RadCom

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

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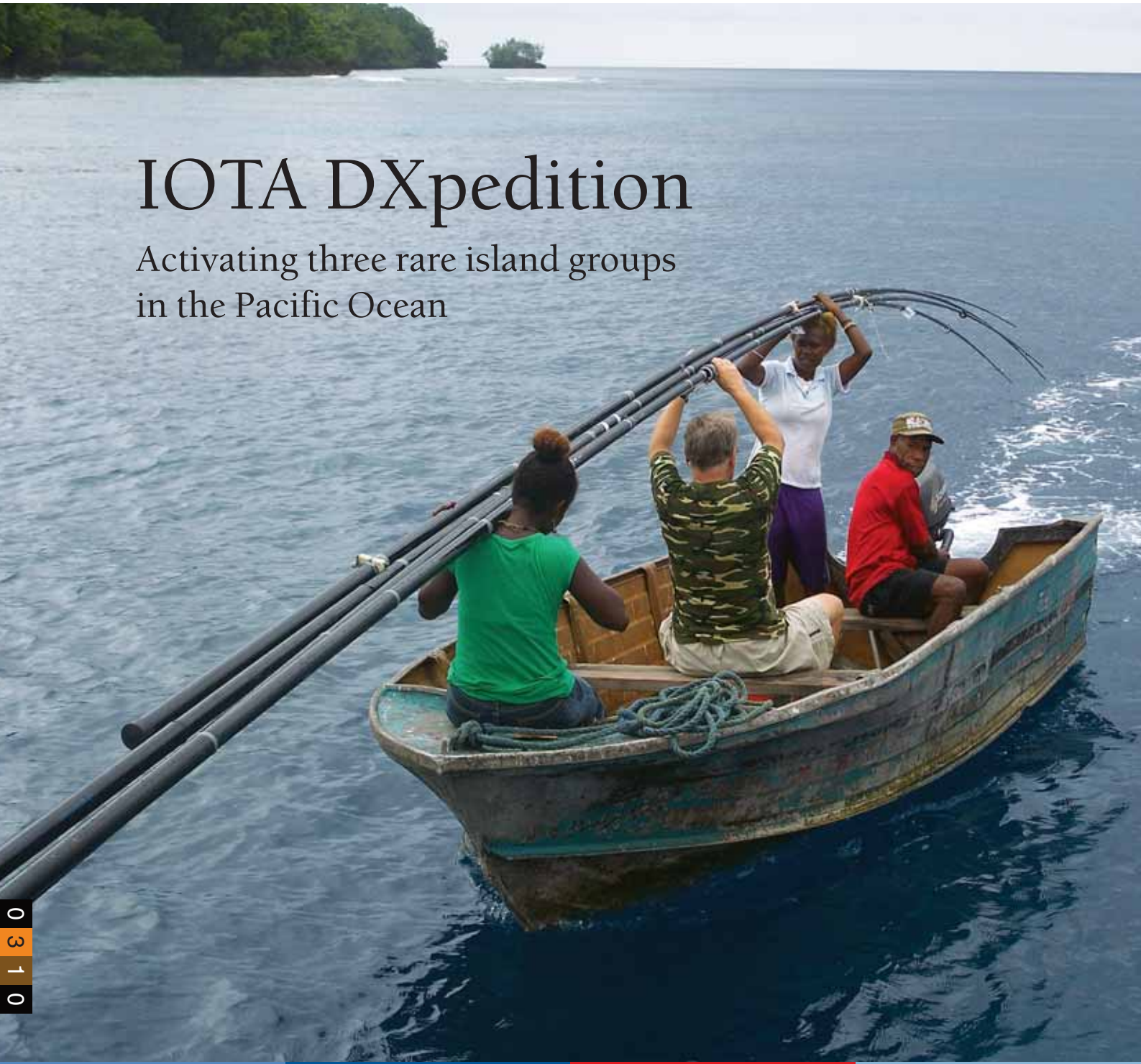

IOTA DXpedition

Activating three rare island groups in the Pacific Ocean

0310

In Practice

Build & use a -40dB coupler for transmitter testing

Construction

Use your SDR on 2m with this downconverter project

Short Circuits

Noise – how random does it have to be?

Meteor Scatter

VHF DX that you never thought possible

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160m - 6m 100W All Modes Transceiver - Auto ATU

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Good Times!

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FREE WARRANTY - GREAT PX DEALS

YAESU

FT-450

The cost effective answer for HF to 6m. It really is a great package. Many advanced features are included in this radio. Don't be mislead by the price! The basic version has no auto ATU. **£589 D**

FT-450AT As FT-450 but with auto atu built-in **£679.95 D**

FT-950 *with PEP update*

The FT-950 is proving to be a great success. Firmly based around the FT-2000, many enthusiasts are waking up to the fact that this is one very serious radio that offers amazing performance from 160m to 6m. 3 year warranty, great PX + no VAT increase! **£1099 D**

FT-2000 *with PEP update*

FT-2000 100W HF - 6m 12v DC **£1869 D**
FT-2000D 200W HF-6m inc AC PSU **£2389 D**

FT-857D

SPECIAL OFFER!

HF to 70cms - a great mobile or portable station at a really competitive price. Detachable head makes a neat installtion. **Was £569 Now £549**

FT-897D ***SPECIAL OFFER!***

HF t0 70cms in a unique portable package with the ability to run from internal optional batteries. A realy well laid out radio for "one-man DXpedition." **Was £659 Now £629**

FT-817ND ***SPECIAL OFFER!***

The FT-817 is a real classic. All bands in a rig that fits in your brief case. More people own one than any other rig! **£439 D**

EXCLUSIVE OFFER!
This month FREE with FT-817, is the Mini **PS-122** 2.2Amp travel supply - runs rig at full 5 Watts

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Dual band 2m/70cms mobile with CTCSS and DCS. Detachable head unit. Great price. **£189 D**

FT-2800M 2m Mobile 65W **£124 D**
FT-8800E 2m/70cms 50/35W **£289 D**
FT-8900R 10/6/2/70cms **£334 D**
FT-1802E 2m 50W mobile **£119 D**
FTM-10SE 2m/70cms 50/40W **£269 D**

NEW VX-8E Triple Band

The VX-8 is another Yaesu first. APRS and Bluetooth, plus waterproof housing make this a "must have" radio. A barometer is included, plus GPS option and you have dual simultaneous receive. **£329 D**

Yaesu Handhelds

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VX-6E	2m/70cms 5W	**£199 C**
FT-60E	2m/70cm 5W	**£142 C**
VX-170	2m 5W keypad	**£95 C**

VX-3E

**2m/70cm*
**Wide Rx*
**Lithium cell*
**AM Ant*
**SW Tx*
**Stereo FM*
**Tiny size*

£139.95 D

KENWOOD

Classic Transceivers

TH-F7E

• 144-146MHz Tx/Rx: FM • 430-440MHz Tx/Rx: FM Up to 6W out with Li-ion battery and **"scanner" style coverage from 100kHz to 1300MHz** including SSB on receive! **£229 D**

TS-2000

Independent reception on 2 bands with a VHF sub band 118 - 174MHz, built-in automatic ATU, built-in TNC for DX alerts, extensive DSP processing and magnificent selectivity. This really is the DC to light rig.

TS-2000 £1489 D
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TS-480SAT £749 D
TS-480HX £849 D

Carriage Charges: A=£3, B=£4, C=£6.95, D=£10, E=£12

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For Icom IC-718 Transceiver

OPF-I-CW-300	300Hz filter	£199.95 C
OPF-I-CW-500	500Hz filter	£109.95 C

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5W in 45W max out

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**Built-In Echolink*
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**Supplied w/ DTMF Mic.*

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TM-271E £165 D

2m FM 60W Mobile Transceiver. MIL-SPEC DTMF, Mic. Built-in CTCSS & DCS encoder / decoder.

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Icom
VHF/UHF Mobile/Handy

IC-E208 Dualband Mobile

**Freq range 144-146MHz, 430-440MHz Tx*
**55/50W (3 pwr steps each band)*
**Wideband Rx: 118-173, 230-549 & 810-999MHz*

£254 D

IC-910H £1249 D

2m / 70cm 100W Base station all modes with option for 23cm module (UX-910 £359)

IC-910HX £1449 D

As above but with 23cm module ready fitted and a big saving as well.

IC-2200H £199 D

2m 55W FM mobile with rugged construction and with digital option.

IC-2725E £319 D

Dual band 2m/70cm. Easy to operate and install and a lovely detachable head.

IC-R6 *Scanner*

This new model wide frequency range of 0.100-1309.995MHz in AM, FM, and WFM modes Amateur stations, AM, FM, short wave broadcasts, TV audio can be listened to. £172 C

IC-E90

6m / 2m / 70cm Handheld Transceiver. £234 C

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V-ID *Paddle*

Iambic Deluxe Chrome Base. £209.95

V-CM	"The Code Mite"	£65.95 C
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We also stock a wide range of leads to match your radio @ www.wsplc.com

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RB/PL	Plus Data mode interface	£159.95 C
RB/NO	Nomic Data interface,	£79.95 C
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Programming modern radios can take ages, and what if you lose the data? Check out the RT Systems data programs that get the job done so much faster.

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Please state exact model when ordering
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High quality microphones with a range of leads to suit most radios.

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BY-4	Twin pad. gold parts	£189.95 C
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RJ-1	Straight key, black base	£109.95 C
RJ-2	Strght key, chrome base	£129.95 C

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Rig Control Software

Famous all over the world, this software is designed by professionals in radio communications. Use today's technology to make your ham operating more fun.

RadioCom-6	Latest version	£179.95 C
SB-RCHAM	Extra interface	£59.95 C
RadioCom-4.5UNI		£79.95 C
RadioCom-4.5PCR		£59.95 C
RadioCom-6-UPG5		£59.95 C

We stock a wide selection of interface leads, Check out: www.bonito.net

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These antennas are extremely efficient and use no traps. The large, air-spaced coils are the secret, and resonant adjtments can be made at ground level.

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HF-6V	80,40,30,20,15,10m self support 7.9m	£389.95 D
HF-9V	As HF-6V but adds 17,12 & 6m. 7.9m	£449.95 D
HF-5B	5-band beam	£449.95 D

Watson
VSWR/PWR Meter

W-420 *SPECIAL OFFER!*

VSWR/POWER Meter
118-530 MHz 5/20/200 Watts

Was £49.95 **Now £34.95**

Carriage Charges: A=£3, B=£4, C=£6.95, D=£10, E=£12

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HEIL SOUND

Proset-4 & 5

The standard headset with a choice of NC-4 or 5 inserts. Requires AD-1 patch lead.

£114.95 C

For Icom transceivers, choose the **Pro-Set-IC** with "Icom" Element **£129.95 C**

Proset-Plus

With the Pro-set Plus you have the benefit of dual NC-4 / NC-5 mic capsules that can be selected. Requires AD-1 patch lead.

£189.95 C

Pro-Set-PLUS-IC Icom Element **£189.95 C**

AD-1 Connector Leads
There's one to suit any ham radio rig. Just let us know you radio. **£16.95 A**

Mic. Bases

CB-1 (H)
Designed to take all hand and stick mics. **£44.95 C**

CB-1 PTT
As above but with PTT built-in. **£59.95 C**

Quiet Phone Pro £159.95 C

The Quiet-Phone is a well padded & super noise cancelling headset. The boom mic (MB-1) shown is an optional additional attachment. See below.

MB-1-4, 1-5 & 1-6 £79.95 C
The MB-1 series of attachments comprise a screw-on boom mic. for the Quiet-Phine Pro. The last digit denotes the "NC" insert capsule. The NC-6 is a new capsule choice and is midway between NC-4 & NC-5.

Traveller Series

Ideal for portable or mobile. The HTSS has a single earpiece, whilst the HTDS has a dual earpiece. Both have boom mics. The cable has an in-line PTT switch and an up/down frequency selector for suitable radios. You will need to purchase the matching HSTA lead to suit your radio.

HTDS £79.95 C HTSS £69.95 C

HSTA Adaptors £23.95 A
These are purpose made adaptors for the Traveller series above. Quote radio model when ordering.

PR-781
A high quality microphone for the discerning ham, designed by Heil to excel Requires CC-1 cable kit for rig. **£129.95 C**

GM-4 & 5
These "Gold Lime" mics contain the NC-4 or NC-5 capsule. Can be handheld or mounted on a stand (clip supplied). Requires CC-1 cable kit for rig. **£119.95 C**

CC-1 Cable Kits - there's one to match every ham radio rig. Just tell us the radio you need it for. **£29.95 A**

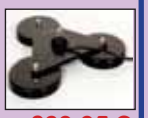
WATSON

Multi-Ranger Mobile / Portable Whips

The Watson Multirangers offer great performance at great value. Use mobile on our 3-way magnetic mount for easy mobile or mount on ground via a suitable SO-239 base with radials. Quick low loss band changing is achieved with the wander plug system and fine tuning is taken care of with the upper telescopic whip. Choose from two models.

Multi-Ranger-9
9-band whip approx 1.9m high with PL-259 base. Handles 125 Watts & covers 80m, 40m, 20m,15m, 10m, 6m, 2m, 70cms and VHF airband.
£39.95 D

Multi-Ranger-200
10-band whip approx 1.9m high with PL-259 base. Handles 200 Watts & covers 80m, 40m, 30m 20m,17m, 15m, 12m, 10m, 6m, 2m.
£59.95 D



W-300S Mag Mount
The quick way to go mobile. No holes needed. Fitted with SO-239 socket, it comes with RG-58 coax terminated in PL-259 plug. **£39.95 C**

SGC

Auto ATU

SGC-237
- *Frequency 1.8 to 60MHz*
- *Power input 3-100W (PEP) 40W max CW*
- *VSWR: <1.4:1 (typical)*
- *Antenna: Min length 2.4m 3.5-60MHz, min length 7m 1.8-60MHz*
- *Input impedance range 45 - 55 Ohms*
- *Output: Ceramic terminal*
- *DC supply 13.8V DC 0.3A*
- *Fully waterproof housing*
- *Size: 178 x 229 x 38mm*
- *Weight: 0.9kg*

£319.95 C

SG-211

Was £219.95 Now £199.95 C

SG-211 "Stowaway" auto antenna tuner back in stock and better price, not weather-proofed. HF + 6m Up to60W. Powered by internal battery.

hy-gain

Rotators Tough designs made in the USA

AR-35X	£99.95 C
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HAM-VX	£1029.95 D
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We also stock a good selection of control cables.

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All windoms include WARC bands

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CW-40LP	40-10m	£116.95 D
CW-40PLUS	40-10m 66' l.	£139.95 D
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G5RV-PLUS	80-10m 102; l.	£79.95 C

Baluns

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Y1-5KPLUS	1:1 1.8-50MHz	£52.95 C

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RFF-58	for RG-58	£3.95 A

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HFT-1500

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- *1.8-30MHz 1kW*
- *Built-in 4:1 balun*
- *Roller inductor*
- *4.5kV capacitors*
- *140 x 318 x 305mm*
- *Weight 4.5kg*

VC-300DLP

W&S £179.95 C

- *1.8 to 30MHz up to 300W*
- *Dummy load*
- *8-way switch*
- *260 x 89 x 238mm*
- *Weight: 1.58kg*

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Sidekick - Ultra compact 80-6m OK on 3-way mag mount W-300S **£329.95 D**

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LCD readout, 20,000 memories, long wire & coax, radio interface.
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- *150W SSB, 100W CW*
- *6 - 3200 Ohms*
- *Cross needle meter*

W&S £209.95 C

MFJ-993B AUTO ATU 1.8-30MHz

W&S £249.95 C

- *Frequency: 1.8-30MHz*
- *300W SSB, 150W CW*
- *Matches 6 - 1600 Ohms*
- *Cross needle SWR/PWR*

MFJ-994B AUTO ATU 1.8-30MHz

W&S £339.95 C

- *Frequency: 1.8-30MHz*
- *600W SSB, 300W CW*
- *Matches 6 - 800 Ohms*
- *Cross needle meter*

MFJ-269 ANTENNA ANALYSER

- *1.8 -170 & 415-450MHz*
- *Frequency Counter*
- *LCD readout*
- *SWR & impedance*
- *N-socket (Ant), BNC (Counter)*
- *AAx10 or ext. 12V DC*
- *Size 103 x 173 x 60mm*
- *Weight 750g*

W&S £349.95 C

RadCom

THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

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When DXpeditioning in remote areas you sometimes have to improvise your aerial pole transport. Details on page 62.

