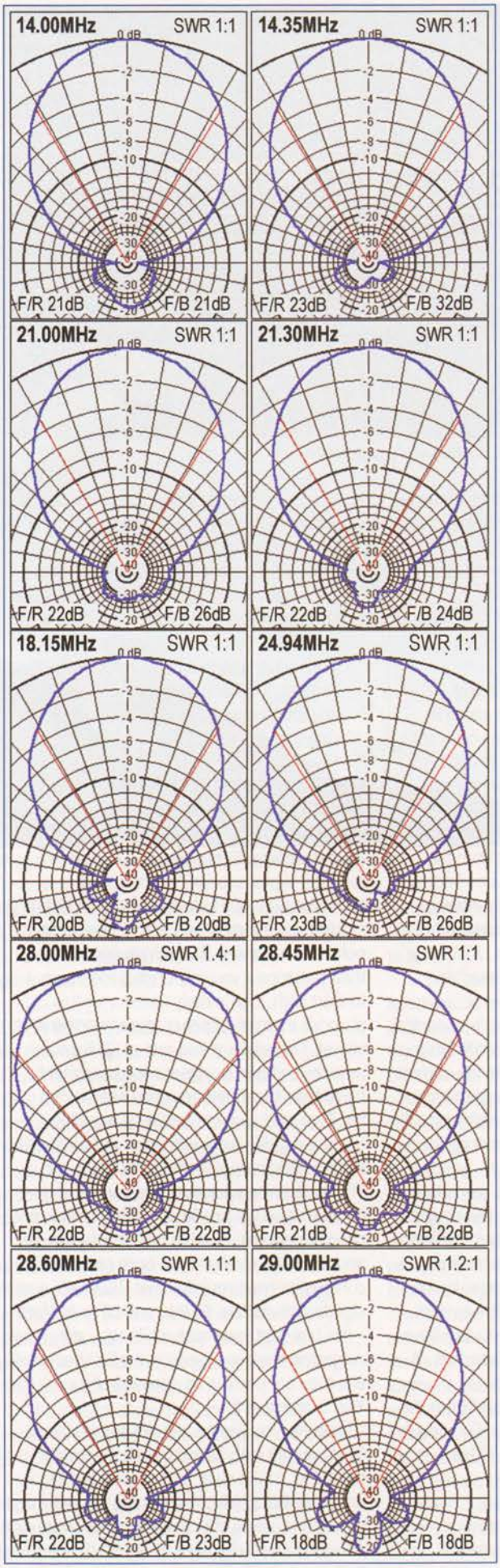



FIGURE 21: Representative 5-band measured azimuth patterns showing F/R, F/B and SWR with the PICaYAGI at a height of 10m.

It applies if you want to measure the results numerically with any hope of being accurate. But if you simply want to tune for the best results and are prepared to not be too disappointed by the actual numbers, these requirements can be relaxed significantly.

Ultimately, you have to live with what you have. In my experience, a Yagi tuned up under less than ideal conditions will still be about right. What you will notice is that the rear pattern – when pragmatically tested against real propagated signals – is consistently much better than you can measure locally.

For the signal source, a DDS generator, good collection of crystals or another Tx are obvious alternatives. The output level must be small enough to not saturate your Rx and, above all, be stable in frequency and amplitude.

My best setup is described shortly, but I recognise that not everyone has that sort of space available. I have, however, also used merely a dipole in a spare bedroom at the same height as PICaYAGI and only about 20m away. The polar diagrams come out much worse but, significantly, I have been unable to find much difference in the best tuning solution.

You also need some means of plotting the pattern. I used *PolarPlot* by G4HFQ [2]. This relies on your Rx (with the AGC switched off) and your PC sound card being linear over about a 30dB range. My PICaSTAR Tx/Rx certainly is but my cheap generic sound card has about 1dB of compression, which shows up as about 1dB worse apparent results. If you have a known good stepped attenuator, you can verify the linearity.

For measuring the received signal, a dB-linear S-meter is very useful. Or you can use *PolarPlot* in Calibrate mode, with the Rx AGC off.

***Tuning process.*** I suggest you start with an easy one on the 15m band. It is easy because you want both Linear Resonators switched OFF, the ELF is not used and you are nowhere near an end stop.

Starting from Parked and pointing at the signal source, the sequence I use to find Best F/R is:

1. Set δT-match to 0 (this means no series capacitor).
2. Set both LinRes to OFF. (For the bottom end of 20m you will need both ON – but not otherwise.)
3. Bring the FED out to roughly right by observing a peak in the source and/or a dip in the SWR.
4. Bring the REF out. You will see the signal dip as it passes through the right length to be a director, then the signal will come up again near the right reflector length. Now the iteration starts.
5. Swing the beam through 270° and settle on the largest rear lobe. Tune the REF to minimise this lobe. But not by too much without checking that some other rear lobe has not become larger.
6. Repeat 5, but this time tuning the DIR.
7. Try other δT-match values and choose the one that gives best SWR. Then try moving the FED slightly to find if either longer or shorter improves both the SWR and the F/R.
8. Loop back to 5 and iterate until you can do no better.

At this point, if it feels good, you can do a full PolarPlot. The process for tuning for a little more gain and a lot less F/R is the same, but with the DIR tuned instead for maximum forward gain.

The next step is critical. Although all your element lengths are now correct, they are not repeatable because, under the Developer UI, the braid backlash has not been taken out. To get it right, select each element in turn and drive it IN by 500 slots. Then bring it OUT in increasingly small increments until you get back to the same tuning point – but without doing any IN movements. Then you can validly Save the solution.

***Tuning the ELF.*** You only have to do this once! You need to adjust the length so that the ELF works best above about 28.5MHz with the 10m HI stub selected. Use a very short 10m LO stub for contrast. Thereafter you tune the lengths of the 10m LO stub for the bottom end of 10m and the 12m stub for 12m.

A very useful trick is to make both stubs only slightly different lengths and use both of them on both bands. Switching between them tells you if the target stub needs to be longer or shorter. I did all this with the antenna only about 3m off the ground and then refined it at full height later.

***Tuning the Linear Resonators.*** With both Linear Resonators switched OFF, tune up on the very top end of 20m. Then switch the DIR Linear Resonator ON and shorten

the DIR until you get the same result. Then shorten it a little more and trim the resonator capacitor. Repeat for the REF.

Move down the band by 30kHz and re-trim first the FED and then both resonator capacitors. Keep moving down the band until you can't get nearer to the bottom of the band without increasing the DIR and REF lengths.

**MEASURED PERFORMANCE.** This is the process I used to measure performance and the results I achieved.

***Measurement setup.*** For my signal source on all frequencies, I used a DDS generator. It was placed 3m up in a tree with a 12V battery and connected directly to a horizontal dipole cut for about 12m. To change frequency etc I put up an aluminium ladder, changed the settings and always replaced the ladder on the ground.

This source is about 80m away from PICaYAGI (and at the same height only because of the ground-slope). In fact, I'm firing along and slightly up a 20° slope, which is far from ideal.

My S-meter has a test mode that gives 0.01dB resolution. This is great for noting if a very small change to element length is in the right direction but adds nothing to the ultimate measurement accuracy.

***Performance plots.*** Some representative plots are shown in **Figure 21**. There are more on the project website [1]. In general, they show better than 20dB F/R and unity SWR.

The performance is slightly degraded on 14.00MHz compared to the rest of 20m; you can also see it is starting to run out of adjustment at 29.00MHz.

***Pattern skew.*** If you look closely at the patterns in Figure 21, you may notice that the rear pattern is skewed slightly. This skew could be an artefact of the antenna or equally, it could be an artefact of the measuring environment. To find out which, I flipped the beam over on its back on 10m (you wouldn't want to try this on any other band) and noted that the skew did not change sides. So I attribute it to significant quantities of fencing wire mesh and barbed wire, the ground slope and an 11kV overhead line about 100m away – but not to the antenna itself.

***Forward Gain.*** You will note that I've made no mention so far of gain. This is because I'm not trying to sell you anything – and it is not validly measurable here or in any other domestic setting. However, here are three tentative thoughts:

1. If the rear pattern is good, then the RF must be going somewhere. Some of it is certainly going in non-useful directions in other planes. But since the rear performance is very close to that predicted by NEC modelling, it is perhaps reasonable to assume that the gain predicted by that same model won't be far out – particularly in directions where I have a clear take-off.
2. I put up a dipole for 15m that appeared not to interact. The PICaYAGI gain over that dipole into the USA was consistent with the NEC model.
3. An unique PICaYAGI capability is to radically de-tune the parasitic elements, leaving a mere FED dipole. Thus it is possible to measure gain versus that dipole-only configuration. I don't think this is entirely legitimate because both antenna modes use the same matching system. So if that were very lossy, that fact would be masked by this measurement. That said, gain measured in this way also correlates closely with the NEC model.

All this goes to prove that measurements that give the results you want are ultimately more valid than those that don't!

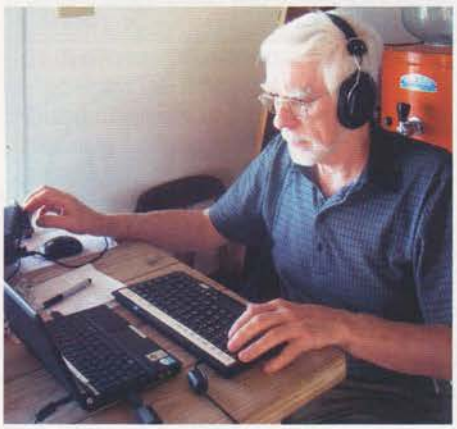
**IN CONCLUSION.** I would like to thank Ian, GM3SEK and Harold, W4ZCB for their suggestions for this article. Thanks also to Byron, WA4GEG and Duke, W1ZA – and Harold, W4ZCB in particular – for hours of patient on-air testing. It was great amateur radio – and with a great new antenna as a result!

WEBSEARCH

[1] http://uk.groups.yahoo.com/group/PICaYAGI
[2] www.g4hfq.co.uk/index.html

# DXpeditioning and Contesting from the British Virgin Islands

## A single operator DXpedition to the Caribbean



One hour into the contest.

BACKGROUND. Having been an active radio amateur for almost 50 years and having reached the 'ripe old age' of 73, the chance to achieve a lifetime ambition became a reality this year. While I have called into many a DX pile up over the years, I've never been at the DX end of a big pileup or operated in a contest as a semi-rare DX station. Seven years as ZL2LA and ZL2BDA had seen me in some pretty hectic on-air sessions but nothing to compare with the kind of pile up 'real DX' always attracts! In other words this trip was on my 'bucket list'!

I was able to make this dream become a reality this year as my son, Geoff, had gone to live and work in the British Virgin Islands (VP2V) in January 2010. So, when fellow Sheffield Amateur Radio Club member Nick, G4FAL, suggested I carry on the SARC tradition of fielding a Caribbean based station for the RSGB Commonwealth Contest in March 2011, I agreed. Nick had entered this contest from Montserrat (VP2MCC) and St Kitts (V47CD) in the three years prior to this one and Colin, G3VCQ, had activated Granada, J38CW, during the 2010 contest. Neither were able to travel this year so I stepped in. At the RSGB Convention in October last year, I met several seasoned Commonwealth Contest veterans – Dave Cree, G3TBK, Chris Tran, GM3WOJ and Bob Whelan, G3PJT. Both Dave and Bob were also to operate from the Caribbean for this year's contest. In the preceding months they, and John, G3LZQ, were to provide me with much valuable advice.

The British Virgin Islands consist of the main islands of Tortola, Virgin Gorda, Anegada and Jost Van Dyke, along with over fifty other smaller islands and cays. Approximately 15 of the islands are inhabited. The capital, Road Town, is situated on Tortola, the largest island, approximately 20km long and 5km wide. The islands have a total population of about 22,000, of whom approximately 18,000 live on Tortola.

THE CONTEST. The Commonwealth Contest takes place over the second weekend of March each year. A study of past results clearly shows there is little, if any, chance of winning it from a UK location, although there are awards for leading UK stations. In the past, most of the leading stations have come from Canada and the Caribbean. The contest has many sections, which are detailed on the Commonwealth Contest website **[1]**. I was asked to join the Rest of the World team along with other 'travellers' such as J68PJ (G3PJT), J88DR (G3TBK), VP2MXF (G3TXF), 8P6DR (G3RWL) and the more permanent residents of their respective countries in the form of C4Z, P3J, ZC4LI, VP8NO and ZB2EO.

PLANNING. Like most things in life, careful preparation always pays dividends. This expedition clearly needed things to be sorted before leaving the UK: licence and callsign for VP2V, a suitable good radio location with accommodation for two people, return air tickets, lightweight radio equipment and antennas that would not exceed the airline baggage limits; a camera, a small laptop and contest/expedition logging software. Money, clothing and other personal effects came last on my list!

I applied for a reciprocal licence and this was easier than I was led to believe. The British Virgin Islands now has an excellent government website **[2]** where all the necessary information and application form can be readily downloaded. In addition I spoke to Darren Woodley **[3]** at the Telecommunications Regulatory Commission in Roadtown **[4]**. I had hoped to be granted a callsign such as VP2VCC (Commonwealth Contest) but the only type of callsigns offered to non nationals are in the format VP2V/G3PHO. I did not relish the thought of sending this call at 30+ wpm on a hand key or even a paddle during contests and pile ups so I was glad my contest software (*Wintest*) would do that for me! Neither was I looking forward to using the callsign on SSB as it looked quite a mouthful for high QSO rates per hour. The licence came through surprisingly quickly and the licence was stamped valid to the end of 2011, an added bonus if I need to make another trip!

For accommodation, I had originally planned to 'rough it' on a very small island in Trellis Bay by the airport. Named Bellamy Cay, it's the size of a rugby field. I was, at first, keen on the idea as being surrounded by water on a small island would lend itself to vertical antennas, which always seem to work extremely well if located on the beach. As my wife accompanied me on the trip, I needed to think again. Fortunately, my son has a friend who had recently built a holiday rental villa at Cooten Bay, on the north coast of Tortola. Once I saw the photos on his website **[5]** I was hooked, realising what a fantastic DX location it was, especially for Europe, Asia and Canada. The owner was very happy to let me erect a mast and wire antennas. There were no neighbours and so no RFI problems.

For equipment, the only lightweight transceiver I had was a trusty old Icom IC-706MK2G. My FT-950 was far too large and heavy to take on an aircraft, as was my Acom 1010 amplifier. So 100 watts was to be the maximum power I could use, thus putting me in the Restricted Section. This in some ways simplified matters because antennas could be simple wire dipoles, doublets, loops and the like. I beefed up the IC-706MK2G with 500Hz and 350Hz CW filters. I already had an SEC 1223 switch mode PSU, which was easily modified to work on VP2V's 110V mains. All my other equipment used 110-230V switch mode PSUs so I made up a 4 way UK socket with a long lead ending in a USA style plug.

I planned to operate on CW for most of the time. My Microham Keyer Mk II therefore became an essential accessory as it would allow me to operate for long periods at high speeds using computer keying (but human brain reading!) with all logging done in *Wintest*. This excellent software is recommended to all contesters and DXers. A Vibroplex paddle was also taken for more relaxed operating and 'ragchewing'. I thought long and hard about antennas for the trip. The Restricted Section clearly limits antennas to single element types so there could be no beams or curtain arrays. G4FAL had taken a first

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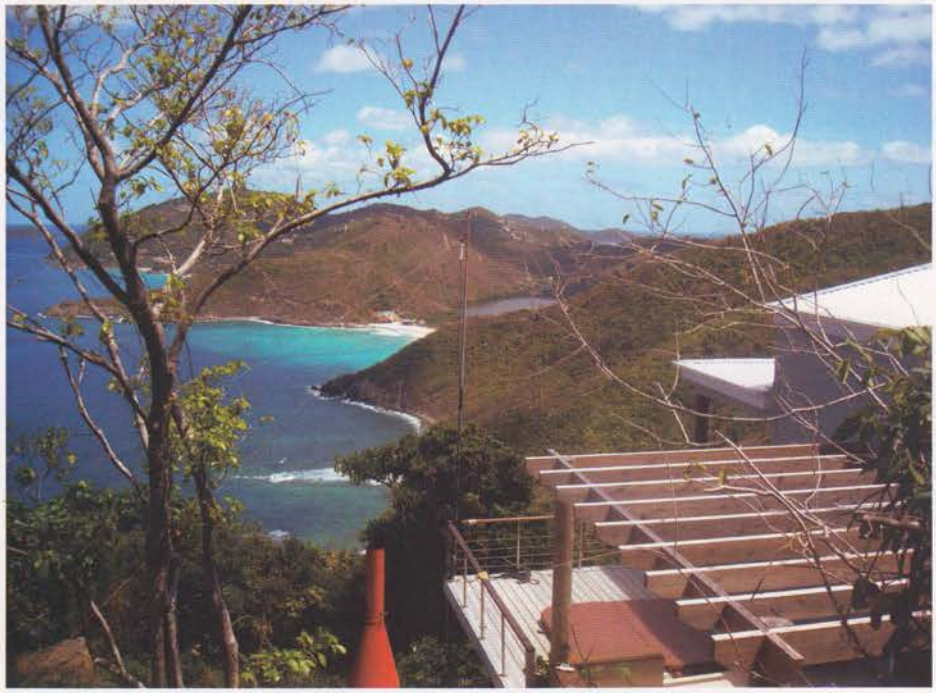


Looking east from the Cooten Bay Villa QTH.

place using just a simple fan dipole system, ie four or five dipoles on a common coax feeder. Other travellers had used slopers or multiband doublets. I finally decided on the fan dipoles, with a homemade Carolina Windom as a backup.

To keep the baggage weight down, I chose used thinner wire and coax than I would normally use at home. Most of my egg or dogbone insulators were replaced with inexpensive white plastic joiners normally used to join two wooden panels at right angles. They make excellent lightweight insulators for antennas.

The two antennas were set up and trimmed at home during late October and November 2010 and QSOs made on every band 80m-10m, excluding the WARC bands. However there were problems doing this as my garden allows only inverted V antennas of 50 foot length in each leg so I fully expected to have to readjust the dipole and Windom lengths once I set them up in the Virgin Islands. I have both an MFJ Antenna Analyser and a miniVNA that take the guesswork out of such adjustments. I took the very compact Asus EEE mini laptop with me to VP2V and this, plus the miniVNA, provided a very quick and efficient way to trim the antenna wire lengths. All four dipoles in the fan array were too long in the Virgin Islands. It's only necessary to make four dipoles to cover 5 bands as the 7MHz dipole works as three half waves in phase on 21MHz. To do this efficiently, I tuned the 40m dipole to 6950kHz, which then gave excellent coverage of the lower 100kHz of the 7MHz band and reasonable VSWR in the lower end of the 21MHz band. If this is not done, the 21MHz resonance point is too high up the band.

The equipment list was rounded off with various extras and spare parts such as lightweight headphones, microphone, computer memory stick, fuses, insulating tape, digital multimeter, 12V soldering iron and 2m of solder, etc. A separate VSWR/power meter was not taken as the IC-706 had its own built in.

**SETTING UP THE STATION.** The villa turned out to be located on the steep north facing slope of the land immediately behind Cooten Bay. In fact the downslope part of the house was on thick wooden pillars or stilts. Around the house was a wooden deck or veranda, the north western corner of which proved to be an ideal mounting point for the 18 foot fiberglass boat mast that my son had managed to borrow for me. This was lashed to the rail around the deck and the fan dipole array pulled up to hang in inverted V fashion. The four dipoles were suspended at their ends using handy trees and bushes. The 80 and 40 metre dipoles had one leg out in a straight line but the eastern side of each dipole had to be bent to fit into the available open space. All four dipoles were arranged to fan well apart from each other to avoid interaction. The effective height of this antenna system must have been 60 or more feet within a few feet downslope of the house as the ground fell away at a very rapid rate from 600 feet down to the sea and beach below us. Once finally adjusted using the mini VNA, each of the dipoles had a sufficiently low VSWR and reasonable feed impedance for them to work at the CW ends of their band without the ATU. After the contest I was very pleasantly surprised that, with the ATU, I was able to work quite efficiently on all the other, WARC, bands as well!

The location was very impressive indeed, at least towards Canada, Europe, the Middle East and Asia. However, it was obvious that contacts into the Pacific via the direct path to the SW would be very difficult as the ground behind the villa immediately rose at least another 400 feet and even to the South and SE (Africa and South America) it wasn't a great deal better. I therefore hoped I could work into VK/ZL via the long path over Northern Europe but this was not expected to be on for the 10 and 15 metre bands.

During the Friday I operated on CW on all the contest bands to make sure everything would be fine on the Big Day. I need not have worried, calls started to pile in at a rapid rate. QSO rates of 113 an hour with no real effort proved to me that I needn't worry about getting out! The first UK station worked was G3VMW on 80m CW, just two minutes after midnight UK time. Eighty meters delivered some amazing signals from Europe. It's not until one operates from a quiet location, removed from Europe and the USA, that one appreciates how good the bands can be. I was very glad I had fitted the extra CW filters to the IC-706 as it would have been quite impossible to work at this QSO rate without them.

**CONTEST DAY.** At 0515 local BVI time I woke up abruptly, thinking I'd missed the 6am (1000GMT) start! I'd left the transceiver running from the previous evening so it was merely a matter of donning the headphones and getting on with it. With 24 hours ahead of me, sitting at the operating table working the contest, eating meals there and, very occasionally, having to rush to the 'little room', I wondered if it would all work out well. Thank goodness my XYL had come with me. She fed and watered me for the full 24 hours! Support like this is essential and I thought of my friends Nick, G4FAL, Dave, G3TBK and others, who were doing the same contest without a "Here's your lunch. How's it going?" and a smile from the good lady.

This contest is not a hectic affair like CQWW or IOTA. Because it's restricted to Commonwealth countries you don't have to deal with hordes of European and American callers. In past years, final QSO totals of over 600 in the 24 hours Restricted Section (ie hourly rates averaging only 30 contacts or so) and just around 1000 QSOs in the Open

VP2V/G3PHO working the pile ups.

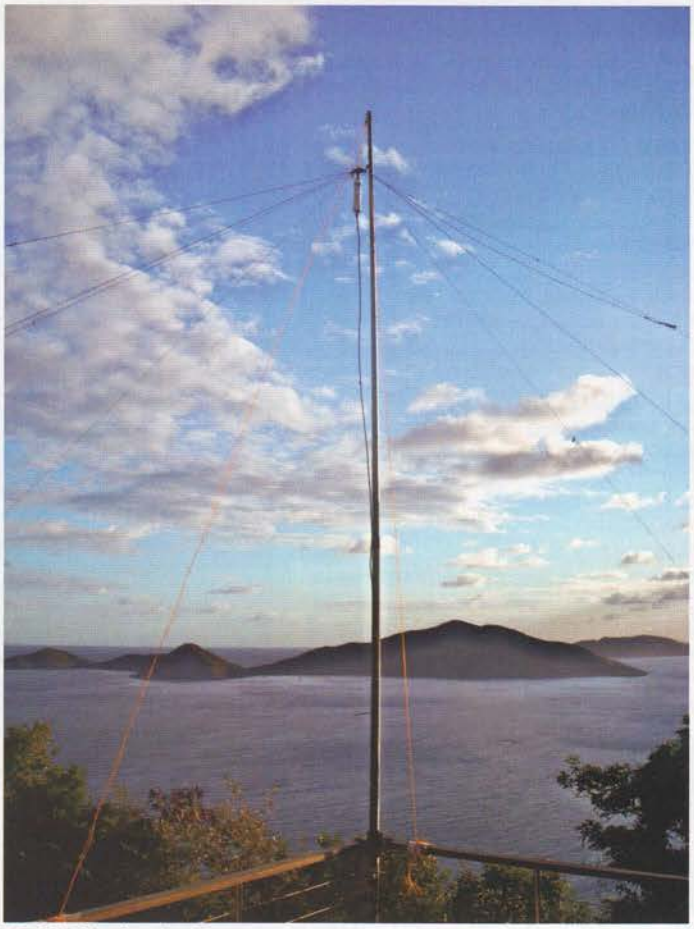
Section have been leading scores. Compare this to the big 48 world wide contests where several thousand contacts are the order of the day. There's even time to send a 73 to an old pal who happens to call you. The total QSO tally is not the deciding factor however as it's most important to work as many Commonwealth areas (BCAs) and HQ stations as possible for they are your multipliers and can be worked again and again on each separate band.

Like any other contest, it's vital to have a game plan. Acting on the advice of G3TBK and G4FAL who have operated from the Caribbean several times, I started off on 80 metres so I could, in an hour or so, bag as many Canadians and neighbouring Caribbean stations as possible before moving up the bands via 40 and 20 metres as the day developed. By 0730 local time (1130 GMT), just 90 minutes into the contest, 20 metres was in fine shape and the Gs were thundering in at 599 plus. G0IVZ was the first one worked and he was followed by a steady stream of familiar calls, G5LP, G3TKF, G3LET, G4FAL and the like, all with outstanding signals. I need not have worried about running 100 watts to dipoles. CQs brought back immediate responses most of the time and mixture of running a spot frequency, alternating with Search and Pounce operating, kept the scoring rate reasonably high. I knew that I had to check 10 and 15 metres whenever possible, as to linger too long on 20m working G stations was not as productive from a final points aspect as picking up the rare multipliers from Oceania, Africa and Asia on the two higher bands. Three hours after the contest started I was working South and East Africa on 15 metres as well as picking up extra multipliers in the shape of local Caribbean contestants J88DR, VP2MXF, J68PJ and 8P9AA. Then it was back to 20 metres and more UK and Canadian stations until 10 metres opened up to Canada for 40 minutes or so at 1500GMT (1100 local time). This continued, alternating with 15 metres until 1800GMT when a return to 20 metres for three more hours was called for. The Gs were still rolling in on this band and, at 1842GMT, I was delighted to work Philip, G3NEO, from Sheffield who I have known for some 50 years and who gets out remarkably well with simple wire antennas and 100 watts. Philip is around 90 years of age and remains a fine and considerate operator of the 'old school'. I was to work him later in the contest on both 40 and 80 metres, so making it a three bander.

By 2100GMT (1700 BVI time) the 40m band was open into the UK and Europe. Once again, G0IVZ was the first G on this band! Clive, GM3POI and Nick, G4FAL had 'rock crusher' signals soon after and it was obvious that I also had a big signal into Europe, bigger in fact than some of my neighbouring Caribbean rivals. Occasionally, during this 40m session, I would take a quick peek at the higher bands just in case there were a few multipliers around. That way I bagged VA7ST on both 20 and 15 as well as P29CW on 20m, a nice one as he was a long way away.

Sadly, due to the rules, whilst MD0CCE was a welcome contact on 20m, he did not count as a multiplier as by then I'd worked dozens of Gs, GMs, GIs and GWs, all of whom were worth the same as each other.

To cut the contest story short, the BVI night time from 2240GMT (1800 BVI time) until 0848GMT was almost entirely spent on the 40 and 80m bands, the former producing a seemingly never ending string of UK stations at incredible strengths for hour after hour. The openings on the higher bands I needed for those elusive multipliers did not happen, although I heard other Caribbean stations working them. The high ground behind me was obviously having a marked effect. In the whole contest I worked only 3 ZLs and 9 VKs. The final hour of the contest, as the sun was rising over Josiah's Bay to the east of me, was spent on 20 metres. At 0600 local time (1000GMT) on Sunday, my final QSO of the contest was with GI4BQI for my 615th QSO ... At least I'd reached my target of over 600 contacts!



The 80-10m fan dipole array.

FINAL RESULTS. At the time of writing, the logs have not been adjudicated but I'm presently lying second in a list of 103 entries in the Restricted Section with 615 QSOs for 6755 points. However, I already know that Bob, J68PJ, although having worked some 45 fewer stations has in fact a higher final score as he made more multipliers on the two higher bands. Before I left the UK for this expedition I didn't expect to be anywhere near the top 50, never mind the top three! The results appeared in the article on the Commonwealth Contest in September's *RadCom*.

AFTER THE CONTEST. I was determined not to let amateur radio take over the remaining seven days of our time in the British Virgin Islands so I limited my operating to a couple of hours before breakfast and maybe an hour before dinner, with possibly the odd late night session from around 11pm local time. Such casual holiday style operating produced almost 3000 more QSOs for 30 hours operating over six days. A short CQ would be followed by immense pile ups on any band tried, including all the WARC bands, where I found I could radiate a decent signal all over the world but especially into Europe. It was very gratifying to see DX Cluster spots thanking me for a 'new one' on bands such as 18 and 24MHz. SSB was tried for relatively short periods on 20m only and netted some 298 contacts. All the remaining time was spent on CW, my favourite mode. In the post contest week I worked every band from 80m to 20m, including 452 QSOs on 15 metres and almost 200 on 10 metres.

When not on the air, my XYL and I were either hill walking, swimming, snorkelling, sailing or eating ... what a great life it is when you are retired! Then it was back to the UK to face the mountain of QSL cards!

Now, where to for next year's contest?

REFERENCES

[1] Commonwealth Contest website: www.beru.org.uk
[2] BVI Telecommunications Regulatory Commission: http://www.trc.vg. Navigate to Documents and then to Application Forms - amateur reciprocal.
[3] dwoodley@gov.vg
[4] Telecommunications Regulatory Commission Government of the British Virgin Islands, L.M. Business Centre P.O. Box 4401, Road Town, Tortola British Virgin Islands VG1110
[5] Cooten Bay villa rental: www.vrbo.com/303092

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The Quansheng TG-UV2 is a dual band 2m/70cms handheld. It covers 136.00 - 173.995, 400 - 469.995MHz and FM broadcast 88-108MHz. The radio includes 7.2v 2Ah Li-ion battery for extended life. It also comes with AC charger, carry strap and belt clip. This is a very robust radio - don't underestimate its performance from the price!

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**FT-8800E** Dual band 2/70cm RX 10-999MHz, 50 Watts output ..... **£329.95**

**FTM-10E** Dual band 2/70cm, 50 Watts output ..... **£309.95**

**FT-7900E** Dual band 2/70cm 50/40 Watts with wideband RX ..... **£239.95**

**FT-2900E** Single band 2m 75 Watt heavy duty transceiver ..... **£139.95**

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**FT-DX5000** HF/6m all mode 200W transceiver ..... **£4,349.95**

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**FT-2000** HF/6m All mode 100 Watts transceiver RX: 30kHz – 60MHz ..... **£2,249.95**

**FT-950** HF/6m 100 watt transceiver with DSP & ATU RX 30kHz – 56MHz ..... **£1,299.95**

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**FT-450D** "New" model compact transceiv er with built-in ATU ..... **£829.95**

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**RG58-DRUM-50** Standard, 5mm, 50 ohm, 50m reel ..... **£14.95**
**RG58-DRUM-100** Standard, 5mm, 50 ohm, 100m reel ..... **£24.95**
**RG58M** Mil spec, 5mm, 50 ohm, per metre (best seller) ..... **£0.60**
**RG58M-DRUM-100** Mil spec, 5mm, 50 ohm, 100m reel ..... **£44.95**
**RG58M-DRUM-50** new 50m reel of mil spec RG58 in a great handy size .only **£24.95**
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**RG213** Mil spec, 9mm, 50 ohm, per metre ..... **£1.30**
**RG213-DRUM-100** Mil spec, 9mm, 50 ohm, 100m reel ..... **£109.95**
**WESTFLEX103** Mil spec, 10mm, 50 ohm, per metre ..... **£1.75**
**WESTFLEX103-DRUM-100** Mil spec, 10mm, 50 ohm, 100m reel ..... **£149.95**
**300-20M** Ladder Ribbon, best USA quality, 300 ohm, 20m pack ..... **£17.95**
**300-DRUM** Ladder Ribbon, best USA quality, 300 ohm, 100m reel ..... **£69.95**
**450-20M** Ladder Ribbon, best USA quality, 450 ohm, 20m pack ..... **£19.95**
**450-DRUM** Ladder Ribbon, best USA quality, 450 ohm, 100m reel ..... **£79.95**

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***Perfect for making your own antennas, traps, long wire aerials etc.***

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**SCW-50** Enamelled copper wire, 1.5mm ..... **£24.95**
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**CCS-50** Genuine Copperweld copper clad steel, 1.6mm ..... **£29.95**
**FW-50** Original Flexweave bare copper wire, 2mm ..... **£34.95**
**FWPVC-50** Original clear PVC covered copper wire, 4mm ..... **£44.95**
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**FWPVC-100** Original PVC coated flexweave antenna wire, 4mm, 100m reel ..... **£79.95**

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Perfect for field days at a perfect price
..... just **£59.95** complete

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**SPIDER-3** Fixed 3 point mast collar for guy ropes ..... **£5.95**
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**PTP-20** Pole to pole clamp to clamp up to 2" to 2" ..... **£5.95**
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**DPC-S** Wire dipole centre with SO239 to suit cable feed connections ..... **£6.95**
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**DPC-38** Dipole centre with SO239 socket with two 3/8" sockets to make mobile dipole ..... **£6.95**
**DOGBONE-S** Small ribbed wire insulator ..... **£1.25**
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**EARTHROD-CP** 4ft copper plated earth rod and clamp ..... **£16.95**
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(5ft Sections)

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## Portable Telescopic Masts

**LMA-S** Length 17.6ft open 4ft closed 2-1" diameter ..... **£79.95**
**LMA-M** Length 26ft open 5.5ft closed 2-1" diameter ..... **£89.95**
**LMA-L** Length 33ft open 7.2ft closed 2-1" diameter ..... **£99.95**
**CARPLATE-HDT** brilliant drive on plate with tilt - ideal to be used in conjunction with the portable telescopic masts and only ..... **£44.95**

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**PL58-10** 10m Standard RG58 PL259 to PL259 lead ..... **£8.95**
**PL58-30** 30m Standard RG58 PL259 to PL259 lead ..... **£16.95**
**PL58M-0.5** ½m Mil Spec RG58 PL259 to PL259 lead ..... **£4.50**
**PL58M-10** 10m Mil Spec RG58 PL259 to PL259 lead ..... **£12.95**
**PL58M-30** 30m Mil Spec RG58 PL259 to PL259 lead ..... **£27.95**
**PL213-10** 10m Mil Spec RG213 PL259 to PL259 lead ..... **£18.95**
**PL213-30** 30m Mil Spec RG213 PL259 to PL259 lead ..... **£39.95**
**PL103-10** 10m Mil Spec Westflex 103 PL259 to PL259 lead ..... **£29.95**
**PL103-30** 30m Mil Spec Westflex 103 PL259 to PL259 lead ..... **£69.95**
***(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)***

## Connectors

**PL259-6mm** Standard plug for RG58 ..... **£0.99p**
**PL259-9mm** Standard plug for RG213 ..... **£0.99p**
**PL259-7mm** Standard plug for Mini8 ..... **£1.25p**
**PL259-6C** Compression type for RG58 ..... **£2.50p**
**PL259-9C** Compression type for RG213 ..... **£2.50p**
**PL259-103C** Compression type for Westflex 103 ..... **£5.50**
**NTYPE-6** Compression type plug for RG58 ..... **£3.95**
**NTYPE-9** Compression type plug for RG213 ..... **£3.95**
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**BNC-6** Compression type for RG58 ..... **£1.50**
**BNC-9** Compression type for RG213 ..... **£3.50**
**SO239-N** Adapter to convert PL259 to N-Type male ..... **£3.95**
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**BNC-SMA** Adapter to convert modern SMA radio to suit BNC ... **£3.95**
**SO239-SMA** Adapter to convert modern SMA radio to suit SO239 .**£3.95**
**PL259-38** Adapter to convert SO239 fitting to 38" thread ..... **£3.95**

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New lower prices!

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**MFJ-927** Compact with Power Injector 1.8-30MHz 200W ..... **£254.95**
**MFJ-928** Compact with Power Injector 1.8-30MHz 200W ..... **£203.95**
**MFJ-929** Compact with Random Wire Option 1.8-30MHz 200W ..... **£214.95**
**MFJ-991B** 1.8-30MHz 150W SSB/100W CW ATU ..... **£214.95**
**MFJ-993B** 1.8-30MHz 300W SSB/150W CW ATU ..... **£254.95**
**MFJ-994B** 1.8-30MHz 600W SSB/300W CW ATU ..... **£349.95**
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**MFJ-904** 3.5-30MHz 150W mini travel tuner with SWR/PWR ..... **£132.95**
**MFJ-904H** 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun ..... **£152.95**
**MFJ-901B** 1.8-30MHz 200W Versa tuner ..... **£109.95**
**MFJ-971** 1.8-30MHz 300W portable tuner ..... **£122.95**
**MFJ-945E** 1.8-54MHz 300W tuner with meter ..... **£134.95**
**MFJ-941E** 1.8-30MHz 300W Versa tuner 2 ..... **£144.95**
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**MFJ-949E** 1.8-30MHz 300W deluxe Versa tuner with DL ..... **£184.95**
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**LDG AT-1000 Pro** 1.8-54MHz continuously ..... **£519.95**
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**NTYPE-6CST** 6mm pure silver plated brass N-type with gold plate pin ..... **£6.95**
**NTYPE-9CST** 9mm pure silver plated brass N-type with gold plate pin ..... **£6.95**

ALL PICTURES ARE FOR REFERENCE ONLY

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# RAYNET

## RAYNET Strategic Governance Group

Setting up Control for a mountain bike event.

GOOD REACTION. The second issue of the RAYNET column begins with thanks to all who have e-mailed with their comments. So far the reaction has been 100% positive I'm pleased to say, with plenty of articles in the pipeline for publication.

By the time you read this, the Network AGM will have taken place in Denby Dale, Derbyshire. Hopefully all who attended had a good day.

ARRL reports that ARES groups on the whole eastern seaboard were on full alert for the passage of Hurricane Irene. Thankfully, there services were not required to any great degree, however it does remind us of how fickle mother nature can be – fortunately we are lucky in the UK that we do not have to deal with hurricanes, but there is always the danger of flooding as was highlighted by the flash floods in the South of England during the last week of August.

Now, some news from Richard Hopkins, MM1BHO, E-Comm DRM for Region 1 and Secretary of Dumfries and Galloway RAYNET, telling us of a co-ordinated approach to preparedness in Scotland, with the full backing and assistance of the Scottish Government. Well done to all for their efforts in getting the scheme off the ground.

SCOTTISH RAYNET STRATEGIC GOVERNANCE GROUP. Over the 14 or so years I have been involved with RAYNET, first as a member and more recently as secretary of the Dumfries and Galloway group and as DRM E-Comm for Region 1 South Scotland, I have been aware of the lack of liaison between some Council Emergency Planners and local RAYNET groups in terms of involvement in exercises etc, particularly in my own area.

So it came as something of a surprise when in early March of this year I was contacted by a senior member of the Scottish Government Resilience Advisory Board with a request for information regarding RAYNET. I sent him the information he required regarding my own area and gave him the contact details of the Network representatives in Scotland.

As with most things Government-related time passed, but eventually I was contacted by the Scottish Government Resilience Manager for the Scottish Police force. He is a licensed amateur and ex-RAYNET member himself. He has been tasked with setting up the Scottish RAYNET Strategic Governance (SG) Group.

GROUP OBJECTIVES. To support, help develop and deliver effective backup communications to user services during emergencies within the terms of the Amateur Radio Licence and to encourage a coherent, operational effectiveness between groups.

The deliverables and membership for the proposed user group are as follows:

- Provide SG with details of all Groups and Zonal contacts in Scotland.
- To collate information on RAYNET exercises and live callouts in Scotland.
- To provide SG with details of a coherent Scottish strategy for voluntary emergency communications and the types of communications offered to User Services.
- To provide an audit of SG kit and its location across Scotland.
- To provide SG with a list of User Services premises in Scotland that are kitted out for RAYNET use in the event of an emergency.

MEMBERSHIP: The Group will be chaired by James Bertram (Scottish Government) with representatives from both Network and RSGB RAYNET Groups, this representation will include Network Zonal Controllers, RSGB Deputy Regional Managers as well as individual Group Controllers or their representatives.

This to my mind is a step in the right direction and I hope that groups within Scotland will work towards the aims of the new SRSGG (Scottish RAYNET Strategic Governance Group).

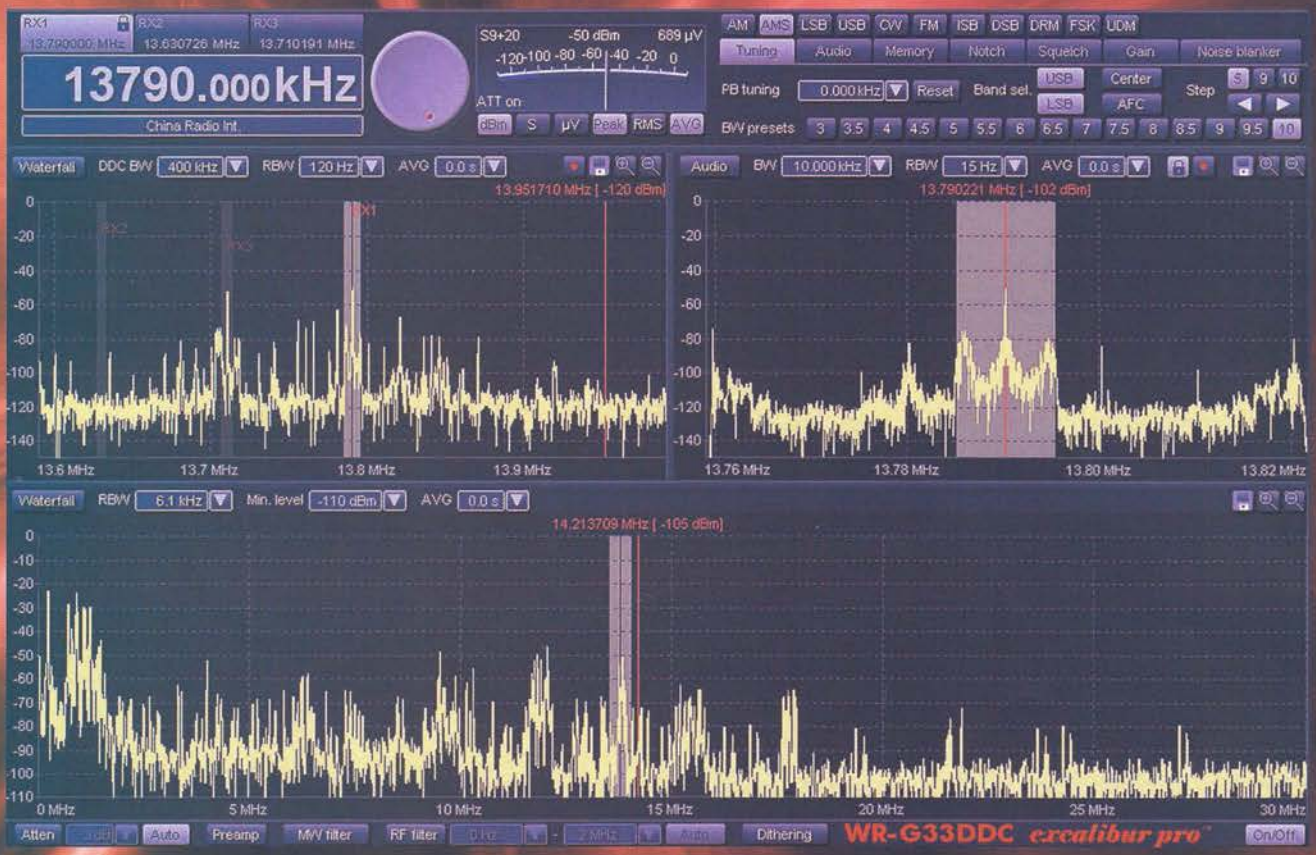
Well, that's all for this month – coming up next month will be a report on Exercise Ketley that took place recently in the Medway area of Kent. Keep the articles and news coming, some technical articles would also be nice.

Checkpoint at Gatesgarth Farm during LDWA event in the Lake District.


Hilltop talkthrough location Ae Forest.

# The blade just got sharper

## *with EXCALIBUR Pro™*

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TS-480HX - HF & 6m 200W.... £859.00.
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TS-2000X-HF/6/2/70/23cm... £1749.00.
TM-V7E - 2m/70cm's ..... £376.00.
TH-F7E - 2mtrs/70cm's ..... £235.00.
TH-D72E 2/70/GPS ..... £424.95.
TM-271E-2m/FM Mobile ..... £165.95.
TM-V71E - VHF/UHF ..... £289.00.
IC-7410 HF/6m base ..... £1695.95.
IC-9100 NEW HF/6m base ... £2895.99.
IC-7600 HF 6m transceiver....£3189.00.
IC-7700 HF & 6m Base ..... £5995.00.
IC-7800-2 HF/50MHz 200W.....£8875.00.
IC-7200 HF+6m 100w .....£799.00.
IC-7000 - HF/6m/2m/70cm's.....£1149.00.
IC-718 - HF 100W.....£569.00.
IC-910H - 2M 100W/70cm 75W £1275.00.
IC-E91 - Top Flight Handheld....£259.95.
IC-E90 - 2m/6m/70cm Handheld £238.99.
IC-E2820 Dualband VHF/UHF ....£478.99.
ID-E880 2/70 digital mobile .....£433.00.
IC-E92D D/STAR handy ..... £387.00.
IC-V80E 2M handheld ..... £109.00.
ID-1 mobile TRX 23CM/FM..... £714.00.
IC-T70E 2M/70CM Handy ..... £158.00.
IC-E80D D-Star V/U ..... £320.00.
PW-1 HF Amp 1KW ..... £5055.00.
FT-950 HF Transceiver..... £1264.00.
FTM-10E - VHF/UHF tx/rx ... £309.00.
FT-897D - HF/6m/2m/70cm.. £779.00.
FT-817ND - 1.8-430MHz 5W. £539.00.
FT-857D - HF/6m/2m/70cms £679.00.
FT-7900 mobile VHF/UHF ..... £239.00.
FT-8800E - 2m/70cm mobile. £329.00.
FT-8900 - 10m/6m/2m/70cm. £369.00.
FT-1900 - 2m 55W mobile.. £133.00.
FT-2900M - 2m 75W mobile.. £138.95.
VX-7R - 6m/2m/70cm handy. £299.95.
VX-6E - 2m/70cm handheld.. £249.95.
VX-3E - 2m/70cm handheld.. £169.00.
FT-60E - 2m/70cm FM 5W .. £129.95.
VX-8DE handy with APRS ..... £369.00.
FT-450D transceiver ..... £799.00.
FT-2000 HF/6M Base 100W... £2119.00.
FT-2000D 200W HF/6M Base £2599.00.
FT-DX5000 ..... £4339.95.
FT-DX5000D ..... £4892.00.
FT-DX5000 MP ..... £5400.00.

## Transceiver accessories

Yaesu SM-5000 monitor ..... £449.95.
Yaesu SP-2000 speaker ..... £159.95.
Yaesu MD-200 mic ..... £234.95.
Yaesu MD-100 mic ..... £119.00.
Yaesu FC-30 ext. ATU ..... £224.95.
Yaesu FP-30 PSU..... £219.95.
Icom SP-20 speaker ..... £179.95.
Icom SP-21 speaker ..... £98.99.
Icom PS-126 psu ..... £449.95.
Icom RMK-7000 kit ..... £57.50.
Icom OPC-581 ..... £34.49.
Icom OPC-589 ..... £21.50.
Kenwood SP-23 speaker ..... £71.95.
Kenwood HS-5 headphones ..... £55.99.
Kenwood MC-90 mic ..... £191.99.
Kenwood MC-60 mic ..... £120.00.
Kenwood MC-58DM mic ..... £56.95.
Kenwood MC-43 mic ..... £20.99.

## MFJ Enterprises

MFJ-989D 1500W Auto ATU..£399.95
MFJ-986C 3Kw HF.....£359.95
MFJ-993B dual 300/150 Auto £254.95
MFJ-991B Auto Intellituner....£214.95
MFJ-976 1500w ATU .....£479.95
MFJ-969 300w Rollercoaster £219.95
MFJ-962D 1.5Kw Inductor.....£299.95
MFJ-949E 300w W/D-Load....£184.95
MFJ-948 300w HF.....£164.95
MFJ-945E Mobile .....£134.95
MFJ-941E 300w .....£144.95
MFJ-934 ATU+AG .....£204.95
MFJ-921 2m ATU.....£98.95
MFJ-924 70cms .....£98.95
MFJ-914 Extender .....£90.95
MFJ-901B 200w Versa tuner....£111.95
MFJ-1026 Active Antenna ..... £204.95
MFJ-267 Dummy Load / SWR - £162.95
MFJ-802 Field Strength Mtr..... £55.95
MFJ-249B 1.8-170 Dig.....£264.95
MFJ-259B 1.8-170 .....£269.95
MFJ-269 HF/VHF/UHF .....£369.95
MFJ-201 grid dip meter.....£154.95
MFJ-269PRO 1.8-170&430-520 £389.95
MFJ-250 1kw Oil filled .....£78.95
MFJ-250X 1KW without oil .....£56.95
MFJ-260C 300w PL259 .....£45.95
MFJ-260CN 300w N-Type .....£54.95
MFJ-264 1.5kw PL259 .....£77.95
MFJ-264N 1.5kw N-Type .....£84.95
MFJ-267 Load/VSWR .....£162.95

## RigExpert ®

AA-500 analyser 5 to 500 MHz .. £574.00.
AA-54 HF ANALYZER ..... £322.96.
RigExpert AA-230 ..... £514.95.
AA-230PRO ..... £574.95.
RigExpert AA-30 - HF Analyzer .. £274.95.
RigExpert AA-520 Analyzer .....£574.95.
RigExpert Plus .....£262.95.
RigExpert Standard .....£190.95.

## HEIL SOUND Microphones & Headsets

PR-781-PTT deluxe base mic...£169.96.
Pro-Set-Plus Headset .....£224.95.
Pro-Set-Plus-IC Headset .....£239.95.
Pro-Set-IC Headset .....£159.95.
Goldline GM-4 Stick mic .....£149.95.
Goldline GM-5.1 Stick mic .....£149.95.
HM-4 Handy mic w/HC-4 insert £82.95.
HM-IC Handy mic + Icom insert £99.95.
HM-10-4 Hand mic + HC-4 .....£79.95.
PR-20 hand microphone .... £129.95
PR-30 hand microphone ..... £229.95.
PR-40 hand microphone ..... £269.95.
Pro-Set-Elite with HC6 ..... £179.95.
Pro-Set-Elite-IC with HC-6 ..... £189.95.
Pro-Set-6 with HC-6 ..... £149.95.
HM-Pro mic ..... £99.95.
Pro-Set Media ..... £129.95.
AD-1 adapters from ..... £22.95.
CC-1XLR leads from ..... £37.96.

## COMET

CHA250B broadband vertical, covers 80-6m, no gaps ..... £299.95.
Comet V-250 3.5-54MHz Max 200w. Ideal for limited space ..... £299.95.
GP-6 High Gain Dualband CoLinear 2/70cm Max 200w ..... £99.95.
GP-15 Tri-Band 2/6/70 Fibreglass Antenna. Max 150w ..... £99.95.
GP-9 highgain dualband co-linear...£139.95.

## Tigertronics

SL-USB-13PDI 13pin DIN Icom ..... £94.95
SL-USB-13PDK 13pin Kenwood .....£94.95
SL-USB-4R 4pin round mic cable .....£89.95
SL-USB-5PD 5 pin round mic cable .....£89.95
SL-USB-6PMD 6pin m/DINYaesu ..... £94.95
SL-USB-8PD 8pin m/ DIN ..... £89.95

## WATSON

POWER-MITE NF 22A peak ..... £79.95
W-25AM 25A Supply ..... £92.95
W-10AM 10A Supply ..... £59.95
W-5A 5A Supply ..... £29.95
W-10SM 10A Supply ..... £49.95
W-30 2/70 Base ..... £49.95
W-50 2/70 Base ..... £54.95
W-300 2/70 Base ..... £74.95
W-2000 6/2/70 Base ..... £89.95

## butternut

Butternut HF-2V 40/80m ..... £299.95
Butternut HF-6V 80-10m ..... £399.95
Butternut HF-9V 80-6m ..... £449.95
Butternut HF-5B 20-10m ..... £469.95
STR-II radial kit ..... £159.95

## HUSTLER

Hustler 5-BTV ..... £229.95
Hustler 4-BTV ..... £189.95
Hustler 6-BTV ..... £269.95
Hustler RM-10 10m resonator ..... £21.99
MO-1 mobile mast section ..... £39.95
MO-2 mobile mast section ..... £39.95
MO-3 mobile mast section ..... £29.95
MO-4 mobile mast section ..... £27.95

## PALSTAR

AT-1500DT 1500w ATU ..... £534.95
AT-2K 2000W ATU ..... £594.95
AT- Auto 1500 Watt ATU ..... £1129.95
AT5K 3500 Watt ATU ..... £999.95
DL-5K 5kw dummy load ..... £424.95

## Miracle Antenna

Miracle Whip QRP allband ..... £129.95
Miracle Ducker IL ATU..... £139.95
Miracle Ducker PL for HF ..... £139.95
Miracle Ducker TL HF/VHF/UHF ... £139.95

### AT-1000 Pro

1KW Auto ATU - 1.8-54MHz - 1-8 secs Tune - Approx SWR Rating of 10:1

***£499.00***

### Z-100 Plus

125w Auto ATU - 1.8-54MHz - 0.1 - 6 secs

***£134.99***

### DM-7800

Made exclusively for the IC-7800. This will give you a true analogue meter

***£136.00***

AT-100 Pro II ..... £189.95.
AT-200Pro ..... £209.99.
AT-897+ ..... £178.00.
KT-100 ..... £173.00.
AT-600Pro ..... £299.95.
YT-450 ..... £224.00.
Z-11ProII ..... £159.95.
YT-100 ..... £177.00.
FT-Meter ..... £44.00.

### Z-817 ATU

ATU specific for FT-817 Uses CAT / ACC port Powered by batteries 0.1 - 20w : 1.8 - 54MHz

***£119.00***

### LDG IT-100

Icom ATU 125w Auto ATU - 1.8-54MHz 0.1-6 seconds Tune

***£158.95***

### LDG RBA 1:1&4:1

1:1 or 4:1 Balun - Covers 1.8 - 30Mhz Power rating 200w

***£35.00***

LDG ELECTRONICS

**Radioworld - the longest-running LDG dealer in the UK!!**

LDG ELECTRONICS

## TONNA

Tonna 220505 6m 5el ..... £118.95.
Tonna 220809 2m 9el ..... £79.95.
Tonna 220811 2m 11el ..... £114.95.
Tonna 220817 2m 17el ..... £148.95.
Tonna 220909 70cm 9el ..... £74.95.
Tonna 220919 70cm 19el ..... £94.95.
Tonna 220921 70cm 21el .....£119.95.
Tonna 220635 23cm 35el ..... £93.95.
Tonna 220655 23cm 55el ..... £119.05.
Tonna 220745 13cm 25el ..... £102.95.

## WEST MOUNTAIN RADIO

RIGblaster Pro ..... £299.95.
RIGblaster Plus USB ..... £159.95.
M4-CBL RG45/4Pin lead ..... £18.95.
RIGRunner 10way 12v distribution board £159.95.
CBA-III Computerised Battery Analyser ... £149.95.
CBA/AMP/240 CBA-II Amplifier ..... £719.95.
PG-40S 12V Backup Power System ..... £144.95.

## DIAMOND ANTENNA

HF10FX 10m Mobile ..... £49.95.
HF15FX 15m Mobile ..... £49.95.
HF20FX 20m Mobile ..... £49.95.
HF40FX 40m Mobile ..... £49.95.
HF80FX 80m Mobile ..... £52.95.
CR8900 10/6/2/70 ..... £112.95.
CP6 Base 6m-80m ..... £389.95.
X50 Base 2/70 ..... £82.95.
X200N Base 2/70 ..... £129.95.
X300 Base 2/70 ..... £149.95.
X7000 Base 2/70/23 ..... £255.95.

## AMERITRON

...The High Power Specialist...

AL-811XCE 10-160m 600w .....£899.95
AL-811HXCE 10-160m 800w ..... £999.95
ALS600X Solid State 10-160m 600w £1499.95
AL-1500XCE 10-160m 1.5KW .....£3769.95
AL-1200XCE 10-160m 1.5KW .....£3499.95
AL-82XCE 10-160m 1.5KW .....£2749.95

## RADIO WORKS

CW-160 160-10m (252ft) ..... £165.95
CWS-160 160-10m (133ft) ... £159.95
CW-80 80-10m (133ft) ..... £134.95
CWS-80 80-10m (66ft) ..... £152.95
CW-40 40-10m (66ft) ..... £121.95
CW-40+ 40-10m (66ft) ..... £142.95
CW-20 20-10m (34ft) ..... £104.95
G5RV+ 80-10m ..... £82.95
G5RV-XF Fullsize ..... £71.95
G5RV-XH Halfsize ..... £56.95

## SGC

SGC-230 HF..... £529.95
SGC-500 HF ..... £1399.95
SGC-235 HF-500w ..... £1199.95
SGC-237 HF+6m ..... £309.95
SGC-237 Porta ..... £559.95
SGC-237 PCB ..... £349.95
SGC-239 HF..... £199.95
MAC-200 ..... £279.95

## Rotators

G-2800SDX Rotator ..... £850.00.
G-450C Rotator ..... £314.95.
G-550C Rotator ..... £295.00.
G-650C Rotator ..... £355.00.
G-1000DXC Rotator ..... £459.95.
G-5500C Rotator ..... £584.95.
AR-35X Hy-Gain rotator.....£99.95.

## Feeders & Wire

RG-213 Military Spec High grade 50 Ohm coaxial Cable

**£139.95** per 100m Drum

RG58U ..... £0.70 per Metre
RG8 Super ..... £1.00 per Metre
RG213 ..... £1.36 per Metre
W103 Westflex ..... £2.00 per Metre
RG-8 100 Metre Drum ..... £70.00
Flexweave 50m Flex ..... £30.95
Flexweave-PVC-50 50m ..... £40.95
Enamelled Copper Wire 50m . £17.95
Hard Drawn Copper Wire 50m £24.95

Rotator Cable: - Color coded Cable
3 core ..... £0.80 per Metre
7 core ..... £1.20 per Metre
8 core ..... £2.00 per Metre

DC Connecting Cable
10A DC Cable ..... £0.50 per Metre
15A DC Cable ..... £0.65 per Metre
25A DC Cable ..... £0.90 per Metre
40A DC Cable ..... £1.35 per Metre

## FlexRadio Systems

Software Defined Radios

FLEX-1500 SDR Transceiver... £579.95
FLEX-3000 SDR ..... £1299.95
FLEX-5000A Transceiver ..... £2495.95
FLEX-5000A-ATU ..... £2795.95

## Telecom linear amplifiers

**Self-contained, solid state**

23CM150 23cms 150W .....£1999.
2M-HK 2m 500W .....£1999.
64-HK 6m&4m dualband 500W. £1999.
70CM-HK 70cms 500W .....£1999.

## Cushcraft

X-7 - 20/15/10 7EL Yagi. .... £899.95.
A3S - 20/15/10 3EL Yagi .....£629.95.
A4S - 20/15/10 Yagi .....£699.95.
A3WS - 12/17 3EL Yagi .....£499.95.
ASL-2010 13-32MHz Log ..£999.95.
MA5B - Mini Beam .....£529.95.
D-3 - 20/15/10 Dipole .....£359.95.
R-6000 - 6Band Vertical ... £449.95.
R-8 - 40-6m Verical .....£559.95.
MA5VA - 10/20m Vertical ....£309.95.

# Second Hand List

## Quality Used Equipment, 3 Month Warranty. Best prices paid for your used equipment.

**Accessories**
MFJ-722 CW / SSB Filter £59.00
Yaesu FRV-8800RX VHF Converter £99.00
OP-90 Leatherette Case for MVT-9000£15.32
SEM TranZmatch with Ezi-Tune £89.00
Alinco DJ-X3 £89.00
Comet CF-BPF 6 band pass filter £30.00
EDC-16B adapter £9.99
WEL2 DL-600 Dummy Load £68.95
50-Watt Dummy Load £56.95
TS-711/811PX Interface £59.95
Kenwood YK-88S SSB Filter £49.00
Kenwood VS-2 Voice Synthesizer £59.00
Kenwood VS-1 Voice Synthesiser £39.00
Icom CT-17 Computer Interface £59.00
SGC MAC-200Antenna Controller Auto-Tuner £220.00
MFJ-784B DSP Filter £219.00
AOR ARD9000Digital Voice Interface. £126.31
Midland 48 Plus Multi £69.00
MFJ-1817 2m/70cm Telescopic Rubber Duck £22.00
CSC-83 Soft Carry Case for FT-817ND £15.00
Icom PS-85 Icom 20A 13.8V Switch Mode £159.00
YSK-7800Seperation lead for FT-7800£30.00
DVS-2 Digital Voice Message for FT1000MP £130.00
MFJ-9018 £65.00
Kenwood DFC-230 digital frequency controlle £89.00
SC-8200Soft Case for AR-8200-8200-S2 £10.00
Kenwood YG-455C-1 - CW Crystal Filter £89.00
Kenwood YG-455CN-1 - CW Crystal filter £100.00
Kenwood YK-88CN CW Filter £50.00
SC-45 Soft Case for TH-G71E £10.00
CASE FOR KENWOOD TH-47 £10.00
010-10117-02 Garmin GPSCarry Case £5.00
HS-800/PRO High Sierra Standard Control Box £75.00
HMC-3 Vox Headset £20.00
Host Master II £20.00
Eton S-350 Field Radio £65.00
Icom LC-158 Carrying Case for IC-R20 £12.00
Bremi BRL-5 switch with 5Watt dummy load £20.00
JD Model 151 - TVI Low Pass Filter £10.00
Archer Antenna Discharge Unit £15.00
Yaesu SC-1 Station Console £89.00
Icom CR-293 High Stability Crystal Unit £80.00
Dee Comm Dummy Load £69.00
BRV-1 Mirror Mount £10.00
Yaesu CSC-92 soft case with integral belt clip VX-3E £10.00
60W Max Dummy Load £35.00
300W Max Dummy Load £79.00
Drake DL-300Dummy Load £50.00
Revex L20 50 Ohm Dummy Load £25.00
MTU-30/20 RF u-tuning Unit C £500.00
MTU-80/40 RF u-tuning Unit B £500.00
KIF700Keyboard & Interface £69.00
SC-37 Soft Case £6.00
SC-41 Soft Case £6.00
Diamond DL1000 Load £99.00
ICOM HM-175GPS hand microphone FOR IC-E92 £120.00
Philips HC8349 Wireless Rechargeable Headphones £25.00
Toyo T-100Dummy Load £59.95
MAG-BM145PL £14.95
MFJ-332B BNC Magmount £15.95
FMU-747 for FT840, FT-747 etc. £69.00
FL-53A 455kHz Filter CW narrow 250Hz £125.00
SU-1 Barometric Pressure Sensor Unit £29.95
Yaesu XF-8.9KCN CW filter £40.00
Inrad Pre-amp board to fit FT-1000mp £57.50
TI-30D 15-Watt Load £20.00
Hansen DL-20 15-Watt Load £20.00
Icom UI-8 FM Demodulator Board £60.00
Garmin GPS-38 Personal Navigator £49.00
FM Wide Modification Kit for FRG-8800£60.00
AirNav RadarBox-Pro 2010 £299.00
AN-3 Three Way Antenna Switch £15.00
Heathkit IM-5217 Meter £30.00
SSB-SP-2000 2m Masthead Pre-amp £159.00
SSB-SP-7000 70cm Masthead Pre-amp £189.00
2-way Coax Switch (SO-239) £8.33
Daiwa CS-401 4-Way Antenna Switch £39.00
Icom UT-84 Tone Squelch Board £49.00
FT-290 MK1 Charger £12.00
ESC-44 Soft Case for DJ-X30 £10.00
CSC-73 Soft Case for VX-5R £7.00
LC-152A Leatherette Carry Case for IC-E90 £10.00
WRP-1300Pre-Amp £29.95
**Amplifiers**
Kenwood VB-2200GX 2M Amplifier £79.00
Explorer 10001KW HF Amplifier £799.00
Ampere APB-57A UHF Amplifier £129.00
MML 144/30-LS 2m 30W Amplifier £89.00
R-25 Microset 30W 2m Linear Amplifier £89.00
**Analyzers + SWR meters**
Daiwa CN-101 1.8-150MHz SWR Meter 15w-1.5kw £55.00
Kenwood SW-200E79.00
AV-20 AVAIR VSWR POWER Meter £25.00
Harrier SWR-1 SWR & Power Meter £15.00
KENWOOD SW-100PWR/SWR METER 140-450MHZ £35.00
TOYO T-430 SWR £39.00
Tech TE-15 Dip Oscillator £88.95
Kenwood SW-2100SWR Power Meter £99.00
MFJ-862 VSWR POWER Meter £55.00
**Antenna**
Wellbrook Indoor Receiving Loop £149.95
MFJ-914 £65.00
EZ-TUNE-7000IBOX High Sierra Control box for £85.00
MC-4MT Mobile Cable £13.00
Heathkit HD-1424 Active Preselector £59.00
Arno 40m EH Antenna £99.95
Telescopic 4m Band Whip £15.00
2m Telescopic Antenna £10.00
Wideband Scanner Antenna £15.00
Wideband Base Scanner Antenna £15.00
Palstar AA-30 Active Antenna £79.00
ATX-1080-uni Multi band antenna 80 to 6m £35.00
C-POISE Wander-Wand Tunable £35.00
**Antenna Rotators**
KR-600RC Rotator £220.00
**Antenna Tuners**
LDG Z-11 QRP ATU £99.00
MFJ-948 Antenna Tuner £125.00
Kenwood AT-230 ATU £199.00
Yaesu FRT7700Antenna Tuner £69.00
Yaesu FC-30 Antenna Tuner Unit £159.00
AT-7000AUTO ATU Includes Icom interface £119.00
Vectronics VC-300D Tuner with LED PEP Meter £199.00
MFJ-971 MFJ QRP Portable ATU, ANTENNA TUNER. £99.00
SG-231 SGC Smartuner £275.00
MFJ-924 MFJ UHF ATU £85.00
MFJ-994 Automatic ATU 1.8-30MHz £255.00
Capco SPC-100300W ATU £95.00
MK-II Multi-tuner £48.95
**Books**
Icom IC-R20 manual in Italian £5.00
AERAD Chart 1994 £2.00
Air Band Radio Handbook 8th Edition £5.00
Air Band Radio Guide 6th Edition £5.00
Airwaves 2007 £8.00
ARRL Handbook 1983 £10.00
ARRL Handbook 1984 £10.00
ARRL Handbook 1985 £10.00
ARRL Handbook 1987 £10.00
Usborne Audio and Radio Book £5.00
BBC Radio Transmitting Stations 1993-94 £5.00
BBC Radio Transmitting Stations Spring 1990 £5.00
Beginners Guide To Packet Radio £5.00
Flight Routings 2001 £5.00
Flight Routings 1992 £5.00
International Airband Radio Handbook £5.00
International FM Guide £2.00
Intermediate Licence Book £4.00
IBA Guide to TV and Radio 1990 £2.00
Microcomputers in Amateur Radio £5.00
PM3055-57 Oscilloscope Manual £5.00
Packet Radio Primer £5.00
Radio Amateur Operator's Handbook £5.00
"Radio" by Tucker & Wilkinson Vol-2 £5.00
"Radio" by Tucker & Wilkinson Vol-3 £5.00
Radio Servicing Vol-4 £5.00
Radio Amateurs' Examination Manual £5.00
RAE Revision Notes £5.00
R&EW Amateurs Handbook Vol 1, 2 & 3 £4.00
RSGB IOTA Directory 2000 £5.00
Scanners 2 International £5.00
UK Scanning Directory 4th Edition £5.00
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"Calling Shanwick" £5.00
Shortwave Voices of the World £5.00
"49 The Thyristor Book" £5.00
Transistor Equivalents and Substitutes £5.00
UK Scanning Directory 6th Edition £5.00
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USA Radio Amateur Callbook 1986 £5.00
VHF Communications Magazine 1975 £5.00
WRTV Handbook 36th Edition £5.00
WRTV Handbook 1987 Edition £5.00
WRTV Handbook 40th Anniversary Edition £5.00
WRTV Handbook 27th Edition £5.00
RSGB Amateur Radio Operating Manual £5.00
Electronic Service Manual £20.00
Scanners 4 Book £5.00
"The Antenna Experimenter's Guide" by Peter Dodd £10.00
Shortwave DX Handbook by DL2VFR £10.00
G-QRP Club Antenna Handbook £10.00
"HF Antennas for all Locations" by Les Moxon £8.00
RSGB Radio Communication Handbook 10th Ed £10.00
RSGB 1994 Call Book £10.00
International Listings 1994 Call Book £10.00
International Listings 1991 Call Book £10.00
**CB**
Lodestar SWR-2T SWR Meter £15.00
Emperor Ninja CB £69.00
Lodestar SWR-2S SWR Meter £15.00
CB SWR Meter £15.00
Superstar 3900EFT transceiver £199.00
Maycom EM-27 CB Transceiver £55.00
DX-5000K-PO - AM/FM/SSB 10/11 Meter £189.00
CB Magmount Antenna £10.00
Harrier-CBX CB Radio £69.00
**DAB Radio**
Gemini 46 Digital Radio £39.00
Sony XDR-S55DAB £30.00
Tevion DAB & FM Radio £30.00
**Data Comms**
Kamtronics KAM Multimode TNC £129.00
ERA Microreader CW Decoder £79.00
USB 56K MODEM £10.00
MFJ-1278b DSP Multimode Data Controller £249.00
**DC/Cig adapter/chargers**
NC-386 Ni-Cd Battery Charger £20.00
**Duplexer / Triplexer**
Revex D24 duplexer 1.6-150 MHz £22.00
**Filters (various)**
Bremi BRL-10 - TVI Low Pass filter 27MHz £10.00
AEC LP-30 - Low Pass Filter £15.00
Packer TVI Filter £9.95
Vanco HF Low Pass Filter £14.95
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# Design Notes

## Mixing at low frequencies

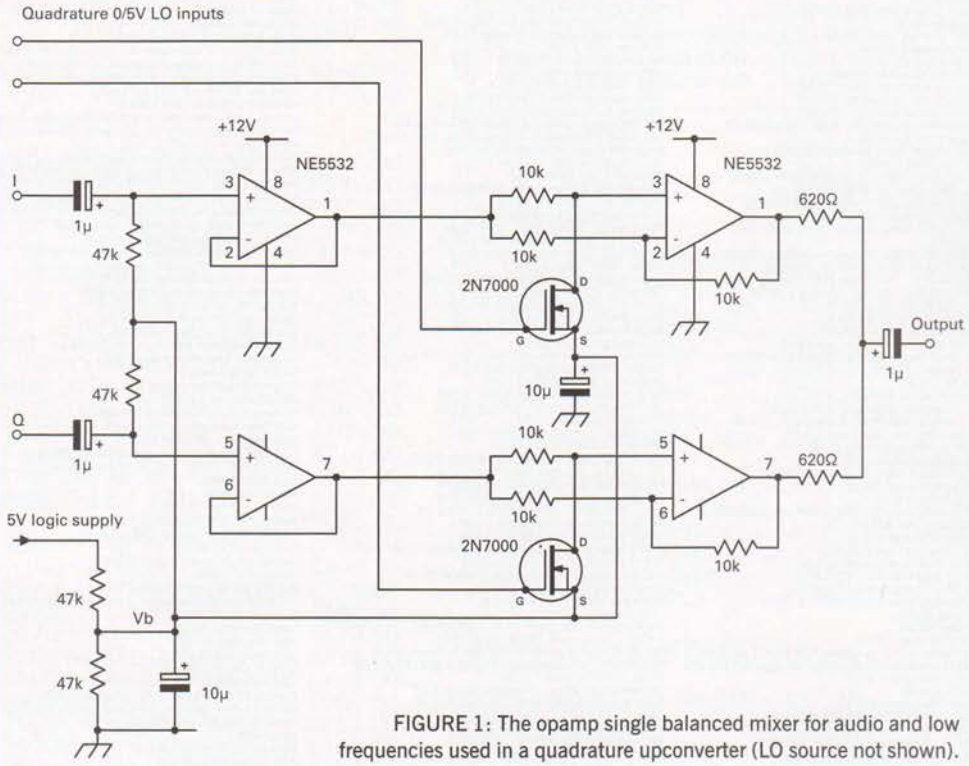


FIGURE 1: The opamp single balanced mixer for audio and low frequencies used in a quadrature upconverter (LO source not shown).

**LOW FREQUENCY MIXERS.** Frequency mixers are one of the most commonly used building blocks in radio and they can be found in a wide variety of types. Most of you will be familiar with those used at RF, such as the dual gate MOSFET, the diode ring double balanced mixer and the Tayloe or CMOS switch designs. At higher frequencies, transistors, FETs or even a single diode can be seen doing the frequency conversion job. But what about very low frequencies? I needed to mix from 25kHz used as a subcarrier for optical communications [1] to baseband to feed quadrature channels into a computer soundcard or an SDR2GO (described last month) unit for SSB reception from the 25kHz carrier. I also wanted to be able to do the reverse, taking I/Q drive from a PC or the SDR2GO and converting to 25kHz so I could drive an optical modulator. What mixer device would work with audio and 25kHz?

There are many ICs designed specifically for frequency mixing. The NE612 chip (that also incorporates components for a simple local oscillator) is one of the better-known ones amongst radio amateurs. More complex devices like the venerable (but still excellent) MC1496 Gilbert Cell mixer offer improved performance for more critical applications. In fact the MC1496 forms the basis of the best I/Q upconverter I ever made, with excellent unwanted sideband and carrier rejection [2]. This chip, as well as the NE612, will work perfectly well down to zero frequency on all inputs and outputs. Either would do my mixing task quite happily. However, looking in the junkbox, I found only an empty matchbox where the NE612 devices should live. There was one very old MC1496 with badly tarnished pins. I needed two such chips for the I/Q converter. In the spirit of trying to keep my optical communications circuitry as simple and as cheap as possible (and to use as many junkbox components as I could), I tried another design, only considered suitable for a few tens of kHz: the opamp single balanced mixer.

The circuit diagram of **Figure 1** shows a pair of these mixers used for an I/Q upconverter from audio to 25kHz. The local oscillator (not shown) has a 74HC74 dual D-type flip-flop to generating two 0/5V quadrature square waves from a source at four times the wanted LO frequency. The opamp on the left hand side is a buffer to ensure the second stage, the mixer proper, is driven from a low impedance source. The buffer could optionally be used to provide some additional audio gain if needed, or some filtering, but here all that is done in the SDR2GO and a unity gain buffer was adequate.

The mixer works by making the second opamp into a switchable gain stage. The 2N7000 MOSFET acts as an on-off switch controlled by the local oscillator. When it is on, the positive input of the opamp is grounded, and the two resistors connected to the negative input give an inverting amplifier with a gain defined by the values of the feedback and input resistors. By making these equal in value, a gain of -1 results. When the 2N700 device is off, the opamp adjusts its output so the positive and negative input pins are exactly equal. This can only be achieved if the output is also at the same potential as the two inputs, so a gain of +1 results. We now have a stage with a gain of plus or minus one, under control of the LO switching input. A frequency mixer is just this, a multiplier. The input audio is multiplied by a square wave with peak values of +1 and -1. The resulting product, which contains the sum and difference frequencies of the audio input and LO (as well as all the LO odd-order harmonics), appears at the opamp output. For a quadrature upconverter, the two outputs from the pair of I/Q mixers are summed – which here is simply done in a pair of identical value resistors.

**SOME PRACTICAL ISSUES.** NE5532 opamps were used here because they have good high frequency performance, a good drive capability and, more importantly, I have a lot of them. But these do not work with their inputs particularly close to the negative rail and, as I wanted single-supply working, this means ground. The voltage on the input pins (made up from DC bias plus the maximum negative input signal voltage excursion) needs to be at least 1V above ground at all times. So, to be able to run from a single polarity supply the opamps have to be biased to some intermediate voltage, shown in Figure 1 as Vb. Normally a value of Vcc/2 would be used to allow maximum signal handling, but the FETs need to be switched and, as the source connection has to sit at Vb rather than ground, the gate drive must exceed this on its positive swing by a comfortable margin.

The 2N7000 devices are logic level FETs and are guaranteed to turn on fully at 3.1V between gate and source. In practice they are sufficiently saturated at +2V, so a bias

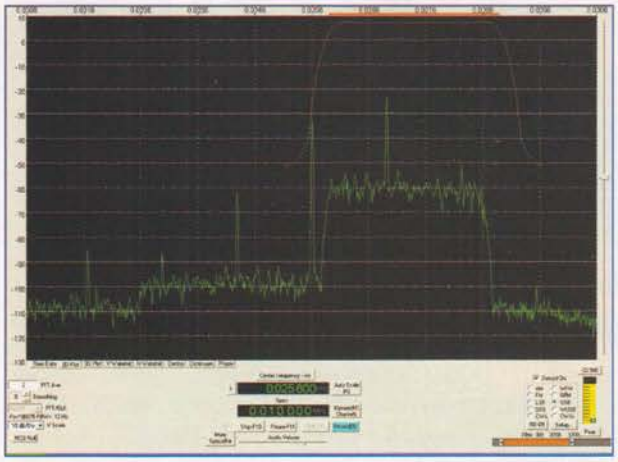

FIGURE 2: Upconverter output driven with a mixture of a tone plus white noise audio input. Note the poor carrier rejection due to the single balanced configuration, but excellent sideband rejection even with no setting up or trimming.

voltage of no more than 3V will ensure proper switching with a 0/5V drive signal. Assuming an audio / baseband input of 2V peak-peak – the maximum possible from most soundcards and more than the SDR2GO delivers; Vb has to be greater than 2V to ensure the inputs stay at least 1V above ground. 2.5V is the obvious choice, conveniently generated by dividing down from the 5V regulated logic supply.

Ideally, filtering should to be added to remove the odd LO harmonics, which are at levels as high as -10dBc. For optical comms purposes this is not too important – unless there is a possibility of receiving stations inadvertently trying to listen to the higher subcarrier harmonics. (The sideband is alternately reversed for each successive odd harmonic). A simple LC filter designed for 300Ω (defined by the two 620Ω summing resistors) will do the job.

Carrier rejection is poor. This design of audio frequency mixer is single-balanced and gives no inherent rejection of the LO signal in the same was as a double balanced mixer like a diode ring would. The leakage mechanism in practice is caused by direct injection of the switching signal present on the gate of the switching FETs into the opamp via device junction capacitance. At maximum output, the LO is only -15dBc. For standard RF purposes this would be completely unacceptable but, again, for optical comms purposes, it is irrelevant as when receiving SSB it is tuned for zero beat.

Sideband rejection after combining the I and Q signal paths for sideband cancellation and reinforcement is excellent. Theoretically, the mixer could become unbalanced with unequal resistors in its feedback path and sideband rejection would suffer. In practice, using 1% resistors, 40-50dB sideband rejection was seen straightaway without any need to optimise the values further.

**RESULTS.** Figure 2 shows the resulting spectrum with the SDR2GO in SSB mode and an audio input made up from a tone mixed with white noise. Note the poor carrier rejection of barely 15dB, but the excellent sideband rejection. This was achieved with no trimming. Using the amplitude and phase adjust facility on the SDR2GO module, sideband rejection of 70dB was seen at a single tone frequency!

**THE NE612 MIXER CHIP AT DC.** While on the subject of mixers at low frequencies, it is worth looking at how the NE612 can conveniently be interfaced for a DC output. This particular chip is notable for operating with low amplitude levels at inputs and outputs – typically no more than 1V p-p at the output and a few tens to 100mV p-p on the input. The NE612 makes a particularly good phase detector for phase locked loops running at frequencies of up to 500MHz; its dual differential outputs allow a particularly good and convenient opamp connection as shown in **Figure 3**. The two outputs sit at a voltage a little bit below the supply rail. For most practical circuitry this means at around 5-6 volts when run at the optimum 7V supply voltage, here derived from a Zener stabiliser. The opamp is operated in what I like to call a pseudo-differential mode. This means it amplifies the signal that appears differentially at the two NE612 output pins with a differential gain given by R2 / R1. The 'pseudo' term comes from the fact that the mean voltage – the DC level that appears on both outputs – is passed unmodified to the opamp output. This comes about from the same reason as the +1 gain in the opamp mixer described above; the amplifier adjusts its output to always ensure equal voltages on the + and – input pins. So now, the opamp on the output of the NE612 can give a high value of differential gain to small signals, allowing a mixer output of only a few tens of mV peak-peak to be raised to several volts at the output. This is all without any need at all for extra DC trimming and bias setting, which at very high DC gain settings could become tricky and prone to drift. The mean DC voltage at the opamp output is that on pins 4 and 5 of the NE612. R3 is present to minimise the DC offset in the opamp and should be equal in value to R1. The NE612 is inherently internally balanced so that even with DC gains as high as several hundred, residual imbalance between the two outputs is always low enough to stay comfortably within the output voltage range of the opamp. By splitting R1 and R3 each into two equal values and connecting a capacitor to ground from the mid points, filtering of any RF at the sum frequency can be made. I have used this NE612 plus opamp configuration several times with RF inputs at the millivolt level and it has always worked without any significant DC drift.

**FEEDBACK.** Andrew Steer wrote, "I read your article on building a USB soundcard in my Dad's *RadCom* magazine and thought you might be interested in my free audio spectrum analysis software". The link for free download of the software can be found at [3]. This is a nice little audio FFT program, ideally suited to demonstrations and teaching, has a simple interface and no complex installation procedure.

Also, take a look at this massive collection of RF circuits and Homebrew ideas by YO3DAC - VA3IUL [4]. An awful lot of work has gone into the preparation of this website and you can spend ages browsing through his collection.


WEBSEARCH

[1] Optical communications – *RadCom* March – May 2011

[2] LF Upconverter using MC1496 – www.g4jnt.com/IQConverters.htm

[3] Simple Audio Spectrum Analyser – www.techmind.org/audio/specanaly.html

[4] RF Design Ideas – http://tinyurl.com/RC-DN-OCT-11 or www.qsl.net/va3iul/Homebrew_RF_Circuit_Design_Ideas/Homebrew_RF_Circuit_Design_Ideas.htm


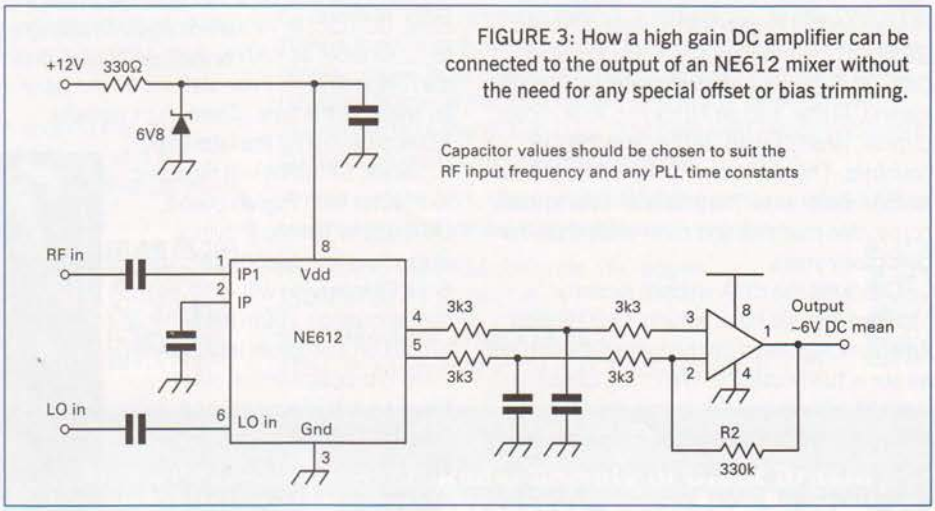


FIGURE 3: How a high gain DC amplifier can be connected to the output of an NE612 mixer without the need for any special offset or bias trimming.

Capacitor values should be chosen to suit the RF input frequency and any PLL time constants

# IOTA

## Latest DXpedition news

The YW5LR Team QRV from SA-035 in July.

**SUMMER SURPRISE.** The Russian Robinson Club members changed their plans just after my last column was finalised and, instead of going to Adak and Kiska islands, set course for the un-activated Alaskan outlier of St Matthew Island, NA-232. They had been planning this for 2012 but had a lucky meeting in Dutch Harbour with British adventurer David Scott Cowper, VP8DEU, who was about to take his motor boat *Polar Bound* through the Northwest Passage. David agreed to take the team to St Matthew and drop them on the mainland after the operation so they were able to be QRV for several days at the end of July. The team members consisted of Yuri Sushkin, N3QQ, Yuri Zaruba, UA9OBA and Tim Tilleman, NL8F. One or two of the Russian Robinsons are planning to be at the RSGB Convention on 7-9 October so try to be there if you want to hear more about their adventures.

**NEW UK CHECKPOINTS.** John Butcher, G3LAS has recently retired from his role as a UK IOTA Checkpoint so the IOTA Manager has appointed Ian Sweatman, M0KCM to cover England (call-numbers G0, M0 & 2E0) and Tony Ritchie, G4VMX, for Scotland, Wales, Northern Ireland, the Channel Islands, Isle of Man and all British SWLs. Robert Small, BRS8841, will continue to cover England (all G, M & 2E call-numbers except 0), Gibraltar, Ireland, Malta, and all Africa and Asia except Cyprus, Israel, Japan, Turkey and the CIS countries. The IOTA community is very grateful to John Butcher for his efforts as Checkpoint, committee member and committee chairman over many years.

Checking the IOTA website recently I noticed that we have around 1100 British amateurs registered on the system though not all are actually using it. With the increasing sunspot activity and the imminent IOTA Marathon kicking off next year, now would be a good time to register or become a more active user.

**HELP NEEDED.** The IOTA website developer Dom Smith, M0BLF needs an assistant to help maintain the rsgbiota.org site and add new features. The key skills needed are familiarity with object-oriented PHP techniques and with MySQL syntax. Familiarity with Perl and AJAX, and remote SSH access to Linux servers would also be helpful. If you think you can help, please contact Dom directly at M0BLF@domsmith.co.uk.

Dom has a number of ideas to improve the user experience on the website at rsgbiota.org and will be demonstrating some features of the next upgrade at the RSGB Convention.

**ANOTHER 'NEW ONE'.** A DXpedition is planned to the previously un-activated Pupuya Island, SA-095, around 20-23 November – though the dates may change if there are weather delays. This is a tricky place to land on as it is just a large rock a few hundred metres off the Chilean coast. There is no convenient harbour or beach on which to land. Operators will be Cezar, VE3LYC and Dino, CE3PG. They plan to be QRV on CW and SSB on 17, 20, 30 and 40 metres with two 100W stations. Check their website at http://ce4a.yolasite.com/ for more information about this activity.

**A RARE DXCC AND IOTA.** The 4W6A DXpedition from Atauro Island, OC-232, may still be QRV when you receive this *RadCom* as the team was expecting to be QRV until 26 September. This is a rare IOTA and also part of the rare DXCC entity of Timor Leste. Check www.4w6a.com for the latest info.

**FORTHCOMING ACTIVITY.** A joint Australian-US team plans to be active from the island of Efate, OC-035, in Vanuatu from 30 September to 12 October as YJ0VK. With eight operators they hope to keep three stations on the air for much of the time. Check their website yj0vk.odxg.org for the latest info.

Jacek, SP5DRH will be active as H40KJ from Pigeon Island, OC-065, in Temotu Province of the Solomon Islands on 8-21 October. He will concentrate on 160m with a focus on Europe as long as there is propagation; at other times he will concentrate on 80m CW and RTTY on 17 and 15 metres. Further information can be found at www.sp5drh.com/h40/. QSL via SP7DQR. With its emphasis on LF this will be a tough one to work from the UK.

The Holyland DX Group (4X1VF, 4X4DZ, 4X6HP, 4Z4KX, 4Z5FI and 4Z5LA) will be active as 4X5A from Akhziv Island, AS-100, from 0700Z on 21 October until 1200Z on the 22nd. They will operate CW and SSB on 40-10 metres with two stations and vertical antennas. QSL via 4Z5LA.

F6DXE, F4ELK and F4ELI will be active as TM5Q from Quemenes Island, (EU-065, from 30 September to 2 October. They will operate CW, SSB and digital modes on 40, 20, 15 and 10 metres. QSL via F4ELI.

Merv, N6NO will be active as VK9OL from Lord Howe Island, OC-004, on 10-18 September. The operation apparently celebrates Merv's 75th birthday and 60 years of ham radio. He plans to be QRV on 40-10 metres, with a focus on CW and European openings. QSL via N6NO. I activated Lord Howe with G3CWI around 25 years ago and it remains one of my favourite DX locations. It is challenging to work from the UK but not impossible given a modicum of good conditions.

A team of four highly experienced IOTA activators (George, EA2TA, Christian, EA3NT, Simon, IZ7ATN and Col, MM0NDX, all part of the larger MS0INT IOTA team) have plans to operate from the extremely rare and dangerous Isle of Rockall, EU-189. Accompanied by Nick Hancock, a climber with considerable experience in inhospitable places, they aim to land and stay atop Rockall for a maximum of 48 hours. They believe the end of May or the beginning of June 2012 is a viable time period to put Rockall on the air. Rockall is an isolated speck of rock so weather and sea state will dictate the entire expedition as near perfect landing conditions are required. The website is www.eu189.com.

Late news as *RadCom* was going to press indicates that there may be a Belgian group on Rockall, EU-189, around 27 or 28 September. There is a website at www.rockall.be that contains more information including details of the 7-man team.

Finally, I will be QRV from Miquelon, NA-032, with some members of the Cambridge University Wireless Society at about the time you are reading this (the last week of September). Please take a look for us.

M0KCM and G4VMX - new IOTA checkpoints for the UK.

NEW

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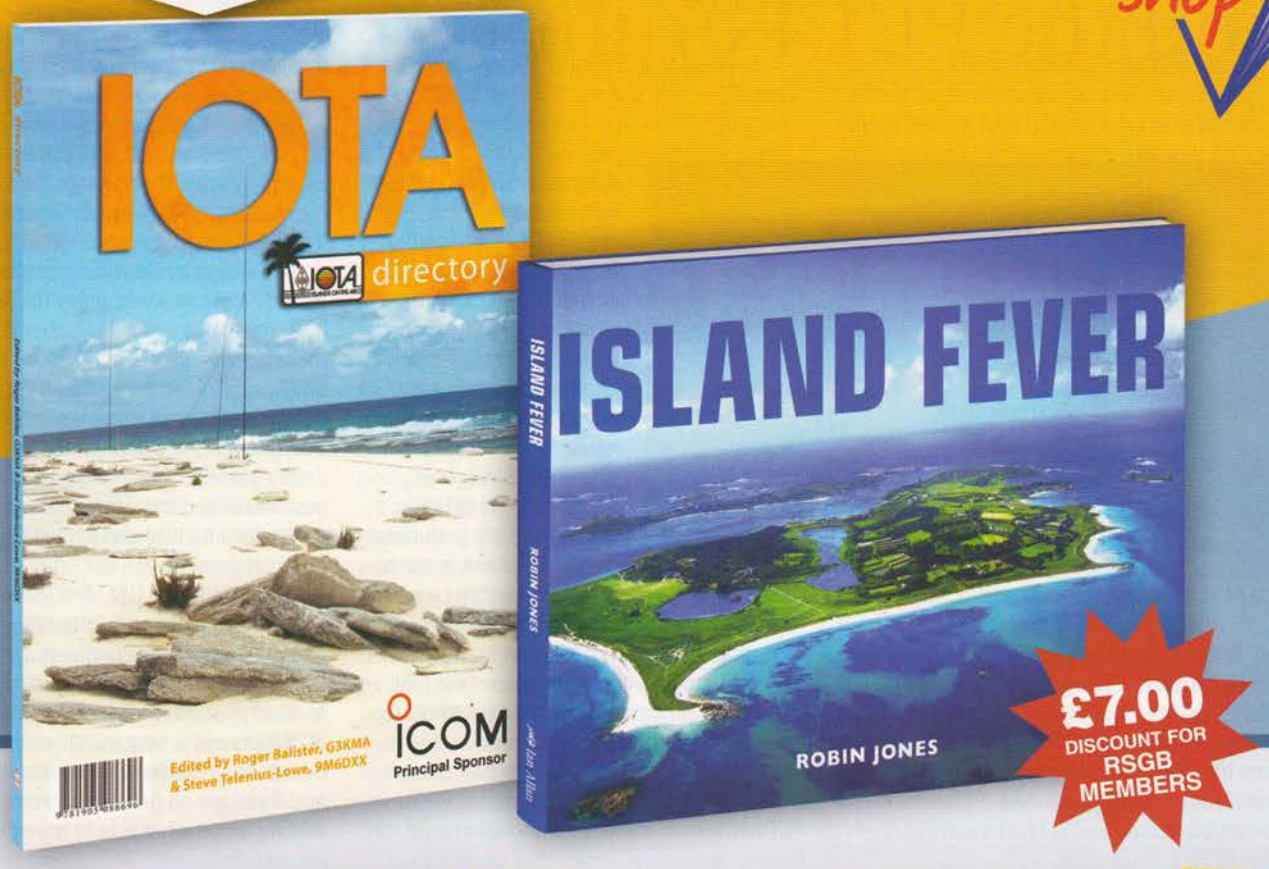


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By Robin Jones

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# ITU Study Group 1 and the PLT Forum

ITU PLT Forum, Session 3. G3RZP is second from left. Photo: G4FSU.

**WORKING AT ITU.** The Working Parties of the ITU-R Study Group 1 met in Geneva from May 25 to May 31, while Study Group 1 met on the first of June. G3RZP came straight from the Dayton Hamvention via Chicago and Heathrow, involving over 24 hours of continuous travel: G4FSU had a comparatively easy flight from Bristol!

**REPORT AND RECOMMENDATION.** This being Ian's first visit to the ITU-R, he was on a steep learning curve, but we were able to start in WP1A on the usual subject of PLT. Expansion of the previous document (that covered protection requirements up to 80MHz) was required and the necessary input was produced to cover the 144, 220 and 432MHz bands. There has been previous comment that the criteria used (degradation of 0.5dB) is unreasonable: however, it is the value that has been used for very many years by ITU-R for establishing interference criteria from other transmissions in the same radios service, and from other services, the criteria is 0.05dB! It is therefore hard to see why the same criteria cannot be used for establishing acceptable levels of PLT interference. It has also been suggested that the levels proposed for protection of the amateur services is low enough 'to hear grass grow' and is thus unreasonable.

However, this can be shown to be wrong by comparison with requirements of other systems likely to be used in the domestic environment. With an ageing population, the requirements for medical care are increasing rapidly and one way to reduce the strain on the health care system is that known as 'eHealth', which covers many facets of using electronics and communications technology. For patients with implants such as pacemakers, radio telemetry is now available using the frequency range 401 to 406MHz, shared with meteorological aids and the Earth Exploration Satellite Service. This is possible because of the ultra low power of the both implant transmitters and the programmers to which they work – a maximum radiated power of 25μW. This is professional QRPP! In practice, the limitations on battery drain, antenna gain and body loss mean that the actual power radiated outside the body is of the order of 10 to 50 nanowatts. The programmer that initiates communications has a threshold for determining if the channel is occupied of around 4μV, so it can be seen that it doesn't take much radiation from the mains wiring of PLT harmonics and intermodulation products (and fundamentals when they get that high in frequency) to prevent the programmer ever transmitting. For home monitoring, a unit is usually used at the bedside, and by interrogation of the implant, (typically a pacemaker) the performance can be downloaded and, in extreme cases, automatically analysed, so saving the patient a trip to a clinic and thus also a lot of time and money. But if home PLT harmonics and intermodulation products produce the 4μV, this important facility is lost – and, since the system can also serve as an emergency alarm, it is possible that more dire circumstances could arise from the in-house use of PLT. This is why the soon to be published RSGB guidelines on pacemakers and amateur radio advises against PLT if home monitoring for eHealth is in use.

So it is not just the amateurs who are asking for much lower levels. In case one is wondering how amateurs can live with 4μV, it should be realised that this is the number at 1m from the mains wiring and in a 300kHz bandwidth. The assumptions involved are that the amateur station is using a 3kHz bandwidth; the antenna gain in the direction of the PLT is 0dBi, it is at least 10 metres away and there is 20dB of wall attenuation.