Photo: David, M0VTG

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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded in 1913 incorporated 1926.
Limited by guarantee
Member society of the
International Amateur Radio Union

Patron: HRH Prince Philip, Duke of Edinburgh, KG, KT

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

General Manager:
Peter Kirby, FCMI, MISM, G0TWW
Honorary Company Secretary:
Rupert Thorogood, G3KKT
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Dr R Dingle, G0OCB

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G Keegan, G6DGK - Region 10
P Helliwell, G7SME - Region 11
P Brooks, G4NZQ - Region 12
J Stevenson, G0EJQ - Region 13

Details of the Society's volunteer officers can be found in the RSGB Yearbook and on the RSGB website.

The above details were correct at the time of printing, 11 January 2010.

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Log-in using your callsign in lower case as the user name, and your membership number (see *RadCom* address label) as the password.

The online *RadCom* can now be found at www.rsgb.org/radcom.

RSGB AGM

Join us in Bedford for the RSGB 2010 AGM. It will take place on Saturday 17 April at the Bedford Swan Hotel, The Embankment, Bedford MK40 1RW. The whole day is geared to bringing the RSGB to you and is an ideal opportunity for local clubs to socialise and meet with each other and meet with senior RSGB officers.

The timings for proceedings are:

10am:	VHF Award Presentations
11am:	AGM Registration
12 noon:	Annual General Meeting
	- Formal Proceedings
1pm:	End of Formal Proceeding
1-2pm:	Lunch
	(£8 for two course hot buffet)
2pm:	Open Forum
4pm:	End of Open Forum

Further details and the Calling Notice will be in the April *RadCom* and on the RSGB website.

PLA/PLT and Ofcom

The RSGB announced last year that it was considering its options in respect of legal action to cause a review of Ofcom's position on the perceived non-compliance of certain 'Ethernet-over-mains' (PLA) devices being placed on the market.

The Society has now completed a review of its options in conjunction with its lawyers and Counsel.

From this review it is clear that there are a number of avenues to be further explored and until this work is complete the Society will defer for the time being the question of legal action. This will allow other necessary preparatory work to be completed and will also recognise that a number of factors are in a state of flux, including new staff appointments at Ofcom and the much-awaited report commissioned by Ofcom from PA Consultants on PLT.

The Society will be vigorously pursuing the avenues recommended by its lawyers and others and in the meantime is very grateful to members who have given support, both moral and financial, to this important cause. It is important that this support continues, as the general threat to the spectrum noise floor from data-over-mains devices (PLT) and short-range-devices is likely to increase.

Funding the work to combat the threat of PLT/PLA remains a priority, and the Spectrum Defence Fund has this work as one of its prime objectives. Further contributions to the Fund will be most welcome to progress the Society's programme in this area.

RSGB Regional Team Vacancies

- Do you want to join a well motivated team?
- Do you want to connect with your fellow radio amateurs?
- Are you fed up with DIY and the Soaps?
- Are you a self starter?

If you meet three of the above statements you could be just the person that the RSGB is looking for. We currently have volunteer vacancies in the following positions within our Regional Team.

Regional Manager Vacancy
Region 1 Scotland South and the Western Isles

Deputy Regional Manager Vacancies

Region 5 –	District 51, Shropshire and Staffordshire and
	District 54, Gloucestershire and Warwickshire
Region 8 –	District 81, North Belfast and County Antrim
Region 9 –	District 91, Hertfordshire and Greater London North of the Thames
	District 93, Bedfordshire and North Buckinghamshire
	District 94, Surrey and Greater London South of the Thames
Region 10 –	District 102, Wiltshire
Region 11 –	District 116, Guernsey
Region 12 –	District 123, Essex

Interested? Please contact Alison Leigh, Regional Administrator by e-mail to alison.leigh@rsgb.org.uk or telephone 01234 832700 then option 6 Regional Manager's Department.

Spectrum Defence Fund

The Society is delighted to report that, less than four weeks after its launch, the Spectrum Defence Fund passed its first big target of £10,000. The fund is designed to allow the Society to build up a sum of money that we can use for the defence of the amateur radio spectrum now and in the future. The target we are aiming for is £200,000.00 so we have some way to go yet!

There is no doubt a need for such a fund. The RSGB has recently spent £20,000 seeking legal advice regarding the interference caused by PLA devices and this could be just the tip of the iceberg as more sophisticated adaptors come onto the market that may affect 6m operation and operation in the microwave bands. We are also more than a little concerned about the effects 'smart metering' may have on the HF noise floor. The fund has been established to protect your interests and to allow you to continue to enjoy your hobby in the best possible operating environment.

The Spectrum Defence Fund is ring fenced. This means it can only be used in the defence of your spectrum interests. All donations big or small are welcomed and very much appreciated. You can send it via Abbey Court or you can make your donation online or with your Regional teams at the many rallies up and down the country. Please support the fund in protection of your hobby.

Work starts at Bletchley

On 11 January 2010 construction of the new National Amateur Radio Centre commenced on schedule at Bletchley Park. Seen here ceremonially breaking the ground is RSGB General Manager Peter Kirby, G0TWW. Centre is Ian Horton of project managers NTN Partnership, and on the right is Charles Smith of contractors Buildings Partnership Ltd. In the background are the aerials of Milton Keynes ARS. We will keep you up to date on progress in future editions of *RadCom*.

Bandplan Corrections

In the Bandplan, the line in the 28MHz section that reads 20.210 to 29.290MHz should 29.210 to 29.290MHz. Also in the same sentence it should read INCLUSIVE rather than INCLUDED. Thanks to Robert Dancy, G3JRD for spotting these changes.

RSGB Club of the Year

The regional winners of the RSGB Club of the Year will be published in the April *RadCom*.

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.

2E0BIJ	Mr S Tingay
2E0BXU	Mr P Halloway
2E0GHR	Mr R Gill
2E0JQF	Mr S Walrond
2E0KOO	Mr K N Milone
2E0NKM	Mr N Morse
5P8ZY	Mr J Jenson
AD6WL	Mr J E Seifert
DL2LAH	Mr K Hartwigsen
EA1AS	Mr F M Martinez Gonzalez
EA3ZF	Mr J Aguilar Altes
EA4ERX	Mr S Fernandes de la Riva
EA4FUW	Mr V Ternande Martinez
EA7HKL	Mr R Moreno Marmol
EA7TL	Mr J L Heredia Del Valle
EB1DPB	Mr J Manual Soto Cernadas
EB1FGO	Mr A A Soto
EC7ITA	Mr A Gallardo
EI4DCB	Dr D Gallagher
G0EJV	Mr L Hodges
G0JDO	Mr T Thomas
G0JTD	Mr R H Lyne
G0MDQ	Mr P J Firmstone
G0TDM	Mr J G Sutton
G0TST	Mr R Hawtree
G0UCQ	Mr P Gater
G1BKL	Mr D N Ambler
G1BPV	Mr A Stalker
G1HAB	Mrs H A Birkmyre
G1HTO	Mr R Fortescue
G1MRP	Mr H Powell
G1NFN	R K R Hammond
G1OGR	Mr R J Welch
G1OJQ	Mr P Brooks
G1OWM	Mr G R Woodley
G1TMF	Mr J Firth
G1VTS	Miss Smith
G1XLL	Mr P Greetham
G3IKN	Mr V A Stagg
G3JUU	Mr D A Adams
G3OZL	Dr A P Jeavons
G3ZHV	Mr R S Bowler
G4AIJ	Mr R G Jones
G4DNK	Mr M P Lelliott
G4FIF	Mr D Cherrington
G4FPJ	Mr R P Rawle
G4JNN	Mr P P Corrigan
G4KFB	Mr M L Bird
G4LXS	Mr C Keat
G4MWW	Mr J G McLeod
G4PQX	Mr D E Taylor
G4TXB	Mr D Hinsley
G4XXK	Mr D G Hart
G4YVE	Mr C T Herwig
G6AWO	Mr R R Mansel
G6DHI	Mr D Kennedy
G6GPF	Mr J K Woodhouse
G6LJC	Mr G Weston
G6LNV	Mr J Cunliffe
G6VGC	Mr R E Woolley
G6XFR	Mr F A Fielder
G6ZGB	Mr C F Salmon
G6ZJN	Mr R M Williams
G7BXL	Mr M G Bickerton
G7CWT	Mr M Joy
G7HGU	Mr T E Hickling
G7SOH	Mr C G Brown
G7SYW	Mr R A Brown
G7VQR	Mr P Mawdsley
G8ADQ	Mr J M Taylor
G8ASC	Mr P J Richards
G8CFD	Mr R Rimmer
G8JJR	Mr K McMahon
G8LWO	Mr F W Merritt
G8PRN	Mr R L Morley
GD3FLH	RAYNET Isle of Man
GI4OYG	Mr M Black
GI7KMC	Mr J Magee
GM4FVM	Mr J S Edgar
GM4LCJ	Mr C A Gove
GM8YIK	Mr A G Robson
GU1IIW	Mr R M Loveridge
GWORTR	Mr R T Rees
GW1SBO	Mr W M Edwards
GW4UWD	Mr O P C Roberts
IZ3QRP	Mr A Salvaneschi
JK1DNW	Mr Y Sugimoto
KOROC	Mr R O Campbell
K3DCW	Mr D C Wright
K6ZWB	Mr R D Reiner
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M1DBB	Mr P Masters
M1ERD	Mr A J Trimble
M1FCG	Mr R Boyns
M1JJK	Mr J J Kelly
M3AAQ	Mr L Handley
M3CQM	Mr A Cook
M3CWC	Mr J L Harrison
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M3XBI	Mr A R Romanov
M3XCJ	Mr J D Fergusson
M3YYI	Mr M Harding
M3YZT	Mr G Bell
M3ZBC	Mr G Cowley
M3ZHX	Mr K Baker
M3ZIR	Mr D Powis
M3ZKU	Mr D Boardman
M3ZNJ	Mr A Harvey
M3ZNP	Mr R Young
M6AAH	Mr A A Cunningham
M6CAA	Mr C Sparrey
M6DAP	Mr D Pasika
M6DKL	Mr P Shaw
M6DWB	Mr W D Broadhouse
M6GEE	Mr B M Gee
M6HNC	Mr H N Clark
M6JDB	Mr J D Broadhouse
M6JEZ	Mr J Mitchell
M6KOL	Mr M Sahm
M6KOR	Mr S Campion
M6NBB	Mr N J Barrett
M6REV	Master R E Nash
M6SSM	Miss S Millard
MD6TSW	Mr D M Williamson
MM1BJP	Mr A McDermid
MM3TWG	Mr T W Galbraith
MM3VYU	Mr W G Young
MM6LAH	Mrs L A Hail
MU6CPV	Mr P Martin
MW0SAW	Mr S Wheatstone
MW3ZHU	Mr M Hilliar-Mills
N0OBG	Mr J B Conley
ND4XE	Mr L Brannen
RS164622	Mr B L Binns
RS183616	MR C P Mulvihill
RS203821	Mr T Owen
RS204514	Mr L F G de Carteret
RS205162	Mr T D Bendelow
RS205171	Mr J F van Rooy
RS205172	Mr H B Jager
RS205173	Mr T Scheltes
RS205174	Mr J G Slangewal
RS205175	Mr J M Slap
RS205176	Mr L Vermeer
RS205208	Mr G D Eales
RS205214	Mr G J Eycott
RS205234	Mr M Hardwick
RS205265	Mr C A Morris
RS205269	Mr S Hampshire
RS205273	Mr J Snowdon
RS205274	Mr W L Sawyer
RS205322	Mr A J Benton
RS205333	Mr M Ferenc
RS205334	Mr C J Keogh-Ly
RS205348	Mr E Mccauley
RS205364	Mr J Vann Smith
RS205375	Travelling Wave Contest Group
RS52760	Mrs D L Risbridger
SV1CDN	Mr D Drakopoulos
VA3KV	Mr J Thiessen
VE4BAW	Mr G Bawden
VE5OB	Mr J Horne
VK3AKG	Mr M Orive
VK3CG	Mr G Sexton
W1URE	Mr R A Schomburg
W43SU	Mr M Kroemeke
W8QJ	Mr J M Knapp
WA8DXD	Mr T R Arvo
WB8NBV	Mr N Joldersma
WR9H	Mr H T Case III
YU4ALM	Mr S Samardzic
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Award Winning

The Priory Academy LSST school, MX0PSL was active again for the British Wireless Blind Fund Transmission event on 19 September 2009. Their members Eleanor, M3VEV, Jon, M3KFZ and Josh, M6JTB operated on the Saturday morning and were able to make contacts in ten countries. The school also asked their Year 9 students at the school to help with the fundraising this year. Two sixth form students, Robert, M3KGH and Mia, M3OFM (who have been members of the radio club since they started at the school in 2004) took a DAB radio and a scarf (as a blindfold) to the Year 9 form rooms during the two weeks before the competition. They were able to demonstrate to the students the difficulties of tuning in a domestic radio; difficulties that are faced on a daily basis by the blind and visually impaired.

The school radio club are delighted to have won the award for the highest sum of sponsorship money raised by under 18s for the second consecutive year and look forward to being able to combine their radio activities with fund raising for this worthwhile cause in future years.

Spectrum Defence Fund

RSGB President, Dave Wilson, M0OBW was at the Red Rose Winter Radio Rally in January collecting donations for the Spectrum Defence Fund. In the foreground are Steve, M0SJR, and Kevin, M0XDJ. All those involved would like to thank everyone for turning out their loose change at a time when many charities are fundraising for different causes.

Photo by Stewart Revell, G3PMJ.

Good Exam Passes

Since running a pilot Foundation Licence course for two students in late 2002, Loughton & Epping Forest ARS have staged a further fourteen courses, thirteen of which have been successfully concluded over a single weekend. The most recent, staged over 30/31 January, ended on the Sunday afternoon with good exam passes for all eight candidates. This now brings to 75 the total number of Foundation licence students to have passed through LEFARS hands. LEFARS Chairman and Lead Instructor, John, G0VEH says that the club are fortunate to be able to rely upon a large pool of experienced tutors, assistants and invigilators.

L-R back row: John, G8DZH (Instructor), John Oldman, Leon Barker, Trevor Barnard, Patrick Ruttiman, John, G0VEH (course lead instructor). Front row: Daniel Gold, Joseph Carey, Christian Ruttiman, Siobhan Barrett-Davies.

Grassroots Help

Telford & District ARS members have now taught, examined and passed over 200 students, led by Mike, G3JKX, with teaching assistance from Martyn, G3UKV, Tony, M0TAW, Chris, M0ECM, Dave, M0EMM, Simon, G0UFE and Richy, M0RKY and many others giving 'on the air' experience to Foundationers on their courses. Since the Society obtained a Grass Roots government grant, they have been able to continue their tradition of not charging students for tuition or shares in room rental fees. With this grant they have also able to invest in up-to-date audio/visual equipment and obtained radio equipment for students' to practice with. Previously, instructors' own equipment had to be used.

TDARS urge other clubs and societies to apply for these grants, the local council was very keen on thier application. One tip; apply for a grant just before the end of the financial year! Yes, there is some paperwork to do, but the end result is really worth the effort.

RAF Waddington ARC

At the AGM in January, RAF Waddington ARC voted in a new committee. Based at The Pyewipe on the outskirts of Lincoln, the club has a fully equipped shack, an impressive aerial farm with aerials for all bands and a pub next door. They maintain a membership of approximately 50 members and are active in most HF and VHF contests throughout the year. The club meets every Thursday at the Pyewipe Inn and welcomes all radio hams, old and new. For more information please contact Chairman Martin Farmer, M0MDF, by e-mail to martin@farmer4.freeserve.co.uk.