These arguments were all accepted and incorporated into the ITU-R report and into the Recommendation on PLT. A lot of help was received in the preparation of this material from Brenna Price, N4QX, CTO of the ARRL, who was in the US delegation to SG1. A very nice compliment received from one Far Eastern delegate was that "we don't bother checking the IARU figures because we know they are correct!"

**WP1B AND SRD.** There were times when it became very useful for IARU to have two delegates as we were able to cover Working Party 1A on spectrum engineering and WP1B on economic aspects: WP1B was dealing especially with Short Range Devices as required for WRC12 under Agenda item 1.22. Regrettably, it seems that there is an increasing world wide acceptance of 433.92MHz as a frequency for SRD and it seems increasingly likely that amateurs must live with this. It is, however, in European law (the SRD Decision) that SRD must "not cause interference and must accept any interference", so the amateur has, at least in theory, priority. Interestingly, it has not proved possible to find out when that frequency was designated for ISM use in the UK.

**THE ITU PLT FORUM.** The PLT Forum held on 27 May proved very interesting. There were several sessions: the first was an overview of PLT developments. This appeared to me to be an 'everything in the garden is lovely: the level of complaints is very small compared with the number of installations (less than 0.0002%) and there are no problems' presentation. It also included what was to my mind a very sinister statement: "PLT is here to stay", with the implication that radio users just had to live with it. Another very telling statement was that devices meeting the requirements of CISPR22/EN55022 would not work and higher levels of input to the mains wiring is required – and is used. The 'notching' was held up as being very successful: the work of G3SBA on intermodulation was, to my mind, rather deliberately played down as 'being very special measurements that are not really applicable'. All of which proves the RSGB point about devices not being compliant!

It was pointed out that CISPR has been trying for five years to produce a standard. It seems that a major problem is that there is up to a 40dB difference between the interference levels acceptable for radio and those which PLT must put out to work: this was almost presented as being the fault of the radio communications community!

Session 2 saw some case studies of the effects of PLT on radio communication systems. With respect to the 0.0002%, John Metrop of UK CAA pointed out that with the requirements for aviation of less than 1 in a thousand million, the stated levels would interfere with 2 flights an hour from Heathrow alone! Charles Einoff of CBS presented studies of the effects on broadcasting, quoting also the BBC report showing the interference to Band 2 FM and to DAB, while Masatoshi Ohishi from Japan showed the measured effects on radio astronomy, showing that, in practice, a 30km separation is needed at HF. Regrettably, these measurements

cannot be repeated at the moment as the site was close enough to the Fukushima nuclear plant to be affected. All these studies contrasted with the optimism shown by the contributors to first session.

Session 3 was entitled 'Let's get compatible' and was in three parts – 'What can PLT stakeholders do?', 'What can regulators do?' and 'What can radio communications stakeholders do?'

The conclusions for the PLT industry was that is should go beyond current thinking and cooperate with the international standards bodies: the ITU-R is the obvious place for this work to be done, but radio stakeholders need to have realistic expectations. Of course, the result of this might be that realistically, some radio services have to be abandoned, although this was not stated explicitly.

Reiner Leibler of the BNetzA (the German administration) looked at what regulators can do: Germany is actively studying the effects, but the existing regulatory framework has not been designed to cover PLT and it is more technically challenging than other radio interference cases. His presentation was very much based on the activities in Germany, but he did make the point that few radio stakeholders actively contribute to the production of EMC standards, more input should be made by regulators and without specific standards, it is difficult to conduct market surveillance.

The final part of the session was made by G3RZP and looked at what radio stakeholders can do to alleviate PLT – other than switching it off! The point was made that to apply 'proportionality' – ie there are more PLT users than radio users was as valid as allowing the city of Paris to put raw sewage into the river Seine because it was cheaper, even though the small villages some 50km downstream would suffer! This did not seem to please the PLT proponents.

It was suggested that the radio stakeholder could assist by helping to carry out appropriate compatibility studies and could look to assist PLT manufacturers to produce better mitigation techniques. Additionally, they can press for at least regional and preferably world wide acceptable EMC standards for PLT. Technical measures include using directional antennas, maximising the distance between mains wiring and the antenna, sometimes using more advanced digital schemes needing lower signal to noise ratios and, in some cases, the use of noise cancellation. But these are mitigation techniques, not cures. Finally, radio communications stakeholders must take a more active part in the production of EMC standards: acting like an ostrich and burying one's head in the sand is not an option.

Reading the ITU Press Release after the event did make me wonder if the writer had been at the same event as us...

OVERALL. We have good protection ratios defined for all the international amateur bands (except 5MHz, which is not accepted internationally as having any amateur service use) up to and including 432MHz. We have it accepted that the amateur requirements are not out of line with the requirements of other radio equipment likely to be used in the home environment and, indeed, even the CISPR22/EN55022 limits have the potential to be too high for certain critical applications such as eHealth. We have the admission that PLT systems on the market in Europe do NOT meet EN55022 and, if they did, they wouldn't work. On the downside, we have the sinister view that 'PLT is here to stay and you'd better get used to it'. There were some informal suggestions that PLT could use something like 33 to 80MHz with notches at 50 to 54, 70 to 71 and around 75MHz and maybe these will come to something in the long run. To cover these meetings needs at least two people from the IARU: even with two, we were not able to cover WP3 on radio monitoring.

# Book review

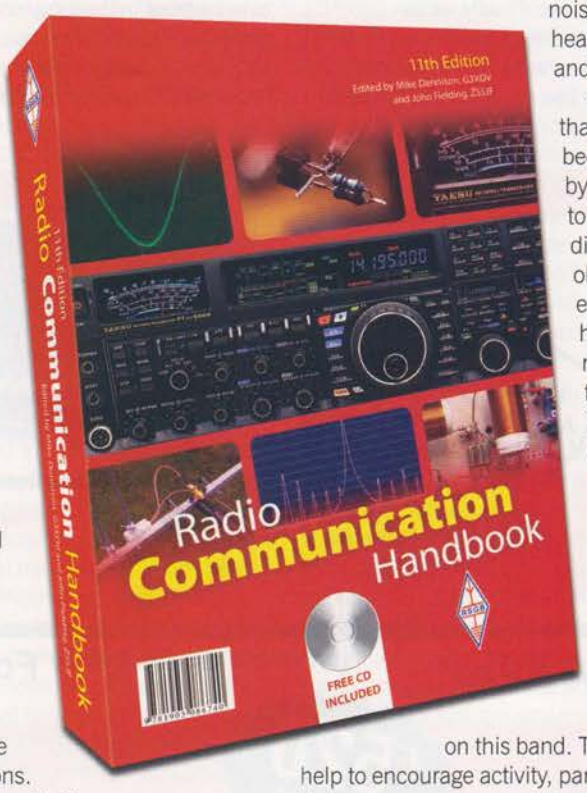
## A major update for the RSGB Radio Communication Handbook

## Radio Communication Handbook 11th Edition

Edited by Mike Dennison, G3XDV and John Fielding, ZS5JF

The RSGB *Radio Communication Handbook* is now in its 11th edition and is better than ever. Long regarded as one of the best amateur reference books, it has been extensively reviewed and revised, with much new and extended material.

So, what has changed? Lots! Many sections have been tweaked, quite a few have been expanded and there are even new chapters. There is major new material on lightwave communication, describing a range of experiments that include sending and receiving SSB signals via beams of light. Not just across the room, either – contacts of over 100km are mentioned. There are practical optical communication projects including transmitters, receivers, transverters and beacons. There is even talk of operating on different optical bands such as infrared, which may have lower atmospheric attenuation and hence offer even better performance in difficult conditions.




LF is another area that is now covered in much greater detail. There has been an explosion in interest in operating below 1MHz, particularly on the 500kHz and 136kHz amateur bands. Operation, equipment, techniques and propagation on these frequencies are quite different from higher frequencies such as Top Band (1.8MHz) or any of the HF frequencies. There are quite a number of practical projects for both bands – receivers, transmitters, antennas and matching units – and even a section on VLF, operating below 9kHz.

Most chapters have had some updating and I found it interesting, as I went through the rest of the book, to note the other areas that had received a facelift. In particular I noticed significant updates on things like digital theory, battery technology, solar power, antennas, data modes and much more. There was quite a lot of updating on the sections that deal with noise, ranging from the effect of oscillator sideband noise through to noise cancelling at the aerial, IF and audio stages – including the use of noise-cancelling headphones and mics!

4m is a band that has often been overlooked by amateurs due to the relative difficulty in obtaining 70MHz equipment. This has changed in recent times thanks to the introduction of low cost radios from the Far East and I was pleased to see that the Handbook includes quite a lot of information on this band. This can only help to encourage activity, particularly now that so many more countries are getting allocations on these frequencies.

Part of the winning formula for the *Radio Communication Handbook* is that it uses the strengths of many different, well-established and accomplished authors. As an example, the Propagation chapter is by Gwyn Williams, G4FKH, Data Communications by Andy Talbot, G4JNT and the Construction and Workshop Practice chapter is by Eamon Skelton, EI9GQ. I feel that the whole book comes over in a comfortable, friendly style – it's like having access to your own panel of experts.

As with many RSGB books these days, the *Radio Communication Handbook* is accompanied by a CD that contains the full text of the book as a fully-searchable PDF file, plus some additional material such as a wide range of useful software goodies. There is also a section of audio, video and Excel files that link to the SDR chapter, bringing a whole new dimension to the publication. But the really amazing thing about the 11th Edition CD is that it actually contains some extra chapters to the book! In order to fit the vast array of new material inside the book's covers, several have been moved to the CD. These chapters, published in previous versions of the Handbook, are retained as reference material.

For me, the great thing about the *Radio Communication Handbook* is that it has something for everyone, no matter what level or interest. Whether you are a relative newcomer or an old hand, you'll find a lot to whet your appetite. It's quite simply the RSGB's best Handbook to date.

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**Other new or updated material includes:**

Digital theory, Battery technology, Noise, IF amplifiers, Filters, Receiver measurements, High power 500kHz Tx, Solar Panels, 4m & 23cm portable, ROS datamode, Data over beacons, PIC based audio source, HF & LF antennas – and much more!

# Start Here

## Understanding radio review terminology

**INTRODUCTION.** Radio amateurs have a wide array of terminology that we use to describe how well our radios perform. Glancing through a magazine or advertisement you're presented with measurements of sensitivity, selectivity, dynamic range and IP3 points. You may also be informed that a certain radio has got 32-bit DSP and roofing filters. Over the next couple of Start Here articles we will look at what these terms mean at a basic level and how they relate to the radio activities that we perform.

**SENSITIVITY.** When comparing radios, manufacturers and reviewers often talk about the sensitivity of their radio. But what does this actually mean? In essence the sensitivity of a receiver is its ability to detect weak signals. But if someone says his or her radio has a sensitivity of 1 microvolt (-107dBm) on a certain band, what does this mean? First, you should be aware that quoting a number like the above only makes sense if you state the bandwidth that you're listening over, say 2.7kHz for SSB or 500Hz for CW. If you listen across a smaller bandwidth then you stand more chance of being able to distinguish a signal from the rest of the noise, ie your system is 'more sensitive'. Note however that this doesn't necessarily mean that you will be able to understand that signal – you can't easily work out what someone is saying if you can only hear say the higher tones of their voice! Using our example above, this means that under ideal circumstances you should be able to detect and understand (maybe not easily!) a signal that is only 1 microvolt strong at your radio anywhere on that band in the mode that you are using.

Real sensitivity specifications need two figures: the sensitivity, which may be expressed as dBm, $\mu$V, dB$\mu$V or other units, plus a statement of the quality that you can expect to hear when receiving a signal at that level. This is the signal to noise ratio, often 10dB (a noisy but quite readable signal). A 2m FM transceiver would typically have a sensitivity around 0.3$\mu$V or better; a modern HF transceiver's sensitivity might be 0.2$\mu$V or better for SSB/CW.

**WHAT IS NOISE?** Sometimes amateurs talk of noise factors and noise figures (the latter often denoted NF). These are related to each other and also to the underlying concept of the noise temperature of a radio setup.

Anything that has a temperature hotter than 0°K (absolute zero) will generate some noise due to its electrons flying around and crashing into the ions that make it up. So when we talk about distinguishing a weak signal from the noise we mean that we're picking out our signal of interest from not only other noises picked up by our antenna but from within our radio system. The lower the noise of the system, the more the wanted signal should stand out. However, lowering the noise of the radio system can get very hard and, eventually, may be limited by the noise being picked up by your antenna. Thus a very quiet radio in terms of noise and with lots of sensitivity might just pick up lots more noise via your antenna and not make it particularly easier to hear the weak signals. This is essentially the case for those of us in urban environments: despite having a radio with great sensitivity, it's simply overwhelmed by the noise it picks up from the local surroundings. Thus, when considering a radio, it's a good idea to have in mind just how noisy your location is. Note also that noise is frequency dependent as it is not always generated equally across all frequencies – in general, the amount of noise decreases as you increase in frequency. So at VHF and above it is more important to worry about the noise of your radio system; consequently the quieter your system and location, the more you can take advantage of a radio with excellent sensitivity. However, while a system with excellent sensitivity (say less than –107dBm) can dig out those really weak signals, in a crowded band with lots of strong signals it can easily be overloaded, producing squeaks, squawks and even phantom signals. This leads us nicely onto selectivity and dynamic range. For those of you who would like to learn more about noise, it has been covered in some detail in the Homebrew and Design Notes/Data column in recent *RadComs*.

**SELECTIVITY:** The selectivity of a radio is often quoted in advertisements, but what does it mean? Selectivity is basically how well your receiver can separate out the signal you want from all of the signals being picked up by the antenna. Most radios have reasonable selectivity – after all, you don't hear your local FM broadcast station on 2m normally... However, how well a receiver can select the desired signal really comes into its own in a crowded band. Filters determine the selectivity of a radio; these filters may be located early in the receiver in the form of an intermediate frequency (IF) filter or may work on the audio output from the radio. In general you get better results from IF filters placed as early as possible in the radio. In advertisements, the standard is to quote the selectivity at two levels, the first is -6dB and the second is -60dB. What this tells us is the width about your operating frequency for which everything inside that range is attenuated less than 6dB (approximately one S-point) and the width about your operating frequency for which everything outside of that range is attenuated by at least 60dB. In practice this means an S9+20 signal is attenuated down to barely audible (S1) provided it's outside of this region (see **Figure 1**).

So what should we look for? Selectivity varies by mode because of the bandwidth we need to receive an intelligible signal. We need about a -6dB bandwidth of about 2.7kHz on SSB but perhaps only 500Hz for CW. If you're looking to dig signals deep out of the noise yet not suffer too much from strong local stations, then you might consider looking for a radio with even narrower selectivity, perhaps 2.1kHz for SSB and 400Hz or even 250Hz for CW. Other modes, such as AM and FM, have different demands: a modern communication receiver's AM filter will be about 6-8kHz wide, an 'FM narrow' filter is about 10kHz. By comparison, a broadcast FM filter is about 180kHz wide!

Next month we'll take a look at the dynamic range of a radio and that mysterious figure called IP3 that can make or break a good radio...

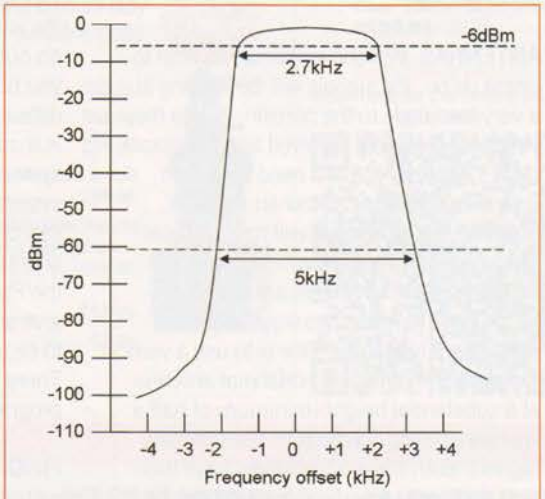
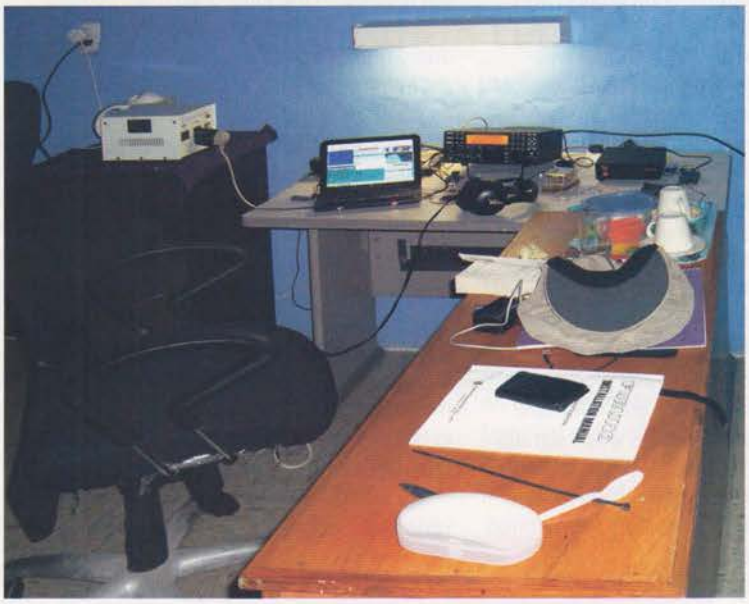



FIGURE 1: A fairly typical SSB filter response, 2.7kHz wide at the -6dB point and 5kHz wide at the -60dB point. CW filters would be narrower; AM and FM filters are wider.

# Working T32C

## Hints and tips for Christmas Island



A typical station for T32C.

**INTRODUCTION.** Last month's *RadCom* featured an excellent article by Steve Nichols, G0KYA on propagation to Christmas Island during our T32C expedition. This short article is intended to give some advice on how to take advantage of those band openings as and when they occur. Although we arrive on the island a few days earlier, we expect to be operational around 1 October and close down after the weekend of 22/23 October. Expect the opportunity to contact us to get easier as time goes on, simply because the better equipped stations and those with easier propagation than from the UK will inevitably be the first to make it into our log.

**ANTENNAS.** Whichever band you plan to chase us on, the signals will be arriving at a very low angle to the horizon, due to the very long distances involved and the polar path. Likewise, you will need to launch your own signals at as low an angle as possible. At our end we will have vertical arrays right on the sea, which is an ideal situation. Most UK DXers are not so fortunate! There are two ways to launch signals at a low angle. One is to use a vertical antenna, the other is a horizontal antenna at a substantial height (minimum of half a wavelength and, preferably, considerably higher). Both these alternatives have their pros and cons. A vertical antenna can be a quarter-wave vertical fed against an extensive earth system, or maybe a sloping dipole (oriented towards T32) hung from your tower, a high tree or whatever. But such an antenna really needs to be well clear of houses, trees and other obstructions which, if mounted at ground level, may be difficult to achieve. Verticals are also susceptible to picking up local noise, which can cause problems when you are trying to receive weak signals. Sometimes it makes sense to use a vertical antenna for transmitting and maybe a small loop (something like the popular K9AY, which is easy to build and erect) or even one of your other (horizontal) antennas for receiving. Most transceivers nowadays permit you to use a separate receive antenna.

As far as horizontal antennas are concerned, height is actually likely to be preferential to gain for this long distance path. Thus, a high dipole is likely to work better than a lower Yagi. So, for example, a 30m dipole at 50ft or so would be likely to work very well. The ubiquitous G5RV and its various cousins are, at best, a compromise on the various bands they cover. Better to focus on putting up a good antenna for the band you have selected (you can always go for a different band later, once the first contact is made). But if you do want a multiband system, a doublet, with a proper twin feeder system can work well; a longwire antenna can be very effective if you can arrange to orientate it with one of the main lobes towards the Pacific. Most antenna handbooks will give an idea of where the lobes are likely to be, depending on the antenna length. There are also several good modelling programs available nowadays.

**FINDING AND WORKING T32C.** Our website shows the frequencies we plan to use on each band. Bear in mind, though, that these are subject to change. One issue that faces us is that at least two other large Pacific DXpeditions will be active around the same time (see my recent HF columns for details). We will therefore need to be flexible and perhaps find other spots to transmit. The good news is that you could well end up working all of these DX stations if you put the effort into optimising your signal into the Pacific area. To find us on the bands, the easiest way is to check the DX Cluster network. If you are not a Cluster user, the best alternative is the DX Summit website, which aggregates Cluster spots and updates every few minutes. Don't be surprised if we have more than one station active on a band – on the main bands we plan to have the capability to operate simultaneously on more than one mode in order to maximise those short band openings, especially to Western Europe.

A key tool in your armoury is ClubLog, developed by Michael, G7VJR and Marios, G0WWW/5B4WN. We will upload the expedition log on a daily basis. Not only will you be able to check whether you are in the log but the really neat feature is that it generates propagation charts based on actual log data rather than predictions. The result is that you can see, for your own country, what are the times at which your fellow amateurs have been working T32C. This can save a lot of time calling when signals are, at best, marginal and when other parts of the world are enjoying the best of the propagation.

Until near the end of the operation, we will utilise split operation only: generally, we will be listening a few kHz higher than our transmit frequency; it will be announced often by the T32C operator. It really does pay to learn how to use your transceiver in split frequency mode, if this is something that you don't normally do. It's only too easy to make a mistake in the heat of the moment and inadvertently transmit on the DX station's frequency, causing more than a little upset and embarrassment in the process.

Apropos of which, we support the *DX Code of Conduct* and encourage all would-be DXers to be familiar with it. The URL appears below and there is also a link from the RSGB website.

We look forward to putting you in the log from Christmas Island.

**WEBSEARCH**

ClubLog: www.clublog.org
DX Code of Conduct: http://dx-code.org
DX Summit: www.dxsummit.fi
K9AY receive loop: http://www.aytechnologies.com/TechData/HowToBuild.pdf
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**MD-100a8x**
Base Station Microphone
**£139.95**

YAESU ML&S

**Officially Yaesu's largest dealer for over Ten Years! Quite a record and one that we are proud of. No other dealer comes close.**

## Yaesu Rotators

**ML&S always guarantee to have the largest stocks in the UK and, of course, the best prices. Cable extra.**

G-450C Medium duty rotator - available today.

**Only £339.95**

| | |
|---|---|
| G-550 Elevation rotator for satellite operation | £329.95 |
| G-5500 Heavy-Duty PC Controlled Vertical rotator for satellite and EME applications | £629.95 |
| G-650C Medium duty with higher brake torque than the G-450 | £379.95 |
| G-1000DXC This new, high-performance rotator is ideal for heavy-duty applications. Its slim-line constructions is ideal for many crank-up tower installations. Rotation range: 450°, with presets. | £499.95 |
| G-2800DXC Yaesu's top-of-the-line rotator is for extra-heavy-duty antenna installations. It includes Auto Slow Start and Auto Slow Stop features to avoid sharp jolts to the antenna array and tower. The G-2800A includes a mast clamp to simplify installation. Total rotation range: 450°, with presets. | £949.95 |
| GS-065 Mast Bearing | £57.14 |
| GC-038 Lower Clamps | £34.95 |
| Rotator Cable 25m with plugs fitted | £69.95 |
| Rotator Cable 40m with plugs fitted | £123.95 |
| Rotator Connector plugs | £25.95 |

**Got a Smart Phone?**
Scan here for the unique ML&S QR Code

ACCESSORIES | AMATEUR RADIO | COMMERCIAL / PMR RADIO | AVIONICS | MARINE RADIO | RECEIVERS / SCANNERS | ANTENNAS

**CONTACT US**
Martin Lynch & Sons Ltd.
Outline House, 73 Guildford Street,
Chertsey, Surrey KT16 9AS
Web: **www.hamradio.co.uk**
E-mail: **sales@hamradio.co.uk**

**OPENING HOURS**
Monday to Friday: 9.00am to 5.30pm
Saturday: 9.30am to 4.30pm
**Tel: 0345 2300 599**

**FRIENDLY HELPFUL ADVICE**
We pride ourselves on our customer service. We believe that is has been instrumental in making us the number one choice for thousands of loyal customers.

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Shopping online with ML&S is safe and secure. E&OE

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**...and the RSGB Convention the weekend after!**

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## Brand New Product!

KG-UVD1P/L
4m (66-88MHz) + 2m (136-174MHz)

**ML&S Price: ONLY £99.99**

The world's very first Twin Band Handie with the UK's two most popular bands in one!

Look at the frequencies in this display!!!

**New KV-UV920R**
Low cost Dual Band, Cross-band Repeat High Performance 2/70 FM mobile Transceiver with wideband receive, remote head etc. Due late 2011.

**Wouxun KG-679E/2M 2m FM Handie**
**Also available for 70cm!**
ML&S Prices:
KG 679E/2M ..... **£59.99**
KG-679E/U 70cm (400-470MHz) ..... **£59.99**
or with Voice Scrambler KG-689E/U ..... **£69.99**

**The UK's Best Selling Dual Bander!**
**Wouxun KG-UVD1P**
2/70 Full Dual Band FM Handie
**ML&S Price: £92.99**

**Wouxun KG-699E/4M**
4m FM Handie
**ML&S Price: £79.99**

**Full range of Wouxun accessories are available.**

**The New Icom IC-9100**
HF through to 23cms Base Transceiver

**ML&S Price: £2899.95 available ex-stock**
**Or Plus 4 Pack only £3875***
Options:
UX-9100 23cm Module.....£623.99
UT-121 D-Star Board.....£180.00
FL-430 6kHz Roofing Filter.....£60.00
FL-431 3kHz Roofing Filter.....£60.00
*Plus 4 Pack includes all of the above.

ICOM

Full Icom range always in stock!

**CANCELLED EXPORT ORDER!**
Brand new 2 year warranty Icom IC-718 HF Base Station transceivers at a massive saving of £260 off RRP.

**BRAND NEW Icom IC-718 100W Base station**
**RRP £690**
**ML&S £429.95 !!!**

ONLY 2 LEFT at time of going to press. PLEASE CALL NOW!

**Icom HF Products**
IC-718.....~~£589.95~~ SEE OFFER
IC-7200.....£829.95
IC-7000.....£1189.95
IC-7410.....£1599.00
IC-7600.....£3279.95
IC-7700 DEMO .....£4995
IC-7800..... £Call!
IC-PW1Euro ....£4699.95
**Icom Receivers**
IC-R9500 ..... £Call!!
**Icom V/U Products**
IC-V80E .....£105.00
IC-T70E.....£158.25
IC-E80D.....£329.95
ID-E880E .....£439.10
IC-E90 .....£239.95
IC-E90/4m .....£299.95
IC-E92ED.....£388.95
IC-E2820 .....£485.95
IC-E2820 +UT-123 .....£699.95
IC-910H .....£1296.96
IC-910X.....£1549.95

**New TS-590S HF/6m Transceiver**
Latest HF & 6M FULL DSP Base Transceiver from Kenwood

**AVAILABLE FROM STOCK £1339.95**

**Add an MC-60A DESK MIC worth £118 for only £100!**

**TS-2000X**
Flagship HF-23cm. All Mode Base Station
**This really is a total shack in a box.**

**Only £1699.95!**

KENWOOD

Kenwood Ham Radio Dealer of the Year 2010-2011

**TS-2000E**
HF-70cm Auto ATU Base
**£1469.95**

**TH-F7E**
Dual Band with all-mode scanner built in
**£239.95**

**TH-D72E**
New FM dual band transceiver
**£429.95**

**PS-60** Matching PSU for TS-590/2000
**£299.95**

**TS-480SAT**
100W HF+6m Auto ATU Mobile/Base
**£779.95**

**TS-480HX**
200W HF+6m Mobile/Base
**£879.95**

**TS-2000X** HF-23cm Auto ATU Base – "A complete shack-in the-box" **£1699.95**

**TM-V71E** 50W 2/70 Mobile
**£299.95**

**TM-D710E**
2/70 Mobile/Base with APRS & TNC. **£445.95**

**MC-60A** Deluxe Desk Microphone
**£119.95**

**ML-5555**
10m Multimode Transceiver
**Available from stock:**
**£149.95**

MyDEL

Latest all mode 12 Watt 10m Transceiver. Simple to use, entire 10m Band in one small box at a very low affordable price.

**ML-5189**
20W 4m Mobile
**Only £139.95**
Includes FREE DTMF Mic

**Solid State Amplifiers from RM!**

RM ITALY

**BLA-1000** Flagship 1kW key down all mode HF Linear Amplifier with built in PSU. **£2799.95**

**NEW BLA-350!**
300Watt output key down HF Linear Amplifier with built in PSU.
**Only £649.95**

Palstar

The combination of affordable pricing and high quality construction and performance makes this the tuner of choice for many Hams. **Only £449.95**

**Palstar AT-2KP** **BACK IN STOCK!**

| | | |
|---|---|---|
| AT-500 | 600W PEP Antenna Tuner | £409.95 |
| AT-1500DT | 1500W Differential Antenna Tuner | £449.95 |
| AT-2KP | 2000W Antenna Tuner | £449.95 |
| AT-2KD | The AT-1500DT and the AT-1KP have been combined into a new 2Kw Tuner | £449.95 |
| AT-4K | 2.5kW Antenna Tuner | £789.95 |
| AT-5K | 3.5kW Antenna Tuner | £999.95 |
| BT-1500A | Balanced Antenna Tuner | £589.95 |
| PM-2000AM | Power/SWR Meter | £159.95 |

**Palstar Dummy Loads** DL-1500 (1.5KW) £119.95 DL-2K (2kW) £259.95 DL-5K (5kW) £379.95

# HAMFEST & the RSGB Convention the weekend after

**FUNcube Dongle *Pro*** This remarkable memory stick-sized device was conceived, designed, built by Howard Long G6LVB. Originally produced as part of AMSAT-UK's FUNcube satellite project, the FUNcube Dongle is the "ground segment", or a radio receiver designed to allow reception of satellites like FUNcube. However with a continuous coverage of 64MHz through to 1700MHz, the FUNcube has found many alternative applications! **Only £118.80.**

**Software Defined Receiver**

ML&S are pleased to announce their appointment as distributor for RF Space Inc SDR-IQ™ Software Defined Radio, Spectrum Analyzer and Panoramic Adapter. Now available from stock.


**Perseus VLF-LF-HF Receiver**

PERSEUS is a VLF-LF-HF receiver based on an outstanding direct sampling digital architecture Only **£699.95**

**Perseus-FM+**

High Performance FM 88-108<Hz adapter for the Perseus SDR Receiver. Available late August. **£299.95**

**Want to dabble in D-Star without the expense of a radio?**

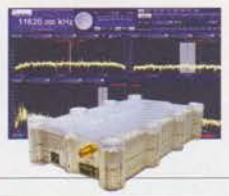
**DV-AP-Dongle** The New DVAP allows you to walk away from your PC and remote control via your D-Star handie. **£219.95**

**DV-Dongle** A quick efficient way of gaining access to the D-Star network via your PC. **£169.95**

**WiNRADiO Excalibur Pro. WR-G33DDC**

The WiNRADiO WR-G33DDC 'EXCALIBUR Pro' is a high-performance, low-cost, direct-sampling, software-defined, shortwave receiver with a frequency range from 9 kHz to 49.995 MHz. **£1599.95**

WiNRADiO



**WiNRADiO WR-G31DDC EXCALIBUR**

**£699.95**

For full details see web.

**Flex 1500**

SDR Low cost SDR Transceiver. **£579.95**

**Flex 3000**

With ATU 100 Watt SDR 160-6m with Auto ATU fitted. **£1299.95**

**FACTORY APPOINTED DEALER for FLEX**

**The entire FLEX Range is now on demonstration in the ML&S Super Store!**

**Come and meet Klaus Lohmann from Flex Radio on our stand at the Newark Show & talk to Sanderly from ML&S about the Flex SDR range.**

**MFJ Products**

| | | |
|---|---|---|
| MFJ-16010 | Random Wire ATU 160-10M | £69.95 |
| MFJ-949E | Manual ATU metered, Dummy Load, 1.8-30MHz, 300W | £179.95 |
| MFJ-901B | Manual Mini ATU 1.8-30MHz, 200W | £109.95 |
| MFJ-971 | Manual ATU metered, 1.8-30MHz, 200W | £118.95 |
| MFJ-904H | Manual ATU, metered, inc balanced, 1.8-30MHz 150W | £149.95 |
| MFJ-969 | Manual Roller ATU Metered 1.8-54MHz, 300W | £209.95 |
| MFJ-993B | Auto ATU Metered 1.8-30MHz, 300W | £249.95 |
| MFJ-1786X | Magnetic Loop 10-30MHz, 150W | £429.95 |
| MFJ-1788X | Magnetic Loop 7-22MHz, 150W | £469.95 |
| MFJ-259B | Antenna Analyser 1.8-170MHz | £259.95 |
| MFJ-269B | Antenna Analyser 1.8-450MHz | £349.95 |
| MFJ-260C | Dummy Load 300W SO-239 | £44.95 |

**Lots more MFJ stocked! See web for details**

**Flex 5000A**

Flagship 100W SDR Base 160-6m **£2495.95**

FlexRadio Systems

**Flex 5000A-ATU**

As 5000A but built-in Auto ATU. **£2745.95**

**Flex 5000A-ATU+Twin RX** with second receiver. **£3434.95**

AirNav Systems

**The New RadarBox is now available from ML&S!**

Radar Box-3D....**£489.00**

Radar Box-Pro...**£399.00**

**Special Offer**

**Buy a new RadarBox 3D and add a BlackBox AirBand Receiver mk11 (RRP £79.99) for only £25!**

**ML&S have installed three 42" Hi-Res monitors to demonstrate Virtual Radar and SDR receivers. When you are next passing Chertsey, pop in for a demonstration.**


**MyDEL** The neatest smartest looking desk top power supplies that money can buy. Ideal for powering any main rig or accessory requiring 13.8 Volts at up to 120 Amps.

**MyDEL MP-8230**

13.8V DC, 25A power supply, switch mode. **£69.95**

**MyDEL MP-925**

Linear PSU **£99.95**

**Ideal for FT-817ND or most handhelds.**

**MyDEL MP-6A**

13.8V DC, 6A power supply. **£29.95**

**Two-year warranty on all MyDEL PSUs**

**MyDEL PS-30SW11**

Latest high performance switch mode PSU. 25amp. **£84.95**

**MyDEL MP-9626**

120A, 13.8V DC power supply, switch mode. **£299.95**

**Ideal for TS-480HX or other 200W output radio.**

**MyDEL MP-5600**

60A switch mode power supply. **£199.95**

**Alinco DM-330MW**

30 AMP switch mode power supply. Lght weight and low noise. **£99.95**

**Yaesu FP-1030A**

**2 year Warranty**

25-30Amp 13.8V fixed DC PSU, Twin meters, near silent running. **£189.95**

**HF Linear Amplifiers**

| | |
|---|---|
| NEW Pioneer 1KW HF amplifier | £1595.00 |
| Yaesu VL-1000 Quadra | £4499.95 |
| Icom IC-PW1Euro | £4145.95 |
| Ameritron ALH-811HXCE | £919.95 |
| Linear Amp Ranger 811HXCE | £1295.95 |
| Linear Amp Ranger 572B | £1395.95 |
| Linear Amp Challenger Mk1V | £2449.95 |

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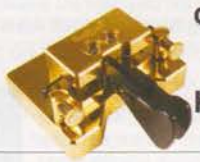
**Begali**

**Begali Morse Keys** Magnetic Classic Gold

| | |
|---|---|
| Camel Back Key | £129.95 |
| Intrepid Semi-Auto Bug | £429.95 |
| Magnetic Classic Iambic Paddle | From £199.95 |
| Simplex Iambic Paddle | From £149.95 |
| Simplex Mono Single Lever Paddle | £149.95 |
| Sculpture Stainless & Carbon Iambic Paddle | £419.95 |



**Special offers on Begali at the HamFest Show!**

**KENT KEYS** **Kent Keys**

| | |
|---|---|
| Hand Key Kit Build it yourself Straight key | £53.99 |
| Twin Paddle Key Kit | £83.47 |
| Single Paddle Key Kit | £61.20 |
| Hand Key Wooden base | £71.44 |
| Hand Key KT1 Steel base | £81.65 |
| Twin Paddle Key | £89.95 |
| Single Paddle Key | £74.50 |
| Vail Key Correspondent replica | £199.95 |

Twin Key

**ML&S are pleased to announce the famous Idiom Press range of CW Keyers and Digital Voice Keyers.**

**LogiKey K-5** An excellent fully iambic keyer with six active messages and 12 banked, 1530 characters in total. **£129.95.**

**LogiTalker** A stand-alone voice keyer with storage from 2 to 266 seconds. Can be configured for any radio. **£129.95.**

Idiom Press Leads for any rig **£19.95.**

**Tigertronics** **Tigertronics SL-USB**

ALL sound card Digital and voice modes are supported by the SignaLinkTM USB. This includes traditional modes such as RTTY, SSTV and CW (to name a few), as well as today's hottest new modes like PSK31, MT-63 and EchoLink.


**From only £99.95**

**Call to discuss your rig-to-cable requirements.**

**NEW Microbit RRC-1258mkIIS**

A complete remote control system for Amateur radio. Microbit1258mkIIS: **£399.95. Leads included.** www.hamradio.co.uk/rrc-1258.shtml

**NEW VERSION OLD PRICE £399.95**

A new version of the RRC-1258MkII which support Rigs with dual receivers is now available and will replace the existing RRC. Remote your rig anywhere in the world where you have an internet connection.

**MiniVNA pro**

Pro-Antenna Analyser with Blu-Tooth:£379.95

**SPECIAL OFFER £369.95**

The new miniVNA PRO is an extraordinary and unique handheld vector network analyzer that makes available a multitude of new features and capabilities which are perfect for checking antennas and RF circuits for hams and commercial users.

**MiniVNA original still available**

**(without Bluetooth)**

**£259.95**

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**New!**
**GAP Antennas Available from stock**

GAP

| | |
|---|---|
| Eagle-DX 6-Band, 40-10m 2kW | Only £325.95 |
| Titan-DX 8-Band, 80-10m 2kW | Only £345.95 |
| Voyager-DX 4-Band 160-20m, 2kW 45ft tall! | £385.95 |
| Challenger-DX 8-Band 80—2m (no 17) | £295.95 |

---

**Isotron!**
**The most compact 1kW HF Antenna ever!**

After 30 years of manufacture and Hot from the USA, these very clever compact antennas are available for all the HF bands. They are easy, quick and simple to install. Tunes & performs without radials or antenna tuners.

The full range can be viewed on our web-site and prices start from only £105 through to £265 for the "Combo's".

Mark, G8AWO showing off the assembled 10/15/20 & 40/80m Combo Isotron's before mounting on the roof at ML&S HQ.

**SAVE 10% AND free delivery on Isotron this month only. Call for details.**

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**Hustler Antennas**
**Base Station Range**

HUSTLER

Free standing, max 7.3m tall, 1kW

| | | |
|---|---|---|
| 4-BTV | 40/20/15/10m | £183.78 |
| 5-BTV | 80/40/20/15/10m | £224.63 |
| 6-BTV | 80/40/30/20/15/10m | £265.48 |

**Mobile Range**

200W or 1kW, both stocked. RM10 to RM-80 10M to 80m single-band whips. £24.95 to £56.95

The full mobile and base range and accessories available from stock, including the high power 1kW mobile range.

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**DX Engineering Products**

The DX Engineering DXE-AOK-17M kit adds 17 meter coverage to the Hustler BTV series of vertical antennas without giving up any existing band coverage. This kit will operate across the entire 17m band with an SWR of 1.5:1 or less.

No disassembly of the existing antenna is required, simply bolt this kit over the 10m trap, make some minimal tuning adjustments and you're on the air with an additional band..... £71.44

| | |
|---|---|
| DXE-363-SST Hi-quality bulkhead connector | £9.99 |
| DXE-AOK-DCF Direct coax feed assembly | £26.99 |
| DXE-BAL050-H10-AT High power transmission line transformer & baluns | £129.99 |
| DXE-BDAB-1P Mounting kit | £27.99 |
| DXE-CAVS-1P V clamp | £14.99 |
| DXE-RADP-3 Stainless steel plate | £59.99 |
| DXE-RADW-500KBD Bulk radial wire kit | £64.99 |
| DXE-SAD-200A Saddle clamp | £12.99 |
| DXE-VFCC-H05-A Vertical feedline current choke | £129.99 |

**See www.hamradio.co.uk for the full DX Engineering range and technical information.**

**DXE-UT-8213 Coax Cable Stripper**
**ONLY £47.99!**

This tool prepares RG-8, RG-213, 9913F7, LMR-400 (not LMR-400UF) and other similar size coax cable for installation of a PL-259 connector - or DXE-N1001S two-piece Type N connector (requires a slight additional trimming of the cable center conductor length).

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**The UK's favourite rig-mounted antenna system**

**NEW! WonderWand Widebander**
1.8-460MHz with Monster 1.8M Whip! £119.95

**NEW! WonderWand Mk4**
7-432MHz antenna with 1.8m Whip..... £89.95

**Wonder-TCP**
40-10m Tuneable Counterpoise..... £59.95

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**DIAMOND**

Huge selection of Diamond products always available

**Base Antennas**

| | | |
|---|---|---|
| X-30 | 2/70, 3/5.5dB, 1.3m Long .. RRP £79.95 | **SPECIAL £59.95** |
| X-50N | 2/70, 4.5/7.2dB, 1.7m Long RRP £85.95 | **SPECIAL £74.95** |
| X-300N | 2/70, 6.5/9dB, 3.1m LongRRP £146.95 | **SPECIAL £109.95** |
| V-1000 | 2/70/23, 8.3/11.7/13.7dB 5m Long RRP £149.95 | **SPECIAL £99.95** |
| X-510N | 2/70 Fibre glass 8.3/11.7dB gain. 5.2m long "N" | **£189.95** |
| V-2000 | 6/2/70, 2.15/6.2/8.4dB, 2.5m Long ..... RRP £149.95 | **SPECIAL £109.95** |

**Mobile Antennas**

| | | |
|---|---|---|
| NR-770R | 100W, 2/70, 3/5.5dB, .98m Long | £39.95 |
| NR-770RSP | as NR-770 but spring loaded | £39.95 |
| NR-770RSP | As above but spring loaded | £44.95 |
| NR-7900 | 2/70, 3.2/6.4dB, 1.46m Long | £69.95 |

**Duplexers/Triplexers**

| | | |
|---|---|---|
| MX-72N | 1.6-150/400-460MHz Duplexer | £44.95 |
| MX-62M | 1.6-56/140-470MHz Duplexer | £69.95 |
| MX-610 | HF/6+2+70 (for FT-8900) | £59.95 |
| MX-2000 | 6/2/70 Triplexer | £91.95 |
| MX-3000N | 2/70/23 Triplexer | £86.95 |

**Switches**

| | | |
|---|---|---|
| CX-210A | 2-way, SO-239 Die Cast | £53.95 |
| CX-210N | 2-way, N-Type, Die Cast | £82.95 |
| CX-310A | 3-way, SO-239, Die Cast | £89.95 |
| CX-310N | 3-way, N-Type, Die Cast | £114.95 |

**SWR/PWR Meters**

| | | |
|---|---|---|
| SX-100 | 1.6-60 MHz, 30W-300W-3KW | £144.95 |
| SX-200 | 1.8-200 MHz, 5-20-200 Watts | £98.95 |
| SX-1100 | NEW MODEL 1.8-1300 MHZ, 5-20-200W PL-259/"N" (was SX-1000) | £249.95 |
| SX-1000 | 1.8-1300 MHz, 5-20-200 Watts | £230.87 |
| SX-40C | 144-470MHz X needle Mobile Meter | £104.95 |
| SX-20C | 3.5-150MHz X needle Mobile Meter | £98.95 |
| SX-240C | NEW MODEL 1.8-54MHz & 144-470MHz X needle 30W/300W/3KW (HF only) | £339.95 |
| SX-27P | COMPACT 144/430, 60W Portable Meter | £45.93 |

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**NISSEI**

One of the oldest names in Ham Radio

| | | | |
|---|---|---|---|
| Nissei | RX-103 | 1.6-60MHz, 20/200/2kW | £49.95 |
| Nissei | RX-203 | 1.8-200MHz, 2/20/200W | £49.95 |
| Nissei | RX-403 | 125-525MHz, 2/20/200W | £49.95 |
| Nissei | RX-503 | 1.8-525MHz, 2/20/200W | £69.95 |

**New Range to ML&S, HUGE DISPLAY, PEP & Average reading.**

| | | | |
|---|---|---|---|
| Nissei | TX-102 | 1.6-200MHz, 2/20/200W | £59.95 |
| Nissei | TX-402 | 125-525MHz, 2/20/200W | £59.95 |
| Nissei | TX-101A | 1.6-60MHz, 20/200/2kW | £84.95 |
| Nissei | TX-502 | 1.6-525MHz, 2/20/200W | £89.95 |

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**COMET**

**Comet SWR/Power Meter**

| | | |
|---|---|---|
| CMX 2300 | 2 separate SWR/Power Meters in one box! | £153.21 |

**Comet Antenna Tuner**

| | | |
|---|---|---|
| CAT-300 | 300W Antenna Tuner | £194.08 |

**Comet Wide-Band Vertical**

| | | |
|---|---|---|
| NEW! Comet CHA 250BKII | 80m to 6m with no ATU and no gaps | £299.95 |

**Comet Rotary Dipole**

| | | |
|---|---|---|
| H-422 | 4 Band trapped dipole | £275.82 |

**Comet HF/VHF/UHF Base Antennas**

| | | |
|---|---|---|
| CWA1000 | 80,40,20,15,10 trapped dipole | £99.95 |
| GP1 | 144/430 MHz 3.0 / 6.0dbi 1.25m | £59.95 |
| GP3 | 144/430 MHz 4.5 / 7.2dbi 1.78m | £69.95 |
| GP6 | 144/430 MHz 6.5 / 9.0dbi 3.07m | £99.95 |
| GP9 | 144/430 MHz 8.5 / 11.9dbi 5.15m | £139.95 |
| GP15N | 50/144/430 MHz 3/6.2/8.6dbi 2.42m | £99.95 |
| GP98 | 144/430/1200 MHz 2.94m long | £139.01 |

**Comet Handy Antennas**

| | | |
|---|---|---|
| BNC-750 | BNC HF whip 7-50MHz TX/RX | £81.69 |
| CH32 | BNC 144/433/900Mhz 45mm | £20.39 |
| CH-99 | BNC Tel Whip 70-1000MHz 195-1135mm L | £20.38 |
| CHF816 | 16 3.5/28/50MHz 74cmL 10W/Yaesu FT817 | £51.03 |
| RX5 | 144/430/900MHz 44cm L 8W SMA | £30.60 |
| RX7 | 144/430/900MHz 44cm L 8W BNC | £30.60 |
| SH95 | 144/430/1200MHz 37cm L 10W BNC | £30.60 |
| SMA3 | 144/430/900MHz 25cm L 10W SMA | £25.50 |
| SMA99 | 70-1000MHz 1.1mm max L Tele SMA | £17.32 |

**Comet Duplexers**

| | | |
|---|---|---|
| CF360A | 28/50MHz w/leads SO239 - PL259/PL259 | £40.82 |
| CF416A | 44/430MHz w/leads SO239 PL259/PL259 | £35.71 |
| CF416B | 144/430MHz w/leads SO239 PL259/N male | £35.71 |
| CF503C | 50/144MHz Sockets SO239 - PL259/PL259 | £45.93 |
| CF530C | 50/144MHz w/leads SO239 - PL259/PL259 | £45.93 |
| CF530A | 50/430MHz w/lead PL259 SO239/SO239 | £40.825 |
| CF4160B | 144/430MHz Sockets SO239 PL259/PL259 | £33.66 |

**Comet Triplexers**

| | | |
|---|---|---|
| CFX431A | 144/430/1200MHz N socket/PL259/N/N | £51.03 |
| CFX514N | 50/144/430/MHz SO239/PL259/PL259/N | £51.03 |

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**Miracle Antenna Hot new products!**

| | |
|---|---|
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| **MMD-30** 30M MIXED MODE DIPOLE | £99.95 |
| **MMD-40** 40M MIXED MODE DIPOLE | £99.95 |
| **Miracle Ducker iL** HF-70cm Mini ATU with BNC | £109.95 |
| **Miracle Ducker** HF-70cm with PL-259 | £109.95 |
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| NEW AT-600pro | 600W Auto ATU | £299.95 |
| AT-100proII NEW | Desktop tuner covering all frequencies from 1.8-54 MHz | £199.95 |
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| AT-1000Pro | 1kw 160m-6m (1.8-54MHz) High speed Auto ATU, tuning range 6-1000Ω | £499.95 |
| AT-897Plus | Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too! | £179.95 |
| IT-100 | New version of the AT-7000 | £159.95 |
| YT-100 | NEW AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control | £177.65 |
| Z-817 | Ultimate autotuner for QRP radios, including the Yaesu FT-817D | £119.95 |
| Z-100Plus | Ultimate autotuner for Yaesu FT-817D | £134.95 |
| Z-11ProII NEW | Portable compact & tunes 100mW to 125W | £159.95 |
| RCA-14 | 4-way DC Breakout Box | £52.12 |
| KT-100 | Dedicated tuner for Kenwood radios | £173.57 |
| RBA-1:1 | Probably the best 1:1balun out there | £35.69 |
| RBA 4:1 | Probably the best 4:1 balun out there | £35.69 |
| FT-Meter | Neat Analogue back-lit Meter for FT-897/857. S-meter, TX Pwr, ALC Etc | £44.95 |
| NEW FTL- Meter | Jumbo version of the famous FT-Meter | £79.95 |

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**...and the RSGB Convention the weekend after!**

# RSGB Convention

## 7 to 9 October, Horwood House near Milton Keynes



Horwood House Conference Centre

VENUE. Horwood House is a conference centre in the Buckinghamshire countryside, just eleven miles from Milton Keynes. Set in 38 acres of landscaped gardens it also has an all-weather tennis court and jogging trail. Inside, as well as the lounge and bar social area it has a spa, sauna, heated indoor swimming pool and air conditioned gym in the leisure club. It is signposted from the A421 whether you are travelling from Milton Keynes or Buckingham.