New Committee. L-R: Barry, G4DBS; Andrew, M0OOO; Dave, G7HNO; Bob, G3VCA; Judy, M6LQO and Martin, M0MDF. Missing from the photo are Mick, M6CMG and Linda, M3ILF.

CTCSS Upgrade

Garex Electronics has a new CTCSS encode upgrade available for the AKD Model 2001 2m transceiver. The modification consists of a simple plug-in PIC module that requires only one extra connection to feed the tone to the main board. The upgrade is available in three levels, depending on the status of the rig that is being modified. Prices range from £7.60 to £24.95 and full details of these modifications can be found on the Garex website at www.garex.co.uk or by phone at 07714 198374.

NEWS IN BRIEF

• Warrington Amateur Radio Club has completely updated their website. The new webmaster Dave, G7SKR has included projects amongst the new design. www.warc.org.uk.

• Tennamast have just launched the first stage of their new website with a section for the most suitable and popular masts for amateur radio. To mark the occasion we are offering a range of special offers for both clubs and individual amateurs. Visit www.tennamast.com or phone 01505 503824 for more information.

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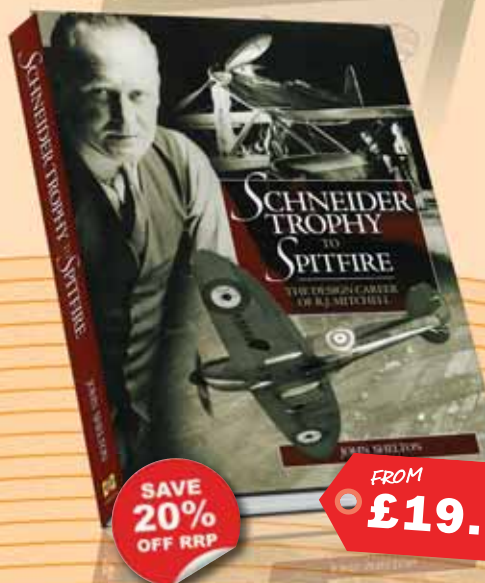

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Haynes Owners' Workshop Manual for Supermarine Spitfire

By Alfred Price & Paul Blackah

The iconic Supermarine Spitfire is the high point of many air shows and they turn heads where ever they are seen. This famous aircraft now receives the Haynes Owners Workshop Manual treatment. Written with the full co-operation and authorisation of the Royal Air Force this fascinating book provides a unique perspective on what it takes to own, restore and operate a Spitfire. This is a wonderful insight into the engineering and construction of this remarkable aeroplane. Presented mainly in colour, there are as you would expect cut away drawings, maintenance information and restorations tips. There is also a history of the Spitfire and even views from the cockpit and the engineer.

This highly detailed and attractively designed hard back book is based around the restoration of the Spitfire Mk XVI at RAF Coningsby. Providing an insight into owning, restoring, servicing and flying Britain's legendary World War 2 fighter – recommended reading.

Size 270x210mm, 160 pages, ISBN 9781-8442-5462-0

Non Members' Price £17.99 **RSGB Members' Price £15.29**

Haynes Owners' Workshop Manual for Messerschmitt Bf109

By Paul Blackah & Malcolm Lowe

Produced as a sister volume to the *Haynes Workshop Manual for Supermarine Spitfire* this book provides the same treatment to the Luftwaffe's Messerschmitt Bf109. This single-seat fighter was the main combat adversary of the RAF's Hurricanes and Spitfires in the Battle of Britain.

This Haynes Owners Workshop Manual covers the history of the Bf109, restoration to flight, the views of owners, pilots and engineers, and operating and servicing insights. Data boxes cover Bf109 facts and figures, plus interviews with Luftwaffe pilots and modern-day owner-pilots. Illustrated with a mix of specially commissioned colour and archive photographs, the Bf109 Manual also includes illustrations from Luftwaffe official wartime servicing manuals, and coverage of restoration projects in the UK and overseas.

Size 270 x 210mm, 160 pages, ISBN 9781-8442-5642-6

Non Members Price £17.99 **RSGB Members Price £15.29**

Schneider Trophy to Spitfire

By John Shelton

R J Mitchell is best known as the designer of the legendary Supermarine Spitfire fighter that he never lived to see enter service with the RAF. Schneider Trophy to Spitfire is the first book to give a comprehensive account of the design career of this great aircraft designer.

Reginald J. Mitchell, known affectionately as "R.J." or even "Mitch" was responsible for twenty eight of aircraft designs. Specialising is flying-boats, Mitchell was responsible for the sleek record-breaking seaplane aircraft that won outright the Schneider Trophy in 1931. There were many other classic designs such as the Stranraer and Southampton flying boats. The author John Shelton examines Mitchell's designs and recounts how each of his aircraft emerged in response to contemporary requirements and prevailing design philosophies. There are details of the successful campaign to win the Schneider trophy and the development of the Supermarine Spitfire.

Produced in hardback Schneider Trophy to Spitfire is heavily illustrated with line drawings of the aircraft and contemporary pictures. This book provides a great insight into the man and career that is R J Mitchell

Size 270 x 210mm, 256 pages, ISBN 978-1-84425-530-6

Non Members £25.00 **RSGB Members £19.99**

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Spectrum Defence Fund

SOS Radio Week

Chatham House Grammar School Radio and Electronics Club set up a station on Sunday 24 February at the Ramsgate Lifeboat station as part of SOS Radio Week 2010. It was a great success despite taking two hours to get a dipole set up, strung across two lamp posts outside the station. Peter, G0KOK used a long fishing line to get the wire up! They made some contacts with amateurs across Europe and the UK. It was hard work for the pupils who are not that experienced in events like this. Nevertheless with the help of Peter, Andrew, G0WBE and Chris, G0VUT from Hilderstone Radio Society they coped and had good fun on the way. The pupils who participated and helped raise funds for the RNLI were Jonathan, M6BNY, Adam, M6HFJ, Jerome, M6WBA, Henry, M6CHZ, Dylan, M6DWM, Terry, M3UCF and Craig, 2E0XDY. It stimulated much interest in all concerned and they have decided to give it a go again next year! The process of getting the sponsor money in is underway – the hard part. They hope be able to report a sum of over £250.

D-Star Day

With D-Star gaining popularity, Martin Lynch & Sons will be holding a D-Star Day on 13 March. There will be displays of all current models of radio plus the D-Star Dongle. This aspect of the hobby presents the user with many questions and it is hoped that this will all become clearer because, on hand to answer D-Star questions, will be Darren, G7LWT, Declan, M0TMX and Matt, M0DQW. It is also hoped that there will be representatives from Icom UK, RAYNET and the amateur radio press!

Appleton Lecture

Professor Sir Martin Sweeting OBE FR, G3YJO, the Chairman of AMSAT-UK, gave the Annual Appleton Lecture to a large audience at The Institute of Engineering & Technology at Savoy Place in London. Speaking as Executive Chairman of SSTL and as a Director of the Surrey Space Centre at the University of Surrey, his lecture was entitled 'Small Satellites – Big Future'. It traced the history of the 30+ micro-sats and mini-sats that have been created at Surrey since the early 1980s. SSTL have many satellites currently under construction and have recently been awarded a contract, with OHB in Germany, for 14 Galileo spacecraft. The video of the 2010 Appleton lecture can be seen at

http://tv.theiet.org/technology/communications/appleton-lecture-small-satellites.cfm

Appeal for Instructors

1st Astley Scouts are based in Higher Green, Astley, Manchester. After hosting several successful JOTAs (GB1ASG, GB100ASG) they have received requests from scouts and scout leaders to run a Foundation course. The local radio club, West Manchester Radio Club, fully supports the JOTA events and due to the amount of time they already give up to support the scouts they do not want to overburden the club with an additional request for support. For logistical, insurance and child protection reasons the scouts would prefer to run the course from the Scout HQ but are having difficulty in finding suitable instructors. They can offer classroom facilities equipped with 2m/70cm collinear and G5RV antennas and have access to radio equipment. The HQ also has full kitchen facilities and adequate car parking. The scouts would like to run the course over a couple of evenings followed by a full weekend session with a view to getting as many scouts and leaders qualified as possible in time for JOTA 2010.

Anyone who is able to give up some spare time to help the Scouts by running the Foundation course and exam, please send an e-mail to carl.thorp@1stastleyscouts.org.uk. Any help will be gratefully received.

Club Construction Night

Stenigot Chain Home ARC held their first club construction night in November. They decided to keep the construction project as simple as possible, but also to include many of the components that one could come across when building projects. The 'Knight Rider' circuit board consisted of a 555 timer and a decade counter IC, quite a large number of signal diodes, resistors, a potentiometer, capacitors and wire links, not to mention a quantity of light emitting diodes, all mounted on a small piece of Veroboard.

The project leader was Chris, 2E0PPS, with the clubs lead tutor Alan, M0AQC in assistance and all club members brought their own soldering equipment and associated tools. Most managed to complete the project, those that didn't will get an opportunity to finish their board and have it tested later.

Some club members had never built an electronic project before and the experience gained from this event will help with the next – more challenging – project.

Help to Haiti

ShelterBox is a local Helston charity that has the smart idea of sending boxes containing a tent, cooking utensils, water purification tablets etc., sufficient to support a family of ten people in the aftermath of a disaster. Poldhu Amateur Radio Club has responded to the Haiti earthquake by donating a box. Several thousands have now been sent. The picture shows Becky Maynard, Head of Fundraising, receiving the cheque from Anne, 2E0TJA and Keith, G0WYS.

Bath Buildathon

The third Bath Buildathon took place just before Christmas with a mixture of Full licence holders and Intermediate students. Martin, M0HKG, travelled all the way from Essex and others travelled in from Wiltshire, Berkshire and Somerset. The Bath Buildathon Crew, Mike, G3VTO, Lewis, G4YTN and Steve, G0FUW, were there to provide guidance and assistance with the testing of the various stages. The main project, once again, was the Walford Brendon 80m double sideband QRP transceiver. Gerald, G4CLD, worked on an 80m CW QRP transceiver, the Brue, also from Walford Electronics, and Tony, now 2E0JWF, put together a Sudden receiver kit, as used at the Buildathon events at the G-QRP Club Rishworth Convention and the QRP ARCI Four Days In May.

By the end of the day all but one receiver was heard working and a number of transceivers were working in both transmit and receive mode, others were completed with some one-to-one mentoring after the event. All of the Intermediate students went on to pass their written exam the following week and most are now attending the Bath Advanced course.

Alan, G1HHL and Dave, M0SXZ busy finishing their Brendon kits.

Special Event

The Mesilla Valley Radio Club of Las Cruces, New Mexico will be operating special event station, K5B, on 21 March 21 in conjunction with the 21st annual Bataan Memorial Death March Marathon. K5B will operate from 1000Z to 2300Z as near as possible to 21.305, 14.229, 7.184, and 3.808MHz. A commemorative QSL card for the event will be available by request. Details can be found at www.n5bl.org/bataan.

On-air with the Bitterns

Congratulations to five new radio enthusiasts, Steven and David Hammond, Tom Hayden, Neil Kerry and Peter Robinson who passed their Foundation licences under the care of the Bittern DX Group trainers, Allan, G0NTJ, Steve, G7VRK and course leader Duncan, M0WRG. The course was held in North Norfolk on two Sundays in January. Candidates and trainers alike are to be commended not only on their success but on the fact that they actually managed to get to the training centre through the snow for their first session. Thanks also to Linda, G0AJJ and Alec, G3YOA who ran the exam.

Australia Day

Lincoln Short Wave Club held an Australian breakfast to commemorate Australia Day. They put GB4VK on the air for the occasion. They ran their usual HF station as well as a 70cm station where they worked through an URLP Link. The Club managed to contact two stations in Port Lincoln, the twin town. The event was attended by RSGB President Dave Wilson, M0OBW and he was persuaded to go on the air too. The Region 13 team put on an RSGB display promoting the hobby to visitors – and the Lincoln Short Wave Club may be seeing some new faces very soon.

RAYNET Talk

A talk on the role of RAYNET in the region was given to the Milton Keynes ARS by Don Kirkwood, G3YQO. Don is the Region 6 zonal co-ordinator for RAYNET and his talk covered the role of RAYNET in the community and its liaison with the various services during emergencies. With the recent flooding, the ice and snow problems within the British Isles and other disasters worldwide, ham radio operators have proved to be the communications link when all else fails.

GB50NG

Aberdare and District ARS ran GB50NG during December 2009 to celebrate The Nos Galan Races, which translates to Midnight Races. It is held every New Year's Eve in the small town of Mountain Ash to commemorate the Welsh runner Guto Nyth Bran and his legendary athletic prowess. Every year a mystery runner(s) take part and this year Welsh rugby stars Jamie Roberts and James Hook laid a wreath at Guto Nyth Bran's grave in Llanwonno graveyard after a special service at St Gwynno's Church. They then followed the race route, with the crowd doing their best to cheer them on as temperatures dipped to -2°C. The Races follow a 5km route around the town and around 1000 runners took part and more than 10,000 people attended the event. This year GB50NG managed to achieve 1011 contacts from all corners of the globe in 45 different countries. Thanks to all who took part especially Paul, GW0JTY, Peter, GW0UHO and Dean, 2W0XTP.

JOTA

Braintree Amateur Radio Club has run previous JOTA events with the Earl's Colne Scout pack. They helped the scouts build a total of 20 crystal sets, with the reward that they worked well and all were taken home. For JOTA 2009, the club had the use of three separate rooms in the warm Earl's Colne Scout HQ, allowing them to set up three GB0ECS radio stations. Although the hut's location is not ideal for VHF working, it is fine for HF and satellite communications. Many scouts, cubs and beavers made contact with other scout groups on the 80m band and via satellite. Apart from the cold nights, they said, it was probably their best ever JOTA event!

John, M5AJB explaining to the scouts how to contact other scout troops.

New AO-7 Distance Records

During January, the distance record for the 35 year-old amateur radio satellite AO-7 was repeatedly broken. First, on 2 January, Luciano Fabricio, PY5LF worked Pierre van Deventer, ZS6BB over a distance of 7630km. Next on 8 January, Luiz Pirajá, PS8RF worked Andre van Deventer, ZS2BK at 7694km.

Then, on 18 January, Pierre van Deventer, ZS6BB managed to work Josep Riera EA6SA at a distance of 7766km. On Sunday 24 January at 2252UTC, Joe Spandler, K3SZH in Harrisburg, Pennsylvania, had a short contact with Francisco Ramires, PY2OV in São Paulo, Brazil. The distance between the two stations was 7738km and is believed to be the furthest contact within the Americas but just short of the world record.

The theoretical maximum range of AO-7 is about 7907km so there is still scope for the record to be broken yet again. Pierre van Deventer, ZS6BB reports that Marco Niccolini, IW5EJM/5 managed to copy his callsign at a distance of 7902km although no QSO took place.

Foundation Pass

Treknow & District Radio Amateur Club supported Terence Hayward from Bodmin through his recent Foundation course. He can be seen proudly displaying his Foundation pass certificate. His new callsign is M3ZNX. M Rowe, 2E0BUS acted as 1st Invigilator and J Brooks, M0HJO as 2nd Invigilator. Also present were T Gabriel, M0VRL and J Rossiter, 2E1AFC.

Intermediate Course

An Intermediate course starts on Wednesday 24 March with the exam on June 30 at the Conference Room at Clay Cross nr Chesterfield. Places on the M0OCT ARS course are limited so early booking is advisable. Telephone 01246 275 889 for details or e-mail exams@m0oct.com. Details on courses always appear on the website www.m0oct.com. Enquiries and bookings are also being taken for the Advanced course starting 1 September with a June Exam 2011.

Science & Engineering Week

The Flight Refuelling ARS, G4RFR, will once again be holding an open day at their Society HQ at Merley, near Wimborne Minster, Dorset, on Saturday 20 March. Doors open at 11am and active demonstrations of most aspects of current amateur radio communications will be available for viewing by the general public and fellow enthusiasts. HF, VHF and microwave exhibits, including satellite and EME should feature, together with other items such as a working high voltage Tesla coil. The theme for Science Week 2010 is based on The Earth, so grounding will be in there somewhere...