LECTURES. This year there are 60 lecture sessions over two days, drop-in test equipment training sessions all day Saturday and the grand raffle prize draw on Sunday at 3pm. Whether you want to hear about some of the most recent DXpeditions, join in a lively technical debate on antennas, learn more about EME or brush up your contesting skills, there will be lectures to enjoy.

Just a few of the highlights are Marcus Walden, G0IJZ who is speaking on 5MHz beacon measurements, NVIS maximum operating frequency and NVIS propagation predictions. His presentation will include details of the 5MHz beacon network, an investigation into the maximum operating frequency and the optimum working frequency for NVIS communications, and a comparison of 5MHz beacon signal level measurements with HF propagation predictions using *VOACAP* and *ASAPS*.

The 4W6A Timore-Liste DXpedition will have closed down just a couple of weeks before the Convention. A team of seven radio amateurs journeyed for a DXCC DXpedition to Atauro Island, OC-232 and Tim Beaumont, M0URX will explain more about the trip.

Howard Long, G6LVB is talking about his FUNcube Dongle and the story of how a simple design requirement for a VHF receiver, with a perceived market of a few dozen units, became an overnight sellout success, shipping in the thousands.

Instant Morse is a way of memorising the dots and dashes of the 26 letters of the alphabet in Morse code in an extremely short period of time and will be demonstrated by Steve White, G3ZVW. It relies on there being people present who don't know Morse, so if you have put off learning it or found it impossibly difficult to come to terms with even the basics, this talk is for you. At the start of this original and highly interactive presentation please offer to be one of the volunteers in the learning process. It won't hurt and it's not an exam. Those who teach the basics of Morse to others can also find the talk useful. Equipment required is either a flipchart and easel or an OHP and screen (not a PC projector).

Professor Mike Warrington, G4EMW, who heads the ionospheric research at Leicester University will describe the effects of the mid latitude trough in the ionosphere that has plagued propagation in the 80m Club Contest during January and February of this year.

Dr Colin Forsyth, from the Mullard Space Science Laboratory, is visiting the Convention for the first time this year. He will speak on the Coronal Mass Ejections that hit the Earth and, in particular, cause aurora.

Contest University has lectures on both Saturday and Sunday this year. One of the highlights will be the Contest Exchange. This is where there will be a mixture of 'hosts' and 'guests'. Hosts are those with stations willing to open their contest to an operator that does not have the facilities available to use such equipment. Guests will get the chance to meet Hosts to network and hopefully secure a deal to visit their station to operate in a contest.

Nick Henwood, G3RWF has been travelling regularly to Western Uganda to work at a community university. His temporary amateur radio station, with the callsign 5X1NH, has now made about 80,000 contacts all over the world using CW, SSB and data modes. Nick will talk about some of the challenges and excitement that are faced as a solo operator. He will concentrate on practical solutions to getting on the air - solutions as relevant in the UK as they are in the foothills of the Rwenzori Mountains. He is planning to bring his suitcases with him, one contains a multi band beam, a single band beam and two verticals and checks in just under 23kg.

Alan Messenger, G0TLK will be speaking about the 5MHz Experiment, which has been running since 2002, has produced almost 50,000 manual records and, since the beacons were commissioned in 2004, over 1,000,000 automated records. That amount of data can be rather daunting, particularly when you add ionospheric parameters to explore NVIS propagation, resulting in several million data items. The average home PC, let alone the user, could get 'digital indegestion' on that lot! With help from scientists at the Space Physics Interactive Resource (SPIDR) in the USA, Alan has retrieved ionospheric data for the last 10 years and built software to combine and process it with Experiment data. The program allows analysis choices without having to prepare data first or get involved with the ionospheric maths. Alan will demonstrate the software, explain the principles behind the various ionospheric parameters, how he has used them and illustrate typical results.

Earth-Moon-Earth communication is one of the greatest challenges within our science based hobby of amateur radio and Brian Coleman, G4NNS will talk about this fascinating aspect of amateur radio. When explained and

Last year the partners enjoyed a day out in Buckingham followed by some retail therapy. This year the plan is a trip to Stowe Landscape Gardens followed by the usual shopping.

In 2011, both VHF and HF trophies will be presented on Sunday 9 October.

demonstrated to members of the public it never fails to capture their imagination especially when they hear an echo returning from the Moon about two and a half seconds after the signal was sent, having travelled about half a million miles. Building a successful microwave EME station requires knowledge of basic astronomy, electrical, mechanical and radio frequency engineering, computing for the tracking system and for digital signal processing to assist with the resolution of weak signals. The construction of the antenna, tracking system and RF hardware will be described and recordings and spectral displays of Earth-Moon-Earth contacts on 10 and 24GHz will be demonstrated. EME systems can be used for some basic radio astronomy and this subject will be touched upon.

The First Class Operators club are planning to run the pile up challenge during the weekend. You can try your hand as an individual effort or make it competitive between a group.

If you want to know more about the lectures shown in the timetable, take a look at the website and you'll find more detail available to help you decide which sessions you want to attend.

PARTNERS PROGRAMME. For those who are not so interested in the radio side of the weekend we have a full programme of events they can join. On Saturday the coach leaves for a visit to the National Trust Stowe Landscape Gardens, one of the most remarkable creations of Georgian England, created by a family once so powerful they were richer than the King. The day will conclude with some retail therapy in Milton Keynes.

EXAMS. Both UK and US exams are available during the Convention weekend. Candidates for the Foundation, Intermediate and Advanced UK exams must book their examinations prior to the event and must provide evidence they have completed the required practical assessments. The contact for further information and for booking examinations the Exams Department at RSGB HQ on 01234 832700.

Candidates for the Foundation or Intermediate examinations must contact Brian Reay, G8OSN via g8osn.rsgb@gmail.com or on 01634 376516 so that their progress on practical assessments can be verified. If required, Brian can also advise on finding a local tutor to complete practical assessments in advance of the Convention. It is essential that Foundation and Intermediate candidates have their progress verified by Brian before the Convention.

The US exams will be available on Sunday 9th. Candidates will need some form of ID, photo ID is preferred, a USA postal address for the FCC to send your licence, the exam fee, which this year would be the Sterling equivalent of $15 and a pen (but they usually have some available if necessary). For the self-study needed prior to the exam, there are many books available from the RSGB or on the internet. The important one is the FCC part 97, which is the equivalent of our Terms and conditions. Well worth a read, as there are many differences in the US regulations from our own. Many websites will give you practise papers with answers and in fact the whole of the examination question pool is available in the public domain and can be downloaded. The ARRL website, www.arrl.org, is a good place to start. It will give you access to the question pool and the Part 97 to download or read online. There are many others just place the question in your favourite search engine for a wealth of information.

At the Convention you can try all three exams: Technician, General and Extra. As with the UK licence scheme candidates need to start with the Technician and move through each level to get the top one, EXTRA. The session will be classed as a Walk In session so that anyone can turn up and take the exams if they so wish there's no need to pre book. It is however nice to know that there are some people coming so a phone call or email is also very welcome.

PRIZE DRAW. This year the prize draw is bigger than ever with three main prizes. There an Icom IC-7410 HF/6m base station transceiver, a Kenwood TS-590S HF/6 base transceiver and a Yaesu FT-450D HF/6m transceiver. Tickets will be on sale throughout the Convention and the draw takes place at 3pm on Sunday 9 October. Our grateful thanks to Icom UK, Kenwood and Yaesu UK for their generous donation of prizes.

The raffle is run on behalf of the RSGB DXpedition Fund. DXpeditions are welcome to apply for funding from the scheme provided that the DXpedition has a good chance of working a significant number of stations in the British Isles, the country being activated must be well up the European wanted lists, the QSO target is in excess of 15,000 and the application for funds is made in advance of the DXpedition. In recent years, funding has been given to South Orkney Is, VP8ORK, Christmas Island, VK9X, Cocos Keeling Is, VK9C/G6AY, Andaman Is, VU4PB, East Timor, 4W6A and Kiritimati, T32C.

SOCIAL SCENE. Visitors to the Convention can enjoy the ML&S Buffet on Friday evening and the Gala Dinner on Saturday (tickets are available at www.rsgbevents.org/acatalog/RSGB_Events_RSGB_Convention_Pick_and_Mix_2.html). On Friday evening, entertainment will be provided by Alex Crow – a mind reader. Alex will astound guests by reaching into the innermost depths of their minds and revealing their thoughts. Imagine a stranger accurately naming and describing your best friend, knowing instantly whether you are lying or telling the truth. This and much more will you witness when Alex Crow comes to entertain!

On Saturday evening, your MC, Jim Lee, G4AEH (of Radio Four fame) will run this year's table quiz – a mixture of radio questions, photos and audio clips.

Weekend packages are available from £114.50. This includes one night accommodation, breakfast, day ticket with access to all lectures and the Friday evening ML&S buffet or Saturday evening Gala Dinner. Only a limited number of rooms remain.

Alternatively, day tickets are available for £6.50 and dinner tickets are £27.50 for Friday evening, which will be three courses and coffee and £32.50 for Saturday, which will be three courses with wine and juice followed by coffee.

BOOKINGS. Day tickets, weekend packages and dinner tickets are available from www.rsgbevents.org/acatalog/RSGB_Events_RSGB_Convention_Pick_and_Mix_2.html.

## RSGB Convention - Provisional Timetable

| SATURDAY | IOTA/SOTA | STREAM 1 | STREAM 2 | STREAM 3 | CONTEST UNIVERSITY |
|---|---|---|---|---|---|
| 09.30-10.15 | Run-up to IOTA's 50th Anniversary, a Two Year Marathon of Island Activity, a presentation by Roger Balister, G3KMA | SDR In Action – Making the most of your SDR receiver by Simon Brown, HB9DRV | A Theoretical Look at Greyline Propagation by Carl Leutzelschwab, K9LA | 4W6A - Timore-Liste Dxpedition 2011 by Tim Beaumont, M0URX | CTU: Ionospheric Sounders - what they are and how to use them for Contesting by Steve Nichols, G0KYA |
| **10.15-10.45** | **COFFEE** | **COFFEE** | **COFFEE** | **COFFEE** | **COFFEE** |
| 10.45-11.30 | The Isles of the Five-Pointed Sun, an illustrated talk on the XV7RRC/XV3RRC operation by Yuri Zaruba, UA9OBA and Sergey Morozov, RA3NAN | Introduction to digital modes on the HF bands by Mike Richards, G4WNC. | 5MHz experiment & analysis of data by Alan Messenger, G0TLK | Africa with two suitcases by Nick Henwood, G3RWF | CTU: Antenna Modelling for Contesting by Steve Knowles, G3UFY |
| 11.45-12.30 | Success at the Second Attempt, the V73RRC DXpedition to Ujelang Atoll OC-278, a presentation by Yuri Sushkin, N3QQ | How to make a Yagi yourself and ensure it works as it should by Justin Johnson, G0KSC | 5MHz Beacon Measurements, NVIS Maximum Operating Frequency and NVIS Propagation Predictions by Marcus Walden, G0IJZ | 10GHz & 24GHz Earth Moon Earth communications by Brian Coleman, G4NNS | RSGB towards 2020 by Dave Wilson, M0OBW, RSGB President and members of the Board |
| **12.30-13.45** | **LUNCH** | **LUNCH** | **LUNCH** | **LUNCH** | **LUNCH** |
| 13.45-14.30 | | Using SDR at VHF and above - a practical outlook by Jim Barr, GI1CET | Where do our wavelengths come from - the work of the IARU by Peter Chadwick, G3RZP | Camb Hams - Your first IOTA DXpedition by Gavin Nesbitt, M1BXF & Rob Chipperfield, M0VFC | CTU: Skookum: Improving your Contest Skills using Mac OSX by Jonathan Mitchener, G0DVJ |
| 14.45-15.30 | Summits on the Air - by Tom Read M1EYP & Jimmy Read M3EYP | CMEs hit the earth, in particular causing aurora by Dr Colin Forsyth from SSL | Adventures in Optical Communication by Stuart Wisher, G8CYW | The amateur's roots in radio astronomy that helped lift the veil on Electricity and Plasma in Space by Tom Findlay, GM4DOZ | CTU: CONTEST EXCHANGE - this is where there will be a mixture of 'hosts' and 'guests' |
| **15.30-16.00** | **TEA** | **TEA** | **TEA** | **TEA** | **TEA** |
| 16.00 - 16.45 | The Pennine Way (with a radio) - by Tom Read M1EYP & Jimmy Read M3EYP | Electronic warfare, concentrating on the radio intercept side by Michael O'Beirne | G3PYE from the first UK repeater to a 21st Century Radio Club by Gavin Nesbitt, M1BXF & Rob Chipperfield, M0VFC | UHF Transponser The FUNcube Project by Graham Shirville, G3VZV | CTU: The RSGB Commonwealth Contest by Nigel Cawthorne, G3TXF |
| 17.00-17.45 | GI SOTA - Activating Summits on the Air around Northen Ireland - by Tom Read M1EYP & Jimmy Read M3EYP | Using your cathode ray oscillograph by Richard Brett-Knowles, G3AAT | The 2012 Olympics - Operating & Opportunities by Murray Niman, G6JYB | FUNcube dongle Howard Long, G6LRB | CTU: Walk in Q&A, Lee Volente, G0MTN & Mark Haynes, M0DXR |
| | | Running All Day on Saturday. Drop-in Hands-on Test Equipment Training Sessions with Richard Brett-Knowles, G3AAT | | | |

| SUNDAY | STREAM 1 | STREAM 2 | CONTEST UNIVERSITY | STREAM 3 | STREAM 4 |
|---|---|---|---|---|---|
| 09.00-09.45 | Beginners talk by Brian Reay, G8OSN | Next generation beacon by Bo Hansen, OZ2M | CTU: How Your Logs get Adjudicated by Ian Dawson, G0FCT | SDR Software – the building blocks of a SDR program, an introduction to the design and implementation of a fully functional SDR program by Simon Brown, HB9DRV | Starting at 9.30am. Instant Morse by Steve White, G3ZVW |
| 10.00-10.45 | All Club Together – taking part in the UK Activity Contests. Presented by Mick Heywood, M0ICK, Richard Staples, G4HGI and Ross Wilkinson, G6GVI (Bolton Wireless Club) | CMEs hit the earth, in particular causing aurora by Dr Colin Forsyth from SSL | CTU: Contest Ethics & Rules, Roger Western, G3SXW | Propagation to T32C - predictions versus reality by Steve Nichols, G0KYA | Instant Morse by Steve White, G3ZVW |
| **10.45-11.15** | **COFFEE** | **COFFEE** | | **COFFEE** | **COFFEE** |
| 11.15-12.00 | HF Trophy presentations | Effects of the Mid Latitude Trough in the ionosphere which has plagued propagation in the 80m Club Contest by Professor Mike Warrington, G4EMW | CTU Walk in Q&A, Lee Volente, G0MTN & Mark Haynes, M0DXR | How to work daily DX on 144MHz using your 100W black-box transceiver and the WSJT suite of digital software – an introduction for absolute beginners by David Hilton-Jones, G4YTL | New VHF Antenna by John Regnault, G4SWX |
| 12.15-13.00 | VHF Trophy presentations | Myths and legends in amateur radio by Peter Chadwick, G3RZP | | VK9C/ G6AY Dxpedition to the Cocos (Keeling) Island DX by Phil Whitchurch, G3SWH | The work of RAYNET/RAEN by Charlie Morrison, GI1FUE & Cathy Clark, G1GQJ |
| **13.00-14.00** | **LUNCH** | **LUNCH** | | **LUNCH** | **LUNCH** |
| 14.00 - 14.45 | Contest forum | 14 years of amateur LF in the UK by Dave Pick, G3YXM | CTU: Single Operator Contesting at VHF by Roger Dixon, G4BVY | The Cambridge University Wireless Society trip to St Pierre et Miquelon DXpedition (FP) by Dominic Smith, M0BLF & Martin Atherton, G3ZAY | Introduction to digital modes on the HF bands by Mike Richards, G4WNC |
| **15.00-15.30** | **RAFFLE** | **RAFFLE** | **RAFFLE** | **RAFFLE** | **RAFFLE** |

# VLF through the ground experiments

## Use the ground as your VLF aerial – for surprisingly good results

PHOTO 1: The completed VLF beacon test transmitter, capable of about 5W output.

**INTRODUCTION.** Recent experiments by 8.7-9.1kHz NoV holders in the UK and VLF amateur stations in Europe have focussed on radiating signals and detecting them at great distance. This inevitably requires a lot of RF power, very large transmitting antennas, huge loading coils and frequency precision. Results obtained in the last two years have exceeded all expectations, with the best radiated DX being in excess of 2700km. Nearly every month new stations appear and new records are set. A successful transatlantic amateur test around 8.97kHz is possible soon.

The work involved in engineering such a *radiating* VLF system puts most people off, but another VLF technique – earth mode – is easy to try, because it does not involve high power, big antennas and the like. The equipment required is small, inexpensive and easily built by almost anyone: this is audio frequency radio engineering, not microwaves.

**EARTH MODE.** Earth mode (through the ground) communication is nothing new. It dates back to the early experiments of Samuel Morse in the 1840s and trench warfare in World War 1. Variations of it are in widespread use today in caving communication and mine rescue.

The basic principle is simple and shown in **Figure 1**. A VLF current is injected into the ground between two earth electrodes (A-B), setting up a current flow in the soil, water or rock. Although most of the current flows in the ground directly between the two electrodes, some current will spread out over much longer paths setting up a (weak) potential gradient between another pair of electrodes (C-D) placed in the ground some distance away. If the receiving electrodes are connected to a small preamp and a pair of headphones or computer, the signal can be detected. Attenuation rates are high (inverse cube attenuation, compared to inverse square for free space radiation), so the signal at any significant distance may be very weak indeed and buried in noise.

The earth electrode 'antenna' (the interconnecting wire and the return path within the ground) may also be considered as a loop antenna, in that part of the loop is formed by the return path in the ground. When the soil conductivity is low the return path will 'spread out' more and the effective loop area will be greater. At the remote (receiving) end, the signal can be detected using a suitably oriented loop antenna, usually placed flat on the ground. The signal may also be detected with a small E-field probe held near to the ground.

Lower frequencies propagate further through the ground with less attenuation, so signals around 1kHz are likely to be clearer than signals at 8kHz at any reasonable distance. This is not always the case though, as interference can be stronger at lower frequencies.

The sub-9kHz spectrum can be *extremely* noisy, with 50Hz (or 60Hz) mains power line emissions and their harmonics being strong to many kilohertz. With sensitive equipment the 60Hz mains network in the USA can even be detected in Europe. Other sources of VLF man-made noise include switch-mode power supplies, heavy electrical equipment, railway electronics and similar. In addition, there can be a high level of natural noise associated with lightning activity and other naturally-occurring electromagnetic phenomena.

All this noise may drown out any attempt to receive weak VLF earth mode signals unless high power is used and the receiving station is close to the transmitter. Nonetheless, people have used a few watts from an audio amplifier to cover short distances using speech.

Intrigued by the possibilities of earth mode communication, a series of experiments were carried out to see just how far such a system could cover. What follows is a summary of these tests so far. There are a lot of unknowns still to be investigated.

**TRANSMITTER AND TRANSMIT 'ANTENNA'.** To test the range of a simple earth mode system, a small ULF/VLF transmitter was built. This consists of a TDA2003 (replacement for the TDA2002) 5W audio amplifier IC with a keyed VLF frequency source. To generate a very stable signal source an HF crystal was divided down using a 4060 oscillator-divider IC, in much the same way used to generate a 1750Hz toneburst. Using this method, a number of stable ULF/VLF frequencies can be derived by selecting the division ratio with a switch. A beacon keyer IC programmed to send either 10wpm CW, QRSS3 or QRSS30 slow CW is used to key the VLF signal source. This was obtained from the K1EL website but there are many PIC based alternatives that would be suitable. Test frequencies used were 8.760kHz and 1.095kHz. Initially, 0.838kHz was used; this was generated by the sidetone output from the K1EL keyer, but this is unsuitable when long duration stable carriers are required. **Figure 2** shows the complete transmitter circuit diagram, designed to run from a 13.8V (nominal) lead-acid battery.

Layout is not critical. The prototype was built 'dead bug' style and housed in a small diecast box (**Photo 1**) together with a simple matching circuit consisting of an ex-PMR toroidal transformer that allows the very low output impedance of the TDA2003 to be matched to resistive loads of between 10 and 160Ω. A transformer using 3C90 core material is likely to be suitable. This allows

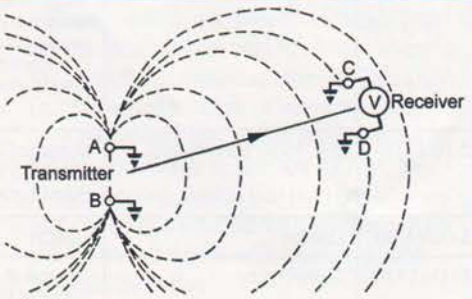



FIGURE 1: The basic principle of earth-mode communications. A VLF current injected A-B spreads out and can be detected, weakly, at another pair of points, eg C-D.

most earth electrode "antenna" systems to be matched as there is little reactive component at VLF. Tune-up is done by adjusting the match for maximum current in the 1Ω resistor in the output circuit. Although the box runs quite hot after a few minutes of transmission (especially if the system is set to send a continuous carrier), the drift is only around 0.1Hz worst case. This could be reduced considerably by separating the crystal oscillator from the PA thermally – for example putting it in a separate box that is thermally insulated. Better still, the signal could be derived from a GPS locked source or similar.

PHOTO 2: 30 turn loop receiving antenna with attached preamplifier.

For the transmit 'antenna', a 1m long copper rod was inserted into the soil at the far end of the garden and a wire brought from this into the shack, around 20m away. Another earth connection was made to the metal central heating radiator pipes. Although the pipes make their way into the road, the mains water pipes are not metal. However, this does make a very effective second ground point.

**RECEIVING 'ANTENNA' AND PREAMP.** No special VLF up-converters or exotic receivers are required, as all the signal processing and analysis is done with a Windows PC using freely available software. You just need some form of antenna and preamplifier to feed your laptop's sound card input.

Four different portable receiving 'antennas' have been tested:

- an earth electrode pair with a separation of around 10m (Figure 1)
- an E-field probe
- a single turn loop laid on the ground covering an area of around 8-10 sq metres
- an 80cm square 30 turn loop resonated to the test frequency (**Photo 2**).

A couple of small preamps have been tried. Both use an MPF102 FET with a tuned drain circuit feeding an emitter follower. One was configured as an E-field probe with a high input impedance and the other (**Figure 3**) as a grounded gate low impedance amplifier suitable for use with an earth electrode pair. The loop antennas could be configured for use with both types of preamp by tuning the loop as a parallel tuned circuit (high impedance) or series tuned circuit (low impedance). The preamp is far from optimised, but it does work. **Photo 3** shows my dead-bug prototype, powered by a PP3 battery.

**PC SOFTWARE.** The two software packages I used are *Spectran* and *Spectrum Laboratory*. *Spectran* is very easy to use and can 'look' at VLF signals in bandwidths down to 0.18Hz. It provides a display showing the VLF spectrum and, if you are successful, weak earth mode signals.

*Spectrum Laboratory (SL)* is an altogether more powerful, but more complex, package and this allows receiver bandwidths down to a few micro-Hertz if required. Another useful feature of *SL* is the ability to lock the system to a VLF MSK signal or to a GPS reference allowing the sound card frequency to be corrected automatically. This gives incredible frequency accuracy and stability allowing one to look in extremely narrow bandwidths for long periods of time. *SL* can also be used to generate stable carriers for QRSS or DFCW tests. Using *SL* with the antennas and preamps mentioned earlier it has been possible to copy VLF amateur stations from across Europe testing around 8.970kHz, even though their ERPs are in the low milliwatt region. Antenna positioning to minimise noise pickup can be critical though.

**EARTH MODE RANGES.** Initial tests were within a few hundred metres of the home QTH near Newmarket. The beacon was set running and I ventured out into the fields behind my house looking for the signal using a handheld loop antenna, preamp and a pair of headphones. Using the 5W transmitter at 838Hz, the best range possible was 500m. Using a laptop PC with *Spectran*, this range

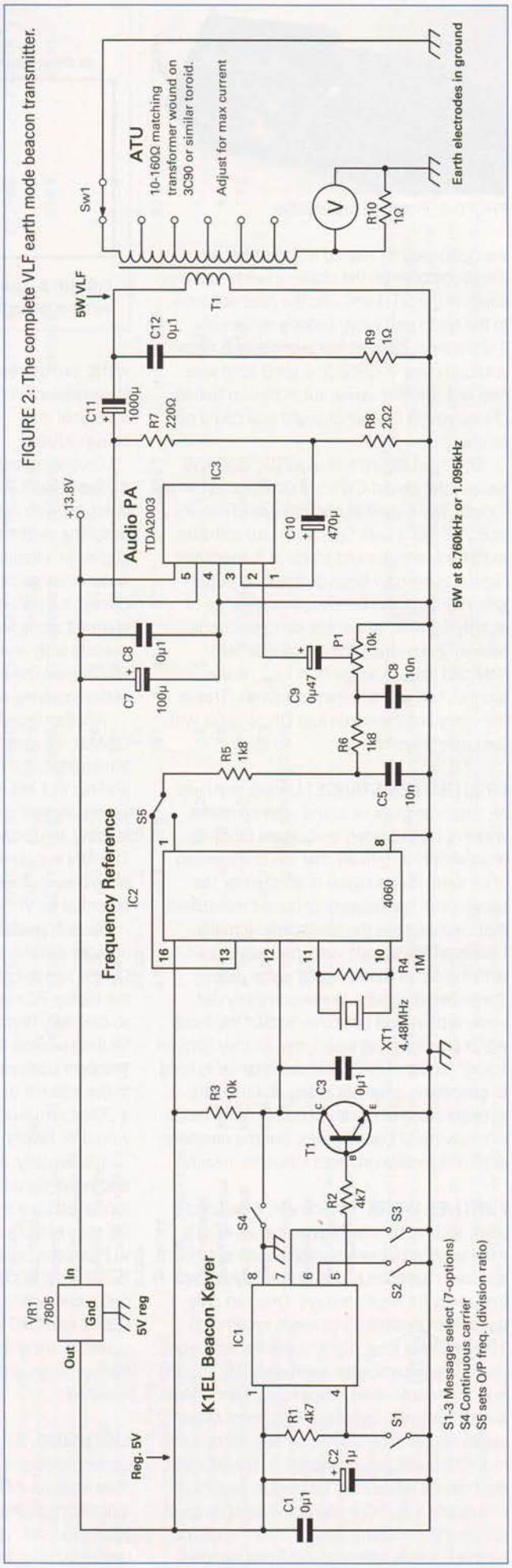



FIGURE 2: The complete VLF earth mode beacon transmitter.

PHOTO 3: Prototype preamplifier.

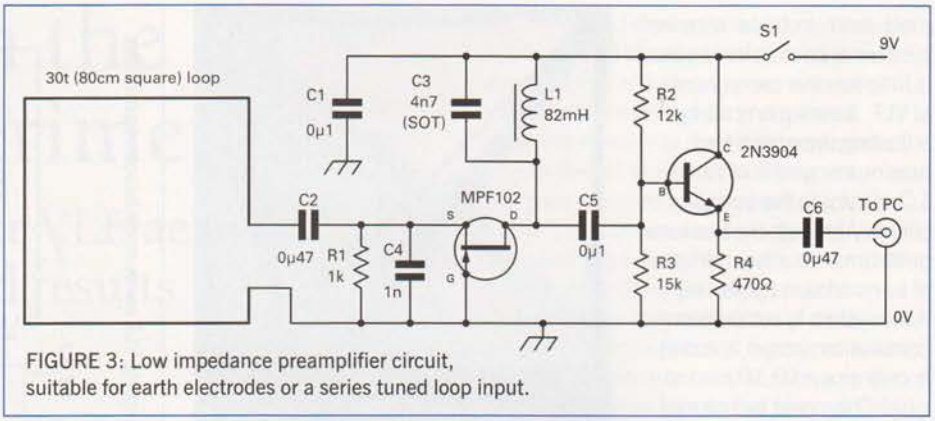



FIGURE 3: Low impedance preamplifier circuit, suitable for earth electrodes or a series tuned loop input.

was gradually increased in a number of directions both on the chalk uplands to the south of the QTH and into the peat-soil fens to the north and west. Initially ranges of 1-2km were covered but eventually 5.6km was achieved in QRSS3. A great time was had last summer going out in the car to find places where the signal could and could not be copied.

The most recent test used QRSS30 (30 second dot period CW) or a continuous carrier (briefly interrupted to confirm identification) at 8.7605kHz with Spectrum Lab software in its frequency locked mode at the receiver. Signals have now been detected at 10dB S/N in an 11mHz bandwidth at a range of exactly 6km using a small earth electrode receiving antenna. The signal was also detected using a single turn loop on the ground, but was somewhat weaker. This is definitely not the maximum DX possible with the current system.

**UTILITIES ASSISTANCE?** Unless one lives on a remote moor or island with no mains water or buried pipes and cables for miles around, it is very likely that the propagation of an earth mode signal is affected by the presence of the network of buried metalwork that criss-crosses the landscape. Initially I believed my signals were propagating with the aid of buried metal water pipes. Some weeks ago the water company did some repairs and I discovered that my local water pipes are not metal, nor do they contain 'tracer' cables. Any 'utilities assistance' is hard to quantify but signals at any distance are stronger close to roads. Certainly earth mode works without buried pipes, but the presence of buried metalwork does influence results.

**FURTHER WORK.** In recent VLF radiated tests, receive bandwidths as low as 42µHz were used with transmissions consisting of a steady carrier on a very accurately known frequency for hours or days. One can only guess the possible earth mode range with 100-200W of long, highly stable transmissions, much larger transmitter earth electrode spacing and better optimised receiving systems . With such a system a small but significant *radiated* signal may also be created as well as the earth mode through-ground signal, so the ultimate earth mode range may be hard to determine accurately. DK7FC/P has achieved a range of just less than 50km using a 600m baseline earth electrode antenna and a few hundred watts, but this was because some of his signal was being radiated.

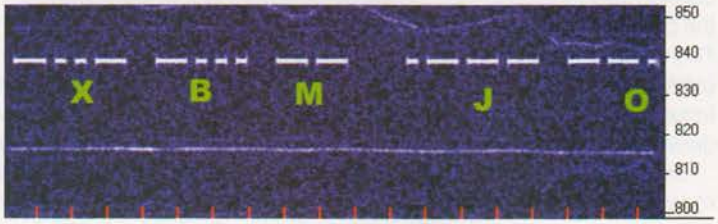



FIGURE 4: Typical result, received 2.5km from the 4W earth mode Tx. SNR > 30dB in QRSS3 with signal audible in *Spectran*'s BPF in circuit.

On one occasion my best results were obtained with one receiving electrode placed in a fenland water drainage ditch. Upcoming tests are planned along fenland rivers and at the seaside with one TX electrode in the water and one on the land – with a similar set-up at the receiving end further along the coast.

Another recent test was 8.760kHz WSPR. G6ALB, located 3km to the west of me, transmitted around 40W into earth electrodes and his VLF WSPR signal was copied very well using just a small handheld E-field probe feeding an up-converter in my upstairs shack. The S/N suggested just a few watts would have been sufficient. This mode has a great potential for VLF earth mode tests.

Tests at greater range require the assistance of more suitably equipped receiving stations. Care is needed to minimise noise pickup and the laptop PC needs to be frequency locked so that very narrow bandwidths can be used for long periods of time. A number of VLF 'grabbers' (stations relaying their VLF screenshots to the internet in real time) active within, say, a 20km range of a given earth mode beacon would be helpful to check coverage.

Incidentally, all the antennas, preamps and weak signal techniques used for earth mode tests are equally applicable to radiated DX tests at VLF. Indeed 5 European amateur VLF stations have so far been copied around 8.97kHz at G3XBM using the receiving kit described, with best DX over 1000km. G3XIZ and DK7FC/P have even been copied around 8.97kHz when using my transmitting earth electrode system as the antenna.

**LICENSING.** As a result of recent correspondence with Ofcom it appears they have no interest in earth mode from a licensing perspective – as long as the tests cause no 'Undue Interference'. My understanding – note this is *not* a legal statement – is that an NoV is *not* required for VLF earth mode tests *as long as no significant signal is radiated* and no Undue Interference is caused. When asked in writing to confirm this as a correct understanding, the Ofcom official declined to comment further...

The energy actually *radiated* by a low power earth mode station is unlikely to exceed a few picowatts, ie an extremely small amount, but it is worth keeping a log of transmissions so any potential interference can be checked.

**MORE INFORMATION.** Any audio power amplifier could be used for the transmitter and there are numerous 100-200W amplifiers available ready built from a number of sources. 5W TDA2003 ICs are available cheaply from many internet sources. The Sub-9kHz website has a lot more information about the tests carried out so far as well as lots of information about ongoing radiated experiments at VLF.

As mentioned earlier, to receive amateur VLF signals does not require large antennas or complex equipment and more participants in both earth mode and radiated DX experiments would be welcomed by the VLF amateur community. Worthwhile experiments are possible with very simple equipment at ULF/VLF, especially using earth mode. I hope this article has shown that low cost experimental amateur radio is still alive and well.

**WEBSEARCH**

Sub-9kHz website:
https://sites.google.com/site/sub9khz/home

Software for VLF reception:
https://sites.google.com/site/sub9khz/software

Sub-9kHz Yahoo group:
http://tech.groups.yahoo.com/group/sub9khz/

RadCom



# HF F-Layer Propagation Predictions for October 2011

## Compiled by Gwyn Williams, G4FKH

| | 3.5MHz | 7.0MHz | 10.1MHz | 14.0MHz | 18.1MHz | 21.0MHz | 24.9MHz | 8.0MHz |
|---|---|---|---|---|---|---|---|---|
| Time | 000011111220 | 000011111220 | 000011111220 | 000011111220 | 000011111220 | 000011111220 | 000011111220 | 000011111220 |
| (UTC) | 246802468020 | 246802468020 | 246802468020 | 246802468020 | 246802468020 | 246802468020 | 246802468020 | 246802468020 |
| *** Europe | | | | | | | | |
| Moscow | 88.....7778 | 886....48888 | ..7555678854 | ..7888888... | ..6999997... | ...99999.... | ...79997.... | ....888..... |
| *** Asia | | | | | | | | |
| Yakutsk | .....42. | 3.....6675 | 3.4..3567787 | ..66673..... | ...77..... | ...57..... | ..... | ..... |
| Tokyo | .....332. | .....37877. | .....333.. | ..... | ....5..... | ..... | ...66..... | ..... |
| Singapore | .....222. | .....88876 | .....663.. | .....574... | ....5774... | ....576.... | ....664.... | ....45..... |
| Hyderabad | ..... | .....5544 | .....46544 | .....663.. | .....564... | .....55.... | .....54.... | .....5..... |
| Tel Aviv | 99.....8889 | 998....49999 | ..7....6883. | ..4755788... | ...888896... | ...78888.... | ...78888.... | ..... |
| *** Oceania | | | | | | | | |
| Wellington | ..... | .....66... | ...355567... | ...3665.6... | ....55..... | ..... | ....44..... | ..... |
| Well (ZL) (LP) | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Perth | ..... | .....6776. | .....37875. | .....676... | ..... | ..... | ..... | ..... |
| Sydney | ..... | .....5877.. | ....38886.. | ....7886... | ....45..... | ..... | ..... | ..... |
| Melbourne (LP) | ..... | ..39..... | .5698..... | 55.993.....3 | ...985....4. | ...88....5.. | ..... | ..... |
| Honolulu | ..... | ...4..... | ...864.4.... | ...5...4.... | .....45... | .....4... | ..... | ..... |
| Honolulu (LP) | ..... | ..... | ..... | .....3... | ..... | ..... | ..... | ..... |
| W. Samoa | ..... | ...62..... | ...87766.... | ...58885.... | ....788.5... | ....687.4... | ....76..... | ....6..... |
| *** Africa | | | | | | | | |
| Mauritius | 2.....222 | 7.....7877 | 7.....78877 | .....8863. | .....64... | .....5.... | .....5.... | ..... |
| Johanesburg | ..... | 55.....255 | 87.....7888 | 4.....38754 | .....784.. | .....477... | .....575... | .....46.... |
| Ibadan | .1..... | 675....1456 | 677....4666 | ..83....67.. | ..47433577.. | ...7666784.. | ...777788... | ...877776... |
| Nairobi | 2.....1 | 77.....7777 | 65.....5455 | 3.....36552 | ..5....56... | ...4..466... | ...666775... | ...76677.... |
| Canary Isles | 666.....666 | 8773....4887 | 8887...37888 | 6.4775678884 | ...7999999.. | ....899998.. | ....8889... | ....8897... |
| *** S. America | | | | | | | | |
| Buenos Aires | ..... | 433.....3 | 7658.....76 | ...8.....34. | ...7..... | ...54..... | ....4..... | ..... |
| Rio de Janeiro | ..... | 544.....34 | 7767.....777 | 3..8.....75. | ...6....46.. | ...55...5... | ....5...4... | ....4..... |
| Lima | ..... | 3213.....2 | 75.7.....65 | ...3.....3. | ..... | ..... | ....4..... | ..... |
| Caracas | ..... | 433.....3 | 8857.....87 | 4..47....673 | ....765567.. | ....576775.. | ....8777... | ....7776... |
| *** N. America | | | | | | | | |
| Guatemala | ..... | 32.4..... | 74.82.....36 | ...6..... | ....4..... | ....4434... | .....5..... | ..... |
| New Orleans | 333..... | 7665.....6 | 73.6.....36 | ....4...3.. | ..... | ..... | .....4..... | .....5..... |
| Washington | 345.....2 | 7776.....37 | 76.55.....77 | ....4..366. | ....4..45.. | ....5455... | .....566... | .....66.... |
| Quebec | 666.....35 | 7755....477 | 3..6.....763 | ....644667.. | ....4.345... | .....45.... | ..... | ..... |
| Anchorage | ..2..... | 3562..... | 6.5464433356 | .....66.. | .....76.. | .....6... | ..... | ..... |
| Vancouver | ..... | 233..... | 3..... | ..... | .....56... | .....6... | .....5... | ..... |
| San Francisco | ..... | 2222..... | ..... | ..... | ..... | ..... | ..... | ..... |
| San Fran (LP) | ..... | ..... | ..... | ..... | .....7.... | .....7.... | .....7.... | .....6.... |

**KEY:** Each number in the table represents the expected circuit reliability, eg '1' represents reliability between 1 and 19% of days, '2' between 20 and 30% of days, etc. No signal is expected when a '.' is shown. **Black** is shown when the signal strength is expected to be low to very low, **blue** when it is expected to be fair and **red** when it is expected to be strong. The RSGB Propagation Studies Committee provides propagation predictions on the internet at **www.rsgb.org.uk/propagation/index.php**. An input power of 100W and a dipole aerial has been used in the preparation of these predictions; therefore a better equipped station should expect better results. The predicted smoothed sunspot numbers for October, November and December are respectively (SIDC classical method – Waldmeier's standard) 71, 76 & 81 and (combined method) 72, 78 & 83. The provisional mean sunspot number for August 2011 was 50.6. The daily maximum / minimum numbers were 96 on 31 August and 0 on 14 August.

# LF

## The hills are alive

EI0CF/P 1000ft up in the Donegal hills.

**PORTABLE ON 500kHz.** Finbar, EI0CF has been testing a portable system that he can operate from the back of his van. The top-loaded 'tee' aerial is supported by a 30ft fibreglass pole, the two 42ft top-loading wires being pulled out near horizontal with thin fishing line. For hilltop use the earth system consists of 100m of wire cut into 16 identical lengths that are laid out as radials, all joined at the base of the vertical. If operating from the beach, a single earth stake in the wet sand is very effective. From the hilltop site, Finbar has worked over 250 miles to GW3UEP with only15W.

**DUTCH TO RETURN TO 600m.** The Dutch authorities have issued a new schedule that includes an amateur allocation from 501 to 505kHz; this should come into force later this year. The 500kHz permits previously issued to Dutch amateurs expired in April. Implementation is subject to several bureaucratic processes that tend to take a long time so the earliest we can expect to hear some PA0s is probably in October.

**NEW ON 136kHz.** DL6NN has been heard and worked in Germany. His QTH is near Koblenz, which is quite a way from the UK so we may have to wait for some improvements to be made before we can hear him over here.

Also logged recently with a strong signal was DF0GZ, operating from a field day site with a balloon-supported aerial. Although several people tried to call the station, no QSOs took place. It is unknown whether it was just a beacon test or whether they had receiver problems.

**BEACON NEWS.** Alex, LU8YD has set up a 24hr beacon on 137.494kHz from Piedra del Aguila, Neuquen Province, Argentina (FF40xa). The estimated ERP is about half a watt from a 200W transmitter. The transmission alternates between 10wpm CW and 30, 60 and 120 second QRSS. The callsign ID is LU8YD. It's a little unlikely we'll get a glimpse of it in the UK but maybe the ZLs and VKs will see something? Alex can be contacted via his QRZ page.

OK2BVG has received permission to run his 500kHz beacon for another year (until July 2012). The beacon has the callsign OK0EMW and operates on 505.060kHz with 1W ERP.

**ARGENTINEANS LISTEN.** At the end of August, LU8YD and LU8YVV made a journey to the quiet countryside in order to listen for DX signals. Alex listened on 136 and 500kHz for amateur signals whilst Jose was DXing on medium wave. Many stations in Europe transmitted in the appropriate time slot in the hope of being received but the east coast US stations were unable to take part due to hurricane Irene. With all the EU activity it was a good opportunity for other receiving stations to try their luck. 4X1RF in Haifa copied G3XDV, DF6NM, OE5ODL and DK7FC whilst KL7UK in Alaska caught sight of DF6NM. Unfortunately no signals reached Argentina.

**KITES UP.** Markus, DF6NM has been out kite flying again on 8.97kHz. Due to wind and rain he had some problems and had to abandon the experiment around noon. Despite the troubles the kite was in the air for about ninety minutes and good reports were received from as a far away as Iceland. Markus estimated the ERP at about 2mW. In the UK many stations received the transmission very well including G3ZJO, G3KEV and G3XIZ.

**FLARE CAPTURED.** The number of LF grabbers located around the globe gives an interesting insight into propagation conditions and when a large solar event occurs, such as the flare of 9 August, its effects can be quite dramatic. Claudio, IK2PII caught the event on his grabber that monitors the strength of several LF utility stations.

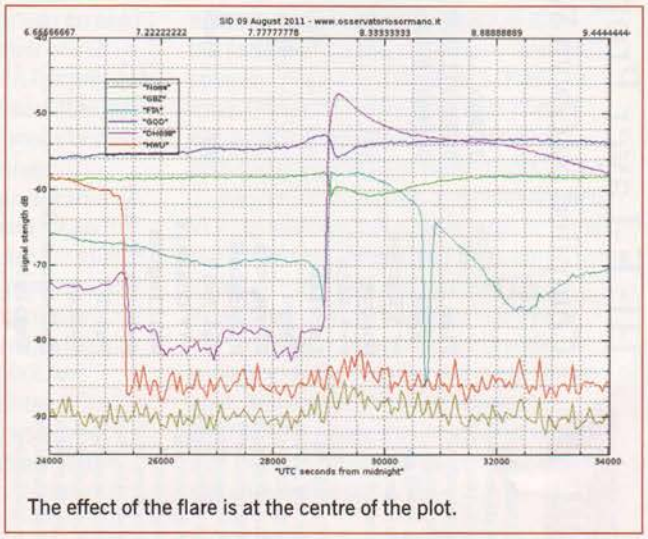
**REMOTE RECEIVING AERIAL.** E-probes like the PA0RDT mini-whip can be modified for VLF reception and are very sensitive and compact, but they are susceptible to interference picked up on the feeder that connects the probe to the receiver and power supply in the shack. Techniques such as grounding the coax at the base of the mast and winding it around large ferrites can help but the ideal situation would be to break the connection completely. There are two problems here: one is to supply power to the probe's head amplifier and the other is to get the signal back without compromising the performance. For VLF all that is needed is to send frequencies in the audio range back to the shack. Wolf, DL4YHF has pressed an old wireless headphone transmitter into service. The stereo encoder had to be removed before performance was good enough and even then the dynamic range was only just sufficient. He suggests that some of the newer 16 bit digital ones might be better.

Optical transmission down a fibre has also been used with success and the bandwidth of the link is potentially much greater than that of the RF system. The difference in noise level is reported to be well worth the effort.

As for the power problem, a rechargeable battery and a solar cell to keep it topped up seems to be the best answer.

Experiments continue, watch this space!

**JAPAN TO NORTH AMERICA AGAIN.** A good signal from JA7NI was received by Steve, VE7SL in August, the first this season over this 7600km path. Steve, whose QTH is Mayne Island on the west coast of British Columbia, was using his 8ft diameter passive loop, fitted with a new tuning capacitor. The old one had become lossy due to long exposure to the elements. Later in the month the JA signals reached Laurence, KL7UK in Alaska. It was so strong one night that Kuni was able to reduce his transmitter power to only 5W and still be fully readable. Roll on winter!




The effect of the flare is at the centre of the plot.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- CTCSS enabled
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- DC cable
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**Optional Accessories**

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# HF

## Check out which DXpeditions will be taking to the air this autumn


Look out for TU2T (see text).

**NEWS.** Last month I wrote that the ST0R expedition was in full swing. It ended with some 121k contacts in the log, which should have gone a long way to satisfying the initial demand for this new one. QSLs will be printed soon. LoTW upload is, however, not expected for some months.

Once ST0R closed down the bands seemed a little empty, though there was some good 20m propagation to the Pacific during August, less so on the higher bands though. ZD8D was a bright spot, a good operation and benefiting (into Europe at least) from the usual reliable north/south path. But as I said last time, things hopefully will have been looking up during September as we approached the equinox – and October promises plenty more DX activity, including the CQWW Phone Contest on 29/30 October. As I always point out with this one, even if you don't consider yourself a contester, the many DXpeditions that are organised to coincide with the contest (see the NG3K website, for example, for a list) are often active before and/or after the contest weekend on other bands and modes. If the bands seem somewhat overcrowded and chaotic over the contest weekend, it's because this really is the 'big one' of the year. If the 10m band is in good shape, then there is a lot more room for participants to spread out, but we really are in the hands of the propagation gods where that is concerned.