The event will be live webstreamed by members of BATC – last year's event attracted a peak web audience of over 1000 spread around the world. For more details look at FRARS.org.uk website or contact the Hon Sec by e-mail at jfell@tesco.net.

Jersey Repeater Update

The Jersey Amateur Radio Repeater Group has had a successful nine months or so of fund raising since its inception. So much so that they are now in position to complete the acquisition of the repeater equipment. It had been hoped, having secured a site in St. Helier, that the installation could have moved on late in 2009 but when the site fell through an alternative had to be found and has resulted in a delay. They now have agreement from the Jersey Electricity Company to site the repeater at their Queens Road premises, a good location with a good 'take off' for the island and beyond. They hope to have the repeater on air soon with the help and assistance of the members of the group and anyone else who would like to 'pitch in'. The Jersey repeater, once commissioned, will operate on the 2m band on 145.6375MHz, CTCSS code B, 600kHz repeater shift, locator IN89we.

Foundation Success

Tamworth Amateur Radio Society has just run a very successful Foundation course, over three Saturdays, with the exam at the end of January. They enjoyed a 100% pass rate. The successful candidates are, from l-r, Timothy Clark, John Davies, Matthew Taylor, Danny Dates and Elizabeth Coffey.

Celebrating 25 Years

Brickfields Amateur Radio Society will be celebrating their 25th Anniversary in March this year. Originally founded in 1984 and named the Binstead Amateur Radio Society, the club soon moved to their present site at Brickfields Equestrian Centre where they adopted their new name. Their callsign G0BAR was first issued on 13 March 1985, so celebrations are being centred around this date, including a lunch, table top sale and the activation of a special event station for which a commemorative QSL card is being printed.

Any past members or associates of the Society who would like further details of the planned activities should contact the Secretary, David A'Bear, G0VZV.

RSGB shop

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Bouncing-Bomb Man

The Science of Sir Barnes Wallis

By Iain Murray

Barnes Wallis is best known as the 'boffin' behind the famous bouncing bomb used by 617 Squadron to breach the Ruhr dams in 1943, but his work covers a far wider canvas.

Bouncing-Bomb Man details Barnes Wallis' work from airships, through novel aircraft structures and special weapons, to long-range supersonic aircraft, and an extensive patent portfolio. This is the first book to describe the entire life's work of Wallis in detail and shows how his genius brought totally new ideas into these various fields. The book is packed with detail on how ideas were conceived, tested and performed in use. From the famous "bouncing bomb", "earthquake bombs" (tallboy and grand slam), airships, supersonic aircraft, telescopes, cargo carriers, bridges and much more they are all detailed here with the science and engineering expertise that he deployed to make them work.

Lavishly illustrated this great hardback book makes extensive use of line artwork and photographs to demonstrate the concepts involved. For those seeking an authoritative work or those simply wanting a good read *Bouncing-Bomb Man* is ideal reading.

Size 270x210mm, 288 pages, ISBN 978-1-84425-588-7

Non Members £25.00 **RSGB Members £19.99**

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The Real Enigma Heroes

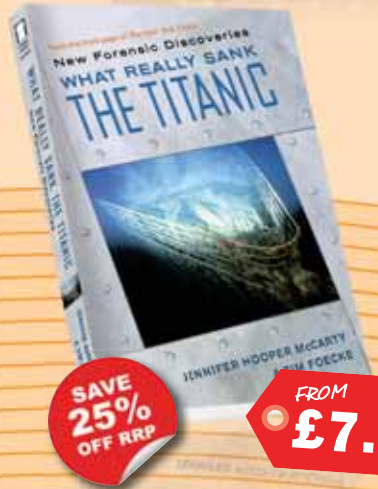
By Phil Shanahan

The capture of the Enigma codes helped shorten WWII by at least a year. Churchill took a special interest in the information that came out of Bletchley Park's Station X and he guarded his contact well so that the Germans would never find out the source. Without the quick actions of three men from HMS Petard, who clambered aboard a sinking German U-boat, the codes might never have been broken. On the night of 30 October 1942, First Lieutenant Tony Fasson, accompanied by Able Seaman Colin Grazier and Tommy Brown, climbed aboard U-559. Passing codebooks up through the hatch, Fasson and Grazier were caught aboard the sub as she suddenly sank. Brown was saved, along with the code books, and the rest, they say, is history...

It wasn't until 1969 that the men were mentioned for their work in rescuing the Enigma codes. Phil Shanahan tells the extraordinary story of the three men who saved countless Allied lives, as well as the efforts to recognise their bravery.

Size 254x178mm, 240 pages, ISBN 978-0-7524-4472-7

Non Members' Price £19.99 **RSGB Members' Price £16.99**



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What Really Sank the Titanic?

By Jennifer Hooper McCarty and Tim Foecke

We are now all aware of the infamous night of the April 14, 1912, when the "unsinkable" RMS Titanic, with over 2,200 passengers onboard, plunged to a watery grave. But what really caused the Titanic to sink? Was it simply an unlucky accident with an iceberg in the North Atlantic or was it more?

Researchers Jennifer Hooper McCarty and Tim Foecke thoroughly investigate the accident applying modern techniques to the evidence. They draw on their participation in expeditions to the ship's wreckage and experiments on recovered Titanic materials. Far from a conspiracy as some propose, the authors build a compelling new scenario for the reasons for the disaster.

Grippingly written, *What Really Sank the Titanic* is illustrated with fascinating period photographs and modern scientific evidence. If you are interested in this Titanic disaster this is a book not to be missed.

Size 231x157mm, 256 pages, ISBN 9780-8065-2896-0

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Contest Presentation

On 10 January, Geoff, W0CG paid a visit to Kilmarnock and Loudoun ARC. He gave a presentation about the PJ2T contest station in Curacao, Netherlands Antilles. It was a very interesting talk and was appreciated by the members who braved the bitter winter conditions to attend. The club is now looking forward to contacting the PJ2T station during the 2010 contest season.

Back: Gordon, MM0GOR, Allan, MM3VNW, Arthur, MM0DHQ, Davie, MM3YFR. Front: Geoff, W0CG, Len, GM0ONX, Barry, GM3YEH. Photo by Graham, MM0GHM.

Mountain Goat

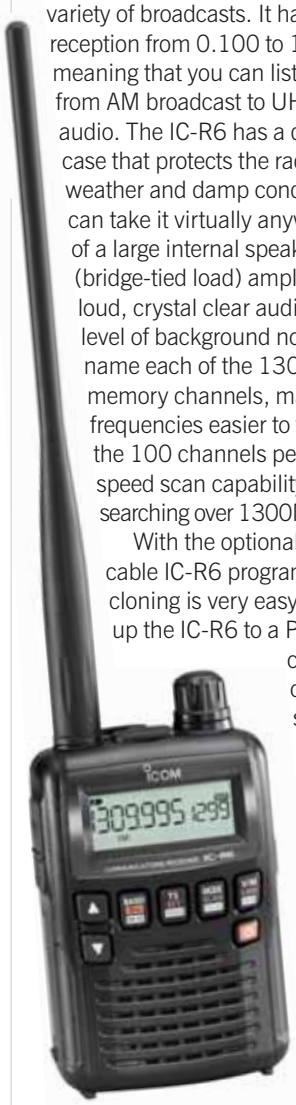
Rick Peterson, M0RCP from Leeds is the latest radio amateur to have achieved the SOTA Mountain Goat award for 1,000 activator points. Rick reached his target on 5 December with an activation of The Old Man of Coniston G/LD-013 using 2m FM, 40m SSB and 80m SSB. This was Rick's 171st activation on 92 different summits, mainly in the Lake District and Northern Pennines areas, although he has also activated in Wales, and as far south as Wendover Woods G/CE-005, near Aylesbury. Activating is sure to continue for Rick, since his son Thomas, M3OOL is over three-quarters of the way to his own Mountain Goat award.

Rick Peterson, M0RCP, new Mountain Goat, with son Thomas, M3OOL on the summit of Tal y Fan GW/NW-040 in North Wales.

New IC-R6 Receiver

The new IC-R6 compact handheld receiver from Icom measures only 58 x 86 x 30mm and contains many big features that allow you to listen to the widest variety of broadcasts. It has wide band reception from 0.100 to 1309.995MHz meaning that you can listen to anything from AM broadcast to UHF analogue TV audio. The IC-R6 has a drip-resistant case that protects the radio from harsh weather and damp conditions so you can take it virtually anywhere. The use of a large internal speaker and BTL (bridge-tied load) amplifier ensures loud, crystal clear audio whatever the level of background noise. You can name each of the 1300 available memory channels, making frequencies easier to find during the 100 channels per second high speed scan capability – useful when searching over 1300MHz of spectrum!

With the optional software and cable IC-R6 programming and cloning is very easy. You can hook up the IC-R6 to a PC so you can customise channel names, scan lists, and more. In addition, the optional CT-17, CI-V level converter allows for PC remote control.



The IC-R6 retails at £173.87 plus VAT and comes complete with BC-07 UK battery charger, 2 Ni-MH rechargeable batteries, FA-S270C antenna, belt clip, handstrap and a handbook. Contact your local Icom dealer for details or visit www.icomuk.co.uk.

NEWS IN BRIEF

• The Isle of Man Amateur Radio Society is continuing past its 60th year. At the recent AGM a new committee was elected. The committee is now Chair - Steve, GD7DUZ, Treasurer - Jeanie, 2D0JEA, Secretary - Andy, GD1MIP, Morgan, MD0DXW, David, MD3YLX, Stuart, GD0OUD (also RSGB rep) and last, but not least, Matty, MD0MAN. Alan, GD0MWL remains as the president. The club holds a weekly meeting on Wednesdays at its club shack in Foxdale and monthly talks / events in Cronkbourne on the second Tuesday of the month. Further details can been seen at www.iomars.blogspot.com.

ATC Exam Successes

At the 2425 (Nottingham Airport) Squadron's recent presentation evening, two members of staff were presented with their certificates for passing the amateur radio Foundation licence examination in December 2009. C/I Sharon Woodier and Adult Flight Sergeant Adam Street are pictured with their instructor C/I Tony Wardle, G4XZA (centre). Flight Sergeant Street, now M6AAS, said that he finds radio communications a fascinating subject and that he hopes to attain his Full licence in due course.

2425 Squadron currently has seven members with a radio amateur Foundation exam pass and five serving cadets with the ATC Communicator Badge, the Corps' highest radio/comms award.

MW Loop Antenna

The Eton AN200 is a tuneable indoor loop antenna that can improve the reception of medium wave stations on most radios throughout the entire medium wave band. The AN200 can boost the reception provided by the ferrite antenna that is built in to most portable radios, or it can simply be placed near the radio to boost reception, it does not need to be connected or plugged in to your medium wave radio to work.

The Eton AN200 has a built-in tuning dial to peak reception of the desired frequency or station at the same time providing selectivity to reject unwanted stations and noise. The antenna is directional and so can be turned to optimise reception of a specific station. The Eton AN200 Antenna is passive and so does not require a power source. The price is £39.95 and available from Eton stockists or direct from Eton UK distributors Nevada, see www.nevadaradio.co.uk.

International Marconi Day

This year the 23rd IMD will take place on 24 April. Although not a contest, awards can be obtained and full details will be found at www.gb4imd.org.uk. For a station to be counted towards an award by applicants, that station must be registered by contacting the webmaster (webmaster@gb4imd.org.uk) prior to the event with full details of the station. In order to qualify as an Award Station operations should take place from a site that either used Marconi equipment prior to his death in 1937 or from which he carried out experiments during the same period.

Screen Readable

The QRP Amateur Radio Club International (QRP ARCI) has published the Winter 2010 issue of its journal *QRP Quarterly*. At the same time a new service has been introduced to assist blind and visually impaired radio amateurs. The magazine will be available in a screen readable format on request. *QRP Quarterly* features a mix of technical, contest and operating news and is to subscribers in the QRP ARCI 14,000 strong membership. Further information can be found at the QRP ARCI website www.qrparci.org.

Facebook

There is a new Facebook page for firefighters and amateur radio operators. It is restricted to amateur radio operators that are firefighters and/or EMT/Paramedics. The purpose of the page is to foster a tighter bond between the worldwide fire service and amateur radio. Jeff, W8JSA, who started the page, hopes it will increase the awareness between the two. In the USA, the FCC has allowed emergency first responders to use the amateur frequencies as a secondary means of communications but only if they are first licensed amateur radio operators.

Midlands D-Star Network

During 2009, five Midlands D-Star repeaters were joined together via the Internet to become 'MidStar UK'. These repeaters are GB7BM (City of Birmingham) GB7GL (Gloucester) GB7WF (Wyre Forest) GB7SY (Shrewsbury) & GB7ZI (Cannock). These repeaters are internet linked, to a Regional Reflector: 21B. This linking enables QSOs to be made throughout the combined coverage area. Mobile users could start a QSO on the M5 as far south as Bristol and continue, without a break, up onto the M6 or along the M54 into Wales. This will be an excellent safety feature for drivers because the usual 'link' and 'unlink' commands will not be necessary when changing from one D-Star repeater to another. Naturally, static MidStar users will also be able to have QSOs anywhere in the combined coverage region.

MidStar users will still be able to connect to their local, national and international reflectors as before. However, if they are connected to MidStar, the usual 'unlink' command needs transmitting before they send a 'link' command to another reflector or individual repeater they want to use.

Digital repeaters are not cheap to buy, operate and maintain, so all D-Star users should consider registering with, and make regular donations, to their local digital repeater Sysop. One very important point of D-Star etiquette: at least four seconds should elapse at the end of each 'over' to allow digital packets to be exhausted within the system before the network receives RF again. Otherwise the initial digital 'header' from the new sender's Tx could be partially lost and the QSO would break down. This could also be caused by stations 'doubling' or due to low signal strength.

Chelmsford Amateur Radio Intermediate Course

The 9th Intermediate course run by volunteers from the Chelmsford Amateur Radio Society will start in March. As well as radio theory, the course teaches how to solder and build a simple radio set. It will be held at the Danbury Village Hall near Chelmsford on Thursday evenings from 18 March until 27 May. The exam will be held on Thursday 3 June. The course costs £75, which covers the room hire, project materials, Intermediate Licence manual and RSGB exam fee. To find out more speak to Clive, G1EUC on 01245 224577.

NEWS IN BRIEF

• The 61st Annual International DX Convention sponsored by the Southern California DX Club will be held at The Holiday Inn Hotel & Conference Center, Visalia, USA from 16 - 18 April. Full details at www.dxconvention.org.

• The D-Star digital repeater node GB7NE at Lynemouth in Northumberland has now operated successfully since it was commissioned last September. It has recently been connected via the Internet to the D-Star network enabling contacts to be made to the many repeater nodes and reflectors worldwide. The repeater operates using digital voice GMSK modulation with output frequency of 439.450MHz. The equipment at Lynemouth is home brew and is the third non-Icom repeater node in the country. During the coming months the equipment and in particular the software, will be further developed to enhance the performance. The repeater node is maintained by Colin, G7RWC but thanks go to David, G4ULF for his ground breaking digital repeater development work, which was described in last month's *RadCom*. If you require further information then have a look at the Northumbria Repeater Group website, www.gb7ne.org.uk.

• The Great Northern Hamfest organisers have changed the date of their rally as their venue couldn't offer the usual date. Now the rally will be held at the Metrodome Leisure Complex, Barnsley, South Yorkshire on 19 September.

• The program Radio Mobile has continued to evolve, says its designer, and is now at version 10.3.5 with many new features. The program is available free for amateur and humanitarian use. Program details and an installer are available at www.g3tvu.co.uk/Radio_Mobile.htm.

• After the success of last year's event, the Summits on the Air Management Team is pleased to announce another International SOTA Weekend to be held on 1 and 2 May. All prospective activators are encouraged to post their planned activations on SOTAwatch, http://sotawatch.org, as soon as is practicable.

• Two new SOTA associations launched on New Year's Day 2010. These latest additions to SOTA internationally are the W3 call area of the USA, and VP8 - Falkland Islands. All the summit data can be viewed on the SOTA Database at http://database.sota.org.uk.