**MAJOR DXPEDITIONS.** An Italian team will be active as TU2T from the Ivory Coast sometime between October and November (dates to be confirmed). Activity will be on all bands and modes, with two stations. More information will be published on the I2YSB website in due course. This expedition will be the first major activity from Ivory Coast since the recent troubles.

DK7LX, DL4WK, DL7DF, DL7UFR, SP3CYY and SP3DOI will be active as 3XY1D from Guinea between 18 October and 1 November. Activity will be on all bands and modes. They plan to have several stations on the air using five transceivers (4 x K2, 1 x IC-7000), 4 x kW linears, 2 x 18m lowband verticals, a 2 element vertical for 40m, a 2 element vertical for 30m, an R7 vertical for 40/30/20/17/15/12/10m, 2 Spiderbeams for 20/17/15/12/10m and some Beverage receiving antennas. One station will be exclusively dedicated to RTTY, PSK31 and SSTV. QSL via DL7DF, direct or by the Bureau. This is another country that has been relatively inactive in recent years. I was there with the Voodoo Contest Group three years ago, which I believe was the last big 3X operation. There was a coup just a few weeks after we left, rendering the country rather unstable.

An international team is planning to operate from two of the three FO (French Polynesia) countries during the second half of October and the beginning of November. The team includes R3FA, UT5UY, FO5QB, UZ1HZ, UU4JMG, RK7A, RA6LBS, UX0HX, US0KW, UX0LL and UA7A. Their first and last stops will be at Papeete, Tahiti as TX3T. The first time will 16 to 19 October and then again 1 to 4 November. The bulk of their activity will be from Hatiheu, Nuku Hiva, Marquesas Islands as TX7M from 19 October to 1 November. During the CQ WW Phone Contest they will activate TX5A from this same location. Plans are to have four K3s and amplifiers for activity on all bands and modes. The team has a website that includes a band and mode survey and propagation forecast and will also include a log search.

Temotu Province (H40) is the next destination of Jacek, SP5DRH. He'll be operating as H40KJ from Pigeon Island (OC-065) between 8 and 21 October, concentrating on 160 as long as propagation holds out, otherwise he'll be focussing on 80 and RTTY. He will also do some digital operation on 17 and 15. Jacek will be running an Elecraft K3 and Tokyo Hi-Power 1 KFX amplifier into an 18m Spiderbeam pole. He has a website, which will have a log search. QSL via SP7DQR either direct or via the SP bureau. Logs will also be on LoTW.

A major expedition to Nauru is planned for 10 November to 6 December, signing C21A. Team members expect to operate beforehand from Fiji, as 3D2T, from 25 October to 8 November. The website shows seven operators from Australia and the US. Activity is planned on all bands and modes with at least three stations active whenever there is propagation.

Chris, GM3WOJ and Keith, GM4YXI will be in Niue as ZK2V and ZK2X from around 21 October until 29 December (Chris there for the whole time, Keith for 2 weeks). The plan is to focus on 40, 30, 20 and 17 to make at least 40k contacts, though they will also be making a point of being on 160 and 80 when propagation allows. Activity will be CW, SSB and RTTY. They plan some interesting interactive log features using *Win-Test* linked to *ClubLog*.

It might be worth mentioning, in case you were anticipating them, that the Jarvis Island (KH5) expedition originally planned for this autumn has been postponed for a year and the Hungarian expedition to various Pacific islands, also due for this month, has been postponed until early in the New Year. And while on the subject, I note that those involved in the Jarvis Island trip are looking for additional team members, not only for that one but for South Georgia earlier in the year (more news later). If you are interested, the cost of each of these is upwards of $10k and that doesn't include air fares to meet the chartered ship. I think sometimes we forget the substantial investments of time and money that DXpedition operators put in to satisfy the demand from those of us sitting at home taking part in the chase. Of course, one must assume they get some satisfaction and enjoyment out of doing so, too. Some presumably are easily able to afford it. For many, though, it is what the travel brochures would call the 'trip of a lifetime'; an opportunity to find out what it is really like at the 'sharp end'.

**OTHER DX NEWS IN BRIEF.** JW/LB9UE, JW8BCA and JW3TR will be active from Svalbard from 12 to 19 October, on 160, 80, 40, 30, 20, 15 and 10 CW and SSB.

Victor, RI1FJL (ex-R1FJM, UA3ME), is the replacement for the August 2011 to September 2012 research season at Kheysa Island in the Franz Josef Land Island group (EU-019). Victor replaces Eugeny, RI1FJ (ex-R1FJT, UA4RX), who left FJL on 9 August. QSL RIFJL via RX3MM only


A preview of the STOR QSL, from the website.

direct (see QRZ.com for details).

Willi, FR/DJ7RJ will operate from Reunion from 4 to 26 October. He plans to "favour the low bands" with a K2 rig and 500 watt amplifier to an inverted-L antenna. QSL to his callbook address.

Seb, F8IJV, will once again be active as 6V7Q from Le Calao resort in Senegal between 22 October and 11 November. Activity will be all bands, operating mainly on SSB, possibly some digimodes and CW too. He plans to take an Acom 1011 amplifier with him this time. QSL via his home call, direct or by the bureau. The log will be uploaded to LoTW.

Sajid, VA3QY, is heading home to Botswana where he will be active from 29 September to 18 October. He'll be taking an FT-857D running 100 watts for activity on CW and SSB on 20 through 10. QSL via VA3QY.

Canadian stations may use special prefixes until 31 October for the centennial of Parks Canada. VA stations can change to CF, VY to CI, VO to CH and VE to CG. Sometimes I wonder when Canadian stations get to use their regular callsigns, they find so many opportunities to use 'special' ones!

Janusz, SP6IXF and Wlodek, SP6EQZ, are heading back to St Eustatius, which counts as the PJ5/PJ6 (St Eustatius and Saba) DXCC Entity. Look for them as PJ5/SP6IXF and PJ5/SP6EQZ respectively from 20 October to 3 November. Activity will be on all bands, CW, SSB and RTTY. QSL via their home callsigns.

DJ8NK, F6EXV, JA1BK and K2WR will be in PJ7 (St Maarten) from 28 October to 9 November, using 80 through to 10m, with two stations active 24 hours a day, SSB, CW and some RTTY. The primary callsign used will be PJ7X. Other callsigns will be PJ7NK and PJ7J, the latter reserved for use on 80m, and a principal goal of this operation will be to make as many QSOs as possible with Europe and Japan on this band. QSL information is PJ7X via F6EXV, PJ7NK via DJ8NK, PJ7J via JA1BK. Internet log checking, updated daily, is planned. The website will carry the latest news.

John, W5JON, will again operate from his Calypso Bay, St Kitts, holiday home as V47JA, 300 feet from the water's edge. The dates this time are 10 October to 5 November. John plans to be on 80 through 10m SSB, including 60m. He's equipped with a Kenwood TS-590S, Yaesu FT-857D and an SB200 amplifier. For antennas, it's an 80-10m dipole and metal roof mounted verticals. His XYL Cathy, W5HAM, will occasionally operate as V47HAM. QSL all to his home call.

Bill, N7OU will be back in the Cook Islands. His plans have him as E51NOU from Rarotonga (OC-013), South Cooks from 17 October to 7 November, then Manihiki Atoll (OC-014) between 8 and 22 November, callsign unknown at this time. He will be CW only, active as time permits as this is also a working trip.

## CORRESPONDENCE AND TABLES.

Simon, M0VKY has found recent conditions disappointing, but nevertheless reports working STOR on 15 CW & SSB, 17 CW & SSB and 20 CW & SSB. Other contacts included ZD8D on 40 CW. 9Y4LAS, PY2JY, YB0AR and YB0AOS on 40 SSB, plus C21YY and 7Q7MH on 15 SSB. Peter, G3HQT sends a short report mentioning contacts with 5X1SF and HP2TP on 30 CW, TL0A on 30 RTTY, ST0R, V44KAO and 7Q7BP on 17 CW, and ZD8D plus TY1KS on 12 CW.

Graeme, G6CSY added to his island totals during the IOTA contest. He is also continuing to find people to work on JT65a. The tally now stands at 109 stations worked, with 20 states and 30 DXCC, mainly on 20m. Graeme also says he has configured his logging software (the DXKeeper application within DXLab) to track lighthouses and World Flora and Fauna [WFF] stations worked. He says, "Both of these types of station are found regularly on the WARC bands. Currently the log shows 35 lighthouses worked (best so far being FP/W6HGF on 40 RTTY, located at Cap Blanc (Ile Miquelon) Lighthouse), and 59 WFF areas worked (best being RI1ANC on 30 RTTY located at Vostok Base, Antarctica)". These sort of awards seem to be becoming increasingly popular and generate another reason for being on the bands, which tend to be all too empty at times, especially during the week (and yet explode when there is a rare station active, so folk are certainly around).

Dave, M0BVE mentions just three new ones during the month by way of ZF2UQ and STOR on 17 plus 3V8SS on 20. It is interesting to note that 3V8 is active following the unrest in Tunisia earlier in the year. It makes one wonder whether we will be seeing activity from Libya in the near future!

Peter, G4XEX laments the disappointing summer conditions and had the most fun chasing Sporadic-E openings on 10 and 12. DX-wise, he mentions YC8AAH, LU2VH, ZS6AKU, PY2ROE and PY4KS on 20 PSK, 9Z4CT, V47JA, KP2/AA1BU, CE3HQ, LV5V, HI3TT, HI3TIJ, PP5BZ, PR2P and PT7ZT on 20 SSB and ZS6US on 30 PSK.

Alan, G4NXG was at the controls of G8A during the IOTA contest and almost fell out of his chair when they were called by VK0KEV (Macquarie Island) on 40. Of course, having a three element 40m beam available was certainly different from Alan's usual mobile operation! That said, Alan did manage to put STOR into the log from his car, so his mobile total is still creeping up.

Colin, MU0FAL says ZA/YU1FW was a nice catch on 12m, while VK3EW on 30 CW was a very welcome caller. 8P9NX OH0NRV and ZP6CW were also worked on 30.

Finally Dave, G3TBK sends in a welcome report, having, he says, kept missing my deadlines. He too found conditions disappointing but managed 20 band/mode slots with STOR, ZD7XF on 8 bands, TY1KS on 8 band/mode slots between 12 and 80, plus CE0Y/I2DMI for a new one on 20 RTTY. Otherwise, Dave says, it was just a month of filling band/mode slots with less exotic stations in North & South America, Africa and Asia. Apart from VK, ZL, 9M6, DU, there was not much doing from the Pacific. "My high note of the month however", says Dave, "is World third in both ARRL CW & SSB low power from J88DR, also the highest aggregate score from the 2 events for the second year. Not bad with just an IC-7000!"

### 2011 TABLE

(starting 1/1/11, WARC bands and all-band)

| Call | 30m | 17m | 12m | ALL |
|---|---|---|---|---|
| G3HQT | 156 | 144 | 58 | |
| G3SED | 17 | 16 | 40 | |
| G3TBK | 162 | 180 | 127 | 227 |
| G4DXW (SSB) | 0 | 86 | 23 | |
| G4FVK | 12 | 16 | 1 | 91 |
| G4XEX | 29 | 39 | 22 | 97 |
| G6CSY | 35 | 15 | 2 | 41 |
| M0BVE | 25 | 11 | 4 | 140 |
| M0VKY | 0 | 36 | 2 | 210 |
| MU0FAL | 71 | 57 | 77 | 149 |

**WEBSEARCH**

3XY1D – www.dl7df.com/3xy1d/index.html
C21A – http://c21.pacific-dxers.com/C21A.html
FO expedition – www.tx7m.com/
H40KJ – www.sp5drh.com/h40/
I2YSB – www.i2ysb.com
PJ7X – www.pj7-2011.org/
ZK2V – www.zk2v.com

# VHF/UHF

## An extraordinary 4,000km tropospheric contact to the Cape Verde Islands on the 144MHz band

**PHOTO 1: The 144MHz antennas at the QTH of Terry Gabriel, M0VRL.**

**PROPAGATION EVENTS.** Although Sporadic-E openings continued to be reported throughout much of August it was obvious that these type of events were very much on the decline. This is to be expected as the main summer season for Es propagation lies between the months of May and August, with a peak around June-July. Openings on the 50MHz band were reported quite consistently up to the third week of August and then tailed off considerably after that. By monitoring higher frequencies the reduction in Es activity may be seen in even better detail. Daily openings on the 70MHz band were reported up to 8 August and then stopped and, apart from two further days of Es openings on 19-20 August, no further activity of this type was reported. Surprisingly, there was one Es opening, on 19 August, that reached as high as the 144MHz band with propagation towards Italy and surrounding areas. Auroral propagation was also noted during the period with an excellent opening being reported on 5 August with Scandinavian activity being noted on the 50, 70 and 144MHz bands. The Perseids meteor shower that peaked around 11-13 August created much activity on all VHF bands, with many long distance contacts being reported. Tropospheric propagation on the 144MHz band was excellent, particularly in the period 9-10 August, with many stations making contacts into the Canary Islands at 3,000km distant and a few lucky stations making a contact with the Cape Verde Islands at over 4,000km distant. The marine duct to the Canary Islands also supported communications on the 432MHz band, an excellent distance for UHF.

**THE 50MHz BAND.** A total of 18 days of Es openings were reported on the 6m band during the first three weeks of August. Most contacts were the normal single-hop pan-European type of contact with stations such as E7/S57DV (Bosnia-Herzegovina), EA3/DH4FAJ (Spain), EA6/M0DLL (Balearic Islands), IA5/IK2GWH (Italy), IS0/I0JU (Sardinia), LA/SM6CMU (Norway), OH0/ON5UR (Aland Islands), SM/DL3UB/P (Sweden), TF/G4ODA (Iceland), UT/DL3DCC/P (Ukraine), ZB2/VA3ITA (Gibraltar) and 9A/VE3ZIK (Croatia). Clearly, many stations were on holiday in August!

There were also times when the band opened up via multi-hop Es to North America. One particularly good day was on 3 August when CW and SSB contacts could be made into Canada and USA. The opening between 1130-1915UTC covered much of the UK with stations from southern England through to central Scotland, Wales and the Isle of Man making QSOs approaching some 6,000km.

**THE 144MHz BAND.** VHF DXers often use tropo ducting and short-lived propagation modes such as Sporadic-E, aurora, meteor scatter and moonbounce to make long-distance contacts. Indeed it is because there are so many different types of these modes that DXing on the VHF bands is so exciting. Propagation is one of the most absorbing interests in amateur radio. Just like the British weather it is always changing and, very occasionally, the results can be superb. This indeed was the case during August, with contacts being made via numerous types of propagation modes, so I'll now take a look at those in a little bit more detail.

The month started off with some short-range tropo contacts being made across the North Sea to Denmark (OZ), Norway (LA) and Sweden (SM). John Regnault, G4SWX (Suffolk, JO02) reported that on 1-2 August he made CW and SSB contacts with the 2m stations of LA3EQ (JO28), OZ1ALS (JO44), OZ1BEF (JO46), OZ3Z (JO45), OZ7SKV (JO46), OZ9KY (JO65), 5P4VW (JO46), SK7CY (JO65), SK7MW (JO65) and SM7UYS (JO65).

The first few days of August were also favourable for making Earth-Moon-Earth (EME) contacts. UK operators, amongst them G4PBP, G4SWX, G6PHH and GW4WND, reported making 144MHz contacts with stations that included CT2GUR (Portugal), DL2LAH (Germany), EA2AGZ (Spain), OE3FVU (Austria), UA4AQL (Russia), UT5UAS (Ukraine), VK2KU (Australia), YO8RHI (Romania) and YU1IO (Serbia). Most of these contacts incidentally were made between 144.110-144.140MHz using JT65 modulation. This technique is very effective and is one used by Brian Oughton, G4AEZ operator of the Selex Galileo Radio Club, G8VYK (Essex, JO01). Running a Kenwood TS-2000, a homebrew 400W solid state power amplifier and 4 x DK9ZB Yagis he recently completed a 2m EME JT65 contact with the expedition station PJ7EME (St Maarten, FK88). Operated by Mike Staal, K6MYC, it is assumed that this QSO was a first from the UK to PJ7. Congratulations!

**AURORAL BACK-SCATTER.** A good auroral back-scatter opening was reported on 5 August between 2115-2315UTC. Normally, contacts on the 144MHz band are made using CW but this event was sufficiently intense to enable SSB contacts to be made. It is not as easy as making a CW contact due to the very rough sounding signal caused by the rapid Doppler shift, but if you speak slowly and keep the exchange to call signs, report and locator then SSB contacts are achievable. Many inter-UK QSOs were heard being made, from the highlands of Scotland right down to the south coast of England. Contacts into Sweden could also be made from central England with 2m stations such as SM4IVE (JO79), SM7FMX (JO65) and SM7GVF (JO77) up to 1,250km distant. Incidentally, an opening on the 50MHz band was somewhat lengthier, being first spotted at 2015UTC by Jim Rabbitts, GM8LFB (Wick, IO88) when he heard the OY6BEC beacon peaking 53A. It was good to note that a number of Scottish stations were active during the aurora and in addition to GM8LFB were the 6m stations of GM4DZX, GM4JYB, GM4UYE, GM4WJA, GM8IEM, MM0AMW, MM0BSM, MM0KSS, MM0TFU and MM5DWW. So, beam north if you want to work GM locator squares in the next event! If you're looking for EI or GI then beam around 340° and for LA, OH or SM you'll need to beam around 20° or so. This is assuming that you live in central England, as beam headings will of course be different from other locations. During very large scale events the real DX will often be found around 80° east of north. It's actually a fallacy that during auroral openings you beam directly north. By doing so you'll only ever work the loud Scottish stations (or English stations if you're north of the border!).

**4,000km TROPOSPHERIC CONTACTS.** As you are probably aware there are many times during the year when tropo paths form that allows contacts up to 1,000km or more to be established. Fortunately the UK is surrounded by water and this helps considerably as tropo paths over the sea are much more efficient than over land. That is because the land often disrupts the enhancements caused typically

by temperature inversions. There are two main long-distance sea paths from the UK, either across the North Sea to Scandinavia and the Baltic region or in a south-westerly direction to Portugal, Spain and beyond. The latter path offers more DX capabilities as many stations in southern England, Wales and Ireland have a clear take-off towards the Iberian Peninsular (CT, EA), Azores Islands (CU), Madeira (CT3), Canary Islands (EA8) and even the Cape Verde Islands (D44).

The marine path that produces regular long distance tropo contacts to the Canary Islands is associated with the Azores High. The Azores High (also known as the Azores anticyclone) is a semi-permanent anti-cyclonic region with relatively consistent high pressure over the Atlantic Ocean. In the summer months it moves northwards and has a major impact upon the climate of Europe. The pressure centre often shifts towards the Iberian Peninsula and a ridge may build across France, northern Germany and even the south-eastern UK. This is when stations in southern England, Wales and Ireland may possibly make contact with stations in the Canary Islands, over 3,000 kilometres distant. In winter, the Azores High moves to the south of the Azores and fluctuations in pressure result in more variable weather and disruption to this long-distance propagation path.

This year hasn't been particularly good, with only two days in May, 1 day in June and 4 days in July when tropospheric paths formed between the UK and the Canary Islands and the Azores. Of course, even during these openings not every 144MHz operator in the UK can contact these far-away countries as the optimum location is to be situated close to the coast in south-west England, Wales and Ireland. Occasionally though, at least once or twice a year, the tropo signals will extend a considerable distance inland into central England and beyond.

Therefore it is pleasing to report that some of the most exciting tropospheric propagation to have occurred over this path for some time was reported in the two day period between 9-10 August. One of the first stations to spot the opening at around 1015UTC on 9 August was Tim Fern, G4LOH (Cornwall, IO70) who heard the low-power beacon ED8ZAA (144.485MHz) pounding in with 599 signals. Later in the day, from around 1730UTC, operators in south-west England, typically in Cornwall and Devon reported hearing strong signals from stations in the Canary Islands. As the evening wore on the duct became even stronger and by 2300UTC stations as far north as G0CUZ (West Midlands, IO82) and G4KWQ (Staffordshire, IO92) could hear the ED8ZAA beacon over 3,000km away. Remarkably, the duct reappeared the following morning and intensified considerably throughout the day, with stations in southern and central England and Wales making contacts into the Canary Islands. It even made it as far as the station of G4DHF (Lincolnshire, IO92), who reported a contact with EA8TX at 3,050km. The duct also supported contacts on the 432MHz band with the station of G4ALY (Cornwall, IO70) making an SSB contact with EA7TJ some 2,670km distant. The 2m beacon CS3BTM (Madeira, IM12) was also heard by a number of stations that included G3LTF (Hampshire, IO91) at a remarkable 3,450km. But even further distances than this were achieved when G4LOH contacted the station of D44TD (Cape Verde, HK86) at 4,048km. A few hours later the 2m station of Terry Gabriel, M0VRL (Cornwall, IO70) also worked D44TD for a new Region 1 record at 4,114km. Terry mentions that he used an Icom IC-275H transceiver, a GS35 power amplifier and 2 x 17-element Yagis (**Photo 1**) to contact the SSB stations of CT1ANO (IN53), EA8AVI (IL28), EA8CQW (IL18), EA8CSG (IL18), EA8TJ (IL18), EA8TX (IL18), EB8BRZ (IL27) and, at 1958UTC, the station of D44TD – with reports of 51/53 over the amazing 4,114km tropo path.

**METEOR SCATTER.** For VHF DXers located in the northern hemisphere, August is regarded as 'meteor month', with one of the best showers of the year reaching its peak near mid-month. It is, of course, the annual Perseid meteor shower, much beloved by meteor scatter enthusiasts. Although the shower peaked this year on 12-13 August, the Earth actually passed through the stream between 9-17 August. One of the interesting aspects of meteor scatter is that 'propagation' is not restricted to particular directions as you would normally observe during aurora, Es and tropo openings. The Perseids shower is circumpolar, it doesn't set (it never disappears below the horizon) and therefore, during any 24-hour period, many different paths are available. Nowadays most contacts on the 144MHz band are made using FSK441 digital modulation, CW operation having now been completely superseded. Some of the stations worked during the Perseids shower in August included DL8HCO (Germany), EA5EMM (Spain), EW1CD/1 (Belarus), F1HQM (France), HA5UK (Hungary), HB9CAT (Switzerland), IK3VZO (Italy), IT9VDQ (Sicily), LA/OE9ICI (Norway), LY2SA (Lithuania), LZ3RX (Bulgaria), OE3FVU (Austria), OH1AF (Finland), OK1UGA (Czech Republic), OM3CFR (Slovakia), OY4TN (Faroes), OZ1SKY (Denmark), RX1AS (Russia), SM2CEW (Sweden), SP2HPD (Poland), S51AT (Slovenia), TF/G4ODA (Iceland), UT5ST (Ukraine), YL2IV (Latvia), YU7GM (Serbia) and 9A3JH/P (Croatia). During the peak of the shower, which appeared to be between 0700-1100UTC on Saturday 13 August, some stations swapped over to SSB to make very quick, single burst contacts. Stations heard around 144.200MHz included DH8BQA, F6DRO, HA5KDQ, IW1BCV, LA8KV, OE1SOW, OK2ZW, OZ1MAX, SK3MF, SP2QBQ, S540, UX2SB, YU1LA and 9A2AE. As you can see the use of meteor scatter, especially during a major shower can be a very productive way of making long-distance contacts on the 144MHz band.

**PHOTO 2: Helping Terry, M0VRL with the logging of the 144MHz DX stations.**

**SPORADIC-E.** Although not totally unexpected it was a surprise to receive reports of a 144MHz sporadic-E opening that occurred on 19 August. This is quite late in the season but events such as these are not totally unheard of. The Es opening between 1645-1740UTC allowed stations in southern and central England to make contacts into Italy, Bulgaria and Serbia. Tim Fern, G4LOH (Cornwall, IO70) reports that between 1722-1734UTC he made SSB contacts with IW0FFK (JN61) at 1,630km, IW0IAJ (JN61) 1,688km, I4BME (JN54) 1,388km, IW4BET/4 (JN54) 1,401km and best DX of the event I7CSB (JN71) at 1,840km. Other stations reporting Es contacts included G4PBP to LZ2ZY (KN13), G6HKS to YU1EV and G8HGN to I4BME. This opening on 19 August marked the end of the summer 144MHz Es season that commenced three months earlier on 21 May. During that time the 2m band was open on 4 days during May, 3 days in June (very poor), 9 days in July and 1 day in August, a total of 17 days during the 91 day period. Most commentators regarded this year's Es season as being particularly poor. On the other hand if you were one of the lucky ones to have worked into Greece (SV), Crete (SV9), Dodecanese Islands (SV5), Turkey (TA) or Israel (4X) at 3,600km you may have a different view on the matter!

**DEADLINES.** We're now heading towards the autumn trans-equatorial propagation (TEP) season on the 50MHz band so keep your beams pointed towards southern Africa and South America. On the other hand we're also heading towards a period of autumnal auroral activity so remember to points the beams north at the appropriate time. Next month I'll hopefully catch up with your 70MHz and 144MHz reports as long as there is not another huge opening! Good luck and if you do hear or work any DX stations on the VHF or UHF bands or have any other news then please send your reports to g4asr@btinternet.com to reach me before the end of each month. Or you can write letters to Yew Tree Cottage, Lower Maescoed, Herefordshire, HR2 0HP.

# GHz Bands

## A new microwave contest and a novel 13/9cm receive converter

PHOTO 1: G2AS/P at Merryton Low in the recent Microwave Field Day contest. Photo: G3PHO.

**CONDITIONS.** And so the rainy conditions continue... At the time of writing (mid-August) the weather seems determined to make up for the dry Spring. Some areas of Scotland have seen record rainfall with localised flooding. Further south, periods of extremely heavy rain have provided some long distance 10GHz rain scatter opportunities for stations too far away to access the high altitude continental storms. This is mainly reflected in the reports below.

**MICROWAVE FIELD DAY.** At long last a Microwave Field Day (MFD) event has been introduced into the contest calendar. The contest was held on 7 August from 0900 to 1700UTC and covered all bands from 23cm up. It was a very wet day over much of the UK although Scotland's rain had stopped by the Sunday.

Whilst the RSGB VHF Field Day contest does incorporate the 23cm band, the earlier flirtation with 13cm is now a distant memory, having given way in favour of another VHF band. I have to agree that this was a popular move amongst many VHF contesters but did disappoint a number of microwave devotees. I was therefore very happy to see that the new MFD event has been well-embraced, with a significant number of participants in this first outing of the new portable contest.

The Whithorn Contest Group operated from the Machars peninsula (IO74), near Whithorn in SW Scotland. Ian, GM3SEK, Ray, GM4CXM, and Alan, GM0USI operated on 23cm and 3cm from their portable location using just a small, one man tent as accommodation for the 23cm station and Alan's car for 3cm. It was far too muddy to get their vehicles on site after the effects of the heavy rain the previous day so, whilst Ian and Ray went truly portable, Alan had the comparative luxury of his car, parked a short distance away on the roadside.

A combination of 2m and ON4KST chat (KST) was used for talk back. The 2m antenna was mounted low on the mast supporting the 23cm antenna. GB3VHF beacon in Kent was copiable on 2m the whole time but only G3VKV was actually contacted using 2m for talk back. Ian questions the future value of 144MHz talk back (from their site, at least) when the same contact could have been arranged using KST. However, they did set up their best DX on 3cm using the 2m talk back, so it did have its uses!

In all, 17 stations were worked on 23cm. These were mostly fixed stations, with the best DX being G0KLX (Middlesex). They tried working GM8IEM using aircraft scatter, with no signals either way. Another got-away was G3RIR/P in Norfolk.

With invaluable help from Tony, G4CBW, Alan, GM0USI managed eight contacts on 3cm into England, Wales and Scotland. The best DX was G3VKV (IO81) in Cheltenham at 347km. Although the 23cm station was unable to work GM4ISM because of obstructions on the direct path, Alan managed it on 3cm by a dog-leg path using rain scatter.

The Sheffield Radio Club, G2AS/P, operated portable on 23 and 3cm from Merryton Low triangle (IO93) in the Staffordshire Peak District. Peter, G3PHO, reports that the contest was an ideal opportunity to get some club members involved in amateur microwave operating. The club's portable set up at Merryton Low can be seen in **Photo 1**.

144MHz was used to set up a few contacts but most QSOs came from direct calls on 23cm and, in three instances, direct calls on 10GHz. One of these was with Alan, GM0USI/P who had an excellent 10GHz signal from IO74TQ. 11 stations were worked on 23cm and seven on 10GHz.

**MFD ACTIVITY ROUNDUP.** G8AGN/P (IO93) and G6GVI/P (IO83) both appeared with 10GHz wideband FM equipment. G6GVI/P worked MW1FGQ (Near Mold, Flintshire) on wideband but neither station was able to work the G2AS/P group because of the intervening Peak District hills.

Richard, G3CWI (IO93), commented that he had a most enjoyable outing on 10GHz, contacting seven stations in four countries. Contacts with GI6ATZ and GM0USI added considerably to the interest.

Neil, G3RIR was on 23cm but didn't

### FORTHCOMING MICROWAVE EVENTS 2011/2012

**RSGB Convention**, 7-9 October, Horwood House, Milton Keynes. Details: www.rsgb.org/rsgbconvention

**Microwave Update**, 13-16 October, Enfield, Connecticut, USA. Details: Bruce Wood, N2LIV, n2liv@arrl.net

**Scottish Microwave Round Table**, 5 November, The Museum of Communications, Burntisland, Fife KY3 9AA. Details: www.rayjames.biz/microwavert

**15th International EME Conference**, 16-19 August 2012, Cambridge, UK. Details: www.eme2012.com

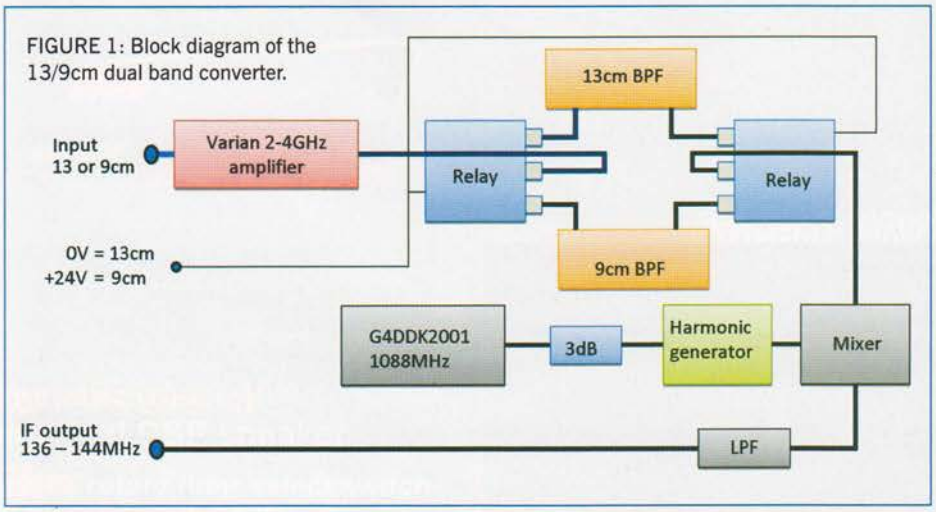



FIGURE 1: Block diagram of the 13/9cm dual band converter.

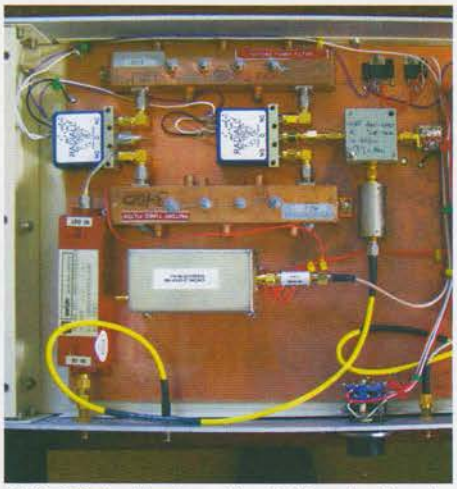


PHOTO 2: Inside view of the 13/9cm dual band converter.

make many contacts from his portable location on the Norfolk coast. One successful QSO was with France at over 400km so he was pretty sure his setup was working well enough. He heard GM3SEK/P at good strength but couldn't make a QSO.

Colin, G8FRA/M5FRA (IO93) managed six contacts and 3 countries on 10GHz and would like to thank Peter, G3PHO for his support.

Dave, G0DJA, made five contacts on 23cm, the furthest being GM4SEK/P at 259km and the nearest G3YJR at 25km. He also worked GW8ASD and G2AS/P.

Bob, G8DTF, worked GW3CWI/P, G2AS/P, and M5FRA/P on 10GHz but he had to temporarily drop the mast down because of the wind speed, damaging the dish as he did so. Nevertheless he later carried on and watching KST he saw that G8GTZ was sending to G0DJA on 3cm so he had a listen. To his surprise he found a very strong carrier on rain scatter so he sent a KST message to G8GTZ. They eventually managed to work over the 262km path.

My grateful thanks to everyone who provided a report on the MFD event.

**A 13/9cm DUAL BAND CONVERTER.** Many of you will know that I am very much involved with the design of low noise preamplifiers for various amateur and astronomy bands. For noise measurements on these I use an HP8970A noise and gain test set together with an HP346A or 436C noise head. Although the HP8970 series can directly measure from 10MHz to around 2047MHz, measuring the noise figure and insertion gain of a preamplifier beyond these frequencies requires the use of a down converter. HP8971 (converter) test sets are available as surplus units for use with the HP8970 series equipment, but they also require the use of a suitable microwave signal generator to supply the local oscillator signal. These items are not always available and, when they are, can be expensive. Because of this most radio amateurs revert to using the receive section of their transverters as the measurement system down converter. This does work, but can lead to some unacceptable errors. But why?

Many transverters use a minimal amount of RF filtering between the high gain receiver RF stages and the mixer. This can result in significant noise from the noise head entering the mixer at the image frequency as well as other unwanted spurious response frequencies. These 'noise channels' may make the transverter receive converter appear to have a lower noise figure than the 'real' noise figure at the wanted frequency. One very popular transverter from the 1990s had just such a problem and it led to the publication of some very optimistic noise figures, but in practice it had an indifferent performance when used for EME. Gain drift in the receive converter only added to the problem. For these reasons it is better not to use a low cost printed circuit based receive converter when measuring preamplifier noise figures.

Faced with the problem of what to do for a converter, I came up with the following solution for 13cm (2300-2330MHz) and 9cm (3400-3456MHz). I have since extended the idea to 6cm and 3cm, but that is not covered in this article.

My solution involves using a surplus Varian, low noise, 2-4GHz amplifier feeding into a connectorised Collins filter similar to the ones I described in this column in March 2011. The output of the filter connects to a connectorised 2-4GHz level 7 (+7dBm) mixer and then, via a 200MHz connectorised MCL low pass filter, to the converter IF output.

The local oscillator is one of my own G4DDK2001 sources, crystalled for 1088MHz. This is followed by an overdriven MAR08 amplifier stage. The harmonic output of the overdriven MAR08 includes the wanted 2176MHz (for 2320MHz with 144MHz IF) as well as a significant number of other high level harmonics.

So far this is just a simple down converter, albeit with a good 5 pole interdigital filter to ensure that the RF passband is confined just to the 2300 to 2330MHz range. The performance of the converter is such that the overall 13cm band noise figure is 5.0dB with 19.5dB insertion gain. There are no other significant responses in the frequency range of the converter.

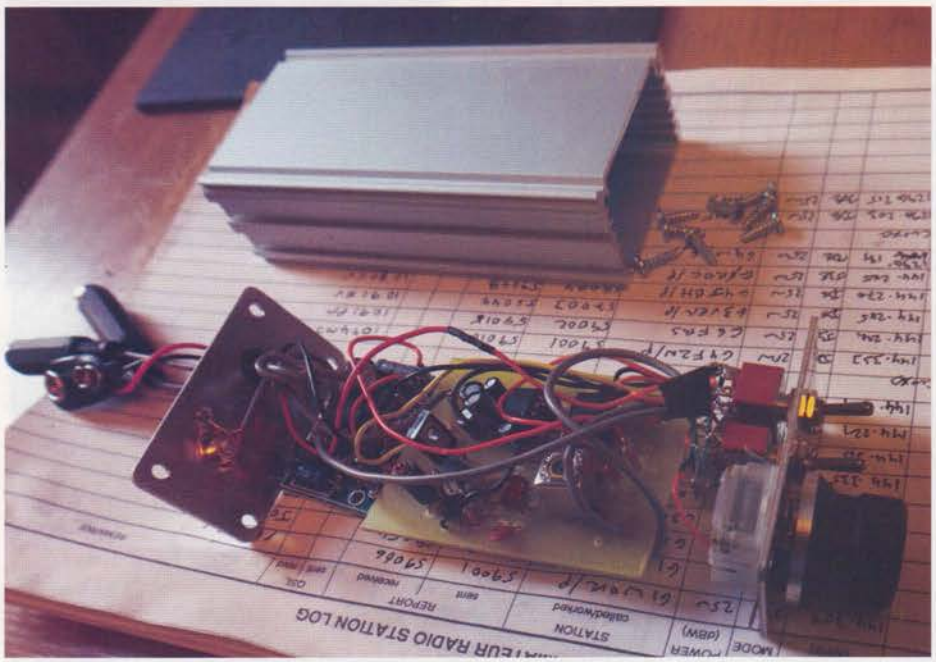
When I implemented this local oscillator I was interested to see what the level of the third harmonic of the 1088MHz was. I measured approximately +3dBm at 3264MHz. That gave me the idea that with an RF frequency of 3400MHz, 3264MHz would give a difference (IF) frequency of 136MHz. This is close enough to 144MHz that it should be possible to measure 9cm band noise figure and gain at an IF of either 136MHz or 144MHz. Of course the 9cm RF band has to be selected and for this a second Collins filter was tuned to cover 3400 to 3456MHz, in order to make measurements anywhere within the usual frequency limits currently used in the amateur 9cm band.

A connectorised SMA relay at the output of the Varian amplifier selects one of the two filters and a second SMA relay at the input to the mixer selects the appropriate filter output. At 9cm I again measured 5.0dB noise figure but now with approximately 10dB gain. The loss of gain is due to higher conversion loss in the mixer at the lower 3264MHz injection level together with a slightly higher filter loss due to tuning to cover 3400 to 3456MHz. The fact that the noise figure is maintained is an indication that the additional loss occurs after the first amplifier. **Figure 1** is a block diagram of the dual band converter arrangement. **Photo 2** shows the dual band converter with the two filters and the two SMA relays. Note that there is a 3dB attenuator between the DDK2001 and the harmonic generator in order not to overdrive the MAR08 too hard, which might cause long term degradation of the harmonic output.

This simple arrangement makes it possible to simply switch from 13cm to 9cm in order to measure 13cm and 9cm preamplifiers. Repeated measurements have shown that this technique works well as long as good filters are used in the RF bandpass stages.

# QRP

## A round up of all the latest QRP news and projects




A fine example of the ZL2BMI DSB transceiver built by Chris Packman, G6XDI, for the 80 and 40m bands.

**THE SPUTNIK TRANSMITS AGAIN!** Mike Rainey, AA1TJ, has become well known for his unusual and innovative QRP projects. Recently he suggested running a 'Sputnik Day' with a series of stations running (as near as possible) replicas of the transmitters used in the first Sputnik. Mike issued a web request to those interested in space history that read, "Greetings Space Historians! We are a group of radio amateurs and we probably rival you in our technical geekyness. We are now involved in an effort to re-create and put on the airwaves replicas of the 20MHz transmitters used in Sputnik 1. (We will use the amateur radio 21MHz band). We are trying to find a schematic diagram for the transmitter. Can you help us? Thanks." Mike received e-mails of support from many QRP enthusiasts including Oleg Borodin, RV3GM, who helped with a source of the original valves used in Sputnik 1 and several QRP enthusiasts intend to build their own Sputnik transmitters.

So watch out for stations active from 4 October for several days to commemorate the launch of the first Russian satellite, *Sputnik 1*, in 1957. A group of QRP constructors and operators will be QRV on 21.060MHz using the same valves that were fitted to the spacecraft in 1957. These were Russian 'rod' valves and were a development of the standard valves, using wire leads instead of pins. This development path was tried in the West briefly but soon discarded for the now-common transistor. Thanks to the generosity of Mike, AA1TJ and the inspiration of RV3GM, a number of crystal oscillator/power amplifier transmitters will have been built and will appear on the air. For details check the 19 July 2011 entry on the AA1TJ blog at http://aa1tj.blogspot.com.

**QRP IN THE COUNTRY.** I guess this could have been sub-titled 'QRP in the cowsheds'. Once again Tim Walford, G3PCJ, invited QRP fans to attend QRP in the Country at his Upton Bridge Farm in Somerset. This year I attended the well-supported event and had a thoroughly enjoyable day. A report on the event reads: "A stiff wind and occasional drizzle did not put off the large attendance of QRP and home building enthusiasts who attended QRP in the Country on 17 July. Hundreds of people from all over England and Holland found their way to Upton Bridge Farm, Somerset where the farm barns provided cover. About 25 stalls and displays showed off or sold everything from components to large construction projects. Apart from a few traders selling components, most displays were from Clubs publicising their activities or of ancient domestic and wartime radios, with a few individuals selling items to make space for new projects! There were also practical construction projects to be seen as 'students' built their Cary receivers with occasional help from the Bath Buildathon team led by Steve, G0FUW ... A raffle raised £200 for those suffering in East Africa ... After the event Tim, G3PCJ, said he was said delighted with the increased attendance and wished to thank everybody who's hard work had made the event so successful. He urged all Clubs within reasonable distance to plan their displays for next year!" Details of next year's QRP in the Country will be announced in due course by Tim Walford, G3PCJ (walfor@globalnet.co.uk); keep an eye on the Walford Electronics website at www.users.globalnet.co.uk/~walfor for details.

**OLD CIRCUITS NEVER DIE...** They just reappear with modifications. Eric Sears, ZL2BMI, is an Anglican clergyman living in New Zealand. In the early 1980s Eric produced a delightful homemade booklet called *The ZL2BMI Double Sideband QRP Transceiver*. It was based on an article first published in the New Zealand *Break-In* magazine for January and February 1984 describing a very simple double sideband transceiver for 80 metres, suitable for wilderness hiking. The book described the circuitry used for ten versions of the transceiver built and used by Eric. The circuits were all very simple using a minimum of parts and built in a compact enclosure. Version 10 of the transceiver fits a 3 x 2 x 1¼in box. The booklet also appeared as an article in the G QRP Club journal *SPRAT*; issue 83. Double sideband (DSB) is a viable mode for phone communications at QRP levels. In fact most stations with a reasonable receiver probably think it is a single sideband (SSB) signal.

In the spring 2011 edition of *SPRAT*, ZL2BMI offered an updated version of the DSB transceiver using more up to date components and designed to produce about 1.5W PEP of RF power with a receiver sensitivity of some 1 – 2μV. The reappearance of the circuit prompted several members of the G QRP Club to try their hand at producing the transceiver. I received a picture of a very nice version of the transceiver built by Chris Packman, G6XDI. Chris has built a two band variation for 80 and 40 metres and gets outputs of 1.5W on 80 metres and 1W on 40 metres. In common with several others who have built the ZL2BMI design, he has had considerable success with the transceiver. Information on the transceiver has been posted on the web by Eric Söderman, SA5BKE, at www.mightymessage.com. Naturally, I would say that the best way to keep up with practical QRP circuits is to join the G QRP Club, see www.gqrp.com.

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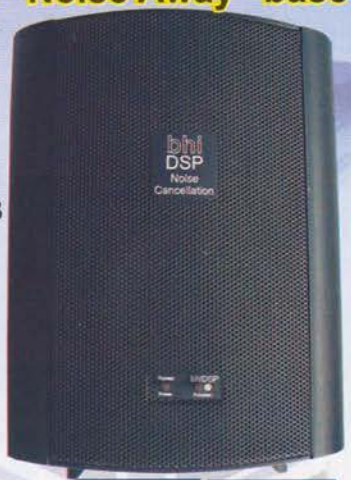


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# Data

## USB to COM interfacing and new *ROS* modes

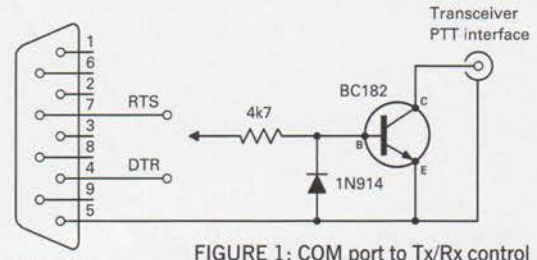


FIGURE 1: COM port to Tx/Rx control interface using RTS and DTR – select as appropriate to suit the software setup.

**USB COM PORTS.** Datamode software has to be able to switch the transceiver between receive and transmit without operator intervention. Although various VOX and audio detection circuitry has been discussed in previous editions of this column, most of these designs introduce a delay of a few tens or hundreds of milliseconds between audio appearing and the transmitter going into Tx mode. The delay going back to receive is often longer still. This is perfectly OK for casual keyboard to keyboard communication modes like PSK31 and Hell, but for fast changeover EME and meteor scatter communications (and even for RTTY contest type operation) the delays are just not acceptable. This forces users back to a serial COM port for control – and reintroduces the problem that serial ports simply do not appear on modern PCs.

An external USB COM port can solve this and there are many offerings out there – just do an internet search for 'USB serial port'. (My Google search quoted 22.1 million results in 0.16 seconds!). Most datamode software uses either the Data Terminal Ready (DTR) or the Request to Send (RTS) signal lines to control Tx/Rx switching via a simple one-transistor or optically coupled interface, as shown in **Figure 1** and **Figure 2**. The choice of whether to use DTR or RTS is often offered in the software setup, as is sometimes even the switching polarity. So it really ought to be straightforward to use COM port control of a transceiver, but recent comments on the various chat groups suggest many are having problems with low cost USB-serial interfaces – particularly some cheap ones bought on eBay. Problems seem to arise because, to cut costs, the manufacturers often only implement the serial receive and transmit data lines, TXD and RXD. Where serial communications is seen, such as on test equipment, data loggers and for large system control and setup, there is usually no hardware handshaking. They operate full duplex so have no need for the RTS and DTR lines. The fact that RTS and DTR are missing on the USB COM port interface is usually never noticed. However, as we are using the port in a non-standard way, we *need* these lines and *do* notice that they're missing! Several users also report some complicated driver issues when trying to install the COM port software supplied.

One established manufacturer of USB / serial interfaces *does* correctly implement all the handshaking lines. All the products from FTDI-Chip [1] are fully compliant and no-one seems to have any complaints. The company offers a full range of USB / serial products, from complete interfaces with USB connector at one end and 9 way D-type at the other with the standard RS232 plus / minus voltage levels, through wired interfaces with TTL 0/5V logic levels, right down to a single chip solution. The latter, the FT232R, can be built into your own hardware to give a smart pseudo-USB product. Look at the FTDI website for your optimum solution. They may cost a bit more than the eBay cheap offerings, but at least you will know there is a tried and tested solution. Furthermore, the software drivers are straightforward to install and you may find they are already on your machine if you have used a piece of external equipment in the past that runs from USB. These often have a 'concealed' COM port inside them, designed so that it looks like a USB interface. They very often use the FTDI chipset.

**UPDATED *ROS* SOFTWARE.** This powerful LF to HF datamode seems to be under constant development and improvement. A recent update stated, "From 3 August 2011, a new *ROS* Mode will become active with provision for selective decoding; it will not be compatible with the present *ROS* Mode. The differences are: A new switch is added, ALL / Call-sign. In position 'ALL', *ROS* will decode any message it receives and is recommended for SWL operation and monitoring. In 'Call-sign', it will only decode transmissions from the station with the entered callsign. Thus, due to the frequency hopping nature of the signal and its forward error correction and ability to avoid QRM, with two stations established in QSO, the channel may also be used by other stations using the mode. Selective decoding is only available to the *ROS-HF* modes; the MF and EME versions, being FSK based and of very narrow bandwidth, do not have this facility."