• A short photo-report for the MM0DGR/M mini DXpedition is available at www.srars.org/wff-reports/gmff-010.htm. Thanks to all who called the station.

• Waters & Stanton have produced a new online catalogue for the Watson range of radio accessories. This can be accessed from the front page of their website (www.wsplc.com) and can be downloaded as necessary.

Membership Focus

QSL Matters: A look into the QSL Bureau and the service it provides Members of the RSGB

The sorting frame.

QSLing. The RSGB QSL Bureau is a service run by the RSGB for the betterment of the amateur radio community. It remains an extremely cost effective option for those that want to QSL. The bureau handles around 1.5 million cards per year and is one of the busiest in the world. Receiving a nice QSL card for a memorable contact is always a welcome thrill; an e-mailed QSL card doesn't quite have the same effect for most amateurs.

SENDING YOUR QSL CARD. Only RSGB Members may send cards through the RSGB Bureau – it's part of your Membership Services package. Make sure you pack your cards securely, it's such a shame if they get damaged on their way to the bureau. Also, be sure to check the weight of the package and make sure you have attached enough postage. Now the Royal Mail charges both on size and weight of packages, you may need to take a trip to your local Post Office to make sure.

Many amateurs carefully sort their cards for maximum sorting efficiency – and a big thank you to them! Sorting them into the correct order isn't a huge job but it makes a huge difference once they get to the Bureau. It helps us if the cards are sorted in DXCC country order and you can find out that list in a number of places, including the RSGB website. If cards are sorted in this way, the 23 feet of sorting frame can be walked once and around 3000 cards can be sorted in something like 15 to 20 minutes. If cards are in a more random order, then the sorting process takes much longer – sometimes 9 or 10 times longer (and whilst walking is a beneficial exercise, those sorting the cards could so without that much walking!). If you want the full details of how to sort and send your QSL cards, you can find details in the latest copy of the RSGB Yearbook or on the RSGB website (www.rsgb.org/operating/qsl.php). Remember that to send QSL cards through the bureau you do need to be a member, although any amateur can lodge envelopes with their QSL sub manager to receive cards.

OUTPUT. To give you a flavour of what we do, here's some facts and figures for the last couple of months. In November last year we shipped to nine countries Austria, Canada, Estonia, Germany, Italy, Russia, Ukraine & USA. In December the count was eight countries, this time Belgium, Czech Republic, Germany, Israel, Japan, Netherlands, Norway and Switzerland. Last month, January 2010, the country count went up to nineteen countries.

So what does that mean? Well, it amounts to a total of around 475kg and approximately 151,000 cards in packages of between 2 and 25kg depending on destination and shipping method.

We have also just finished packing and shipping 181,216 cards (yes, we do count them!) to all of the UK sub managers in around 100 separate packages. The next UK dispatches are scheduled for just after the Easter holidays.

UNCOLLECTED CARDS. The volunteer sub managers are a valuable resource, much appreciated by the amateur community at home and abroad. Sorted UK cards are sent on to the sub managers for onward distribution. The system relies on those wishing to receive cards depositing stamped addressed envelopes with the sub managers.

Sadly, **Photo 2** shows several hundred uncollected cards for which Wayne Thomas, the manager of the M0P-M0Z series, has no pre-paid envelopes. He really would like to unite the cards with their owners.

John Fogden, G4WSX, who handles G3I-K and G4W-X sub groups reports having 'a few thousand' heading for the shredder very soon – something he'd rather not have to do! Our volunteer sub managers only have to hold cards for three months; many retain them for much, much longer because they would like each and every amateur to get the cards that have been sent.

Even if you aren't particularly interested in collecting QSL cards, but are active on the air, you will probably receive cards now and again. If you send your QSL sub manager just a couple of pre-paid C5 envelopes, that will make all the difference. Our volunteer sub managers work very hard to get all the cards to their destinations as quickly as possible and if everyone lodged a couple of envelopes with their sub manager, the job would be much easier. If you need the address of your QSL sub manager you will find the details in the RSGB Yearbook or on the RSGB website (non members will need to obtain the information through the RSGB online shop).

SENDING CARDS. The address for all your QSL cards into the system is: RSGB QSL Bureau, PO Box 5, Halifax HX1 9JR.

PHOTO 1: Some of January's cards (approximately 150kg) nearly ready for dispatch overseas. Boxes on the left are sealed and ready to go, whilst the open ones are 'topping out' just waiting for those last few cards to make the most cost effective use of the weight limits.

PHOTO 2: Just some of the uncollected cards that the volunteer sub managers are holding on to, hoping that they can unite the cards with their rightful owners!

RSGB shop

RadCom 2009 CD

Volume 84

This CD contains every word of every page published in *RadCom* during 2009 and much more besides. Everything in the magazine including all the adverts is provided in an easy to use PDF format. Not only can you print any of the 1000+ pages included but you can search the text for those specific items you want. The latest version of the Adobe Acrobat software is included on the CD if you don't already have a copy. There are also samples of other RSGB archive CDs and extracts from RSGB books. If you want to free up some shelf space and still keep all your *RadComs* handy for future reference there is no better way than the *RadCom 2009 CD*.

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Note: RadCom archive CDs dating from 1939 are also available.

Non Members' Price £19.99 **RSGB Members' Price £16.99**

Callseeker Plus 2010

If you want the convenience of an instant search callbook that covers the UK and Europe that is *Callseeker Plus*!

This CD contains the most up-to-date listings of United Kingdom and Republic of Ireland amateurs' callsigns, you will also find comprehensive coverage of callsigns from across Europe. It also contains the all the information from both the RSGB Yearbook Information section in an easily searchable PDF. *Callseeker Plus* boasts a host of "extras" including hundreds of Mega Bytes of useful amateur radio software (list available on the website). This CD is a must for every radio amateur who wants an economical choice with lots of software, additional information and data from across Europe.

Non Members' Price £15.99 **RSGB Members' Price £13.59**

Radio Amateur Call Book CD

The Pegasus Flying Horse CD

Using the very latest Europe and US call data, makes this the most up-to-date and very best World Call CD available. In co-operation with the RSGB you also get the latest UK call information on this CD alongside the World Call data. Requiring no hard disk installation this CD has an easy to use and effective interface. The "Radio Amateur Call Book" is compatible with existing logging software and all operating systems from DOS to Windows XP.

This CD has the following:

✓ International and North American listings and amateur radio prefix maps
✓ Contains more than 1,600,000 amateur radio callsigns
✓ More than 60,000 email listings
✓ More than 60,000 QSL manager listings
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DIGITAL

Homebrew

A PIC controlled DDS local oscillator for the LF/MF receiver.

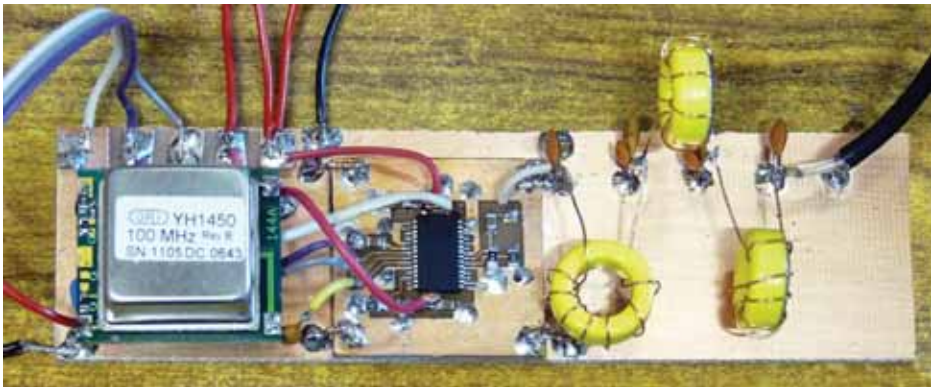

Photo 1: The DDS local oscillator with added low pass filter and buffer amplifier (see text).

BRINGING IT ALL TOGETHER. This month's project is based on a collection of circuits we have built over the last few months. The AD9851 DDS board (October 2009) will be combined with the 40 pin PIC development board (November 2009) to make a direct digital synthesiser (DDS) local oscillator (LO) for the LF/MF receiver project. As most of the hardware has already been described in some detail, this month we will be taking a close look at the PIC software that drives the DDS unit.

AD9851 DDS LO. The AD9851 DDS board forms the core of this project. This unit is mounted on a strip of copper clad board with the 100MHz oscillator module as described in the October 2009 issue. For the 0 – 4MHz LF/MF receiver with an IF frequency of 10.7MHz, the DDS output frequency range is 6.7 to 10.7MHz. The original bare-bones DDS board does not include an output low pass filter (LPF) or buffer amplifier. I used the filter design tool in QUCS to design a 7th order Chebyshev LPF with passband ripple of 0.1dB. This filter is designed for an I/O impedance of 200Ω. The cut-off frequency is about 12MHz. This will completely eliminate the 100MHz REFCLOCK signal and the strongest spurs at REFCLOCK ±output, ±2 x output, ±3 x output etc.

If you intend to use the DDS as a general-purpose signal generator, the LPF should be redesigned for a higher cutoff frequency. About 1/3 of the REFCLOCK frequency (ie 33.33MHz in this case) is the recommended maximum output frequency. Using the DDS at higher frequencies will result in output 'spurs' at an unacceptably high level.

The filter is followed by a transistor buffer amplifier. The measured output is 2Vpp into 50Ω. Second harmonic output is more than 30dB down. Non-harmonic spurs are generally more than 70 – 80dB down across the entire output range. This reasonably good performance is a result of limiting the output frequency to less than 11% of the REFCLOCK frequency. **Figure 1** shows the output spectrum when the DDS is tuned to (10.7-3.727)=6.973MHz. This plot covers a 5MHz span, centred on 6.97MHz.

CONSTRUCTION. The circuit around the DDS PCB was built on a strip of copper PCB laminate, see **Photo 1** (which actually shows my 'signal generator' version that has some component value differences - see http://homepage.eircom.net/~ei9gq/dds.html for details). The REFCLOCK oscillator is a 100MHz OCXO purchased new on eBay. Similar units are available from time to time. 100MHz OCXOs are usually less expensive than the more sought-after 10MHz and 5MHz oscillators. Alternatively, a 5V TTL tin-can oscillator can be used. Another option is to use a lower frequency crystal oscillator and enable the AD9851 6x REFCLOCK multiplier. 100MHz/6 is a rather inconvenient 16.6666MHz. Perhaps a 20MHz oscillator and 6x multiplier would be a more convenient arrangement. It is very easy to modify the control software so that it works with a 120MHz REFCLOCK. It would also be possible to use a common 20MHz oscillator to provide clock signals for both the DDS and the PIC microcontroller. I have avoided using this option because of the risk of introducing noise from the PIC into the DDS clock signal.

The LPF inductors were wound on T50-2 powdered iron toroids. The 3.67μH inductors are each 27 turns of enamelled copper wire. The 4.18μH inductor is 29 turns. I used 0.375mm enamelled wire (Maplin YN86T). Any enamelled wire with approximately the same diameter will give similar results. The transistor in the output buffer amplifier is a 2N3866. Any similar VHF power transistor like the 2N4427 or 2N5109 should work equally well. I didn't use a heatsink for this transistor in my prototype. The transistor runs slightly warm, but it never gets uncomfortably hot. A small clip-on heatsink might be a useful addition to this stage, especially if the DDS unit ends up in a small enclosure. The output transformer of the buffer amp is 10 turns, bifilar wound on a FT37-43 toroid. **Figure 2** shows how the LPF and buffer amplifier were added to the DDS circuit.

At this stage in the proceedings, I would usually describe the testing and alignment procedure. However, the DDS can't do very much at the moment. To make it do anything useful, we will need to build a digital control system that will provide the necessary serial data, data-clock and update signals to the DDS chip. Early tests on the DDS board used a PIC16F628 microcontroller to provide these signals. This simple test rig was rather lacking in features. It had no keypad, no rotary encoder or any other method of controlling the output frequency. The DDS frequency word was fixed in the PIC at programming time. This was more than a little inconvenient when the DDS was used as a receiver local oscillator. To QSY to a new frequency it was necessary to remove the PIC, re-program it for the new frequency and then re-install it in the receiver!

Clearly, we need to find a more flexible arrangement. My shopping list of features includes a VFO knob, direct frequency entry via a keypad and a high precision digital

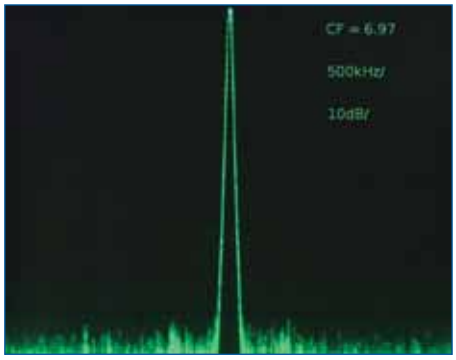

FIGURE 1: DDS output spectrum of 6.973MHz signal, span ±2.5MHz.

FIGURE 2: LPF and buffer amplifier added to the DDS circuit.

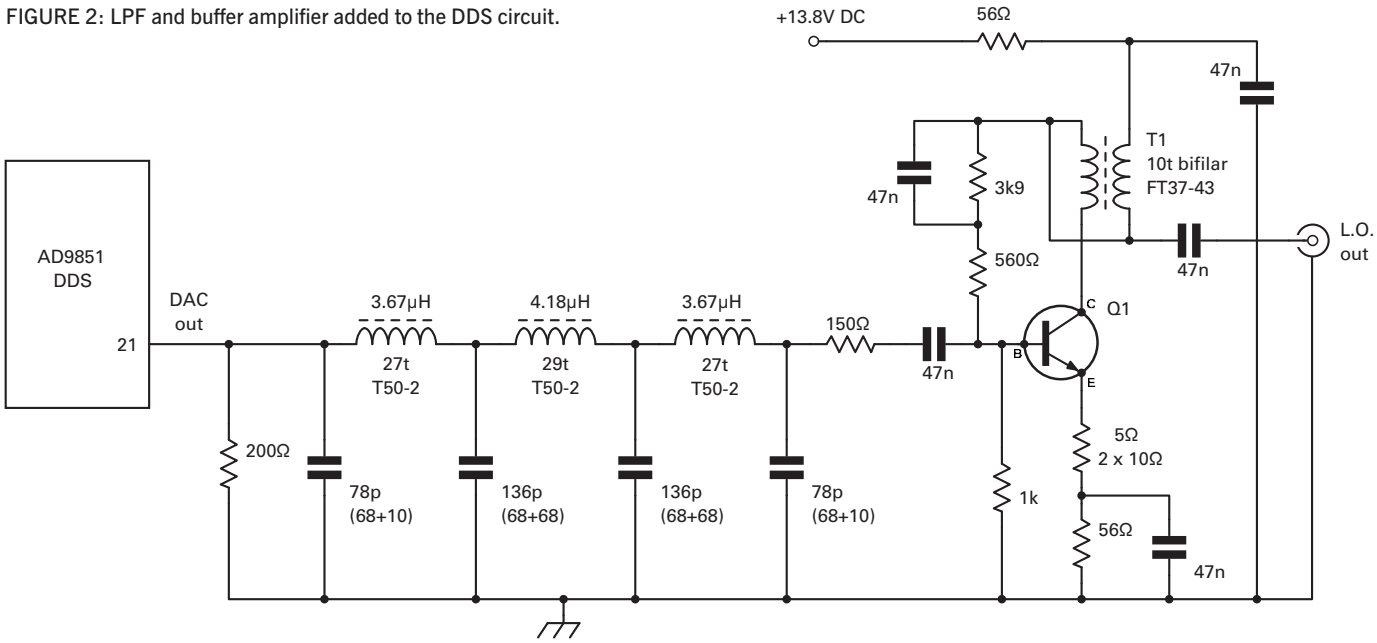

Photo 2: My first program was the traditional 'Hello World!'.

frequency display. This project will probably grow a few more features as we progress, so it would be a good idea to use a larger microcontroller with more I/O pins than the humble PIC16F628. The obvious choice is to use the PIC development board from November 2009 and a 40 pin PIC18F4550 microcontroller **[1]**. This device has 32kB (16k by 16 bit word) of program memory, 2kB of RAM, numerous digital and analogue I/O pins, several counter/timers, UART, a maximum clock frequency of 48MHz and, best of all, a built-in USB2 interface. The USB interface can be used to re-program the PIC without removing it from the circuit.