A single hop digital repeating facility is also built in, fully under the control of the station operator, who may select the mode from the menu. Then, after appending the prefix R- to the callsign, the data will be re-radiated, with CRC checking on the data content. This facility can offer cross band operation via the CAT transceiver control. It is not intended to replace a full packet network, but provides a useful extension to operations in difficult locations and cross linking, noting this may also be accessed via the established internet remote functions.

Of particular interest to those operating under the SS directive (mainly US licensees) is a fine technical point and one that has, to date, been somewhat overlooked. Whereas the *ROS* system is distributed as a single .exe file, the composition of the *ROS* EME and MF modes is in actuality fundamentally different. The MF modes, being unable to take advantage of the BW / Noise / Spreading gain, the coding is restricted to FSK and is therefore eligible for operation within the existing FCC Spread Spectrum diktats. Operators are invited to observe an EME or MF mode beacon using, for example Speclab, where can be seen that the transmitted pattern is repeated, demonstrating that no randomiser is deployed and, at 50 and 100Hz BW respectfully, the concept of spectral dispersion is not applicable.

While this latter point is not applicable to UK licence holders, for whom the *ROS* mode has always been acceptable, at least it will allow US operators to use the MF / EME submode without fear of operating outside their licence terms, thus increasing the usage of the mode. The MF-7 mode affords a S/N gain round 10dB over PSK31, with no need for linear transmitters due to the phase-continuous modulation scheme.

WEBSEARCH

[1] FTDI Chip USB / Serial interface products – www.ftdichip.com

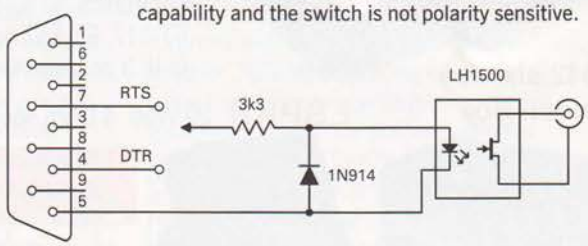


FIGURE 2: This opto-isolated version gives galvanic isolation between the PC and the radio equipment, which reduces the possibility of noise pickup. The Vishay LH1500 solid state relay has 130mA switching capability and the switch is not polarity sensitive.

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| MFJ-994B (600W) intelli tuner | £319.99 |

### SGC


| | |
|---|---|
| SGC MAC-200 | £259.99 |
| SGC-239 | £199.99 |
| SGC-237 | £309.99 |
| SGC-230 | £449.99 |
| SGC-Smart lock | £69.99 |

### YOU KITS

HB-1A-Mk3 40/20. 40/20m coverage. SSB/CW/AM. P/O: 3W battery 5W 13.8V.
Ready built
**£199.99**

## ANTENNAS

### DIAMOND CP-6

A superb (diamond quality) 6 band trap vertical antenna with trap radials – "rotary" trap system allows "flat wall" mounting. 80m/40m/20m/15m/10m/6m. 200W SSB, HT 4.6m (15ft tall).
SEND SAE FOR DATA SHEET
OUR BEST SELLING VERTICAL
OUR PRICE **£349.99**

### DIAMOND V-2000

6m + 2m + 70cm. 2 section (2.5m long) PL-259 fitting.
Superb quality
**£134.99**

### NEW INTRUDER III

13 band (80-10/6/2). PL-259 fitting. Includes WARC bands. 13 band version of Intruder II.
**£59.99**
(2 for £89.99)

### INTRUDER II

11 band (80-10 6/2/70cm). PL-259 fitting. Collapses to 95cm (~ 3 ft).
**£39.99**
(2 for £70.00)

### DIAMOND SD-330

L: 1.85m. Freq: 3.5-30MHz (200W SSB) 12V DC supply required. (Included 3-way mag mount). Auto tuning. Type: 1/4 wave - centre loading. Super mobile 'Screwdriver' antenna.
**£439.99**

## GIZMOS

### NEW SANGEAN ATS-909X

The ultimate all-mode portable shortwave + FM (76-108). Fully coaded portable with improved Rx thanks to a "dsp" tuner. Includes PSU.
**£239.99** Del £10

### W-8681 PROFESSIONAL WEATHER STATION

Wireless – no cable required from inside out. Rain, wind speed, forecast, touch screen.
SALE PRICE **£64.99**

### QUANSHENG TG-UV2

2m/70cm hand-held (SW O/P) VOX/CTCSS/DCS 200 channels. Dual watch. Incl's battery and drop in charger.
IN CAR CHARGER..... £24.99
SPEAKER MIC..... £16.99
**£81.99** P&P £5.00

### ALINCO DJ-596E

2m + 70cm Handie. Includes nickle metal N.M.H.I and charger.
Includes free speaker mic
**£149.99**

### D-72

2m/70cm + APRS
NEW
**£425.00**

### WOUXUN HANDIES
all include battery, charger and antenna

| | |
|---|---|
| KG-UVD1P (2m/70cm) | £92.99 |
| 679E2 (2m) | £59.99 |
| UVD1P/L 4m/2m | £99.99 |
| USB lead + s/ware | £21.00 |
| BNC adapter | £6.00 |
| Car chgr | £9.99 |
| Spkr/mic | £15.99 |
| Spare batt | £19.99 |
| AA batt box | £11.00 |
| SO-239 adapter | £6.00 |

LIMITED STOCK

## 10m PNEUMATIC MAST

We have a small quantity of "military spec" pump-up masts (part of a Government order). All brand new in a crate and supplied with cover (close HT – 6 foot). Anodised green finish.

40m guy kit pack ..... £49.99
Ground fixing spikes (3-off) ..... £35.00
2 foot all ground fixing kit ..... £99.99
(Can be hand operated or by compressor/foot pump)

Del £40 10m MAST, ONLY **£1199.99**

## HEAVY DUTY 24ft SWAGED MAST SET

New extra heavy duty 2" mast set. 4 sections x 6 foot that slot together. SPECIAL BUY

**£79.99** each. Del £10 THREE FOR £179.99 DEL £15.00

## NEW SWAGED MAST SETS

24 foot mast. 1½" – 4 sections (6ft long). (Swaged)
**£49.99** OR 2 SETS £84.99

24 foot mast. 1¼" – 4 sections (6ft long). (Swaged)
**£46.99** OR 2 SETS £78.99

## H/DUTY CAR BOOT MAST SET

18 foot (1½" dia).
18 foot – 6 x 3 foot (1½") slot together ally sections.

**£49.99** each. TWO FOR £79.99 DEL £13.00

## NEW CAR BOOT MAST SET

Superb 18 foot (6 x 3 foot sections) that slot together.
Dia: 1¼" ideal to take anywhere. **£39.99**

**2 for £74.99 del £13.00**

## NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/ Mains/PC/Phone etc.

*Simply close shut over cables and notice the difference!* Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.

**2 for £14.99 / 5 for £34.99** (P&P £4.00)

## MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to avoid tangling.
(Fits up to 2" mast) **£13.99** + P&P £4.50

30m pack (4.4mm) nylon guy rope £15.00
132m roll 4.4m nylon guy (480Kg b/f) ..... £45.00 Del £7.50

## NEW EASY FIT WALL PULLEY

Pulley will hang freely and take most rope up to 6mm. (Wall bracket not supplied).

**£13.99** + P&P £4.50

Wall bracket, screws not supplied. Simply screw to outside wall and hang pulley on WALL BRACKET £2.99 P&P £1.00

30m pack (4.4mm) nylon guy (480kg) ..... £15.00
132m (4.4mm) nylon guy (480Kg) ..... £45.00

## HANGING PULLEY

Heavy duty die-cast hanging pulley. Hook and go!

**£24.99**

## BARGAIN WINCH

500kg brake winch. BARGAIN PRICE

**£89.99** Del £10.00

(Now includes cable grip)
Winch wall bracket ..... £22.99

## BUTTERNUT VERTICALS

HF-2V (80/40m) ..... £279.99
HF-6V (80/40/30/20/15/10m) ..... £375.00
HF-9V (as HF-6V + 17/12 & 6m) ..... £425.00

## TONNA YAGIS

22089 9ele 2m ..... £79.99
220811 11ele 2m ..... £109.99
220817 17 ele 2m ..... £139.95
220818 9ele 2m XD ..... £129.95
220921 21ele 70cm ..... £109.00
2208938 9ele 70cm XD ..... £135.99

## LOW LOSS PATCH LEADS

£4.50 P&P

| Connectors | Length | Price |
|---|---|---|
| PL-259 - PL-259 | 0.6m | £11.99 |
| PL-259 - PL-259 | 1m | £14.99 |
| PL-259 - PL-259 | 4m | £19.99 |
| PL-259 - PL-259 | 20m | £49.99 |
| BNC - BNC | 1m | £12.99 |

## MT-3302

Heavy duty universal mount.
Includes 5m cable **£34.99**

## MT-6601

Adjustable roof rack/window bar mount
**£19.99**

## NEW DIAMOND WD-330


Amazing performance. Twin folded dipole. 2-30MHz – and it really works. No ATU required (25mts long). Supplied with 30 mtr PL-259 feeder – ready to go. If you want great transmission, look no where else. Japanees quality made product WOW **£229.99**

## NEW DIAMOND BB6W

2-30MHz (250W) 6.4m long. End-fed wire antenna. Icludes matching balun. Sling up & away you go.

**£199.99**

## CUSHCRAFT BARGAINS

*Delivery £15.00*

MA5B Mini beam 10, 12, 15, 17, 20m ..... WOW £519.99
A4S 4 ele beam (10 - 20m) ..... £675
A3S 3 ele beam (10-20m) ..... WOW £599.99
R-8E Vertical (40 - 6m) "special" ..... SPECIAL £525

## Q-TEK PENETRATOR

"We've sold 100s all over Europe"

★ 1.8 - 60MHz HF vertical ★ 15 foot high ★ No ATU or ground radials required ★ (200W PEP).

SEND SAE FOR LEAFLET **£219.99**

NEW Wire Penetrator 50ft long (1.8-70MHz) ..... £189.99

## Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end) ..... £34.99 P&P £4.00 (a pair)

TRAPS BACK IN STOCK

## BALUNS & TRAPS (1kW)

Baluns 1:1 or 4:1 or 6:1 ..... £39.99 each P&P £4
Traps 80m or 40m or 20m or 15m ..... £39.99 pair P&P £5

## Standard & Deluxe G5RV

P&P on either full/half size £7.50

Half size 51ft (now includes heavy duty 300Ω ribbon) ..... £28.99
Full size - 102ft (now includes heavy duty 300Ω ribbon) ..... £33.99
Half size (Deluxe) - 51ft (40-10m) ..... £39.99
Full size (Deluxe)- 102ft (80-10m) ..... £48.99
In-line choke balun for G5RV, etc ..... £39.99

## CAROLINA WINDOM

| | | |
|---|---|---|
| CW-160S | (160-10m) 40m long | £159.99 P&P £10.00 |
| CW-160 | (160-10m) 80m long | £164.99 P&P £10.00 |
| CW-80 | (80-10m) 40m long | £134.99 P&P £10.00 |
| CW-80S | (80-10m) 20m long | £152.99 P&P £10.00 |
| CW-40 | (40-10m) 20m long | £121.99 P&P £10.00 |
| G5-RV | (80-10m) + balum | £74.99 |

## NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W) ..... £79.95 P&P £6.50
RS-102 1.8-150MHz (200W) ..... £59.95 P&P £6.50
RS-402 125-525MHz (200W) ..... £59.95 P&P £6.50
TM-3000 1.8-60MHz (3kW) Incls mod meter ..... £69.95 P&P £6.50
RS-40 144/430MHz Pocket PWR/SWR ..... £34.99 P&P £5
DL-30 diamond dummy load (100W max) ..... £29.99 P&P £5

## D-308B DELUXE DESK MIC

(with up/down). Many amateurs (over 4000) have been pleased with it's performance. Includes 8-pin round Yaesu mic lead. Icom/Kenwood & other leads available. Phone (£19.99 each). Replacement foam windshield £3.00 + P&P.

Back in stock – 8-pin modular 8-pin round Yaesu adapter £19.99 **£79.99**

## GENUINE COAX SWITCHES (P&P £6.00)

2 way CX-201 (0-1GHz) SO239 ..... £24.99
2 way CX-201 'N' (0-1GHz) 'N' ..... £29.99
4 way CX-401 (0-500MHz) SO239 ..... £79.95
4 way CX-401 'N' (0-500MHz) 'N' ..... £89.95

## WATSON COAX SWITCHES

(POST £4.00)

CX-SW4N DC-1.5GHz (5xN) ..... £59.99
CX-SW4PL DC-800MHz (5 x SO-239). £56.95
CX-SW3N DC-1.5GHz (4 x N) ..... £49.95
CX-SW3PL DC-800MHz (4 x SO-239). £41.95
CX-SW2N DC-3GHz (3 x N) ..... £32.95
CX-SW2PL DC-1GHz (3 x SO-239) ..... £26.95

## REPLACEMENT POWER LEADS

DC-1 Standard 6-pin/20A fits most HF ..... £22.00 P&P £3
DC-2 Standard 2-pin/15A fits most VHF/UHF .... £10.00 P&P £3
DC-3 Fits Yaesu FT-7800/8800/8900, etc ..... £17.50 P&P £3

## COAX BARGAINS

True military spec real UK coax

RG-58 Military spec x 100m.
**£69.99** or 2 for £100.00
Coax stripping tool (for RG-58) ..... £8.99

RG-213 Military spec x 100m (10mm dia).
**£199.99**/100m or 2 for £300.00

## Q-TEK TRI-MAGMOUNT

Very heavy duty. Available:- SO-259 or 3/8 – specify. **£44.99**

## YAESU G-450C

Heavy duty rotator for HF beams, etc. Supplied with circular display control box

WOW **£329.99** or £389.99 with 25m cable/plugs

G-650C extra heavy duty rotator. ..... £369.99 or £429.99 with cable
G-1000DXC extra heavy duty rotator. ..... £479.99 or £539.99 with cable
G-2800DXC The goliath of rotators ..... £845.99
GS-065 thrust bearing ..... £59.99
GC-038 lower mast clamps ..... £35.99

## AR300XL

Quality rotator for VHF/UHF. Superb for most VHF-UHF Yagis, 3-core cable required. 3-core cable £1 per mtr.

GS-050 stay bearing £39.99 OUR PRICE **£99.99**

## DIAMOND YAGIS

No tuning required

2m/5 element No tuning required SO-239 feed ..... £47.99
2m/10 element No tuning required SO-239 feed ..... £84.99
70cms/10 element No tuning required SO-239 feed ..... £54.99
70cms/15 element No tuning required SO-239 feed ..... £69.99
6m/2 element No tuning required SO-239 feed ..... £89.99

## Q-TEK COLLINEARS (VHF/UHF)

Del £10.00

X-30 GF 144/70, 3/6dB (1.1m) ..... £44.99
X-50 GF 144/70, 4.5/7.2dB (1.7m) ..... £59.99
X-300 GF 144/70,6.5/9dB (3m) ..... £79.99
X-510H GF 144/70, 8.5/11dB (5.4m) ..... £139.99
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m) ..... £89.99

## DUPLEXERS & TRIPLEXERS

MX-2000 50/144/430MHz Triplexer ..... £84.99
TSA-6011 144/430/1200MHz Triplexer ..... £84.99
MX-72 144/430MHz ..... £39.99
MX-72 "N" 144/430 ..... £42.99
MX-62M (1.8-56MHz + 76-470MHz) ..... £79.99
MX-610 1.8-30MHz + 49-470MHz (S-239 conn's) ..... £99.99

## MOBILE ANTENNAS

Del £10.00

DB-7900 2m/70cm (5.5/7.2dB) 1.6m (PL-259) ..... £44.99
DB-770M 2m/70cm (3.5/5.5dB) 1m (PL-259) ..... £24.99
Diamond CR-8900 10/6/2m/70cm (1.26m) ..... £99.99
Diamond AZ-506 2m/70cm – only 0.67m long ..... £39.99
PL-62M 6m/2m (1.4m) PL-259 ..... £23.99
PL-627 6m/2m/70cm (1.7m) PL-259 ..... £44.99

## ALUMINIUM POLES

20 foot (collection only) 2" ..... £69.99
10 foot (collection only) 2" ..... £34.99
2.4m (2") Ally pole ..... £32.99
5 foot x 2" pole ..... £17.99

## EP-300

Over the ear earpiece.
**£9.95**
P&P £4.00

## RH-770H (BNC)

2m/70cm Tx + wide Rx. High gain up to 5.5dB.

**£59.99**
P&P £5.00

## TWIN FEEDER/ LADDER LINE

300Ω Twin Feeder £1/mtr £70/roll
450Ω Ladder £1/mtr £70/roll (100m)

## EARPIECE/BOOM MIC

Over ear earpiece + boom mic. Available in Kenwood version or Yaesu/Alinco/Icom.

**£24.99** P&P £4.00

## DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/ OD35mm. 6 for £16.99 P&P £4.00
12 for £26.99 P&P £5.00
20 for £40.00 P&P £10.00

## COPPER ANTENNA WIRE ETC

Hard drawn (50m roll) ..... £40.00 P&P £7.50
New: 50m roll, stranded antenna wire ..... £16.99 P&P £7.50
Flexweave (H/duty 50 mtrs) ..... £44.99 P&P £7.50
Flexweave H/duty (18 mtrs) ..... £21.99 P&P £7.50
Flexweave (PVC coated 18 mtrs) ..... £24.99 P&P £7.50
Flexweave (PVC coated 50 mtrs) ..... £59.99 P&P £7.50
Special 200mtr roll PVC coated flexweave ..... £180.00 P&P £10.00
Copper plated earth rod (4ft) + wire clamp ..... £16.99 P&P £8.00
Copper plated earth rod (4ft) as above + wire ..... £27.99 P&P £8.00
New RF grounding wire (10m pack) PVC coated ..... £14.99 P&P £5

## METALWORK & BITS

(Del Phone)

2" mast-floor base plate ..... £16.99
6" stand off brackets (no U-bolts) ..... £8.99
9" stand off brackets (no U-bolts) ..... £10.99
12" T & K brackets (pair) ..... £19.99
18" T & K brackets (pair) ..... £24.99
24" T & K brackets (pair) ..... £29.99
U-bolts (1.5" or 2") each ..... £2.00

All our brackets are of high quality, British made and galvanised.

8mm screw bolt wall fixings ..... £1.70
8-nut universal clamp (2" to 2") ..... £9.99
2" extra long U-bolt/clamp ..... £7.49
2" crossover plate with U-bolts ..... £18.99
15" long (2") sleeve joiner (1.5" also available) ..... £18.99
3-way guy ring ..... £8.99
4-way guy ring ..... £10.99
Heavy duty guy kit (wire clamp, etc.) ..... £49.99
Set of 3 heavy duty fixing spikes (~0.7m long) ..... £29.99
30m pack (4.4m) 480kg B/F nylon guy ..... £15.00
Roll of self-amalgamating tape 25mm x 10mtr ..... £8.99
Special offer:- Self-amalgamating 3 rolls ..... £20.00

# EMC

## Solar photovoltaic systems and some rural EMC issues

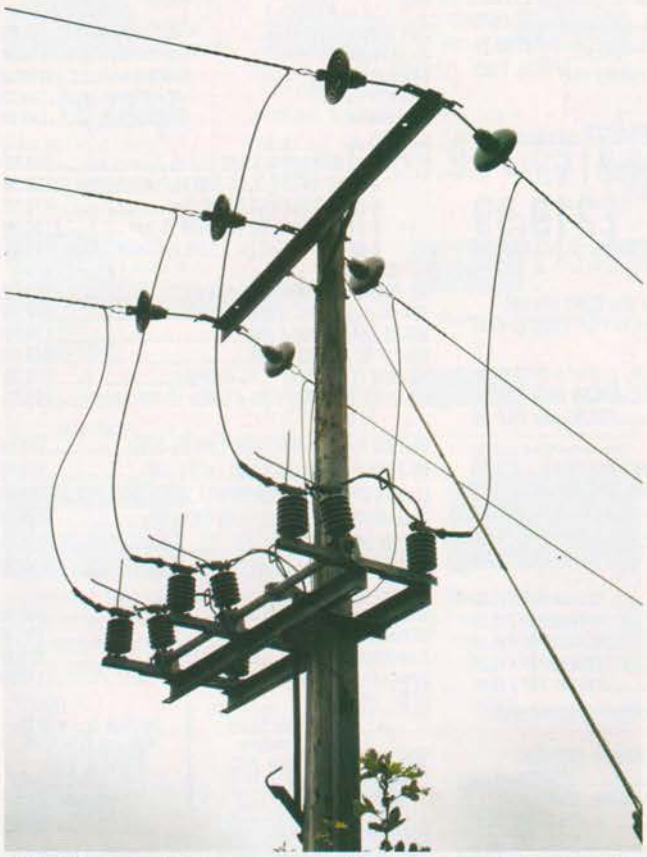


PHOTO 1: A circuit breaker on an overhead powerline that was arcing.

**SOLAR PV MICRO INVERTERS.** The item on RFI from solar photovoltaic (PV) micro-generation systems created quite a lot of interest from members who are intending to have such systems installed. The key EMC issue is the grid-tied inverter, also known as a Grid Connected Power Conditioner (GCPC) that converts DC from the solar cells to 50Hz AC that is synchronised to the AC mains.

In answer to questions from members about EMC performance of these inverters, we do not have sufficient information about particular models of inverters with low RF interference. Nevertheless, these should meet the generic EMC standard EN 61000-6-3:2007, for Residential, Commercial and Light Industrial (RCLI) environments, although this standard does not offer sufficient protection for weak signal HF amateur radio reception. Another factor is that the HF conducted emission limits for the DC input port are significantly higher than the equivalent limits for the AC mains output port. This relaxation of DC power port emission limits seems to have crept in some time since the original generic emission standard was published in 1991.

Dave, G3XOU been investigating installing a solar PV system at his QTH in Tavistock. Dave found a report from the Fraunhofer-Institute for Wind Energy and Energy System Technology in Kassel, Germany. This describes a project that the EC funded in 2001 on EMC and safety aspects of PV systems [1].

This led Dave to the conclusion that a 'String Inverter' system where DC outputs from multiple panels feed one single inverter was not a good choice for radio amateurs who operate on the HF bands. He then started to investigate the new 'Micro-inverter' technology provided by ENECSYS. Each individual solar PV panel has its own Micro-inverter fitted on the underside of the PV panel. This keeps the DC cables very short, minimises the HF emissions from the DC cables and provides an AC grid feed back into the building. The AC outputs from the Micro-inverters are all wired in parallel. It also has a Bluetooth interface for monitoring the operation and performance of each panel.

Before spending a substantial amount on a solar PV system, Dave wanted to be confident that it would not cause real problems for HF band operation at his QTH. He purchased one ENECSYS SMI-200-72 200W Micro-Inverter for £150 in order to carry out some EMC tests. This inverter can be incorporated into the final system. At his work he has the necessary test equipment to carry out pre-compliance EMC testing of electronic products, so he was able to do some tests on the outgoing grid mains feed and the DC positive and negative feeds to the Micro-inverter from the solar PV panel.

Dave found that the emissions on the AC output had a broad peak around 24-32MHz. The highest peaks were about 15dB below the EN61000-6-3 limit but emissions at other frequencies were 20-30dB or more below the limit. He also measured HF common-mode current emissions on the mains cable. Although this test is not required by the Generic EMC standard, it shows the characteristics of RF currents that may be radiated by cables. In addition to the peaks from 24-32MHz, Dave measured another broad peak from around 49MHz to above 54MHz. Both of these peaks could be reduced by about 10dB using a single clip-on ferrite core and 15dB with two ferrite cores.

Dave didn't have access to a special DC LISN for measuring conducted emissions on DC input cables but a common mode current test showed broad peaks centred around 26.5MHz and 53MHz. Again, these peaks could be reduced by about 10dB using a single clip-on ferrite core and 15dB with two ferrite cores.

Dave's next job is to carry out some tests from the proposed site of his solar PV system with the various HF antennas at his QTH, checking each of the HF bands and the 50MHz band for noise and spurious signals. Even allowing for the cumulative effect of multiple Micro-inverters, the initial results look interesting and, if required, clip-on ferrite cores can be used to suppress common mode currents successfully.

**OVERHEAD POWERLINE RFI.** Don, G3BJ reports that his home in Shropshire is one of the quietest locations for man-made RF interference that he has ever known. In addition to his activities as EMC Committee Chairperson and acting RSGB General Manager, Don has tried to keep an eye on the DX bands. Towards the end of June 2011, he was horrified to find intermittent wide-band noise from 10-30MHz at a strength of about S7. It seemed to be present morning and afternoon but not at night.

First, Don eliminated his own house as a possible source by using a battery operated receiver and switching off the house mains, to confirm that the noise was still present. Then he listened on the main HF Yagi and turned it either side of the peak until the interference dropped into the band noise. He measured the two points carefully using a compass and took the mid-point to get a bearing of 255°. Plotting this on a large-scale map showed that there were only 20 houses within three miles on that bearing, with the nearest about ¾ mile away.

Don drove in that direction armed with a domestic short wave receiver and a 160m homebrew D/F set. There was a signal peak on a particular overhead power line about a mile away. This was on wooden poles and is believed to be an 11kV line; there are no 'super-grid' lines on metal pylons in the area. There was a much stronger interference peak near a village 2-3 miles away, but Don could

not get a clear D/F null. Due to the great distance, it seemed likely to be something like a high-current industrial or agricultural process, or a faulty power grid component.

At this stage, Don decided to call Ofcom for help. The response was next-day, with a call from the triage unit to check out the obvious possibilities. When these were exhausted, the case was allocated to Don's 'local' Ofcom field engineer who promptly phoned and arranged a date for a visit. For the few days prior to the planned visit, the noise was absent, so Don cancelled the arrangement, believing the problem had cured itself. The following day it was back, so he agreed a new date with the engineer.

The Ofcom field engineer turned up with a van full of equipment but the noise was absent! He nevertheless said that he would 'have a drive around' and, whilst he was out, the interference returned. Don called the engineer's mobile phone and reported the fact, confirming that it was still on the same bearing of 255°. He was monitoring the noise for an hour and suddenly it ceased. Then a minute later, he received a phone call. "Has it stopped?" the engineer asked. Don confirmed that it had. The engineer asked Don to listen while he tried to recreate it and, sure enough, he could.

Returning to Don's house, the engineer explained that it was a circuit breaker on a power pole about two miles away. He had cleared it by pulling the stay wire to the pole and releasing it, to provoke a slight wobble of the pole. He would report it to the power company. The satisfying thing from Don's point of view was that the pole was located right on the 255° bearing from his home. Don has provided a photo of the pole-mounted circuit breaker (see **Photo 1**).

The following day, the engineer called to say that it had been reported and that the power company planned to fix it that same day. Don said that's what he calls service and that peace has returned to rural Shropshire. Don encourages anyone who is experiencing a serious RF noise source (and who has confirmed it is not in their own property) to use the Ofcom interference reporting service. Don considers that despite the concerns that all radio spectrum users have about PLAs, there is still an outstanding service available from Ofcom field staff on other issues.

As mentioned above, radio direction finding an interference source at 1.8MHz can be difficult because the interference can be conducted along power lines for hundreds or even thousands of metres. An effective strategy for finding any broadband RFI source is generally to listen on the highest frequency on which it can be heard, moving up to even higher frequencies as you get closer. If you can hear it on a VHF or even UHF band, it will generally be easier to locate the source, especially if you have a portable directional antenna.

If following an overhead powerline away from public roads, it is advisable to obtain the permission of the landowner if there is no public right of way or 'open access' land. Bear in mind that an RF interference source could indicate a fault so if you find overhead power lines that have fallen onto the ground or are touching the cross bar or the timber pole, keep well clear.

**ELECTRIC FENCE RFI.** Electric fences can be another source of RF interference in rural areas. Joe, G4PMY reports that he is the technical curator of the Hack Green Nuclear Bunker, located near the town of Nantwich in Cheshire. They have two amateur radio stations installed, one using a 40m mast in the grounds and the other is a field station using low height aerials. The stations have participated in Museums on the Air.

Joe reports that they had been very lucky there having a very low noise level on HF until the farmer next door purchased horses and installed electric fence systems in two fields. Now Joe reports up to +40dB of pulsed broadband noise day and night, from 1MHz to about 19MHz, with the highest levels in the 3.5MHz and 7MHz amateur bands. Joe has looked at the installation from a distance and the fence 'wire' appears to be string with a strand of wire twisted into its construction. The connections between the electronic box and the conductor running around the field appear to be no more that a croc-clip and Joe wonders if it is in good contact with the conductor.

Joe reports that three months after installation, there was no sign of reduced interference levels and he asks whether the EMC Committee has any information relating to the proper deployment of such devices and whether there is any history of Ofcom taking action against such devices.

In the past, the 'energiser' units for electric animal fences had a relay that produced an audible click. Arcing at the relay contacts could also produce clicks on radio. Modern electric animal fence energisers use a solid state design that steps up the battery or mains supply voltage to typically 500-700V DC to charge a capacitor. This capacitor is then discharged through a pulse transformer to give an output pulse with a typical peak amplitude of 7kV. A typical modern electric fence energiser unit is shown in **Photo 2** (note that this is not the brand that G4PMY is investigating).

The energiser units themselves are claimed to produce low RFI and many claim compliance with safety and EMC standards EN61011, EN61011-2, or EN60335 Pt 2-76. Nevertheless, any arcing on the fence line has the potential to make an electric animal fence act like a spark transmitter with a long wire antenna. It is reported that various factors related to the fence line and the earthing system may


**PHOTO 2: A typical modern electric fence energiser unit.**

cause RF interference. The Electric Fence Association publishes a Code of Practice for the UK [2]. In the section on safety, this states, "Fence wiring should be so installed that it is well away from any telephone or telegraph line, radio aerial or any earth continuity conductor". There is also a section on fault finding with a brief section on radio interference but more detailed information on reducing TV or telephone interference is available from Electric Fence Online [3]. The latter guide also states that the energiser's earth system must be sufficient and that interference is normally caused by bad joints, sparking inside poor quality or cracked insulators or vegetation touching the fence line. Tackling these issues also reduces loading on the fence line, which improves the effectiveness of the electric fence for its intended purpose.

A possible way to tackle RF interference from an electric fence would be for a radio amateur to work in co-operation with a farmer to make improvements to the electric fence installation that benefit both parties. If it cannot be resolved in this way, the next step would be to use the Ofcom interference reporting service.

WEBSEARCH

[1] Fraunhofer-Institute for Wind Energy and Energy System Technology, EMC and Safety Design for Photovoltaic Systems – www.iset.uni-kassel.de/esdeps/
[2] Electric Fence Association, Code of Practice – http://efa.fences.org/cop/
[3] Electric Fence Online - TV and telephone interference – http://tinyurl.com/RC-EMC-EF2 or www.electricfence-online.co.uk/shop/electric-fencing/electric-fence-advice-faqs/guide-to-electric-fencing.html#4

# Sport Radio

## A dedicated backpacker, an expansion to the Super League and the Contest University

PHOTO 1: Tom Read, M1EYP on The Cloud (343m/1125ft), SOTA G/SP-015, his usual location for the UK Activity Contests.

**THE MOUNTAIN GOAT.** Last October I wrote about the 50MHz Backpacker Contest, saying that it had "come under the microscope this year, because the level of entries is very low. 2005 was the last year in which more than ten entries were received. This year [2010] it was down to three, so look out for changes to the format in 2011." Well, a change duly took place, because this year it was run to coincide with the May to August sessions of the 6m UK Activity Contest. Dedicated backpacker and SOTA Mountain Goat Tom Read, M1EYP (**Photo 1**) took full advantage of the change.

Tom said; "I started going out portable on Tuesday nights a few years ago, to link up with a few summer evening SOTA activations that were scheduled to take place. Inevitably this raised my awareness of the UKACs and I started taking part in them. I was only ever a minor participant in these, as my portable rig – the FT-817 – only had 5 watts available. Nonetheless, I encouraged my son, Jimmy, M3EYP, to take part from the home shack and fellow members of the Macclesfield & District Radio Society to join in. We became a top ten player in the club championships through decent participation levels.

"All changed for me personally when the rules were amended for the 2011 season. The M5 multiplier gave me more opportunities to work the stations in JO01 and JO02 but, moreover, the introduction of the AL section meant that I could use my SOTA summit situation to my advantage. When competing in the AR section against the 100 watt stations, being on a hilltop gave me little advantage over the stations in cars and home QTHs, but the AL 10 watt section suddenly gave me an advantage. The takeoff is absolutely critical at low power and there are much fewer places you could drive to that could compete with somewhere you had to walk to!

"In January, February and March, I won seven of the nine AL sections of the UKACs in 2m, 70cm and 6m, as the benefit of the SOTA summit was proven. As the year has moved on into summer I have won a few more sessions, but other competitors came into the mix. At least three others started participating in UK Activity Contests as SOTA qualifying activations, while a couple of other stations have managed find good drive-to locations.

"Of course, being SOTA qualifying meant that I was meeting the more stringent requirements of the 50MHz Backpackers series, now moved to coincide with the summer sessions of the 6m UK Activity Contests. Disappointingly I was the only station to participate (at the time of writing) in these as a 'Backpacker', even though the scores do get auto-entered into the AL series as well. I have found that the limitations of the receiver of the FT-817 have disadvantaged me, especially when there has been Sporadic-E on 6m. To compensate for this I have made the most of my best DX contacts on 6m CW – such as 2218km to UX1UA in the June session.

"A typical Tuesday evening sees me setting off from home around 6.30pm, after the family evening meal. I have a 25-minute drive to Cloudside, where I park and kit up. There follows a steady 10-minute walk to the summit of The Cloud, 343m ASL, SOTA reference G/SP-015 (1 point). The walk distance is about a quarter of a mile, and there is about 250 feet of ascent involved. In the winter months, torchlight is required for this ascent as it is already dark at that time and there is no lighting on the route.

"While in a normal SOTA activation you might set up a distance away from the actual summit, out of consideration to other hill walkers, there tends to be far fewer people, if any, on the hill after dark. Therefore I set up as close to the trig point as possible and maximise the benefit and take-off of the height. I have a well-honed routine for setting up, so I can complete it almost as quickly in the dark as in daylight.

"My radio equipment is a Yaesu FT-817 and microphone, a Mini Palm Paddle (useful for completing difficult exchanges), a 7Ah SLAB (more than enough for 2.5 hours at QRP!), a SOTA Pole (fibreglass fishing pole as mast), ring, guys and lightweight pegs to support the mast. My antenna for 2m is a 5-element SOTA Beam, for 70cm a 6-element SOTA Beam and for 6m a wire delta loop. The coax is Aircell 7. My other equipment is a Berghaus jacket, a fleece hat, a Petzl headtorch (and a spare), a 'Rite in the Rain' all-weather notebook and pencils and a Bothy bag (a lightweight emergency shelter to pull over and sit in, in case of rain or extreme cold).

"After the contest, I am often just able to make last orders at the Harrington Arms in Gawsworth for a pint of ale and a meat pie in front of a roaring fire!

"Although it is often after midnight by the time I get home, I am usually far too keen to see what score I have attained to do the sensible thing and go to bed. Consequently, three Tuesdays a month are typically late nights for me, as I transfer my handwritten log into the log entry interface on the website."

Unfortunately Tom was the only entrant

**TABLE 1: The top five teams in last winter's Super League contests.**

| | 1st | 2nd | 3rd | 4th | 5th |
|---|---|---|---|---|---|
| 2m | Bristol | Trowbridge | Camb Hams | Bolton | Chesham |
| CW | Three A's | Lichfield | Mid Beds | Bristol | De Montfort Uni |
| SSB | Cray Valley | Three A's | De Montfort Uni | Bristol | Lichfield |
| 70cm | Trowbridge | Chesham | Bristol | Spalding | Colchester |
| Overall | Bristol | Camb Hams | Cray Valley | Trowbridge | GMDX |

**RSGB HF EVENTS**

| Date | Event | Times (UTC) | Mode(s) | Band(s) | Exchange |
|---|---|---|---|---|---|
| Oct 2 | 21/28MHz * | 0700-1900 | CW/SSB | 21/28 | RS(T) + SN + District |
| Oct 12 | 80m Club Sprint | 1900-2030 | CW | 3.5 | SN + name |
| Oct 27 | 80m Club Sprint | 1900-2030 | SSB | 3.5 | SN + name |

**RSGB VHF EVENTS**

| Date | Event | Times (UTC) | Mode(s) | Band(s) | Exchange |
|---|---|---|---|---|---|
| Oct 1 | 1.2/2.3GHz Trophy + | 1400-2200 | All | 1.2/2.3G | RS(T) + SN + Locator |
| Oct 4 | 144MHz UKAC | 1900-2130 | All | 144 | RS(T) + SN + Locator |
| Oct 11 | 432MHz UKAC | 1900-2130 | All | 432 | RS(T) + SN + Locator |
| Oct 16 | Second 50MHz | 0900-1200 | All | 50 | RS(T) + SN + Locator |
| Oct 18 | UHF UKAC | 1900-2130 | All | 1.2G | RS(T) + SN + Locator |
| Oct 25 | 50MHz UKAC | 1900-2130 | All | 50 | RS(T) + SN + Locator |
| Oct 25 | SHF UKAC | 1900-2130 | All | 2.3-10G | RS(T) + SN + Locator |

**BEST OF THE REST EVENTS**

| Date | Event | Times (UTC) | Mode(s) | Band(s) | Exchange/sinfo |
|---|---|---|---|---|---|
| Oct 1-2 | Oceania DX SSB | 0800-0800 | SSB | 1.8-28 | RS + SN |
| Oct 1-2 | WAB HF | 1200-1200 | All | 14-28 | RS(T) + SN + WAB area |
| Oct 1-2 | IARU 432MHz-248GHz | 1400-1400 | All | 432-248G | RS(T) + SN + Locator |
| Oct 1 | EU Sprint SSB * | 1600-2000 | SSB | 3.5-14 | Both callsigns + SN + name |
| Oct 8-9 | Oceania DX CW | 0800-0800 | CW | 1.8-28 | RST + SN |
| Oct 8 | EU Sprint CW * | 1600-2000 | CW | 3.5-14 | Both callsigns + SN + name |
| Oct 29-30 | CQWW DX SSB | 0000-2359 | SSB | 3.5-28 | RST + Zone (UK=14) |

*HF Championship event + VHF Championship event
For all the latest RSGB contest information and results, visit www.rsgbcc.org.

in each of the first three sessions. Not wishing to flog a dead horse any further, the Contest Committee has therefore declared the event defunct for 2012.

**AFS SUPER LEAGUE.** October sees the start of the new Super League series. This is two months earlier than last year, because for this season it has been expanded to encompass 6m and 160m. The two additional events are the 2nd 6m Contest and Club Calls Contest. **Table 1** shows the top five teams in each of last season's Super League contests.

For the 2011-12 season a team element has been introduced into the Second 6m Contest and the team sizes standardised to four across all the qualifying events.

**CONTEST UNIVERSITY.** This year's Contest University (CTU) consists of a stream of events at the RSGB Convention on 8 and 9 October. All visitors to the Convention are welcome to attend as many CTU sessions as they wish. There are a wide range of topics being covered this year: Ionospheric sounders, antenna modelling, *SkookumLogger*, the RSGB Commonwealth Contest, log adjudication, ethics and rules and single operator contesting. On both days there will be drop-in Q&A sessions to discuss any queries you may have, or even just to discuss ideas and share experiences related to contesting. On the Saturday there will be a new session called 'Contest Exchange', which is your opportunity to get to know medium to large size station owners who would be willing to make available their shack to those wishing to experience a contest from such a station (perhaps for those who do not have these facilities available to them at home). Everyone is invited to come along to learn about the stations and the owners in order to hopefully secure some opportunities.

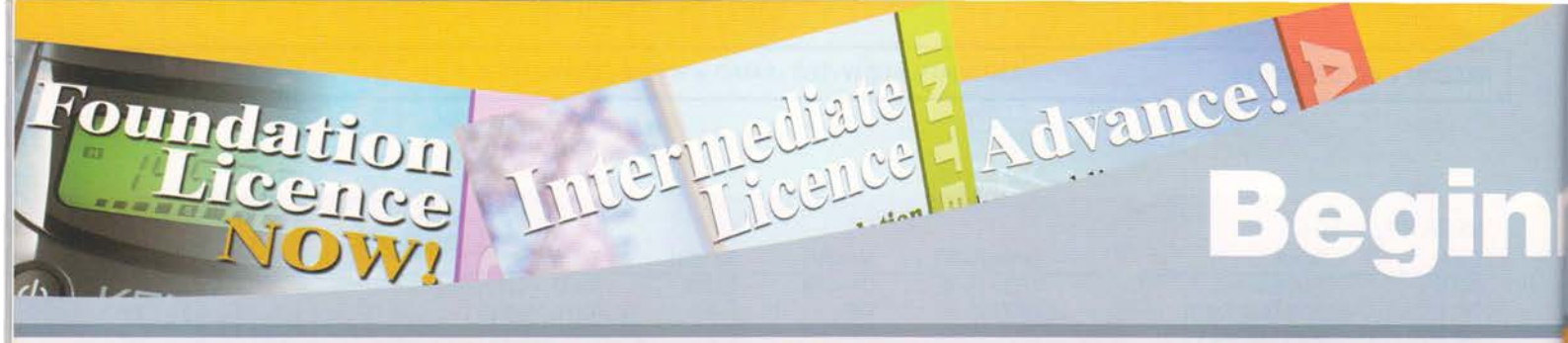
Contest University is not only focussed on the fresh or wannabe contester, but also experienced contesters wishing to learn new things to enhance their performance, whether it be in the area of operator style, knowledge, hardware or technology.

**THIS MONTH'S EVENTS.** RSGB HF contests begin with the 21/28MHz on Sunday 2nd. To quote the adjudicator, John Cockrill, G4CZB in his report on last year's event; "There is a saying that impending execution concentrates a man's mind, so the planned deletion of this event from the contest calendar may have contributed to the substantial increase in entries in all sections. In particular, both the UK and Overseas Open sections saw an almost threefold increase and overall the total number of logs received were double those of 2009." So the wake-up call worked, although improved conditions on the upper HF bands probably played a part as well. Then we have the 80m Club Sprints, with CW on the 12th, followed by SSB on the 27th. The exchange is *both callsigns*, a serial number and your name.

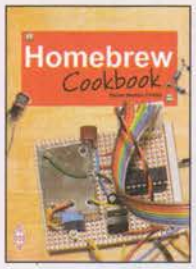
Higher up the frequency spectrum, the 1.2/2.3GHz Trophy Contest takes place for eight hours on Saturday 1st. After several years of modest but steady participation, the number of entries to this event increased substantially last year, even though propagation was nothing special and the weather was awful. Then it's on to the UKACs, with 2m on the 4th and 70cm on the 11th. The Second 50MHz Contest takes place for three hours on the morning of Sunday 16th. It will be the first qualifying event for the 2011-12 Super League series. The remainder of the month is the domain of the UKACs, with 23cm on the 18th, and 6m and SHF on the 25th.

Moving on to non-RSGB events, there's a lot to highlight in early October, particularly on the 1st. The Oceania DX SSB Contest runs for 24 hours from 0800. QSOs with stations in Oceania are the only ones that count for points, which basically means working VK, ZL and the Pacific islands. As far as the UK is concerned, this is therefore an event for those with big stations. Or is it? If you're happy to dip in for a few contacts rather than stage a serious entry, the owner of a modest station should be able to grab some DX countries on HF or greyline QSOs at LF.

The Worked All Britain HF Contest runs on 20m-10m for 24 hours from 1200. UK stations send a report, serial number and WAB area, while non-UK stations send report, serial number and DXCC country. Inter-UK QSOs do not count for points in this one. The IARU 432MHz-248GHz Contest runs for 24 hours from 1400. The first six hours coincides with the RSGB 1.2GHz/2.3GHz Trophy Contest. From 1600 the SSB leg of the EU Sprint takes place. Being a sprint, of course there's a QSY rule. It says that if you make a QSO as a result of calling CQ or QRZ, you then have to QSY a minimum of 2kHz before you can make another QSO. And please don't forget that the exchange includes *both* callsigns. On the 8th-9th, the CW legs of the Oceania DX and the EU Sprint take place. The same rules of engagement apply as the SSB legs. We then move to the end of the month and the CQWW DX SSB contest that takes place on 29-30th. Being one of the biggest contests of the year, it's safe to say that some rare countries will be active, some unusual callsigns heard and at times the SSB portions of the HF bands will be extremely congested.