PINGUINO. Pinguino **[2]** is a complete USB based PIC development system. The key components of Pinguino are a development board with a USB PIC, the Pinguino PIC bootloader and the Pinguino IDE (integrated development environment) PC software. Pinguino is based on the popular Arduino board for the Atmel AVR microcontroller. Pinguino code is written in the C language and compiled using the SDCC (Small Device C Compiler), which is included in the Pinguino installation. Because the Pinguino is a clone of Arduino, many of the 'Arduino Language' functions have been ported to Pinguino. This language is easy for the beginner to learn. The hardware input/output operations that make up a large part of most microcontroller code are abstracted into simple functions like *digitalRead(); digitalWrite(); analogRead(); analogWrite()*; etc. The semicolon is an important part of the C language syntax.

Pinguino software and hardware designs are free and open-source. Versions for Windows, Linux and Apple Mac are available from the Pinguino website. Read the installation instructions on the Pinguino blog page carefully. The Pinguino USB bootloader is based on the bootloader from the Vasco PUF (PIC USB Framework) project **[3]**.

ADDING AN LCD. One of the most frustrating aspects of microcontroller programming is not knowing what is happening inside the chip. It is possible to use emulation hardware or simulation software to debug your software but, when things go wrong, it can be very difficult to track down the source of the problem unless you have a direct pipeline to the core of the chip. A simple LED and series resistor connected to a spare I/O pin can serve as a status indicator. A single line added to your source code can be used to turn on the LED. This will tell you if the block of code containing this single line has been executed. More complex debugging code might flash the LED with a different flashing sequence for each type of error or condition. It would be even more useful to have a proper alpha-numeric character display for showing text output. A full screen computer monitor type of display is not necessary for simple applications. A small LCD character module will be quite adequate for now. A 2 line x 16 character display as used in some of our previous projects is ideal for this application. The display chosen is a standard 2x16 HD44780 compatible type. I have tested the following code on a Winstar WH1602B display and the Maplin N27AZ; most 2x16 displays should work fine.

My very first C program was the famous 'Hello World' program as featured in The C Programming Language by Kernighan and Ritchie. Showing 'Hello World' on a display is often used in programming tutorials as the simplest possible program for the beginner. This is generally true when the program is run on a computer with a screen and operating system shell. However, even this simple example is a bit more difficult when it is run on a microcontroller. The microcontroller must first carry out basic housekeeping like configuring I/O pins and initialising the LCD display module before sending the message one character at a time to the display. Before we begin, we must wire the display module to the PIC. Due to the scarcity of I/O pins on the 18 pin PICs, all of our previous projects have used a 4 bit interface between the PIC and the LCD module. As we are now using a 40 pin PIC, I have decided to use the faster 8 bit interface mode. The 8 LCD data lines D0-D7 are connected directly to the PORTB pins of the PIC RB0-RB7. The RS (register select) and ENA (enable) lines are connected to PORTE pins 1 and 0 respectively. **Figure 3** shows the connection details. Note that the R/W (read/write) line is not used because my program never needs to read from the display. The power supply and LCD contrast adjustment are not shown. See Homebrew October 2006 and **[4]** for further information if required. Check the datasheet for your display for details of the pin connections. Most modules are software compatible with the Hitachi HD44780 types, but some manufacturers use a different configuration for the connector.

Our first job is to initialise the LCD module. The datasheet for most display modules will

give details of the initialisation process. The procedure is similar for all HD4478 based displays: wait for a specified time after power up, send the first command, wait for a specified time, send the next command and so on. The command sequence I use in hexadecimal is 0x30, 0x30, 0x30, 0x3C, 0x0C, 0x01, 0x06.

The data-sheet for the N27AZ display specifies that you must wait for more than 30ms after power-up before sending commands or data to the display. As some older displays specify 100ms, we will erron the side of caution and use that value.

Pinguino has a couple of useful delay functions: *delay(Xms)*; and *delayMicroseconds(Xus)*; which makes our job much easier. To satisfy the requirement for a 100ms delay our first C statement is *delay(100)*;.

To make the program more readable and less prone to errors, I have already defined a pair of constants, RS and ENA at the beginning of the program, as the Pinguino logical I/O pin numbers (not the PIC IC pin numbers) for the pins that control the RS and ENA lines to the LCD module.

As the first byte to be sent to the display is a command, the RS line is pulled low using the simple statement *digitalWrite(RS,LOW)*;

Now that the LCD module is expecting a command, we can put the first command on the PORTB pins of the PIC. The hex value for this command is 0x30 (0x indicates that the following value is hexadecimal and not decimal). This operation is just a simple assignment: *PORTB=0x30*; this places 0x30 (00110000) in the output latch for PORTB. Since this port has been configured as an output, this value will magically appear on the PIC PORTB I/O pins. Next we need to generate an enable pulse by pulling the ENA pin high and then low again. Because we are using a very fast PIC with a clock speed of up to 48MHz, it is possible to generate a clock pulse which is shorter than the required value of greater than 500ns. To ensure that the enable pulse is of sufficient duration, I have inserted a 1 microsecond delay between the ENA=HIGH and ENA=LOW transitions. As you can see from the code below, this is easy to do using the Pinguino instructions. The 1ms delay after each command satisfies the data-sheet requirement for a delay of more than 39 microseconds before the next instruction is sent.

```
digitalWrite(ENA,HIGH);   //Enable line high
delayMicroseconds(1);     // Delay
digitalWrite(ENA,LOW);    //Enable line low
delay(1);                 // Delay 1ms
```

By repeating this process several times using the initialisation values above, the LCD was successfully initialised. Sending the first character to the display is just as easy as sending a command. Select the data instead of the command register by pulling the RS line high. Yes, you've guessed correctly. *digitalWrite(RS=HIGH)*; the complete sequence is:

```
digitalWrite(RS,HIGH);
  PORTB='H';
digitalWrite(ENA,HIGH);
delayMicroseconds(1);
digitalWrite(ENA,LOW);
  delay(1);
```

This prints H on the LCD screen. Not quite 'Hello World', but it is a start. We can repeat this sequence 11 times to display the full message. The space in the middle also counts as a character. The above example suggests that writing messages on a display is an incredibly tedious process involving about half a dozen instructions for each character written. Happily, this is not the case, now that this very useful segment of code has been written, it can be moved into a user defined function so that it can be called by a single statement any time that it is needed. I chose to call my function *display()*; for obvious reasons. This functions allows the programmer to show a single character by calling the function like this: *display('H')*; I have also written another function called *display_string()*; which works by calling *display()*; several times in quick succession. The LCD initialisation code was also put into a function. Several other functions called *clear()*; *home()*; and *line2()*; were also written. These are available from the source code examples on the web.

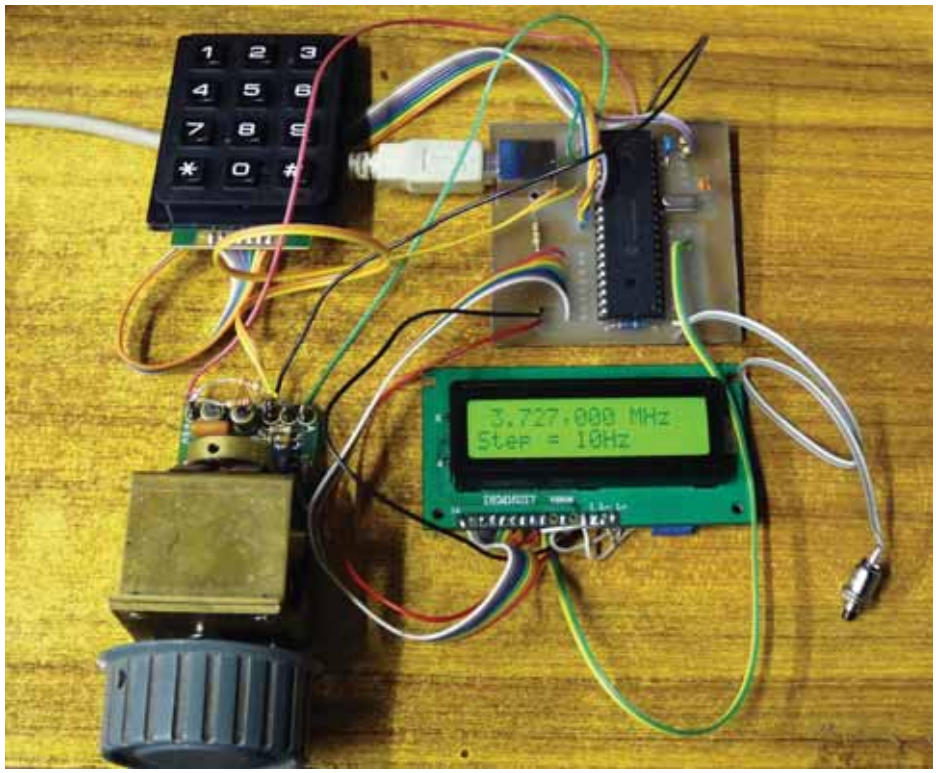

Photo 3: The completed DDS local oscillator.

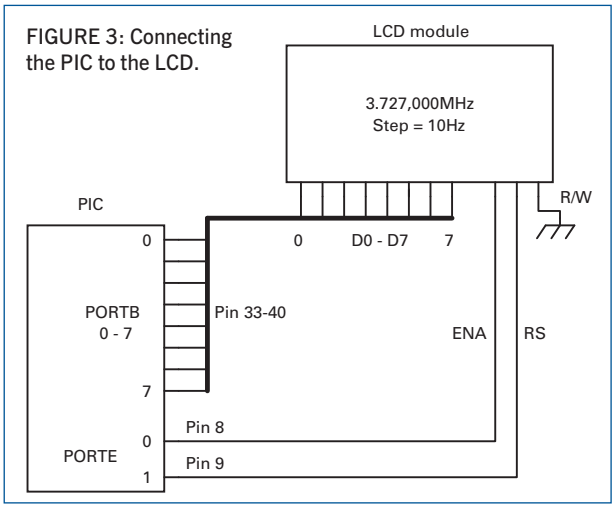

FIGURE 3: Connecting the PIC to the LCD.

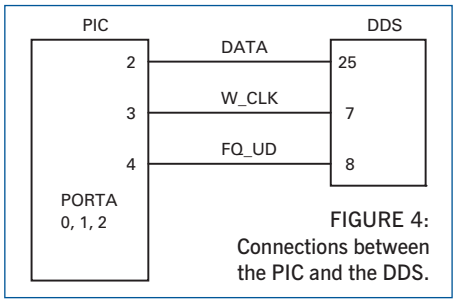

FIGURE 4: Connections between the PIC and the DDS.

The user defined functions make life a lot easier. Calling *lcdinit()*; and *display_string("Hello World!")*; produced a program that compiled successfully without any reported errors - a rare event in my experience. Uploading the program to the PIC is a very painless process using the Pinguino IDE. Just reset the PIC with the reset button (car key) and click 'Upload' in the Pinguino IDE within a few seconds.

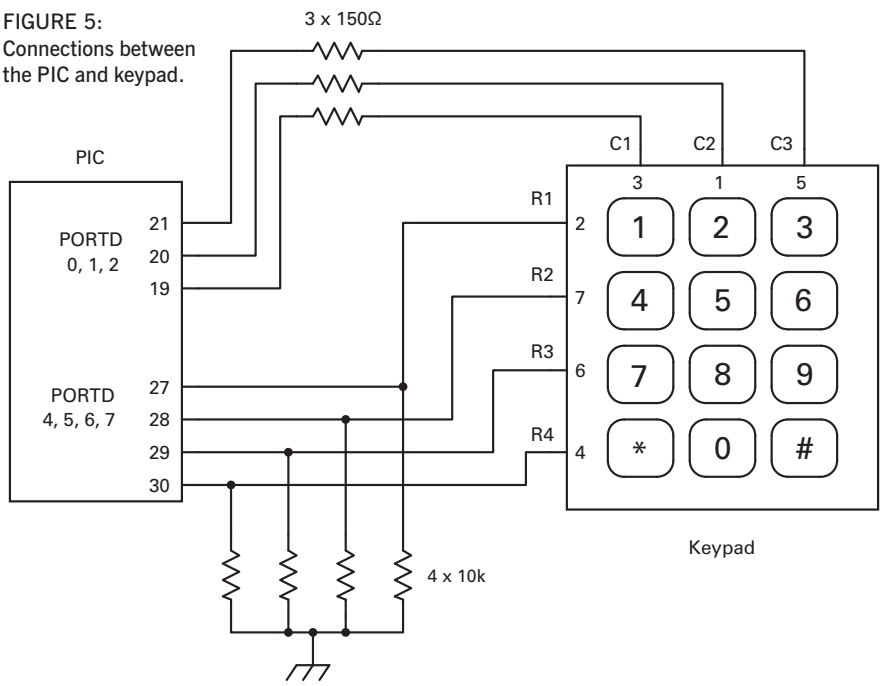

FIGURE 5: Connections between the PIC and keypad.

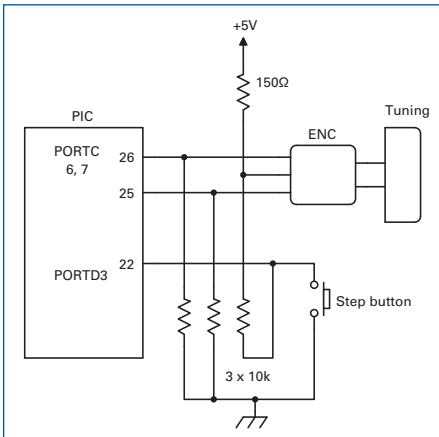

FIGURE 6: Connections between the PIC and rotary controller.

After about five seconds, the bootloader jumps to your code.

Things didn't work out exactly as planned. As soon as the program ran, the display was completely filled with rapidly flickering garbage. I had put my code in the main loop of the Pinguino program which is executed over and over in a never ending loop. The addition of a simple 'while' statement at the end of my program stops program execution at this point so that my important message remains stable. The main loop code is below. The resulting message can be seen in **Photo 2**. My first ever C program for the PIC actually works!

```
//Pinguino main loop
void loop()
{
 lcdinit();
 display_string("Hello World!");
 while(1){} // Wait forever...
}
```

Our next task is to send the 40 bit frequency and control word to the DDS IC. The AD9851 and other similar devices have a simple serial interface which sends the 40 bits one bit at a time using just three PIC I/O pins and a ground connection. The first bit is placed on the serial data input of the DDS and a clock pulse is applied to the word clock (W_CLK) pin. This cycle is repeated forty times to send the complete 40 bit word. To complete the sequence a frequency update pulse is applied to the FQ_UD pin of the DDS. Pinguino I/O pins 13, 14 and 15 have been assigned to this task. As with the previous example, these pin numbers have been defined as named constants in the C source code. My chosen names are DDS_DATA, DDS_CLK and DDS_UD. It is not possible to show all of the code here, but the following few lines will illustrate how the *dds()*; function works:

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

The *for* loop is configured to execute the code between the { } brackets 32 times, once for each bit of the 32 bit frequency word. The first line of code in this block is an 'if' statement that works in the following manner: *if(condition true) {do this}*. We can optionally include an alternative course of action by including an 'else' statement. The program flow then becomes:

```
if( condition true ) {do this}
        else {do something else}
```

freq is a variable of type unsigned long which contains the frequency word we want to send to the DDS. If we want to generate a 5MHz output, the value is 5000000÷(100000000÷2^32)= 214748365 or 0xCCCCCCD in hex. Before running the above code, freq can be assigned this value: *freq=0xCCCCCCD*.