## Homebrew Cookbook

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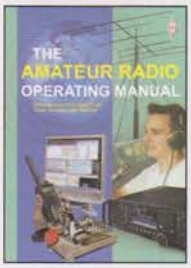


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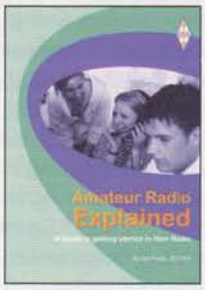


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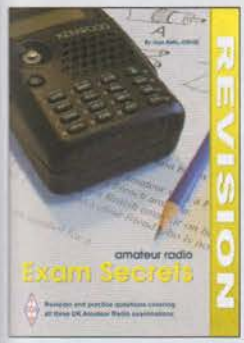


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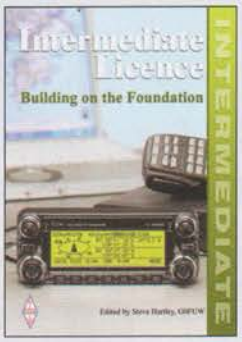


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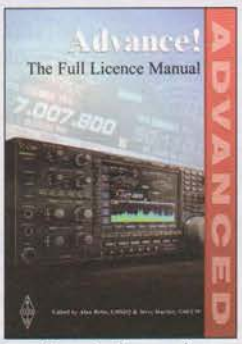


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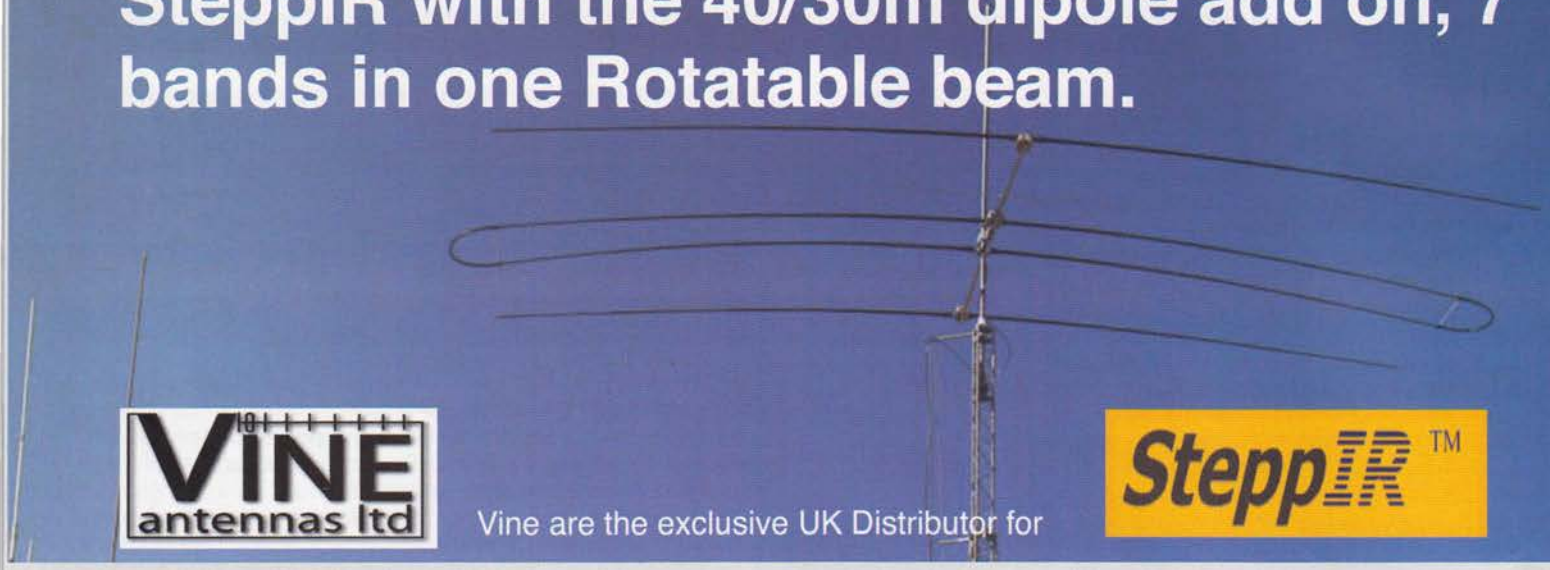

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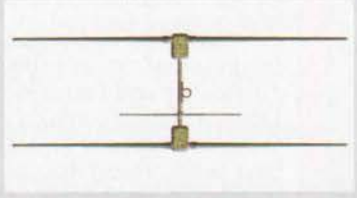
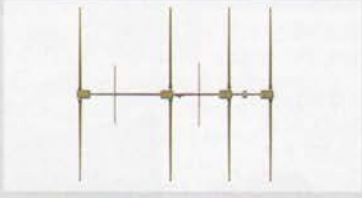
**The SteppIR concept is to solve the problem of covering many ham bands without destructive interaction between elements, and without the interlaced multi-element structures that result in excessive antenna weight and windloading. A combination of microprocessor-based technology, special high-conductivity copper-beryllium strip and extremely reliable stepper motors has allowed this concept to be realised. SteppIR Inc has been offering these versatile antennas for nearly ten years now and they are in use worldwide, often in the most challenging environments. Continuous improvement in materials and manufacturing has led to the current range of yagis and vertical antennas covering all amateur bands 80 to 6m, with all frequencies in between, ideal for SWL broadcast use and future-proof in the event of new amateur HF allocations becoming available in future WARC conferences. Models recently introduced include the DB-series of shortened yagis for 40 and 30 metres and the new DB-11 antenna (see our September RadCom advert) for the restricted QTH. The illustrations below demonstrate the SteppIR concept, and show some of the product components. More information is available at www.steppir.com, or from our UK agent Vine Antennas - www.vinecom.co.uk.**

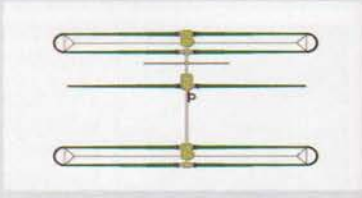
SDA-100 controller



2el Yagi - 20-6m

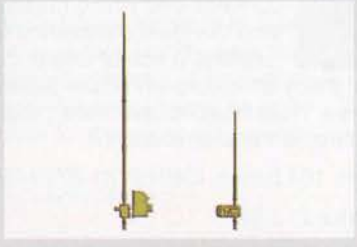


4el Yagi - 20-6m

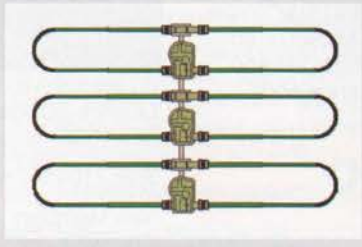


DB18 3el Yagi 40-6m

Motor box interior



BigIR 40-10m vertical + 80m coil



DB11 - 2el on 20m, 3el 17-6m

80m coil interior view

**SteppIR antennas are available in the UK from Vine Antennas**

**Tel 08000 69 96 73 - info@vinecom.co.uk - www.vinecom.co.uk**

Please send news reports to radcom@rsgb.org.uk. To get future events listed here and put on GB2RS, e-mail details of your meetings as early as possible to GB2RS@RSGB.org.uk and we'll do the rest. We need to know your club name, RSGB Region number, contact name & phone number, date of meeting and detail of meeting. Example: South Bristol ARS, Region 11, Len, G4RZY, 01275 834 282, 29 October, On the Air. It's that simple. The deadline for the November *RadCom* is 28 September and for the December edition it's 26 October. For GB2RS, the deadline is 10am on the Tuesday for the week of broadcast.

## REGION 1: SCOTLAND SOUTH & WESTERN ISLES

REGIONAL REP: LEN PAGET, GM0ONX, RM1@RSGB.ORG.UK

**BORDERS ARS**
**Danny, 2M0CDO, 01890 882 850**
14 EGM and AGM from 8pm

**COCKENZIE & PORT SETON ARC**
**Bob, GM4UYZ, 01875 811 723**
7 Normal club night
21 Video/DVD night
29 Weekend event: CQWW SSB Contest

**KILMARNOCK & LOUDOUN ARC**
**Graham, MM3GDC, mm3gdc@btinternet.com**
11, 25 Club night

**LIVINGSTON & DARS**
**Norman, 07740 946 192, uk.groups.yahoo/group/ms0liv**
4, 18 Club evening
11 Operating evening
25 Morse code practice

**LOTHIANS RS**
**Andy Sinclair, secretary@lothiansradiosociety.com**
5 Senegal & Jersey DXpeditions by Tom, GM4FDM

**Kilmarnock and Loudoun ARC** had another Advanced exam success when Ian, 2M0ISM gained the call MM0IMC. The club membership wish Ian all the best with his new call.

## REGION 2: SCOTLAND NORTH & NORTHERN ISLES

REGIONAL REP: DENNY MORRISON, GM1BAN, RM2@RSGB.ORG.UK

**ABERDEEN ARS**
**Lewis, GM4AJR, 01224 575 663, www.radioclubs.net/aars**
1 Junk sale
3 Weekend event - SSB Field Day

**Caithness ARS**, by kind permission of the RT Hon Earl of Caithness, PC, Chief of the Clan Sinclair and Ian Sinclair were invited to set up a Special Event Station using the callsign GB0NHL at Noss Head Lighthouse. This was part of International Lighthouses and Lightships on the Air. The event was held on 21 and 22 August. They managed to contact 340 Lighthouse Special Event Stations and radio amateurs from 27 countries around the world. The event was a great success not only did it draw attention to the lighthouse at Noss Head, Wick and the work of the Clan Sinclair Trust in preserving this historic site, it enabled the Caithness ARS to meet with like minded people from around the world on the air.

The Caithness Amateur Radio Society Special Event Team was (L-R): Brian Sparks, Donnie Munroe, Hamish Duncan, Jim Durrand, RT Hon Earl of Caithness, PC, Ian Sinclair and Laurie Dickenson. Other members of the team not in the photograph: Denny Morrison, John Crowden, Doug Fraser, Les Thomas and Bob Renshaw.


The President of the RSGB, Dave Wilson, M0OBW and wife Kath, M1CNY visited the **Caithness ARS** in August. Dave gave a presentation on the future of the RSGB. There followed a lively question and answer session the night closed with a buffet enjoyed by all. On the 26th, Dave made a first for him in amateur radio, a radio contact from a horse drawn vehicle with Stuart, GM4WMM residing in Orkney. The horse and carriage were provided by Mary Edmundson and Jane Renshaw from Merry Men of Mey Carriage Driving of East Mey.

## REGION 3: NORTH WEST

REGIONAL REP: KATH WILSON, M1CNY, RM3@RSGB.ORG.UK

**BOLTON WIRELESS CLUB**
**boltonwireless@gmail.com**
10 Activity night: show and tell
24 Setting up a microwave link with Michael, G4WYZ

**CHESTER & DARS**
**Barbara Green, 07957 870 770, www.chesterdars.org.uk**
4 Quiz versus Wirral and District
11 Committee meeting
18 Vintage radio by GW8N
25 On the air

**SOUTH MANCHESTER R&CC**
**Ron, G3SVW, 01619 693 999**
6 Antenna & propagation clinic, Ron, G3SVW
13 Contesting, Ron
20 The Great Train Robbery, Doug, G8ILW
27 Use and abuse of the oscilloscope, Ged, G8RSI
31 Technical forum

**THORNTON CLEVELEYS ARS**
**www.tcars.org.uk**
3 Natter night/construction competition
10 AGM, 8pm
17 New Chairman's address
24 RAF defence of the country, Ian, G3ZRZ
31 Slide show, Ted, G3WBB

**Chorley & DARS** has its first overseas member, Mike Rodgers, KE5GBC. He has been made an honorary member and some of the members speak with Mike over HF on a regular basis. www.radioclubs.net/chorleyamateurradiosociety.

## REGION 4: NORTH EAST

REGIONAL REP: HAROLD SCRIVENS, GOUGE, RM4@RSGB.ORG.UK

**ANGEL OF THE NORTH ARC**
**Nancy Bone, G7UUR, 01914 770 036, nancybone2001@yahoo.co.uk**
3, 10, 24, 31 On the air
9 Advanced examination
17 Talk at 7.30pm

**DENBY DALE RC**
**Richard, M0RBG, 07976 220 126, m0rbg@talktalk.net**
5 Mini rally, Pie Hall, Denby Dale
15 Weekend event: GB2WYS, Jamboree On The Air
19 AGM

**EAST CLEVELAND ARC**
**Alistair, G4OLK, 01642 475 671, alistair.mackay@talk21.com**
7, 21 On the air
14 Radio magazines evening
28 Bring in something interesting evening

**HAMBLETON ARS (NORTHALLERTON)**
**Tony Wilson, G3MAE, 01609 881 530**
12 Operating night
26 Morse keys, Tony, G3MAE

**HORNSEA ARC**
**Gordon MacNaught, G3WOV, 01377 240 573, gmacnaughtwov@yahoo.co.uk**
2 21/28MHz Contest
5 A tale of two workshops
12 Rally prep plus CW Sprint
16 Hornsea Rally, Floral Hall
19 Rally washup
26 Video visit
27 Club Sprint SSB

**RIPON & DARS**
**Rob Hall, M0RBY, 0787 608 5631, www.ripon.org.uk**
6, 20, 27 On the air and club night
13 VHF contesting

**SHEFFIELD ARC**
**Peter Day, G3PHO, sarc@g3pho.org.uk**
3 Social evening
10 Making your own equipment, Peter Day, G3PHO
17 SARC awards & trophies presentation evening
31 Quiz or video evening

In July, **Sheffield ARC** held its first Foundation licence examination since the club reorganised its training procedures in the spring. These changes include revised course material, a fresh approach to teaching methods and a reorganisation of the team of trainers. The new system involves strong encouragement for prospective radio amateurs to become active club members before and during the tuition course so that they stay with the club after their exam. With the new teaching approach, the students have also been very much involved in all the club activities, including the local fetes the club attend in Sheffield through the summer and the field days from HF up to microwaves. The students did all this while still attending the courses and studying.

Thanks must go to trainers Ian, G0OUG, and Steve, M1ERS, as well

as and the **Sheffield ARC** members who have helped to make this a success.

L-R: Trevor, M0TWS trainer, Mike, M6MBO, Connie, KB0ZSG, Steve, M1ERS trainer, Michael, M6MHO, Hussain, M6HOM, Tim, M6KRU, Vinoth, M6EFT, Ian, G0OUG trainer. There were two more new licensees who could not be present for the photo shoot – Mike, M6VFO and Ken, M6KJP. Included in the photo is the club's overseas visitor Connie, KB0ZSG, from Houston, Texas. She is on a three month holiday to the UK where she's enjoying the hospitality of the club and its members.

Ken, M6KJP is another of the recent Foundation licensees at **Sheffield ARC**. Due to his mild learning difficulties, Ken has spent around a year learning the course, reading the books, memorising and retaining what he had learnt. With much encouragement from M6KSH, Ken persevered. When he finally sat the exam he passed with 21 out of 24 on the paper. He now enjoys talking locally on GB3US and 2m. Well done Ken.

In a joint effort, members of **East Yorkshire RAYNET, East Yorkshire Repeater Group** & **the Yorks & Lincs 4x4 Response Group** took part in the Annual Hull Dove House Hospice Midnight walk, giving much needed communications and emergency transport cover. The event saw a record number of entries taking part, with just over 600 walkers taking to the street into the early hours of the morning, dressed in pink, to complete the 5 mile course – to the delight of the many late night revellers in the city! The event raised thousands of pounds for the local Hospice and it is good to see that amateur radio played such an important role in the local community. A talk though unit was deployed to cover the Hull city centre and the event was deemed a total success by all taking part.

**East Yorkshire RAYNET, East Yorkshire Repeater Group & Yorks & Lincs 4x4 with an RSGB DRM in his new uniform. Photo: Sue Brashill, M3HRT.**

## REGION 5: WEST MIDLANDS

REGIONAL REP: VAUGHAN RAVENSCROFT, M0VRR, RM5@RSGB.ORG.UK

**CHELTENHAM ARA**
**Derek Thom, G3NKS, 01242 241099, chairman@caranet.co.uk**
20 Silent key sale

**COVENTRY ARS**
**John, G8SEQ, 07958 777363**
7 Cruising the Scottish Islands & Norwegian Fjords & a bit of radio by G4GEE
14 AGM
21 Quiz night
28 Video night

**FOREST OF DEAN ARG**
**www.fodarg.org**
11 Mobile Phone Forensics, Nick Gleed
25 Global Maritime Distress Safety Systems, Steve Trott, GW0ZOE

**GLOUCESTER AR&ES**
**Anne, 2E1GKY, 01452 548478, daytime, www.g4aym.org.uk**
3 A DDS based signal generator, Cliff, G8CQZ
10 DF hunt
17 VHF operating/workshop
24 HF operating from new shack
31 Informal meeting

**MIDLAND ARS**
**Norman, G8BHE, QTHR, 01214 229 787**
1 Visit to National Hamfest at Newark and Lincoln showground
5 Open meeting, shack OTA & training classes
9 RSGB Convention, Milton Keynes
12 Committee meeting and training classes
19 AGM and presentation of awards
26 Review of new committee, programme planning, training classes
30 Visit to North Wales Rally at Llandudno

**MID-WARWICKSHIRE ARS**
**Don, G4CYG, 019 2642 4465**
11 Homebrew and construction
25 Programme planning for 2012

**SALOP ARS**
**www.salop-ars.org.uk**
6 Construction competition
13 Natter night
20 Pre-AGM meeting
27 AGM

**SOLIHULL ARS**
**Paul Gaskin, G8AYY, 0121 628 7383**
20 AGM

**SOUTH BIRMINGHAM RS**
**Don, 0121 458 1603, www.radioclubs.net/southbirmingham**
1 National Hamfest at Newark and Lincoln Showground
3 Open meeting, on the air and ragchew
5 Lecture in the main hall at 8pm
6, 13, 20, 27 Training classes with Dave Murphy, G8OWL
7, 14, 21, 28 Construction evening
9 RSGB Convention at Milton Keynes
10 Shack painting and renovations
17 Committee meeting
24 Repairs to tower and aerials
30 North Wales Rally at John Bright School, Llandudno
31 Field day & events planning; AGM preview

**SUTTON COLDFIELD ARS**
**Robert Bird, spirit.guide@hotmail.co.uk**
10 General meeting, OTA (2m, HF, Morse)
24 Loop aerials, Bob, G3PLP

**WORCESTER RAA**
**Rich Moles, M0UVA, secretary@m0zoo.co.uk**
1 Club trip to the National Hamfest
11 Equipment and rig tune up night
14 Weekend event: JOTA, Kinver Scout & Guide campground
25 WRAA birthday meeting

In September **Gloucester AR&ES** presented the G3MA Trophy. Pat Perkin's grandson, Nick, visited to present the trophy to Stan Gibbs, G4YYR.

## REGION 6: NORTH WALES

REGIONAL REP: MARK HARPER, MW1MDH, RM6@RSGB.ORG.UK

**DRAGON ARC**
**Stewart Rolfe, GW0ETF, 07833 620733**
3 Early history of radio by GW8NZN
17 Visit Moelfre Lifeboat Station (7pm start)

**WREXHAM ARS**
**Patrick, 2W0HUU, 07947 701 927, www.wrexham-ars.co.uk**
4 Domestic radio restoration, Mike
18 Guest speaker

## REGION 7: SOUTH WALES

REGIONAL REP: JIMMY SNEDDON, MW0EQL, RM7@RSGB.ORG.UK

**ABERYSTWYTH & DARS**
**Ray, GW7AGG, 01970 611 853, ray@clocktower.go-plus.net**
13 AGM

## REGION 8: NORTHERN IRELAND

REGIONAL REP: PETER LOWRIE, MI5JYK, RM8@RSGB.ORG.UK

**GREENISLAND ELECTRONICS AMATEUR RADIO SOCIETY**
**Peter Lowrie, MI5JYK, mi5jyk@rsgb.org.uk**
10 On the air, 2m

**Bushvalley ARC** provided a station at the Dervock Fun Day in July. As part of the Dervock Community, the club helped to commemorate Kennedy Kane McArthur winning the Marathon at Stockholm 1912 and joined the community in celebrating one year to the Olympic Games in London next year. The club was honoured by a visit from a former Olympic gold medallist, Dame Mary Peters, who won gold in the pentathlon in 1972, representing Northern Ireland. The photograph shows Dame Mary with members of the club, with the club marquee and antennas in the background.

The BBC's Len Goodman pictured with Jim Henry, GI0DVU, on a recent visit to the **Lagan Valley ARS** shack, where they were filming a programme commemorating the sinking of Titanic 100 years ago.

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## Ecoflex®

**New Ecoflex Low Loss Cables & Connectors at Nevada!**

New range of cables & connectors at Nevada! Flexible with PE-LLC dielectric and gas content of over 70% for very low loss and use up to 6 GHz

**Ecoflex 15**

**Specification**
- Diameter: 14.6mm
- Loss per 100m: 2.81dB @ 100MHz, 1.96 dB @ 50MHz

**Price: £5.99** per metre, **£539** per 100m drum

**Ecoflex 15 Connectors**
- **PL259** connector (Part: 7350) .....**£8.95**
- **N type** connector (Part: 7395) .....**£9.95**

**Ecoflex 10**

**Specification**
- Diameter: 10.2mm
- Loss per 100m: 4.0dB @ 100MHz, 2.8 dB @ 50 MHz

**Price: £2.89** per mtr, **£260** per 100m drum

**Ecoflex 10 Connectors**
- **PL259** connector (part: 7378) .....**£5.95**
- **N type** connector (part: 7367) .....**£6.50**
- **BNC type** connector (part: 7379) ...**£6.50**

## Aircell

Aircell range is a highly flexible coaxial cable for use up to 6 GHz. The low losses in relation to the diameter and the small bend radius of the cable make it perfect for the Radio Amateur.

**Aircell 5**

**Specification**
- Diameter: 5.0mm
- Loss per 100m: 9.4dB @ 100MHz, 6.61dB @ 50MHz

**Price: £1.39** per mtr, **£125.00** per 100m drum

**Aircell 5 Connectors**
- **PL259** connector (part: 7760) .....**£2.25**
- **N type** connector (part: 7700) .....**£3.95**
- **BNC type** connector (part: 7720) ...**£3.25**

**Aircell 7**

**Specification**
- Diameter: 7.3mm
- Loss per 100m: 6.28dB @ 100MHz, 4.52dB @ 50MHz

**Price: £1.99** per mtr, **£179** per 100m drum

**Aircell 7 Connectors**
- **PL259** connector (part: 7390) .....**£2.65**
- **N type** connector (part: 7392) .....**£5.25**
- **BNC type** connector (part: 7371) ...**£5.25**

## Aircom Plus

Operating up to 10 GHz, this semi Air spaced cable has a massive oxygen free copper inner conductor covered with a thin film of PE to prevent corrosion permanently

**Aircom Plus**

**Specification**
- Diameter: 10.3mm
- Loss per 100m: 3.8dB @ 100MHz, 2.6 dB @ 50MHz

**Price: £3.65** per mtr, **£328.00** per 100m drum

**Aircom Plus Connectors**
- **PL259** connector (part: 7378) .....**£5.95**
- **N type** connector (part: 7367) .....**£6.50**
- **BNC type** connector (part: 7379) ...**£6.50**

## MFJ Accessories

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| MFJ 260C ....300W Dummy Load | £45.95 |
| MFJ 269 ....HF/VHF/UHF Analyser | £349.95 |
| MFJ 260C ....300W Dummy Load | £45.95 |
| MFJ 550 ....Practice Morse Key | £16.95 |
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| MFJ 901B ....Portable 200 Watts ATU | £109.95 |
| MFJ 912 ....Remote Balun Box | £79.95 |
| MFJ 931 ....Artificial Ground | £114.95 |
| MFJ 941E ....300W Versa-Tuner II | £139.95 |
| MFJ 949E ....300W 1.8-30Mhz Antenna Tuner | £179.95 |
| MFJ 969 ....300W HF + 6m Antenna Tuner | £219.95 |
| MFJ 971 ....200W Portable AntennaTuner | £122.95 |
| MFJ 993B ....300W Fast Automatic Tuner | £254.95 |
| MFJ 1025 ....Noise Canceller/Enhancer | £184.95 |
| MFJ 1026 ....Noise Canceller + Active Antenna | £204.95 |


**Anytone AT-5189D**
4m (70MHz) FM Transceiver **£148.95**

**Anytone AT-588**
2m (145MHz) FM Mobile Transceiver **£149.95**

NEW

**Anytone AT-5555-N**
10m (28MHz) All Mode Mobile Transceiver **£149.95**

**Anytone AT-5555PC** .....**£14.95**
Control Software Disk & USB Lead Kit
**Anytone AT-5189PC** .....**£14.95**
Control Software Disk & USB to modular plug lead kit

## NEVADA – Cable Specialists

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|---|---|
| **Westflex 103** | |
| 100 metre drum | £139.95 |
| 75 metre length | £106.86 |
| 50 metre length | £71.24 |
| Price Per metre | £1.50 |
| **RG-213U – Mil Spec** | |
| 100 metre drum | £116.00 |
| 50 metre length | £62.50 |
| Price per metre | £1.29 |
| **RG-213tm – Economy version** | |
| 100 metre drums | £99.00 |
| **RG-Mini 8 (Super XX)** | |
| 100 metre drum | £59.95 |
| Price per metre | £0.65 |
| **RG58/CU – Mil spec** | |
| 100 metre drum | £39.95 |
| Price per metre | £0.45 |
| **450 Ohm Twin Feeder** | |
| 100 metre drum | £89.00 |
| Price per metre | £0.99 |
| **300 Ohm Twin feeder** | |
| 100 metre drum | £76.50 |
| Price per metre | £0.85 |
| **Flexweave Antenna Wire** | |
| 100 metre drums | £49.95 |
| Price per metre | £0.55 |
| **Coated Flexweave Antenna Wire** | |
| 100 metre drums | £88.00 |
| Price per metre | £0.98 |

## Antenna Collection

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| **VHF/UHF Base Antennas** | |
| **Comet** | |
| GP1 .....145/433MHz 3/6 dbi 1.25m | 59.95 |
| GP3 .....145/433MHz 4.5/7.2dbi 1.78m | 69.95 |
| GP6 .....145/433MHz 6.5/9.0dbi 3.07m | 99.95 |
| GP15N....50/145/433MHz 3/6.2/8.6dbi 2.42m | 99.95 |
| GP98 .....145/433/1200MHz 2.94m Length | 139.00 |
| CA-52HB4.High-Gain 4 Ele Beam 50MHz (6M) | 119.00 |
| **Diamond** | |
| V-2000 ..50/144/430 MHz ...2.5m | 127.67 |
| **Sirio** | |
| CX4 .....70MHz (4m) 4.15dBi 2.9m Length | 69.95 |
| SY68-3....70MHz (4m) 3 Element Yagi Beam | 79.95 |
| Gainmaster...Fibreglass 10m (28MHz) Vertical | 129.95 |
| Tornado ..Vertical Base Antenna 50MHz (6m) | 49.95 |
| Vector **NEW** 4000 Big 10m (28MHz) Vertical | 89.95 |
| 2008.....High Gain 10m (28MHz) Vertical | 89.95 |
| **HF Base Antennas** | |
| Comet H-422....40/20/15/10m Dipole | 269.95 |
| Comet CHA-250BL...6 to 80m Vertical | 299.95 |
| Sirio SY27-3...3 Element 28 MHz Yagi | 74.95 |
| Sirio SY27-4...4 Element 28MHz Yagi | 89.95 |
| Moonraker GP-2500...6-80 mtr Vert | 199.95 |
| **HF Wire Antennas** | |
| Van Gorden.....G5RV 40-10mtrs | 21.95 |
| WDM3 ....40/10mtr Heavy Duty Windom | 69.95 |
| WDM4 ....80/10mtr Heavy Duty Windom | 89.95 |
| WDM-8010.....Std. 80/10 Windom | 44.95 |
| WDM-4010.....Std. 40/10 Windom | 39.95 |

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**PS-50**
45-50 Amp Bench Power Supply **£199.95**

**Other Palstar Power Supplies**

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|---|---|
| **SPS9600**.Heavy Duty 60 Amp Switch Mode | £199.95 |
| **PS30M**....30 Amp Variable Linear PSU | £99.95 |
| **SPS8250**.25 Amp Switch Mode | £79.95 |
| **SPA8230**.23 Amp Compact, Lightweight | £64.95 |
| **PS06** .....4-6 Amp 13.8V Power Supply | £29.95 |
| **PS04** .....2-4 Amp 13.8V Power Supply | £24.95 |

**Wouxun KG-UVD1P/L**

New Twinbander operates on 2m and 4m. Unbelievable value for money - at last you can work 2m and 4m together in one handheld !
- KG-UVD1-PL 2m + 4m Handheld FM Transceiver
- Frequency: 4m (66-88MHz) and 2m (130-174MHz)
- Output Power: adjustable up to approx 5W

**£99.95**

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**Featured Item This Month**

**Icom IC-7800**
**Used Model 514A**
Flagship HF/6m Transceiver.....£5495

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| AOR 8200 MkII...Wideband H/H Scanning RX | 299 |
| Bearcat UBC-800XLT..6000 Ch Desktop Scanner | 225 |
| Create CB2F/6K..Unused old stock 6kW HF Balun | 99 |
| Icom R75 Used Model 539A..1-60MHz Comms RX | 499 |
| Icom IC-575A .....Classic 28/50Mhz All Mode TX | 429 |
| Kenwood TS2000E...HF/VHF/UHF All mode TX | 995 |
| Kenwood TS-570DG..5-100W Base/Mobile HF TX | 589 |
| Kinetics SBS-1.....Real-Time Virtual Aircraft Radar RX | 299 |
| LDG Z11-Pro II....Automatic Antenna Tuner | 119 |
| MFJ 784.....DSP Filter Unit | 229 |
| MFJ 1278B .....Multimode Data Controller unit | 199 |
| MFJ 208.....Portable Antenna Analyser | 69 |
| Yaesu FT920 .....HF/6m Base TX Excellent Cond | 699 |
| Yaesu ATAS 120..Automatic Mobile Antenna System | 229 |
| Yaesu FT450 .....HF/6m Portable/Base Transceiver | 549 |
| Yaesu FT450AT...HF/6m Portable/Base Transceiver | 599 |
| Yaesu FRG100 ....HF Desktop Receiver | 329 |
| Yaesu FT7800.Twinband 145/433MHz FM Mobile TX | 179 |
| Yaesu FT897D.All Mode HF/VHF/UHF Portable/Base TX | 619 |
| Yaesu VR-5000 ...Wideband RX Fitted DSP Board | 429 |
| Yaesu FT100 .....HF/VHF/UHF All Mode TX | 399 |

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- Support mast req 1.5-2"Dia
- Weight (inc bracket & Matching unit): 4.0kg

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| AT600 Pro | 600W Auto Antenna Tuner | £299.95 |
| AT897 Plus | for Yaesu FT897 | £179.95 |
| AT1000 Pro | (160 - 6m) 1kW | £499.95 |
| IT100 | for Icom Models 125 Watts | £159.95 |
| YT100 | for Yaesu Models 125 W | £179.95 |
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| Z11 Pro2 | (160 - 6m)125 Watts | £159.95 |
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| FTL | Meter for FT857, FT897 | £79.95 |
| Balun 1:1 | 200 Watts | £34.95 |
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**Icom IC-7600**
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**Icom IC-9100**
HF/VHF/UHF Transceiver.....£2999.00
**Icom IC-7200**
Rugged Style HF/6m Transceiver.....£849.95
**Icom IC-E92D**
Twinband H/H Transceiver + D Star ..£388.99
**Icom IC-R20**
All Mode 0.1-3304MHz Handheld Scanning Receiver.....£394.95
**Icom ID-E880**
New Twinband Mobile TX + D-Star ..£449.95

**Kenwood TS590S**
New HF + 6m Transceiver **£1339.95**

**Kenwood TS-480SAT**
100w DSP TX with ATU 160-6m .....£779.95
**Kenwood D72E**
Twinband H/H GPS TNC APRS etc.....£475.95
**Kenwood TS-2000**
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**Yaesu FT897D**
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**Yaesu FT-857D**
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**Yaesu FT450D**
HF/6M Transceiver ATU/DSP 100W ...£849.95
**Yaesu FT817ND**
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**Yaesu VX-8DE**
New Enhanced Tri-Band H/H TX.....£399.95
**Yaesu VX8GE**
Twinband VHF/UHF APRS Handheld..£375.95
**Yaesu FT8900R**
Mobile 4 Bander 2m/6m/10m/70cms ..£339.95
**Yaesu FT7900E - B2**
Twinband 145/433MHz Mobile FM TX .£249.95
**Yaesu VX3-E**
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| G5RV.....Full Size (Kevlar) 80-10m 102ft | £69.95 |
| G5RV.....Half Size (Kevlar) 40-10m 51ft | £49.95 |
| BL-6T.....6:1 Balun 1kW (Peak) | £49.95 |
| BL-4T.....4:1 Balun 1kW (Peak) | £49.95 |
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Frank, GI4NKB and Harold, GI4GOS made the trek to Omagh for the GI HF convention organised by **West Tyrone ARC**. They report that they got slightly lost in Omagh town centre but a quick call on S22 got them directions to the venue in double quick time. There was lots of car parking space with the potential to use the nearby supermarket if the on-site space overflowed. The £3 entry fee included a free cuppa and they were given the programme for the day.

The venue itself was excellent, it would be hard to imagine a better place to hold a conference: it was modern, bright, airy and clean. Water coolers were strategically dotted all around the place.

Some of the lectures ran simultaneously and so decisions had to be made on which ones to attend. Frank managed three full lectures and parts of several others and without exception were excellent.

The programme included John, EI7BV on How did Amateurs get their bands: The Early Years & the Bands Below 30MHz; Simon, GW0NVN on The Shack in a Suitcase; Paul, EI5DI talking about Contest logging with SD, the program he created; Michael, MI5MTC on A Futterer's Fun with QRP Homebrew; Malcolm, GI8AFS on the HF Beacon Project, Carlos, G0AKI on IOTA; Simon, GW0NVN with a talk entitled EMC Don't Panic and Paul, EI5DI on the T32C DXpedition to Kiritimati (Christmas Island).

The convention was sponsored by the RSGB, IRTS, Practical Wireless, JBT Trading, TA Electronics, Nacl Engineering Castlederg, Icom UK, Grainger Communications Ltd Omagh, Waters and Stanton, Brae Computers Omagh, Quinns Centra Omagh and Omagh Computer Repair centre.


## REGION 9: LONDON & THAMES VALLEY

REGIONAL REP: ALISON JOHNSTON, G8ROG, RM9@RSGB.ORG.UK

**BROMLEY & DARS**
**Andy, G4WGZ, 01689 878089**
18 Construction contest

**BURNHAM BEECHES RC**
**Dave, G4XDU, 01628 625 720**
3 Surplus equipment sale
17 Construction project

**CHESHAM & DARS**
**Terry, G0VFW, 01442 831 491, cdars.club@ntlworld.com**
5 General meeting, CW training session
12 Members' forum - bring your radio equipment
19 Aerial design principles, Roger, G3MEH
26 Getting started on the air & CW practice

**COULSDON ATS**
**Steve Beal G3WZK, secretary@catsradio.org**
10 Radio in the Scouting movement – G6CJR/M0NDJ

**CRAY VALLEY RS**
**Bob, M0MCV, 020 8265 7735 after 8pm**
6 High performance antennas, Justin Johnson, G0KSC
20 Club Buildathon, Richard, G8ITB

**CRYSTAL PALACE R&EC**
**Bob, G3OOU, 01737 552 170, g3oou@aol.com**
1, 8, 15 Foundation training course continues
7 Military radio equipment for the amateur, Dennis Noe, M0NDJ
22 Foundation exam

**DORKING & DRS**
**Garth, G3NPC, 01737 359472, www.ddrs.org.uk**
25 Software defined radio, Olof Lundberg, G0CKV

**EDGWARE & DRS**
**Mike, G4RNW, 020 8950 0658, michael.stewart5@ntlworld.com**
3 The Royal Airship Works, Steve, G0PQB
27 Natter night

**NEWBURY & DARS**
**Rob, G4LMW, 01635 862 737, g4lmw@btconnect.com**
8 Thatcham Arts & Leisure
26 Kite antennas, Roger, G4ROJ

**RADIO SOCIETY OF HARROW**
**Linda, G7RJL, 0208 386 8586, www.g3efx.org.uk**
14 RSGB Talk by Dr Alison Johnson, G8ROG
28 The tuned circuit, Brian, G3YKB

**READING & DARC**
**Pete, G8FRC, 01189 695 697**
6 Wireless Workshop
13 Smart grids, Prof Colin Bayliss, G3WKZ
27 Autumn Junk Sale

**SHEFFORD & DARS**
**David, G8UOD, 01234 742 757, www.sadars.co.uk**
13 Autumn junk sale

**SURREY RADIO CONTACT CLUB**
**John, G3MCX, 02086 883 322, john.g3mcx@btinternet.com**
3 Autumn surplus equipment sale
17 Fix-it, advice, chinwag & move-it-on

**SUTTON & CHEAM RS**
**John, G0BWV, 020 8644 9945, info@scrs.org.uk**
20 Noise eliminating products, Graham Somerville, bhi

**VERULAM ARC**
**Tony, 2E0WAP, 01727 853 087**
4 50th birthday dinner, 8pm, Quality Hotel, St Albans
6 Social with GB3VH group, Queens Head, Sandridge
18 Antennas and VSWR, David, G4HHJ

**WEY VALLEY ARG**
**www.weyvalleyarg.org.uk**
7, 21 Club night

**WIMBLEDON & DARS**
**Andrew Maish G4ADM, 020 8335 3434**
14 On the air
28 AGM

YOUR RSGB
SUPPORTING YOUR CLUB

At a recent club meeting **Newbury & DARS** acknowledged the tremendous contribution Richard Jolliffe, G3ZGC had made to the activities of the Club over many years. In presenting Richard with his award, President Gus Gale, G3LLK recalled how he had first met Richard when he was still at college studying for the qualifications that led to him becoming a Radio Officer in the Merchant Service. Having gone to sea, Richard kept regular skeds with Gus from all over the world. Calling in to the club nets was also part of his activities. However, it was after taking a shore job that Richard became closely involved with Committee activities and took office for various spells as Secretary, Treasurer and Chairman. To recognise this hard work and dedication over so many years the club awarded Richard Honorary Life Family Membership.

In September, **Chesham & DARS** held a Foundation examination. Five candidates took the exam and passed with flying colours. They are now awaiting their M6 callsigns to be issued by Ofcom. Pictured are (L-R): Phil Blakeney (1st invigilator), Dean Napper, Jake Kattan, Peter McFadden, Derek Simpson, Karl Braisher & Terry Thirlwell (lead instructor). Congratulations to all.

This year **Verulam ARC** made every effort to do well in the VHF NFD contest in June. Operating from a high spot on Dunstable Downs it logged its largest number of QSOs in ten years of this contest. Operation was on the 6m, 4m, 2m and 70cm bands. The Club looks forward with keen anticipation to see how it is ranked in the results. Whatever the outcome, the event was greatly enjoyed by all who took part, including two 13 year old members. The club also participated in the RSGB's 144MHz Backpackers competition on 6 August using the club call sign G3VER.

To round off a successful year for the club, it is holding a dinner on 4 October to celebrate its 50th birthday.

## REGION 10: SOUTH & SOUTH EAST

REGIONAL REP: GAVIN KEEGAN, G6DGK, RM10@RSGB.ORG.UK

**HARWELL ARS**
**Malcolm, G8NRP, 01235 524844, info@g3pia.org.uk**
11 My world of VHF, Tim, G4VXE
25 Shack activity night

**HORNDEAN & DARC**
**Stuart, G0FYX, 023 9247 2846, www.hdarc.co.uk**
6 Natter night/social evening
20 AGM

**HORSHAM ARC**
**www.harc.org.uk**
6 Used equipment sale
20 Social, The White Horse, Maplehurst RH13 6LL

**MID-SUSSEX ARS**
**Peter, G4AKG, 01444 239371**
7, 14 Radio night
21 AGM
28 Surplus equipment sale

**SOUTHDOWN ARS**
**John, G3DQY, 01424 424 319**
3 Talk at Chaseley
5 Operating at Hailsham shack

**SWINDON & DARC**
**Den, M0ACM, 07810 317750, www.sdarc.net**
6 The telegraph on Britain's railways, John Biffen, Science Museum
13 Activity night
20 British Forces Broadcasting Service, Phil, M0PBZ
27 Activity night

**TROWBRIDGE & DARC**
**Ian, G0GRI, 01225 864 698, E/W**
5 Practical demo of ATV, G8BYI & G8DRK
19 Natter night

**WORTHING & DARC**
**Phil, G4UDU, 01903 816684**
5 The History of light bulbs, John Narborough
12 AGM
19 Discussion evening
26 GX3WOR on the air

**Brede Steam ARS** took part in the Lighthouses on the Air weekend in August using GB1DLH. The Dungeness Lifeboat station allowed them to use the downstairs communications room as a base. This year they used a Carolina Windom and a Kenwood TS-200, an 811 linear and the HRD software. On erecting and testing of the Windom it could not be loaded on any band. On looking for the fault it was found that the PL259 at the base of the balun was not connecting properly. Once sorted it loaded reasonably well. All the other equipment performed well.

On Saturday the operators started on 40 and then switched to 20m and soon the log book began to fill up with other Lighthouse on the Air stations. The weather was very sunny and warm and the coast of France could be seen at a distance of about 31 miles from the window of the operating room. On Sunday the weather was not as good and visibility was down quite a bit, although it was still very warm. The station attracted a few visitors who were out walking on the beach with their dogs. The Lifeboat crew also paid regular visits to make sure they were all ok and to see what was going on.

The operators switched from 20 to 40m and back again during the day to find those elusive lighthouse stations and the weekend ended up with 168 calls in their log. The BSARS members do not like to think of this weekend as a competition. It is a time to have a chat with others and exchange details and generally have a good time. All in all the weekend was a great success. All the members from BSARS had a good time and they were made very welcome by the Lifeboat station crew.

The **Hastings E&RC** annual Summer Barbecue & Field Day had an extra special feature this year. In addition to the usual tents and gazebo up on the Fairlight Hills in Hastings Country Park, the Club had invited Roger, G4ROJ, to demonstrate his kite aerials. Fortunately the forecasters were wrong about the rain, but the wind was a strong & blustery sou'wester, which made tent erection 'interesting'! The wind was quite turbulent behind the trees, grown to protect visitors from the full blast of the prevailing wind, which made kite flying also quite challenging. A small delta was still veering about wildly even at full height so, after a quick bite of lunch, Roger put up a small sled, which has shaped pockets with no struts to break, flying a 132ft centre-fed dipole. They worked 35 stations as G6HH, going back preferentially to QRP, /M, M3, M6 & 2E0 station. They would have worked many more as the kite aerial attracted a mini pile-up, but when the kite came down, as it did four times, of course they lost them. An interesting & fun day out.

**Crawley ARC** will be running a Foundation course on the weekend of 15/16 October, commencing 9.30am at Hut 18, Tilagate Recreational Park, Crawley. Closing date for entries is Friday 23 September. Crawley ARC will also run an Advanced examination on Monday 5 December at 7pm, which will be preceded by four or five weekly seminars to help bring students up to speed. Applications for the exam need to be received by 7 November. For further information and details of how to apply please contact Malcolm, G3NZP who is QTHR and can be reached on 01342 713573.

Four members of **Brede Steam ARS** have passed their Intermediate exam – Richard, 2E0IXI, Jonathan, 2E0FBS, Dan, 2E0WHY and Isabelle, 2E0IJA. All four had carried out their training with so much enthusiasm that the future of amateur radio and the BSARS are secure for the next 50 years. The rest of the club members wish them every success for the future and those who are currently training for their Advanced exam will be giving 110% in gaining their prestigious M0 callsign.

**Waterside New Forest RC** took part in Lighthouses on the Air activities this year during the weekend of 20 and 21 August by setting up a radio station in the beautiful gardens of Lepe House on the New Forest coast. The lighthouse in question is known as the Beaulieu River Millennium Beacon and it was built by the community of Beaulieu in the year 2000 in order to assist seafarers in navigating the approach to and departure from the Beaulieu River's entry into the Solent, via a relatively narrow channel between Beaulieu Spit and the Lepe Foreshore. The radio station, callsign GB0BMB, was set up and operated by Tim, G4YVY, Gordon, G1ZEC, Tony, G6MNL, Robin, G0OSG, Mel, G0FOH and Rod, G6LVJ, who took the photos. The equipment used was the club's FT-757 GX II HF transceiver into a G5RV aerial oriented roughly north–south. There were some heavy rain showers during the weekend, but the weather was kind during the critical periods of setting-up and dismantling the radio station. Many successful contacts were made with other amateur stations, including large numbers from the UK and Europe, and one with W2XF in New York.

## REGION 11: SOUTH WEST & CHANNEL ISLANDS

REGIONAL REP: PAM HELLIWELL, G7SME, RM11@RSGB.ORG.UK

**APPLEDORE & DARC**
**Brian Jewell, M0BRB, 01237 473251**
15 JOTA at G4SOF QTH
17 QSLing by Don, G0RQL

**BRISTOL RSGB GROUP**
**Robin, G3TKF, 01225 420442**
31 Forensic science and the mobile phone, Nick, G8YJM

**CORNISH RADIO AMATEUR CLUB**
**Steve, G7VOH, 01209 844939, G7VOH@btinternet.com**
5 Committee meeting, Perranarworthal Church Hall
6 Club meeting, Gweal an Top School
20 Workshop evening, Gweal an Top school

**EXETER ARS**
**Nick, M6NRJ, 01363 775 756, info@exeterars.co.uk**
10, 24 Club night at the Moose Centre

**MID SOMERSET ARC**
**Nick, M6NJB, 01749 346320, nick.bennett@midsarc.org.uk**
11 AGM

**NORTH BRISTOL ARC**
**Dick, 01454 218362, www.nbarc.org.uk**
7 Bring and buy
14 Antennas for small spaces, Dick, G0XAY & Tony, G8CKK
21 Skittles night
28 Hong Kong Mass Transit, Paul, G8YMM

**PLYMOUTH RC**
**Chris M0ZCP,**
**07834 767 161,**
**chrisparker33@hotmail.com**
11 Bring & buy sale

**SALTASH & DARC**
**Brian, M0BHG,**
**01752 844 321**
7 Grand annual junk sale, visitors welcome

**SOUTH BRISTOL ARC**
**Andrew Jenner, G7KNA,**
**07838 695471**
6 Morse code workshop
13 Autumn table top sale
20 Event and contest planning for 2012
27 On the air

**TAUNTON & DARC**
**William, G3WNI,**
**01823 666 234,**
**g3wni@btinternet.com**
5 AGM

**THORNBURY & SOUTH GLOUCESTERSHIRE ARC**
**Tony, G0WMB,**
**01454 417048,**
**tonytsgarc@btinternet.com**
5 Radio restoration, Doug, G7FCO
12, 26 On the air
19 Video night

**TORBAY ARS**
**Dave, G6FSP,**
**g6fsp@tars.org.uk**
7, 14, 21 Natter night

**WEST DEVON RC**
**Jules Cuddy, M1AGY,**
**01752 291588**
4 Natter night & open evening, refreshments available
18 Homebrew wire antennas & baluns

**YEOVIL ARC**
**Steve Crask, G7AHP,**
**steve@g7ahp.co.uk**
6 Amateur & WX satellites, G7AHP
13 Practical projects & soldering techniques
20 Life after the Foundation licence, G3ICO
27 Committee meeting & on the air

Three or four years back Paul appeared at a **Poole RS** meetings asking if a place were available for the pending Foundation licence course. He was clearly very interested but lacked any technical background at all and found the course a severe challenge. Nevertheless he battled on and by the third session had enrolled in a maths class at evening school in order to cope with Ohm's law. To help with his dyslexia the exam was printed on green paper and he passed. He went on to enrol on the Intermediate course.

All the time he was working on the courses, Paul had been coming to meetings, showing up at public events and at windy hilltops for contests: an enthusiastic club member. Despite a couple of failed attempts, Paul never gave up and continued to work hard and, when he felt ready, he sat the Intermediate exam – and passed.

Paul has amazed himself passing examinations in an area so utterly alien to him and has shown the world what he can do. He has learned to study. He can place components accurately on strip board and solder a neat joint. And the tutors? They have found new tools and analogies to use in training and have found teaching Paul a rewarding process.

**South Bristol ARC** meets weekly at the Novers Park Community Centre in Bristol and put three candidates forward for the June Advanced exam. Despite misgivings after the exam was complete they managed a 100% pass rate. Jiafeng, Paul and Henryk all passed the exam and now have the callsigns M0JFZ, M0PRJ and M0HTB. Henryk has gone from no licence at the start of the year to Full licence in 6 months, passing his Foundation exam in January, his Intermediate exam in March and now his Advanced exam in June. The photograph was taken at the club and shows (L-R) Jiafeng, M0JFZ, Paul, M0PRJ and Henryk, M0HTB.

Recently four members of **Torbay ARS** successfully passed the Advanced exam. Three of the members undertook the Bath distance learning course and one was self taught. The club provides mentoring for candidates in the subjects that they find difficult. The successful candidates were Mike, M0LOB, Andy, M0WAN, Gordan, M0NAA and Brian, M0TQR.

Nine members from the Torbay Amateur Radio Society took part in the Torbay buildathon. Run by the Bath Buildathon crew, headed up by Steve Hartley, G0FUW, everything needed to get started was provided. The project was a direct conversion receiver for 40m – it was a version of the G3RJV Sudden receiver that had been around for over 20 years. It's a relatively simple circuit that uses VFO control of an NE602 mixer with an audio amp being provided by an LM386. To help build the Sudden as quickly as possible they used the Manhattan style of construction, where components are soldered to each other above a piece of copper clad board. Constructors started building the audio section plus the 9 volt bus bar first. Once completed, it was tested and they then proceeded on to the VFO section. Once the audio section was built and tested they assembled the VFO around the mixer IC. The helpers showed how to check that the VFO was working before adding the RF input tune circuit and coupling the 2 ICs together to complete the receiver.

The beauty of this project was that absolutely everyone got something out of this little circuit, from the seasoned homebrew experts to those with very little experience. Thanks go out to Steve, G0FUW, Mike, G3VTO, Lewis, G4YTN and Dan, M0TJN, who did a tremendous job and made the day a most enjoyable experience.

The finished project and the group: L-R Pam, G7SME, Larry, M1ARW, Mike, M0LOB, Colin, G4FCN, Alby, M6VAL, Charlie, 2E0TAG, Derrick, G3LHJ, Mike, M6AYJ and Mike, G1TUU.