One thing that needs further explanation is the condition in the *if* statement. *freq&1* is a bitwise **and** of the 32 bit binary number in the variable freq with binary 1. This masks off the upper 31 bits leaving only the last or least significant bit (LSB). If this bit is a 0 the condition is FALSE and the 'else' code is executed, pulling the DDS_DATA line low. If the bit is a 1, the condition is TRUE and the DDS_DATA line is pulled high.

The next two lines just generate the DDS_CLK pulse in a very obvious way. The final line in this block: *freq=freq >> 1*; does a bitwise right-shift of the frequency word by one place so that the next bit can be evaluated during the next iteration of the *for* loop. A second for loop (not shown) sends eight zeros to make up the remainder of the 40 bit word. The connection details are shown in **Figure 4**.

The keypad and rotary encoder connections are shown in **Figure 5** and **Figure 6**. Reading the keypad and encoder involves more of the sort of simple logic employed in the earlier examples. To scan the keypad, all three column pins are set high and the state of the row inputs is checked periodically. A zero result shows that no key has been pressed. A non-zero result shows that a key is pressed. We don't know which key until we check each row individually. The following code shows the check of row 1 only. To understand how it works, write the decimal numbers 16, 32, 64 and 128 in binary. Bits 4, 5, 6 and 7 of PORTD are connected to rows 1, 2, 3 and 4 respectively.

```
switch(key_state){
        case 16 : key_char='1'; break;
        case 32 : key_char='4'; break;
        case 64 : key_char='7'; break;
        case 128 : key_char='*'; break;
        }
```

The completed control circuits are shown in **Photo 3**. Source code for the above examples and for the finished DDS are available at http://homepage.eircom.net/~ei9gq/dds.html.

ERRATA. In the February column Figure 1 we inadvertently transposed IC1 pins 4 and 5.

REFERENCES

[1] http://www.microchip.com
[2] http://www.hackinglab.org/
[3] http://vasco.gforge.enseeiht.fr/
[4] http://homepage.eircom.net/~ei9gq/counter.html

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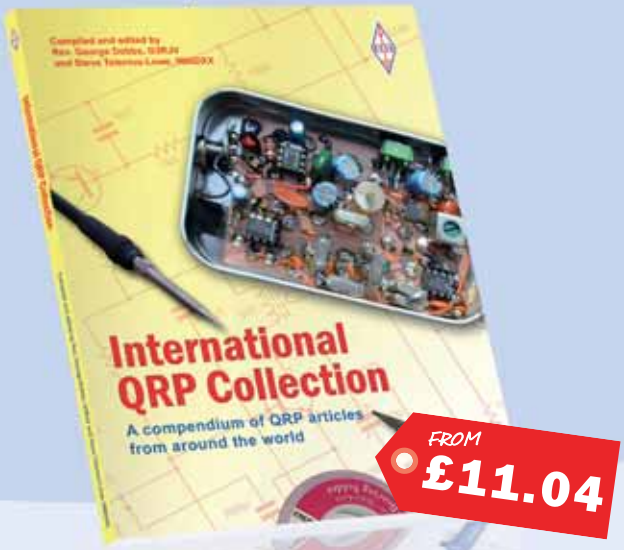

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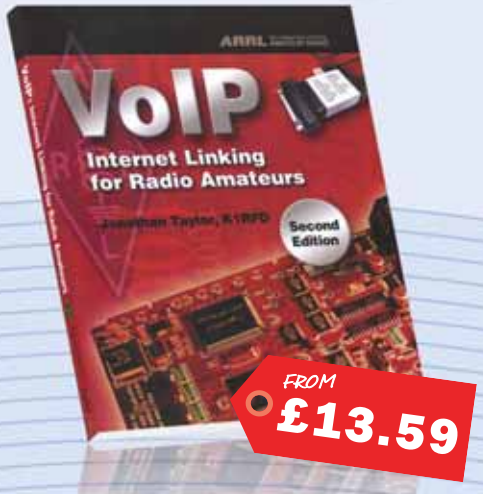

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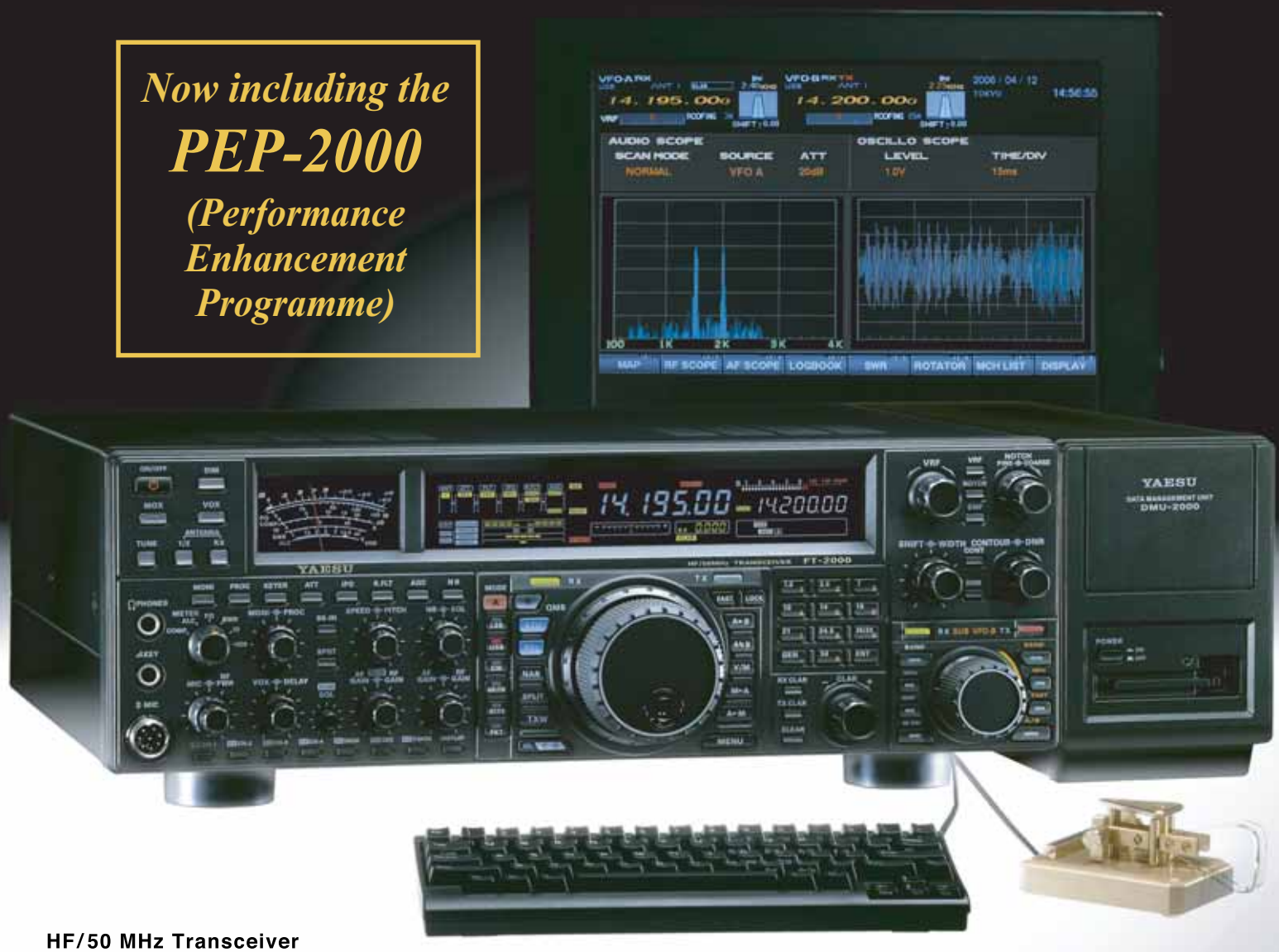

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Building the antenna may have caused this reviewer some headaches – but it was well worth it.

PHOTO 1: The complete unpacked antenna in kit form.

OVERVIEW. The Spiderbeam is a novel design of a multi-band 3-element wire beam. In fact, it is a 4-element on 10 metres. The construction uses a glass fibre spider and the elements are taped onto the spider and are bent into a V shape. Feedlines for each beam are tied together and attached to a current balun, the main feeder then being 50Ω coax. It has been developed for use primarily on DXpeditions, so has a fast assemble and dis-assemble time, once the aerial has been constructed. It is ideal for this purpose as it is has a total weight of only 6kg – or 12lbs in my money! It has been around since 2003 and I was asked recently to review one of these antennas.

KIT CONSTRUCTION. The Spiderbeam arrives in kit form and once the elements and guys have been cut and the balun constructed, it is only a matter of assembly and disassembly each time the antenna is used. If you don't like the sound of this construction work, this antenna is available pre-assembled; check out the website for details. The light weight makes it extremely portable, so it is suited to DXpeditions or holiday use. In fact, if you look at the website, www.spiderbeam.net, you will see that it has been in action on a large number of DXpeditions already.

The complete unpacked antenna, in kit form, can be seen in **Photo 1**. Even the balun has to be wound and inserted into its box! This might deter some people, but there is a 36 page manual with step by step instructions so by taking your time, all should be well. In fact, there are two manuals, one in English and one in German, since the antenna is designed by Cornelius Paul, DF4SA.

ASSEMBLY. Assembling the centre joint was a little tricky. There are some aluminium spacers that have to be inserted into the four tubes in order to maintain the tube integrity, see **Photo 2**. Luckily, I had a medical long nosed ridged clamp, with which I was able to hold the spacer and feed it into the tube. Tools like this always come in handy and are often available at larger rallies like the National Hamfest. Without that tool, an improvised piece of cardboard would have to be used, as suggested in the handbook. This would not have been so easy! Once assembled, it would not be taken apart again.

I must admit that the rest of the construction was most unlike any antenna work I have ever done. When fabricating guy lines with the Kevlar rope, these had to measured exactly and the ends burred with a hot soldering iron or similar. Small plastic insulators had to be installed to each end of these lines. This was followed by some pieces of PVDF-Monofil line, which resembled fishing line, again to exact lengths, with insulators on each end. Then Velcro straps had to be cut to length, some for gluing to the booms, with other lengths for mounting the balun and even more lengths for holding the antenna elements onto the pieces that had been glued to the boom. Fast drying glue for this job is supplied.

All this was again followed by cutting the wire elements to length, very precisely, with insulators on each end. Then, exactly measured lengths of monofilament guy lines are attached to the elements and each element labelled.

LOTS TO DO. I did most of this assembly whilst in the shack and must admit to not really enjoying it. There were lengths of monofilament, Kevlar, wire elements and odd bits of Velcro all over my floor. I was beginning to wish I had not volunteered for this! Actually, Blue Peter came to mind a couple of times. I am not sure if this is an age related thing or whether I had no confidence in the final item. Either way, I was ready to pass this to somebody else, in fact anybody else! The weather did not help, with rain and winds most days.

However, Chris, G0DWV persuaded me to carry on and was kind enough to come over to my place to lend a hand on a couple of days.

I was not finished yet! I had to wind the balun with a very springy piece of coax. This took some time, getting the two windings symmetrical and winding it tight enough to allow for installing it into the provided box and soldering it in place, a time-consuming job. Then feeders had to be fixed with heat-shrink, to the correct length again, with connectors on the ends.

Eventually we finally made it to the garden. Strangely enough, the two days that Chris came to give me a hand were superb; blue skies and sunshine, with little wind and not too cold either.

CONSTRUCTION. The assembled glass fibre poles were mounted on a short stub mast that was in turn mounted in my workmate, **Photo 3**. Stringing the support wires and ropes is a fairly straightforward job, although I was not too happy with my fixing of the antenna elements. You do need to pay attention to the instructions as the construction is quite different from other antennas. They look untidy but are functional, **Photo 4**.

PHOTO 2: Assembling the centre joint.

PHOTO 3: The assembled glass fibre poles were mounted on a short stub mast.

PHOTO 4: The fixing of the antenna elements.

PHOTO 5: Terminating the feeders onto the balun is simple.

PHOTO 6: Lifting into place.

PHOTO 7: I was pleasantly surprised with the results.

This is probably OK for portable use, but a more permanent method would need to be adopted for a fixed station. In fact, if the weather had not been against us we intended taking the beam down again and tidying these up. In use, no problem occurred despite lots of wind and rain. Finishing terminating the feeders onto the balun is simple, making sure there is no phase reversal, **Photo 5**.

With the antenna still in the Workmate® about 6ft off the ground, we checked the SWR with a Timewave TZ-900 antenna analyser. This gives a visual representation of each amateur band and shows just how the antenna is behaving. We were pleasantly surprised in that resonance was low on each band, with ten meters being the opposite. Obviously this would change on raising the antenna to operating height.

The complete antenna is very light and can be handled very readily by one person, at least in the horizontal plane. Mounting it onto a tower is not quite as easy! For portable use, with a pump-up mast, it would be somewhat easier, mounting the antenna at a low height. With a tilt-over tower, the head unit is too near the ground. We found the best method is to take two of the fibreglass poles out, taking care not to muddle or dislodge the wires etc, and then it will slide into the head unit of the tower at about 6-8ft above the ground, with the tower tilted up to match the angle. Then we lifted it some more to enable the two poles to be re-installed, **Photo 6**. Taking the tower back up to vertical was then quite easy. We attached the coax, RG213, and fed it back to the shack. Checking resonance again proved our assumption correct. 20 and 15 meters were just about ideal for the CW ends of the bands. In fact, 20 metres was 1.6:1 on 14.015MHz rising to 2:1 at the top end. On 15 metres, it was 1.2:1 on 21.060MHz, rising to 1.7:1 on 21.330MHz. Ten metres needed some pruning, which we didn't bother to do as the band was dead anyway! On 28.050MHz the SWR was 3:1 and on 29.400MHz it was 1.6:1.

TESTING ON-AIR. My moans and groans were forgotten when we tested the antenna. Although I was supplied the full five-band version, I made only the three-band version, 10/15 and 20 metres. Despite the initial assembly headaches, I was pleasantly surprised with the results. I see no reason why the five band version should not perform just as well. We rested it at about 50ft, pointing in the same direction as my 4-el SteppIR, at 110ft, **Photo 7**. Now I was in a predicament here as my SteppIR rotator has failed and I could not rotate either beam. However, comparing the two, on stations that I know are in the correct direction, the Spider was just about 2 S-units down on the SteppIR, which I thought to be amazing, considering the difference in height, the difference in beams, etc.

I was quite impressed and worked quite a number of USA stations with ease and on some there was little difference, depending on where they were situated. I then tried some stations in the other direction, by electrically reversing my SteppIR. On this beam stations that were S7 were unreadable on the Spider. I would estimate the back to front at 20dB plus.

Following the instructions implicitly produces a beam that needs a minimum of tuning, a good SWR and bandwidth. Looking at the responses on the Timewave analyser certainly proves that. It is an ideal antenna for portable/DXpedition use, being so light and easy to assemble and erect. It would pay to buy the rugged version for permanent home use however.

SPIDERBEAM. The 5-band Spiderbeam costs 389 Euros and the heavy duty version costs 459 Euros direct from DF4SA (www.spiderbeam.com or www.spiderbeam.us for North American readers). You may be interested to know that Cornelius makes full details of the Spiderbeam construction available on the website so those that enjoy building their own antennas from scratch cam do so. You can apply for a full set of instructions in pdf form, free of charge. See www.spiderbeam.com for full details. My thanks to Spiderbeam for the review antenna.

COMPETITION. Spiderbeam is offering the 5-band antenna that was used during this review as a prize for a DXpedition organised by our readers. To take part, please simply e-mail brief details of the DXpedition – date, callsign, location and team or individuals involved. We will draw a winner from the editorial biscuit tin. All DXpeditions with a start date until 30/09/2010 are eligible to take part. The winner will be published in *RadCom*.