## REGION 12: EAST & EAST ANGLIA

REGIONAL REP: MARK SANDERSON, M0IEO, RM12@RSGB.ORG.UK

**BITTERN DX GROUP**
**Linda, G0AJJ,**
**01692 404154,**
**secretary@bittern-dxers.org.uk**
13 Informal meeting at Pinewood Park Leisure Club
27 Meeting at Pinewood Park Leisure Club

**BRAINTREE & DARS**
**John, M5AJB,**
**01787 460 947**
3 JOTA planning, RAYNET talk by G0DEC

**CAMBRIDGE & DARC**
**Ron, G3KBR,**
**01223 501712**
14 Test equipment discussion evening
28 Enigma, the German M3 cipher machine, Max, G4WEZ

**CHELMSFORD ARS**
**Martyn, G1EFL,**
**01245 469 008,**
**www.g0mwt.org.uk**
4 AGM
11, 18, 25 Net night
12 Committee meeting, Danbury Village Hall
27 Advanced exam revision class, Danbury Village Hall

**COALHOUSE FORT ARS**
**John Parker, M1DUC,**
**coalhouserad1o@yahoo.com**
28 Weekend event: Halloween

**COLCHESTER RADIO AMATEURS**
**Kevan, 2E0WMG,**
**07766 543784,**
**kevan2e0wmg@live.co.uk**
20 AGM

**FELIXSTOWE & DARS**
**Paul, G4YQC,**
**pjw@btinternet.com**
3 Fish & chip supper
17 Amateur use of Clansman, Iain, G0OZS
29 Foundation course

**LOUGHTON & EPPING FOREST ARS**
**Marc Litchman, G0TOC,**
**020 8502 1645**
15 JOTA: GB1HS, 1st Hainault Scouts

**LOWESTOFT & DISTRICT PYE ARC**
**Lee, 2E1LJL,**
**01502 564 242,**
**leejlewis@hotmail.co.uk**
6, 20, 27 Club night at shack
13 AGM, Railway and Bowls Club

**NORFOLK ARC**
**Chris Danby, G0DWV,**
**01603 898678,**
**cmdanby@btinternet.com**
12 Informal / construction / shack / RSGB 80m Club Sprint CW contest
26 Informal / construction / shack / Bright Sparks
27 RSGB 80m Club Sprint SSB contest

**SOUTH ESSEX ARS**
**Dave, G4UVJ.**
**01268 697 978,**
**secretary@southessex-ars.co.uk**
12 Power supplies, Philip, G8LHW

**WEST KENT ARS**
**Keith, G4JED,**
**westkentars@googlemail.com**
10 Ireland DXpedition, Dave Green, G4OTV

At the first **Bury St Edmunds ARS** exam session in July, four local students were successful – one at Foundation level and three at Intermediate. This was the first time the club had run any exams and they went straight in with a combined Foundation/Intermediate evening. It all worked very well, but with so much paperwork floating around, needed careful tracking! Congratulations to Andrew, Sean, Jack and George, and thanks to Dave, Darren and Peter from BSEARS.

From left: Invigilators Peter, G4PNF and Darren, G7SDC, Instructor Dave, G4HUP, Jack, 2E0CHJ, Andrew, M6AZD, George, 2E0CHU and Sean, 2E0CHQ.

**Cambridgeshire Repeater Group** took part in SSB Field Day and, armed with a suitable laser, they projected their callsign on the side of the barn - in letters about 15 feet high! The photo by M0LCM shows the HF tent with operator silhouetted, the VHF masts and so on.

**Bittern DX Group** came together for International Lighthouse and Lightship weekend at Blakeney on the North Norfolk coast to activate Blakeney Mariner's Light, GB2BML. There was no shortage of operators and by Saturday morning three stations, two HF and one VHF, were ready to go on air. Band conditions fluctuated greatly, but there was a steady stream of contacts with from UK operators, throughout the activation period. As Blakeney is on the east coast, European and Russian contacts continued until late into the night. Overnight the bands quietened down although there was a certain curiosity factor from a number of American stations. Cliff, M6JJK was delighted to contact Alaska and Linda, G0AJJ logged a station in Nepal. Tim, G0OOD was present on site with his key. His high speed performances on CW were a delight to watch: a constant reminder to us all about our own inadequate skills in this mode.

GB2BML though is not like a contest and radio activity ceased while the group enjoyed its annual barbeque. The setting for the station is delightful; a well mown field just below a beautiful church overlooking the North Sea. A real summer outing.

The Revd Jo Fawcett, Assistant Curate of St Nicholas' Blakeney explains about the lighthouse, seen in the background, to Ruth Myerscough, M3SIQ.

## REGION 13: EAST MIDLANDS

REGIONAL REP: JIM STEVENSON, G0EJQ, RM13@RSGB.ORG.UK

**DERBY & DARS**
**Richard Buckby, radio@dadars.org.uk**
4 Junk sale
11 Committee meeting
18 Technical topics
25 On the air

**FRISKNEY AND EAST LINCOLNSHIRE COMMS CLUB**
**Chris M0MFP, 01507 442240**
4 RAYNET, A Clark, G8EVI

**HUCKNALL ROLLS ROYCE ARC**
**Dave Wilde, G1YAI, 08444 355 593, secretary@hrrarc.com**
28 SSTV, Paul Rossiter

**LINCOLN SHORT-WAVE CLUB**
**Pam Rose, G4STO, 01427 788356, pamelagrose@tiscali.co.uk**
1 National Hamfest 2011, Newark Showground
2 All hands on deck for National Hamfest clear up

**LOUGHBOROUGH & DARC**
**Chris, G1ETZ, 01509 504 319**
4 Open forum - ideas for open day
11 AGM, 8pm
18 Power supplies, Andrew, G7SEG
25 Practical evening

**SOUTH KESTEVEN AMATEUR RADIO SOCIETY**
**Nigel, M0CVO, 01476 402 550**
5 National Hamfest – what did you think?
19 Informal evening

**WELLAND VALLEY ARS**
**Peter D Rivers, G4XEX, 01858 432105, g4xex@fsmail.net**
17 Beginners guide to satellites & data modes

## SPECIAL EVENT STATIONS FOR OCTOBER 2011

These callsigns are valid for use from the date given, but the period of operation may vary from 1 - 28 days before or after the event date. Operating details are provided in an abbreviated form as follows: T = 160m; L = 80 or 40m; H = HF bands (30 - 10m); V = 6 and/or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet. Details published here are kindly provided by Ofcom.

| Date / Callsign | Phonetics | Location | Bands | Keeper |
|---|---|---|---|---|
| 01/10/2011 | | | | |
| GB650JP | 650th Anniversary of JPs | Scarborough | LH27 | G4SSH |
| 07/10/2011 | | | | |
| GB0HAW | Harpenden And Wheathampstead | Kimpton | LH27 | G7HMV |
| 09/10/2011 | | | | |
| GB1LM | Liverpool Marathon | Wirral | LH | M0BFV |
| 14/10/2011 | | | | |
| GB1PS | Pontefract Scouts | Yorkshire | HV2 | G0BPK |
| GB1WSG | Wells Scout Group | Somerset | TLHV27 | G7LVN |
| GB2BSC | Barnswood Scout Camp | Cheshire | LHV27 | M0GMG |
| GB2DWE | Dudley West Explores | Dudley | TLHV27 | G6YKT |
| GB2LC | Linnet Clough | Stockport | LHV27 | G4ZVA |
| GB2RSC | Radio Scouting Chesterfield | Derbyshire | TLH27 | G0THF |
| GB4DXS | Dewa Explorer Scouts | Sandiway | LHV27 | G7GFC |
| GB4EDS | Eden District Scouts | Kirkby | LH27 | G4TUA |
| GB5ASG | Alpha Sierra Golf | Cumbria | TLHV27 | G0GGX |
| 15/10/2011 | | | | |
| GB0BWS | Bishops Waltham Scouts | Bishops Waltham | LHV27 | G0JLX |
| GB0GCS | Grimsby Cleethorpes Scouts | Cleethorpes | LHV27 | M1BYQ |
| GB0GDS | Greenock District Scouts | Greenock | LH27 | M1AWV |
| GB0NFS | New Forest Scouts | Hampshire | TLHV27 | G4YVY |
| GB0WNS | Wolverhampton North Scouts | Wolverhampton | LH27 | M0YDH |
| GB1AG | Astley Scout Group | Manchester | LHV27 | M1VIP |
| GB1CDS | Conwy District Scouts | Conwy | TLH27 | GW0VKW |
| GB1HS | Hainault Scouts | Essex | LHV27 | G0TOC |
| GB1TDS | Thurrock District Scouts | Essex | LH2 | M1DPE |
| GB2BD | Bideford Devon | Bideford | LH27 | G4SOF |
| GB2FSG | Fressingfield Scout Group | Suffolk | LHV27 | G7VNN |
| GB2GCS | Grimsby Cleethorpes Scouts | Cleethorpes | LHV27 | G0MNI |
| GB2HLS | Houghton-Le-Spring | Tyne and Wear | TLHV27 | G7GQP |
| GB2MMS | Macclesfield Methodist Scouts | Cheshire | TLHV27 | G6TDJ |
| GB2TWH | Taunton West Hatch | Taunton | LH | G0EYR |
| GB2WYS | West Yorkshire Scouts | Brighouse | TLHV27 | G0BWB |
| GB6HS | Hove Scouts | West Sussex | LH | G0XAN |
| GB8CS | Clevedon Scouts | Somerset | LH2 | M1EPX |
| 22/10/2011 | | | | |
| GB2LSM | Long Shop Museum | Suffolk | LH | G4XVE |


# IC-9100

The IC-9100 is an advanced, compact, all-in-one, HF-VHF-UHF multiband and multimode transceiver. Bands and modes include; HF + 50MHz + 144MHz + 430MHz and 1200MHz. DX, QSO, RTTY, D-STAR DV, satellite and moon-bounce are easily achieved. Also, IF DSP technology guards against QRM and QRN on all bands.

***IC-9100 features include:***

- Multiband, multimode capability
- Dual, independent receiver
- 32-bit floating-point DSP
- Double-conversion superheterodyne
- USB connector for PC control
- GPS position reporting functions
- Satellite-mode operation
- RTTY demodulator and decoder

***IC-9100 options include:***

- 1st IF filters for HF/50MHz bands
- CS-9100 programming software
- D-STAR DV mode
- 1200MHz band unit

***In short...***

***One fabulous rig that does it all!***

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Count on us!

**FREE MEMBERS' ADS**

Charges are waived for Members' Ads submitted by e-mail to memads@rsgb.org.uk. One ad per member per month; other important terms & conditions apply (see grey box on page 86).

## FOR SALE

**13cm ANTENNA**, 27-ele JVL loop antenna, £27. 9dB patch antenna, £16. Adrian, G4UVZ, 01823 421 751, adrianwhatmore248@btinternet.com (Taunton).

**20ft ALLOY POLE** and winch, the pole can be lowered to ground level to adjust antenna as well as raised approx 16ft. Photos available showing it in situ. All brackets included, everything in excellent condition, £75, buyer to collect. Dave, M3KAX, 01977 612 457, d.larkin@talktalk.net (Pontefract, West Yorks).

**30m (100') TOWABLE TELESCOPIC LATTICE MAST** (Radio Structures Ltd). Electric winch, integral trailer, battery boxes. CCTV monitor, CCTV pan/tilt head on top, 12/24VDC converter, 240VAC inverter. Brake lights, normal trailer lights. Ideal for field days and temporary sites. £4,000 ono. Richard Broom, G4LFE, 01522 869 955, info@rids.co.uk (Lincolnshire).

**AMERITRON AV-620** vertical antenna, 20m to 6m, no radials required, excellent performer, inc manual, £150. Butternut HF5V-111 80-10m vertical antenna, inc manual, £125. Chelcom 3 band Windom, 40m / 20m /10m, good condition, £30. All buyer collect except Chelcom. Bernard Whitty, G3HWX, 01704 840 328 (Ormskirk Lancs).

**ANDREW LDF 4-50A**. 100m, brand new Heliax, foam dielectric, ultra low-loss 50Ω coaxial cable, £75. J Beam type LW 5/2M, brand new, 5 element folded dipole Yagi (qty four) + type PMH4/2M matching harness, £75. Cable / antenna specs available. Derek Stanners, G3HEJ, 01276 678 758, Derek.s@gmx.co.uk (Camberley, Surrey).

**COMPLETE STATION**. Kenwood TS-570D, MFJ-949E ATU, MyDEL 22A PSU. All boxed, little used, with all manuals and documentation, £550. Will split. Jim, G8BJO, 07546 984 394, g8bjo@yahoo.com (Ipswich).

**CUSCHCRAFT A3S TRIBANDER**, elements painted in tasteful Hammerite green, traps all good, new boom, 300+ countries worked, dismantled, buyer to collect, offers? Dale, G3VMK, 01159 664 221, g3vmk@btinternet.com (Nottingham).

**DIAMOND BB7V** multiband vertical antenna, 2-30MHz (with antenna tuner). 6 telescopic sections extending to 22ft, all sections are self locking, quick to erect, matching unit at base. As new condition, half price only £150 + p&p UK £7. G0SIV, 01268 728 396 (Basildon).

**EDDYSTONE DIALS**. New, boxed, perfect. One 6"x4" and one "flagship" receiver type 9"x3.5" with backing plates and fitting template. Both slow-motion drives, unmarked dials, 2" dia knobs. Probably unobtainable. Sensible offers only, plus carriage. Peter, G3WBW, petrador@swbroadband.co.uk (Newquay, Cornwall).

**FT-7800E**, boxed, exc cond, £120. UT-102, boxed, £20. Microset VUR-30 144/432 amplifier, unboxed, £80. Robert, GM4GUF, 01899 308 386 (South Lanarkshire).

**FT-897D** wideband Tx, DTMF microphone included, in excellent condition. Very happy to demonstrate. I Astley, M0IAA, 07929 505 683 (Wakefield).

**HOUSE IN RURAL FRANCE** with 60 foot tower and multiple antennas. Full details: www.photomogg.co.uk. Shaun, GM4SIK, 0555 813 806 (Azat, Chatenet, 23210 Creuse, Limousin, France).

**HRO M**, 2 sets of coils (15 in total), band spread conversion details, mains PSU, spare valves. Offers? Table model case for HRO, spare tuning capacitor & drive, offers? Buyer collects or arranges carriage. Nick Valentine, G3KWJ, 01372 270 364 (Ashtead).

**ICOM IC-7400** Boxed with user manual & mic, £500 + £10 postage. Reason for lower price is that the internal ATU is not functioning (OK on 6m). Also NC-20 QRP CW transceiver, £100 + £7 postage. Colin Beynon, GW3WSU, 01446 400 431, gw3wsu@btinternet.com (Barry).

**ICOM IC-746** 100 watts at HF, 6, 2m with mic, manual, no box, filters, £450. KW 107 tuner, £60. Yaesu 2100Z, scratched a bit, just serviced, £300. Kenwood TS-850S, nice, no box, £450. Freeman, G4MGX, 01234 741 330 (Bedford).

**KENWOOD TS-450SAT** HF base, £325. Trio/Kenwood TS-711E 2m base, £175. Microwave Modules MML 144/100S 100W 2m linear, £40. Mitsubishi M57727 2m multimode 37W RF power module, new, unused, £25. Delivery FOC to National Hamfest by arrangement or plus carriage. Alan, G1EAB, 01159 612 295, G1EAB@tiscali.co.uk (Nottingham).

**KENWOOD TS-480HX** in excellent working condition. Just over a year old with all the fixtures and fittings, power leads and mic fully working. £650 + £10 p&p or collection welcome by arrangement. Rob, G4FAX, 07713 084 244, Rob.macfie@gmail.com (Luton).

**LABGEAR LG300 TRANSMITTER**. 80-10m, 813 in PA, Labgear wideband coupler. One previous owner from new, VGC, GWO. Wireless Set No 19 MkII, 2-8MHz, ~16W (CW), ~4W (RT). Probably post-War & unissued, c/w all bits, immac condx, GWO, good mod reports. Gerald, G3LEO, 01845 567 519 (W Yorks).

**MORSE KEYS**. Silent key sale. Swedish style straight key, unknown maker, £80. Kent twin paddles, £45. Both unused but slightly tarnished. Photos available. Frank, GM3JKS, 01465 821 228, frank@knockycoid.demon.co.uk (South Ayrshire).

**NEW EIMAC 4CX250R** with base, chimney, data sheets and info. Offers? Dennis, GM3NIG, 01292 317 577, dennis@gm3nig.fsnet.co.uk (Troon, Ayrshire).

**RELAXING HOLIDAY LOG CABIN**. Snowdonia National Park. Ideal as base for SOTA expeditions. David Butler, 2E1IJK, 07596 387 805, www.northwalesholidays.info (Gwynedd).

**TARHEEL** HF motorised mobile antenna, extended whip for improved 80m coverage, £250. GAP Eagle antenna, brand new, still in box, £225. Icom IC-706 mk IIG, fist mic, OPC-639 DC cable with EMC filter, £375. Collection preferred or postage at cost. Brian, G4XVR, 07740 824 044 (Cheshire).

**TH-F7E 2m/70cm** and scanner, incl headset with mic, charger, car adapter, £120 plus postage. Diamond GSV-3000 30A-34A 12V PSU, £120 plus postage. Diamond X-30 2m/70cm, £30 plus postage. Andrew Kersey, G0IBN, 01621 868 347 (Colchester, Essex).

**TOURING CARAVAN**, 2007, 6 berth Heki. Sunroof, H/C water, shower, cassette toilet, blown air heating, 3 way fridge, oven, hob, loads of extras. 2 awnings included. Fantastic condition throughout. Fully serviced. First to see will buy. £8,495 ono. M0CVS, 07818 447879 (Derbyshire).

**VALVES FOR SALE**. Approximately 150 valves, mostly boxed and unused, some duplicates. List available. Offers? Collect or postage at cost. David Hancock, G3OMY, 01425 473 646, hancock741@btinternet.com (Ringwood).

**YAESU FT-950**, 100W HF & 6m transceiver. 1 month old, as new, in original double box with power lead, mic, manual. Used once by silent key. £1,000 ono, can post. On behalf of Graham Hickford, M0GRA. Jonathan, 07971 662 048, jonathan.hickford@gmail.com (Abingdon, Oxon).

## WANTED

**COLLINS 30L-1, 30S-1, KWS-1** etc, for my own station. Will collect. Steve, G3YFG, 07793 665 000, g3yfg@btconnect.com (Clitheroe).

**COLLINS TCs** Rx/Tx parts, however small or large. Also case needed for R1155 and slotted retaining bar /associated posts for the Jones connectors. All for own use. C Young, M0BGA, 01637 875 848, rcry100@yahoo.com (Newquay).

**CW FILTER TYPE YG-3395C** for fitting to a Trio/Kenwood TS-520. Ken, G3RFH, 01253 821 447, ken.g3rfh@fsmail.net (Blackpool).

**DATONG AD270 or AD370**. Price and condition please? John, G3HCT/VK4OQ, john.bazley@bigpond.com (posting to UK).

**DATONG PC1** receive upconverter, HF to 2m, needed in good working order. Shaun, G8VPG, 01225 873 098. g8vpg@aol.com (Bristol).

**HRO PARTS**: S-meter, knobs, coil contacts. Valves: 6K7, 6SQ7, 6B7. Other parts may be of interest. Bruce, G3WCE, 01692 538 794, G3WCE@grimblepoos.co.uk (North Walsham).

**KENWOOD TS-120V or 130V**, consider the 'S' model also, working or faulty. Tony, G3KDP, 01736 797 987, RAF367@aol.com (Cornwall).

**MARCONI SPECTRUM ANALYSER TF2370**. Scrap unit wanted for spares or just the plug-in boards. The counter is faulty on my instrument, just reading zeros. A board extender would also be useful. I can collect. Phil Stevens, G3SES, 01244 383 954, frances@frances2.wanadoo.co.uk (Chester).

**MICROWAVE MODULES** 1296/144MHz 23cm receive converter. Gus Coleman, G3ZEZ, 01255 425 965, gus@kestrel84.freeserve.co.uk (Clacton on Sea).

**TELESCOPIC/TILT OVER TOWER** 80/100' high, in good condition, with rotator cage. Aidan McGrath, EI8CE, 00353 879 881 021, aidanei8ce@eircom.net (Co Waterford).

**WW2 RADIO EQUIPMENT**, accessories and ephemera that can be used for 'hands on' demonstrations at public events. Anything restorable considered, but especially WS19 power amp, WS22, WS52, R1155, T1154. Martyn Wright, G4RLF, 01722 743 270, CQ@G4RLF.co.uk (Salisbury).

## RALLIES & EVENTS

**Members of the RSGB Regional Team will be present with a bookstall at the rallies this month marked with an RSGB diamond.**

**30 SEPTEMBER & 1 OCTOBER – NATIONAL HAMFEST** – brought to you by the RSGB in association with the Lincoln Short Wave Club. George Stephenson Pavilion, Newark and Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark NG24 2NY (close to junction of A1/A46/A17). TS, B&B, CB, C, SIG, Morse proficiency tests on demand, RSGB Bookstall, RSGB Services & Committees, DF, FM [www.nationalhamfest.org.uk].

**7-9 OCTOBER – RSGB CONVENTION** – Horwood House, Little Horwood, near Milton Keynes. Full convention programme with lectures for all interests and all levels of technicality [www.rsgb.org/rsgbconvention].

**9 OCTOBER – AUTUMN MILITARIA & ELECTRONICS & RADIO AMATEUR HANGAR SALE** – Hack Green Secret Nuclear Bunker, Nantwich, Cheshire, CW5 8AL. OT 10.00, £2.50, civil, military and vintage radio equipment plus vehicle spares and more. Contact Rod Siebert, 01270 623 353 or coldwatr@hackgreen.co.uk [www.hackgreen.co.uk].

**16 OCTOBER – BLACKWOOD AND DISTRICT ARS RALLY** – Coleg Gwent, Risca Road, Cross Keys NP11 7ZA. TI V44 (S22), CP, OT 10.30/10.40, £2. TS, B&B, SIG, C, WIN. Dave, GW4HBK, 01495 228 516, gw4hbk@talktalk.net [www.gw6gw.co.uk].

**16 OCTOBER – HORNSEA AMATEUR RADIO CLUB RALLY** – Floral Hall, 7 The Esplanade, Hornsea, East Yorks HU18 1NQ. OT 10.30, CP, TS, B&B, SIG, RSGB, RAFARS, LB, C, DF, WIN. Details from Rick, M0CZR, R106221@aol.com [www.hornseaarc.co.uk].

**23 OCTOBER – GALASHIELS AND DISTRICT ARS RADIO RALLY** – The Volunteer Hall, St Johns Street, Galashiels, Scottish Borders TD1 3JX. OT 11.30/11.15, £2.50. B&B, TS, C, WIN. Details from Jim, GM7LUN on 01896 850 245 or mail@gm7lun.co.uk.

**23 OCTOBER – CALLINGTON AMATEUR RADIO SOCIETY RALLY** - Callington Community College, Launceston Road,Callington, Cornwall PL17 7DR. TI, CP, OT, 10am, £2, TS, B&B, C, DF, WIN. Contact John G4PBN, 01822 835 834, lumley85-cars@yahoo.co.uk

**29 & 30 OCTOBER – NORTH WALES RALLY** – John Bright School, Llandudno LL30 1LF. 10am – 4pm, TS, B&B, CP, DF. Details from Liz Cabban, GW0ETU on 01690 710 257 or lizcabban@vodafoneemail.co.uk.

**30 OCTOBER – HOLSWORTHY AMATEUR RADIO RALLY** – Holsworthy Community College, Victoria Hill, Holsworthy EX22 6JD. Roger Williams, 07773 983 691, email gsowter@talktalk.net.

**6 NOVEMBER – WEST LONDON RADIO & ELECTRONICS SHOW (Kempton Rally)** – Kempton Park racecourse, Staines Road East, Sunbury on Thames, Middlesex TW16 5AQ. OT 10.00. TS, FM, DF, free CP, RSGB, LEC, TI S22 (V44). Paul, M0CJX, 08451 650 351, info@radiofairs.co.uk [www.radiofairs.co.uk].

**12 NOVEMBER – ROCHDALE & DISTRICT RS TRADITIONAL RADIO RALLY** – St Vincent's Church Hall, Caldershaw Road, Rochdale OL12 7QL. NB This is a Saturday rally. OT 10.15/10.30am, £2.50, concessions for U12 and seniors. B&B, C. Dave, G0PUD, QTHR, 07710 243 107, e-mail dave.shaw1@sky.com. [www.radars.me.uk].

**20 NOVEMBER – 34th CATS RADIO & ELECTRONICS BAZAAR** – 1st Coulsdon Scout HQ, r/o Council Car Park, Lion Green Road, Coulsdon, Surrey. 10.00-13.00, £1, B&B, C, DIS, CP free. Details Glenn, G4FVL, chairman@catsradio.org.

**20 NOVEMBER – PLYMOUTH RADIO CLUB RALLY** – Elm Community Centre, Leypark Walk, Estover, Plymouth PL6 8UE. CP, TI, OT 10.00, £2, TS, B&B, C, WIN. Bob Griffiths, G7HNB, 017523 431 277, freebobx@yahoo.com.

**20 NOVEMBER – MAYO RADIO EXPERIMENTERS NETWORK CLUB RADIO RALLY** – Welcome Inn Hotel, Castlebar. OT 11am. Padraic Baynes, EI9JA, +353 (0) 876 957 154, pbaynes1@eircom.net.

**4 DECEMBER – BISHOP AUCKLAND RADIO AMATEURS CLUB RALLY** – Spennymoor Leisure Centre, Co Durham DL16 6DB. CP, TI S22 (V44), OT 10.15/10.30, £1.50 (U14 free). TS, B&B, C, LB, DF, FAM. Details from Mark, G0GFG, 01388 747 497.

**3 JANUARY 2012 – FRISKNEY & EAST LINCOLNSHIRE COMMUNICATIONS CLUB MID-WINTER TABLETOP SALE AND AUCTION** – Friskney Village Hall, Church Road, Friskney, Lincolnshire PE22 8RR. OT 7.30pm, £1.50 & Tables are 2 for 1 at £4.00. Free tea & coffee, 1 free entry to the raffle. felcc@btinternet.com or 07554362020.

**15 JANUARY 2012 – RED ROSE WINTER RALLY** – George H Carnall Leisure Centre, Kingsway Park, M41 7FJ (easily accessible from Jct 9 of the M60 opposite the Trafford Centre). Free CP, B&B, C, OT 11am, TS, SIG, DF, RSGB bookstall. Details from Steve, 07502 295 141 [www.wmrc.org.uk].

**5 FEBRUARY 2012 – 27th CANVEY RADIO & ELECTRONICS RALLY** – 'The Paddocks', Long Road, Canvey Island, Essex SS8 0JA [southern end of A130]. Free CP, OT 10.30, C, DF, TS. Dave, G4UVJ, 01268 697 978 (evenings) [www.southessex-ars.co.uk].

This list shows all rallies and events we are aware of as at 5 September 2011. If your rally or event is not listed, TELL US ABOUT IT! Send an e-mail to GB2RS@RSGB.org.uk and your event will appear here and on GB2RS. It's free! Guidelines for submissions: Please let us know your event details as early as possible. If you submit by e-mail (to GB2RS@RSGB.org.uk) then we suggest you set your e-mail program to request a 'read' receipt so you can be sure we've seen the details.

TI Talk-In; CP Car Park; £ Admission; OT Opening time - time for disabled visitors appears first, (eg 10.30/11am); TS Trade Stands; FM Flea Market; CBS Car Boot Sale; B&B Bring and Buy; A Auction; SIG Special Interest Groups; MT Morse tests; MA Foundation Morse Assessments; LB Licensed Bar; C Catering; DF Disabled Facilities; WIN prize draw, raffle; LEC Lectures/Seminars; FAM Family attractions; CS Camp Site.

## SILENT KEYS

**We regret to record the passing of the following members:**

| | |
|---|---|
| Mr P Chisholm, RS45276 | 12/8/2011 |
| Mr J C M Greig, G2FBU | 18/3/2011 |
| Mr S R Barker, G3CHD | 20/8/2011 |
| Mr P E R Courcoux, G3EBP | 27/7/2011 |
| Mr L J Smith, G3HJF | 11/7/2011 |
| Mr F J Longman, G3HOH | 3/8/2011 |
| Mr J H Hampson, G3PJL | 28/8/11 |
| Mr B J Henman, G3UNT | 29/8/2011 |
| Mr C A Goddard, G4LAA | |
| Mr F L Whitehead, G4MLL | 2/8/2011 |
| Mr H E Baxter, G4ORD | 19/8/2011 |
| Mr R T Warrener, G7DTD | 15/8/2011 |
| Mr H C Owen, G7EBA | 15/7/2011 |
| Mr J W Selley, G7OFB | 28/7/2011 |
| Mr M A North, G8CGO | 6/5/2011 |
| Mr B T C Chevous, G0AUZ | 24/8/2011 |
| Mr M D Thatcher, G0AVY | 21/8/2011 |
| Mr N J Tolcher, M0CTO | 22/7/2011 |

**26 FEBRUARY 2012 – RAINHAM RADIO RALLY** – Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent ME8 0BX. 10.00, TI, C Trevor, G6YLW, 07717 678 795, trev@wig1.co.uk.

**26 FEBRUARY 2012 – SWANSEA ARS RALLY** – Court Herbert Sports Centre, Neath Abbey, Neath, SA10 7BE. OT 10:30. £2.50p. Free CP, TS, B&B, SIG, C. Details from Roger, GW4HSH, 01792 404 422. [www.radioclubs.net/swanseaars].

**4 MARCH 2012 – CAMBRIDGE & DISTRICT AMATEUR RADIO CLUB RALLY** – Wood Green Animal Shelter, King's Bush Farm, A1198 London Road, Godmanchester, Cambs PE29 2NH. OT 10:00, CP, £3, TI S22, TS, B&B, LB, C, DF, SIG, FAM, Contact John, G0GKP, 01954 200 072, j.bonner@ntlworld.com. [www.cdarc.co.uk].

**11 MARCH 2012 – WYTHALL RC RADIO AND COMPUTER RALLY** – Woodrush Sports Centre, Shawhurst Lane, Hollywood, nr Birmingham B47 5JW on the A435, 2mi from J3 M42. TS, C, £2, B&B, CP, TI S22 (V44). Contact Chris, G0EYO, 07710 412 819, g0eyo@blueyonder.co.uk [www.wrcrally.co.uk].

**1 APRIL 2012 – SOUTH GLOUCESTERSHIRE AMATEUR RADIO RALLY** – Scout Activity Centre, Woodhouse Park, Almondsbury, Bristol BS32 4LX. OT 10.00, B&B, CP, C. CBS, TI S22 (V44). Stan Goodwin, G0RYM, 07833 517 370, SouthGlosRadioRallyCoordinator@gmail.com. [www.southglosradiorally.org.uk]

**22 APRIL 2012 – 28th YEOVIL QRP CONVENTION** – Digby Hall, Hound Street, Sherborne, Dorset DT9 3AA (adjoining the central shopping car park). OT 9.30am, TI S22, CP, TS, LEC, B&B, C, DIS. Contact Derek, M0WOB, 01935 414 452, yarc-contact@tiscali.co.uk.

**17 JUNE 2012 – 25th NEWBURY RADIO RALLY AND BOOT SALE** – Newbury Showground, next to M4 J13. Big display area of amateur radio stations, exhibitions, special groups, clubs and societies. TI S22 (V44), free CP, OT 9.00, £2, TS, C, DF, FM, SIG. Sellers have access from 8am and pitches cost £10. Details from rally@nadars.org.uk [www.nadars.org.uk].

**24 JUNE 2012 – WEST OF ENGLAND RADIO RALLY** – Cheese & Grain, Bridge Street, Frome, Somerset BA11 1BE. TS, RSGB Books, C, CP, DIS. Contact Shaun, G8VPG, 01225 873 098, rallymanager@westrally.org.uk [www.westrally.org.uk].

**4 NOVEMBER 2012 – HOLSWORTHY AMATEUR RADIO RALLY** – Holsworthy Community College, Victoria Hill, Holsworthy EX22 6JD. Contact Roger Williams, 07773 983 691, email gsowter@talktalk.net.

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## CLASSIFIED ADS

## THE GREAT CONTEST DEBATE

In this issue we present letters from both sides of the Contest debate. Members will be able to see the good points that both sides have made and decide for themselves. After this issue we will be leaving this debate – at least for a while – and looking to highlight other matters that concern RSGB Members.

**Colin Shaw, G8FRA/M5FRA**

The recent letter about contests has generated some internet chatter from the contest lobby suggesting they flood *RadCom* with letters extolling the virtues of contesting and explaining why any complaints are wrong or misguided.

I have long held the view that the problem is not contests in themselves but the way *some* contesters behave. The heat of the moment seems to take over and good operating procedures, respect for other ops and the spirit of amateur radio is forgotten. There has been progress; the RSGB now stipulates that contesters stick to the band plans and exclude the WARC bands. That was a major victory for common sense and mutual cooperation. I wish more contest organisers would do the same.

I will not venture into the arguments employed by each side in the debate but will say that if some contest ops continue to disregard band plans and trample over other ops in the relentless quest for points the bands will be quieter as more people are driven away from the hobby. Then we might start to lose spectrum.

My plea is that we all find ways to coexist on crowded bands, remember that we all have the same 'right' to be there, respect that we do not have the same interests and be aware of the bigger picture. Is that too much to ask?

As for me, I am NOT anti contest, just anti bad operating and yes, I even took part in a contest last month!

**Chris Tran, GM3WOJ/ZL1CT**

As the team leader for our UK HQ station, GR2HQ, I have been working with many of the top contesters in the UK over the last two years. They are all highly motivated and technically aware and some have been willing to travel long distances to operate one of the GR2HQ stations. Contesting is the leading edge of our hobby and is the ultimate 'self-training' in all aspects of equipment, software and antennas.

Why is contesting so popular worldwide nowadays? First, if you have a busy family life, you can cram a lot of QSOs into a short time and keep your DXing operating skills sharp. Secondly, a contest stimulates a lot of much-needed band activity, makes rare DXCC entities available and many technological innovations are a result of contesting.

**Nigel, G0RPM**

Bill's right that there are too many contests and the behaviour of some contesters leaves a lot to be desired. However, let's get some perspective. The fact is that contesting is one of the fastest growing areas of the hobby. Clubs like Verulam ARC use contests as a way to get Foundation licensees on the air and to encourage them to move up to Intermediate and Full licences. They've done this with my son, 2E0DTW, and daughter M6RUT. Contest entries are increasing year on year and contesting is playing its part in bringing new blood into the hobby.

Bill is one of a significant number of people who dislike contesting. That's fine and there is plenty of room for people like Bill on the air. The WARC bands are always available and the main bands are mostly contest free on weekdays. Even at weekends it is possible to work around most of the contests. Bill, please don't give up on the hobby. There are always people, for example on 80m SSB, who want nothing more than to have a natter. Why not get a few mates together from your local radio club and set up a weekly 'rag chew' net? Amateur radio is a great hobby with many different facets, so it should be possible for everyone to find something to enjoy.

**Dave, G3UEG**

A number of people seem to be propounding the view that contests render the bands unusable. After a bit of research, the facts do not match the views being put forward. I spent most of this last weekend scanning the bands 40m to 10m, while the 24hr IOTA contest that ran from 1200GMT on Saturday 30th to 1200GMT on Sunday 31st, was taking place. I was trying to work STOR.

Before 1200 on Saturday the bands were very sparsely occupied. During the contest, there were plenty of unoccupied portions of the bands, some good DX (including VK) and special event stations to work, as well as non-contest people calling CQ. After the contest finished midday Sunday the bands again went very quiet. There was also plenty of space and activity on 17m. There was ample opportunity this weekend to rag-chew if you wanted to, but you have to switch the radio on and look and listen. There are many aspects to our wonderful hobby, which can and should co-exist.

**Stewart, GW0ETF**

Following the latest round of anti-contest letters in *RadCom* I'd like to reassure members that the majority of UK contesters do concern themselves with how best to co-exist with our non-contesting colleagues. This is evidenced by recent threads on the UK Contest reflector, which at times have become quite heated.

However I must challenge the erroneous belief expressed recently in your letters pages that contesting serves no purpose in self training. Nothing can be further from the truth!

Contesting is the ultimate incentive to optimise your station, software, antenna systems and operating technique, as well as understand the nuances of propagation. The oft quoted 'exchange of silly numbers' is just the final piece in a very large jig-saw; unfortunately it is the only part that many come across and upon which contesters are often judged.

**G1MQQ**

If G0OIL thinks that we non-contesters are so fortunate as to have exclusive use of 12, 17 and 30m (that's a grand total of 250kHz!), would he be prepared to swap and restrict all contest activities to those three bands and leave the lions share for the non-contesting majority?

**Mike Stewart, G4RNW**

The situation of the intrusiveness of contesting has now become total anathema. Although retired, I am busy during the week, as are most people, and accordingly I do most of my DXing on the weekends when my contacts may be available. On a Saturday afternoon if I switch on 20 metres and am lucky enough to find it open, the band is inevitably so busy with contesters that one cannot put the proverbial 'fag paper' between the occupied frequencies. All one can hear is "CQ, CQ Contest – 59, 73 good luck in the contest CQ CQ - QRZ". Pah!

What do they think they are doing? Just get a group together with the ability raise enough money to buy the top Icom or Yaesu rig, a big PA plus an eleven element Yagi on a 100ft tower and you can then proceed to bore a hole in the sky. You can't fail! Now, if they would restrict the contesters to a few hundred Hertz of the band, make it QRP only, into an end fed wire, then you might make a case.

**Gordon Hunter, G8WWD**

From the number of letters relating to contesting at weekends, it is fairly obvious that we have a problem that needs to be resolved. Those who work during the week and only ever get on the bands in daytime at weekends are frustrated and the contesters seem to think that the solution is the WARC bands, which of course is a very simplistic view. Often 12m and 18m are not open or not fully open when 20m is, but the latter is full of contest stations. Going the other way, 30m is only for narrow band use and many people want to have a phone QSO.

So, here is my suggestion. The RSGB and the IARU need to take on board the

problem and review the band plans. It seems fairly easy to deal with the problem so that both contest stations and non-contest stations can use the bands they want to. If you listen on say 20m then the further up the band you go, the less traffic there is, unless there is a contest on. Above 14.250MHz is frequently sparse in stations. So, why not limit phone contests to using the top 100kHz or so of the band, ie 14.250-14.350MHz? That gives the contesters a share of the band for their use during a contest, without consuming the whole band and in fact makes the contests more challenging!

Instead of just using brute force the contesters will have to learn how to use their rig's filtering such as DSP, IF bandwidth, notch filters, etc to the full in order to work stations and therefore it enhances their learning experience, which is, after all, what amateur radio is supposed to be all about. It also leaves the remaining section of the band available for non-contest stations to use so that others can also enjoy the hobby.

Of course just to ensure that the band plan is obeyed, the RSGB and other countries similar bodies should ensure that all contacts outside the allocation are deemed null and void from a points view!

Similar splits could be done on 80m, 40m, 15m, 10m, etc.

Now, before all the contesters complain that a portion of the band is not enough for them, let me just remind them that ALL radio amateurs, contesters and non-contesters have the same right to use the bands when we wish. They don't have the right to take over the whole band to the exclusion of others!

**Jon Barden, G6UWK**

I want you to imagine you are a newly licensed Foundation class operator, you have your certificate proudly displayed on the wall and, let's be honest, what chance have you of being heard when some stations are using more power than my microwave oven into multi element antennas?

Now think what a thrill it is the first time this operator gets North/South America, for perhaps 20 seconds the other station desperately wants to hear them. Now, yes, all they want is the obligatory 59 and serial number, but who cares? This operator has seen first hand that their voice/PSK/CW etc has bridged the Atlantic Ocean. I for one remember that feeling with amazement that someone in another continent half way round the world heard my voice. That is the fun of our hobby so yes it can be irksome but isn't amateur radio a broad church?

I, for one, find other things more of a problem in that some stations seem to feel they have the right to 'own' a certain frequency and talk over stations who were using it before them – but that is personal bugbear of mine.

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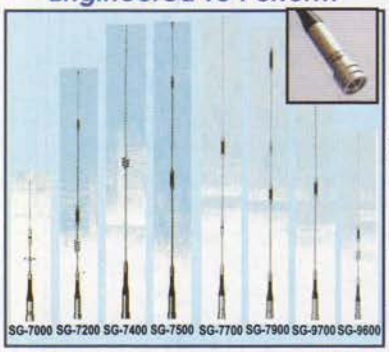


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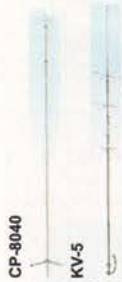


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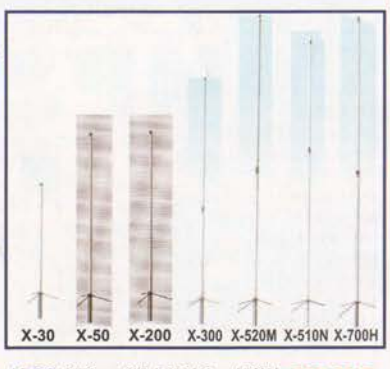


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## The World's Most Popular ATUs!

### MFJ-949E 300 Watts with Dummy Load

More Hams use the MFJ-949E ATU than any other model in the world! The reason? Because it is reliable and can match just about any antenna. Wires, coax, balanced, it handles them with ease. The large inducor is rugged and the 8-way antenna switch lets you select your antenna, quickly. You get a large 3 cross needle meter which makes tuning easy. You even get an internal dummy load. No wonder it's the hams choice! **£184.95 C**

## MFJ The World's Most Popular AUTO ATUs!

### MFJ-993B IntelliTuner Auto ATU 300 Watts 1.8-30MHz

This tuner lets you tune any antenna; long wire, coax cable or balanced feed. You get both analogue cross-needle metering & LCD data display! MFJ's exclusive Intellituner Adaptive Search and instant recall algorithm gives you ultra fast tuning with 20,000 memories! Beat that! Select 300 Watts for 6-1600 Ohms matching or 150 Watts for ultra wide 6-3200 Ohms. Versatile antenna selection and pre-used setups are found in milleseconds! This tuner matches virtually anything you thow at it. **£254.95 C**

### MFJ-925 Ideal For IC-7000/FT-857D

This compact auto ATU sits nicely under the IC-7000 or FT-857D.It's all you need for a complete automated station that will match any antenna! **£174.95 C**

### MFJ-929 World's Fastest ATU

World's fastest compact auto ATU. The algorithm offers 132,072 solutions and instantly matches any antenna with near perfect VSWR. Get the best from your antenna! **£214.95 C**

### MFJ-991B 300W Auto ATU

Handles 300W, fitted cross needle meter. Wide range: coax, balanced or wire. 300 Watts level matches 6-1600Ohms, or 150 Watts with wider range of 6 - 3200 Ohms. **£214.95 C**

### MFJ-998 1.5kW Auto ATU

This Auto ATU will handle really high power, which makes it well above UK limits and also offers great efficiency. You get the same fast tuning, with cross needle metering & LCD display. Coax, balanced or wire. **£669.95 C**

### MFJ-928 Econo 300W Auto ATU

Here;s a very economical Auto ATU. No metering, but lightining fast tuning with 20,000 memories and wide matching range. Leave it in-line and just forget about it! **£203.95 C**

### MFJ-927 Remote ATU

Here's a great way to tune wire or coax. This fully weatherproof ATU will sit outside right by your antenna and with the included "power thru" box, you feed the DC supply up the coax. No separate hh cable needed. **£254.95 C**

### MFJ-969 300W Roller Inductor

160 - 6m, it will match wire, coax or balanced. It reads true PEP (requires 12v DC or internal cell), Fiitted cross needle meter and, Dummy load, and QRM-Free Pre-Tune. **£219.95 C**

### MFJ-948 300W Roller Inductor

Very similar to the MFJ-949 above, but without the dummy load. The same 300 Watts and the same great design. This tuner will meet all your needs and your antennas. **£164.95 C**

### MFJ-941E 300W 1.8-30MHz

Great calue, has cross-needle meter, 1000v balun and 8-position selector switch. A great ATU at budget price. **£144.95 C**

### MFJ-945E 300W 1.8-30MHz

Designed prticularly for coax mobile systems. Now you can move around the band so much easily. **£134.95 C**

### MFJ-989D 1.5kW 1.8-30MHz

The latest version gives lower losses and true peak reading. Includes 6-position antenna switch and dummy load. **£399.95 C**

### MFJ-962D 1.5kW 1.8-30MHz

This low profile model retains the 1,5kW and incorporates a roller coaster tuning and twin needle meter. **£299.95 C**

## MFJ Vertical HF Antennas

**MFJ** Vertical HF Antennas. Ideal for small gardens.

**MFJ-1796** A 1.5kW40m - 2m self supporting vertical. Requires no radials. Height 3.65m **£244.95**

**MFJ-1798** An 1.5kW 80m to 2m vertical that is self supporting and needs no radials. Height 6.7m **£309.95**

| | |
|---|---|
| **MFJ-1625** Window Ant + Tuner | £204.95 D |
| **MFJ-1796** 40m-2m vertical | £244.95 D |
| **MFJ-1798** 80m-2m vertical | £309.95 D |
| **MFJ-1908H** 43ft fibre glass mast | £244.95 D |
| **MFJ-1922** Digital screw driver control | £101.95 D |
| **MFJ-1924** Prog. screw drvr control | £132.95 C |
| **MFJ-1925** ATAS-100 controller | £74.95 C |
| **MFJ-202B** Receiver noise bridge | £82.95 C |
| **MFJ-250X** 1kW dummy load (no oil) | £56.95 C |
| **MFJ-260C** 300W dummy load | £45.95 C |
| **MFJ-261** 100W dummy load | £33.95 C |
| **MFJ-265** 2.5kW load fan cooled | £209.95 C |
| **MFJ-403** Micro CW keyer | £67.95 C |
| **MFJ-403P** Micro travel iambic | £82.95 C |
| **MFJ-4103** PSU for FT-817 | £53.95 C |
| **MFJ-417** Pocket morse tutor | £77.95 C |
| **MFJ-442** Slim electronic keyer | £204.95 C |
| **MFJ-461** Pocket morse reader | £101.95 C |
| **MFJ-4726** 6-way remote ant switch | £164.95 C |
| **MFJ-490** Memory keyer + paddle | £249.95 C |
| **MFJ-495** Memory keyer | £192.95 C |

## MFJ Antenna Analysers

### NEW MFJ-266 *Every Ham Needs One!*

Covers 1.5-65MHz (in 6-bands) plus, 85-185MHz & 300-490MHz. In analyser mode you get freq. VSWR, complex impedance and magnitude - all displayed simultaneously, on high contrast LCD. In Counter Mode, you get 500MHz range, with 100Hz resolution & field strength. Functions as 10dBm signal source and can measure inductance & capacitance. **£339.95 C**

### MFJ-259B

1.8 - 170MHz Analogue meters. Measures VSWR, complex impedance & magnitude. Coax velocity, distance to open or short circuit. Counter, generator, inductance, capacitance, freq counter & LCD digital display. **£269.95 C**

### MFJ-269

Covers 1.8-170MHz & 415-470NHz plus 12-bit A/D for improved accuracy. Reads complex impedance, magnitude PLUS parallel resistance & reactance! Read coax specs & problems. Plus acts as generator & freq. meter. N connector. **£369.95 C**

## Ameritron Linear Amplifiers

### AL-811XCE

600W of PEP power from a desk top linear that covers 1.8-30MHz. Great price! **£899.95 D**

### AL-811HXCE

800W of PEP power from a desk top linear that covers 1.8-30MHz. New low price. **£999.95 D**

### AL-82XCE

This amp will easily deliver 1.5kW from less than 100W input. 1.8 - 30MHz. Uses 2x 3-500z. **£2749.95 D**

## HyGain Vertical Antennas

### AV-14AVQ

10-15-20-40m Vertical Antenna 15.kW 18ft / 5.5m (pictured right)
**Self-Supporting *Automatic Band Switching *Power: 1500W PEP *Gain: 3dBi nominal * VSWR: <1.5:1 typical *Connector: SO-239 *Vertical angle: 16 degs *Horizontal angle: 360 degs*

**£199.95 D**

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|---|---|
| **AV-640** 6-40m vertical | £429 D |
| **DX-77A** 10-40m vertical | £479 D |

**AV-6160** The new 160m to 6 m self supporting vertical. Designed for ground mounting, this is an ideal all-band antenna for those with small gardens. **£429 D**

## Hy-Gain Rotators

### AR-303X £99.95 D

Lightweight Rotator for small beams. Check out this new low price!

*It's Antenna Time!* We carry the full range of Hy-gain rotators & will be happy to advise which is the best for you. We also carry good stocks of rotator cable & antenna accessories.

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|---|---|---|
| **AR-40X** | VHF or Mini HF | £309.95 D |
| **CD-45IIX** | Small HF | £489.95 D |
| **HAM-IVX** | Medium HF | £669.95 D |
| **HAM-VX** | Heavy Duty | £1099.95 D |

## MFJ *For details of the full range of MFJ products - check out our web site!*

*Carriage Charges: A=£4, B=£5, C=£8.50, D=£11*