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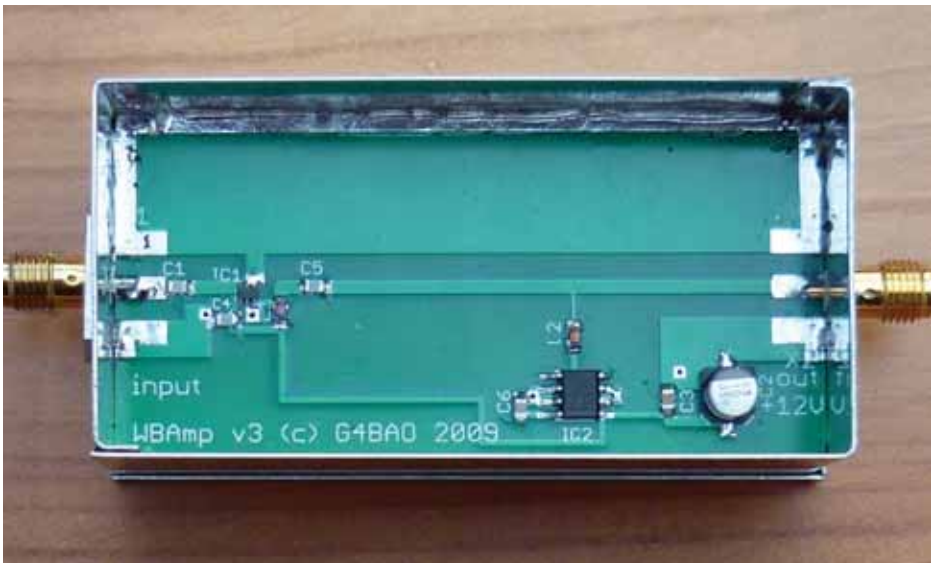

PHOTO 1: Completed preamplifier fitted in its tinplate box.

PARTS LIST

Preamp components (all SMD)

C1, C4, C5	1nF npo ceramic (0805)
C2	10µF 16V
C3	100nF X7R ceramic (0805)
C6	330nF X7R ceramic (0805)
L1	680nH inductor (0805)
L2	1µH inductor (0805)
IC1	ABA52563Avago Modamp
IC2	UA78L05ACDG4 5V regulator (SO8)

Bias tee components (all SMD)

C1	330pF npo ceramic (0805)
C2	1nF npo ceramic (0805)
C3	10nF X7R ceramic (0805)
L1	820nH inductor (0805)
L2	220µH Bourne CM453232-221KL

INTRODUCTION. This article describes a wideband preamplifier that offers useable gain between 30MHz and 3GHz. It gives typically <3.5dB noise figure and >20dB gain between 30MHz and 1500MHz, falling to around 19dB gain and 4.6dB noise figure at 3GHz. While it is not designed to compete on noise figure and gain with the narrow band preamplifiers of the type designed by G4DDK **[1]** et al, it can make a very useful addition to a wideband receive system, or as a general purpose test amplifier.

The preamp can be powered up the coax via the companion bias tee, so it can be placed at the masthead and will 'liven up' many a wideband receiver by overcoming coax cable losses. The amplifier itself is linear but, that said, care should be taken if you already suffer from strong local signals. Putting a lot of very wideband gain at the masthead may make this worse.

The design is very simple and based around a single Avago ABA52563 **[2]**, 3.5GHz 'modamp' device, and is realised in surface mount components on inexpensive 0.8mm FR4 PCB material.

The preamp PCB is designed to fit in to a readily available 37 x 74 x 30mm tinplate box. The bias tee fits a similar box of 37 x 37 x 30mm **[3]**. SMA or N connectors can be fitted, according to taste. See **Photo 1** and **Photo 2**.

PREAMP CIRCUIT DESCRIPTION. The circuit is shown in **Figure 1**. No real originality is claimed for the RF circuit, as the Avago application circuit was followed fairly closely. The preamplifier requires no tuning and has a built-in 5V regulator and bias tee to allow the supply to be fed up the receive coaxial cable from the second bias tee at the shack end.

As the device is nominally 50Ω in and out, only DC blocking capacitors (C1, C5), a bias feed L1 and decoupling, C2-4 are needed. The power supply (from the output connector) feeds into a familiar 78L05 regulator, putting 5V onto the active device via RF choke L2.

BIAS TEE CIRCUIT DESCRIPTION. The circuit is shown in **Figure 2**. For a bias tee you should aim to produce as little loss in series to the RF over as wide a bandwidth as possible and as high a loss to RF through the DC port. A 330pF capacitor C1 is a good compromise to give reasonably low loss at the LF end. The DC feed consists of two inductors and bypass capacitors. The small RF inductor L1 is effective at higher frequencies; the larger L2 works well at the low frequency end.

CONSTRUCTION. Construction should be fairly straightforward. Rather than duplicate information, readers are invited to read the construction notes accompanying G4DDK's downconverter article (p58) for basic

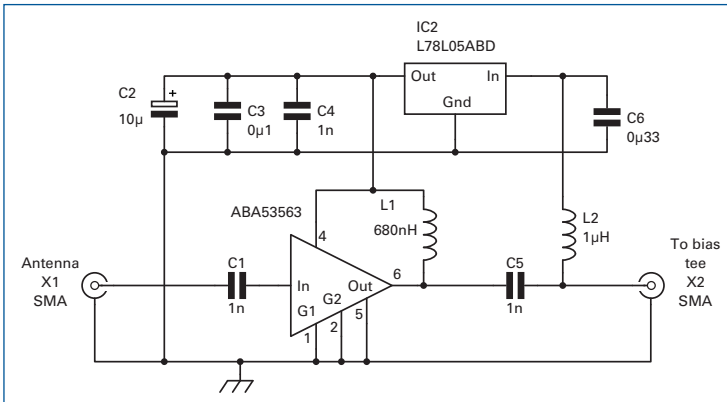

FIGURE 1: Circuit diagram of the wideband preamplifier.

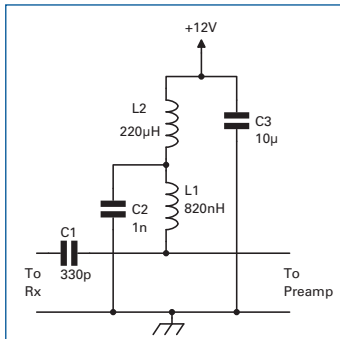

FIGURE 2: Bias tee circuit schematic.

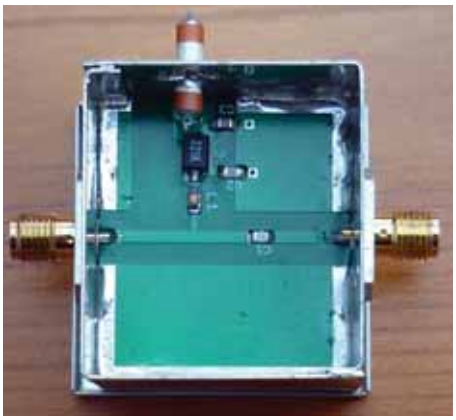

PHOTO 2: Completed bias tee.

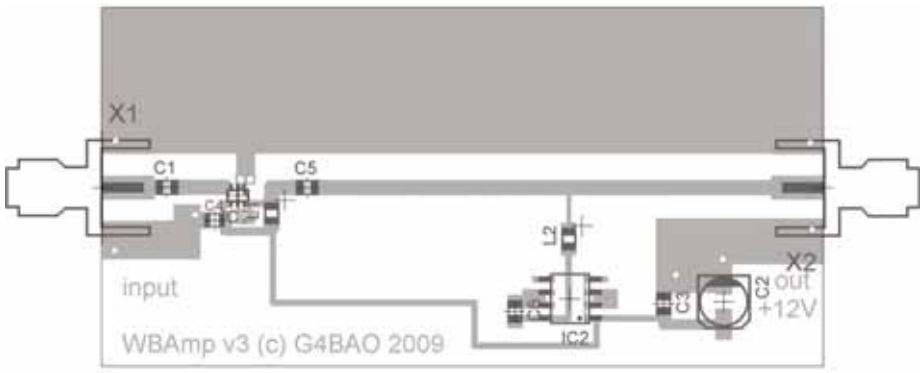

FIGURE 3: Preamplifier PCB overlay.

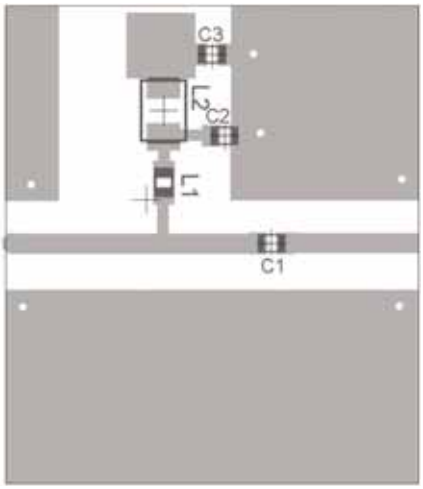

FIGURE 4: Bias tee PCB overlay.

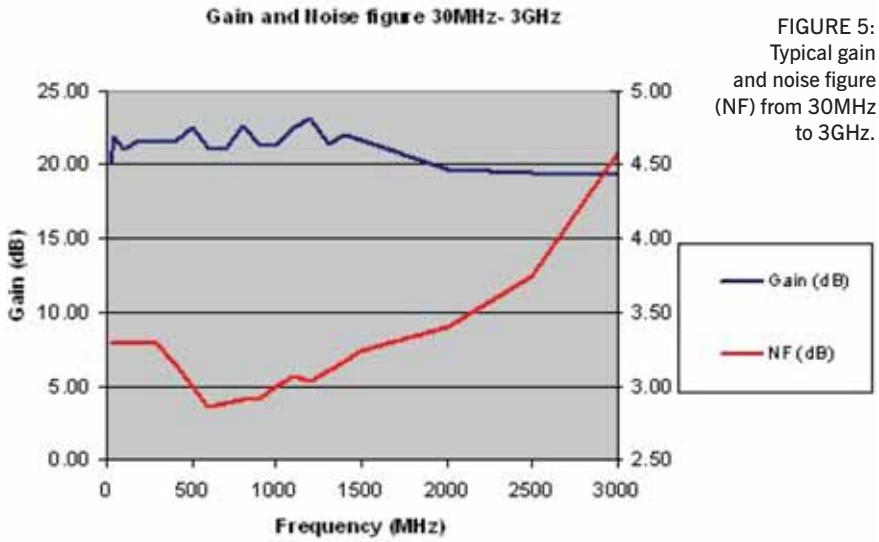

FIGURE 5: Typical gain and noise figure (NF) from 30MHz to 3GHz.

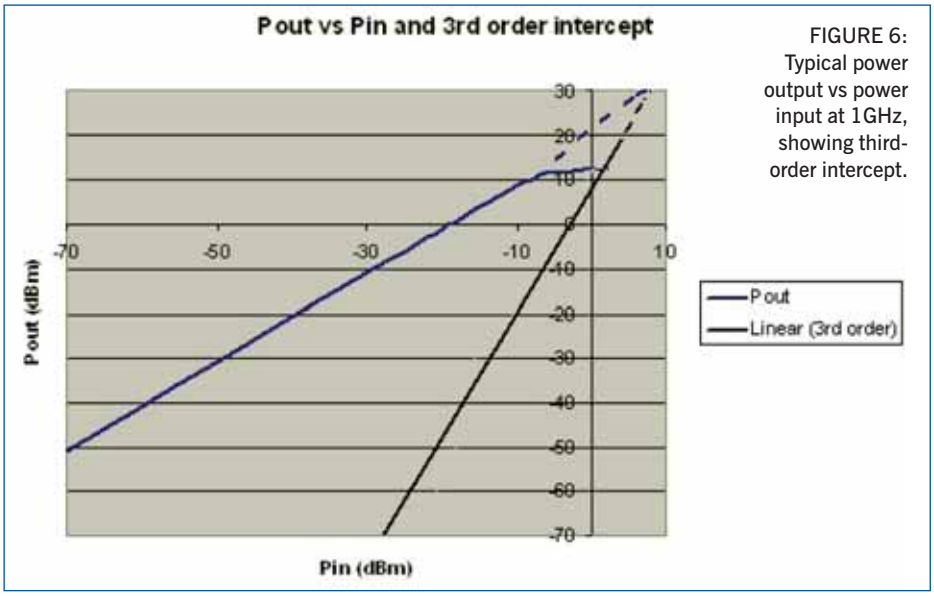

FIGURE 6: Typical power output vs power input at 1GHz, showing third-order intercept.

construction information including how to construct the tinplate boxes, mount connectors etc. The preamplifier overlay is shown in **Figure 3** and the bias tee overlay in **Figure 4**.

Neither the preamplifier or bias tee require any tuning.

RESULTS. Test results of gain and noise figure for a prototype preamplifier are shown in **Figure 5**. **Figure 6** shows the power output and linearity of the preamplifier at 1GHz. The amplifier saturates at an output power of around +12dBm, and its third order intercept is +30dBm. This was determined using two signals 10kHz apart and measuring the level of third order intermodulation products. Note that third order intercept is a measure of linearity: the amplifier will not produce +30dBm output!

The bias tee has an insertion loss of 1dB or less between 30MHz and 3GHz; this is negligible, given the preamplifier gain.

CONCLUSIONS. This preamp uses readily available, inexpensive components and is relatively easy to build by someone with a steady hand, small soldering iron and a good magnifier. I use it at the masthead with my Icom ICR8500 and a not very broadband 'white stick' antenna, originally designed for 900MHz. It is fed by 20m of UR67 coax, which not exactly ideal! The preamp makes the GB3MHL beacon on 23cm readable when nothing is detectable with just the antenna alone and makes a noticeable improvement to the not-so local repeaters on VHF and UHF.

PCB AVAILABILITY. Kits for this project, including PCBs, are available from the author. E-mail john@g4bao.com or see www.g4bao.com for details.

WEBSEARCH

[1] Details of G4DDK preamplifiers can be found at www.g4ddk.com/VLNAcontents.html.
[2] Data sheet for the ABA-52563 3.5GHz Broadband Silicon RFIC Amplifier is at www.avagotech.com/docs/AV02-1785EN.
[3] Suitable tinplate boxes can be obtained from Alan Melia, G3NYK, see www.alan.melia.btinternet.co.uk/componen.htm

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CCS-50 Genuine Copperweld copper clad steel, 1.6mm **£24.95**
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FWPVC-50 Original clear PVC covered copper wire, 4mm **£39.95**

Rigging Accessories

Get rigged up, for full list of all options visit our website!

PULLEY-2 Adjustable pulley wheel for wire antennas, suits all types of rope **£19.95**
GUYKIT-HD10 Complete heavy duty adjustable guying kit to suit upto 40ft masts .. **£49.95**
GUYKIT-P10 Complete light duty/portable guying kit to suit upto 40ft masts **£29.95**
SPIDER-3 Fixed 3 point mast collar for guy ropes **£3.95**
PTP-20 Pole to pole clamp to clamp up to 2" to 2" **£4.95**
DPC-W Wire dipole centre to suit either 300 or 450ohm ladder line **£4.95**
DPC-S Wire dipole centre with SO239 to suit cable feed connections **£5.95**
DPC-A Dipole centre to suit ½ inch aluminium tube with terminal connections ... **£6.95**
DPC-38 Dipole centre with SO239 socket with two 3/8th sockets to make mobile dipole **£5.95**
DOGBONE-S Small ribbed wire insulator **£1.00**
DOGBONE-L Large ribbed wire insulator **£2.00**
DOGBONE-C Small ceramic wire insulator **£1.00**
EARTHROD-C 4ft copper earth rod and clamp **£19.95**
EARTHROD-CP 4ft copper plated earth rod and clamp **£14.95**
G5RV-ES In-line SO239 replacement socket for 300 or 450 ohm ladder line **£4.95**
AMA-10 Self amalgamating tape for connection joints, 10m length **£7.50**

Mounting Hardware & Clamps

We have all the mounting brackets you could possible want – for all options see our website

TRIPOD-HDA Free standing, heavy duty, fold away tripod, which adjusts from 50-65mm **£149.95**
TRIPOD-25L Free standing heavy duty tripod to suit masts 65mm or less **£69.95**
TRIPOD-20L Free standing heavy duty tripod to suit masts 2 inch or less **£59.95**
TRIPOD-15L Free standing heavy duty tripod to suit masts 1.5 inch or less **£54.95**
TK-36 Heavy duty galvanised pair of T & K brackets, 36 inches total length **£49.95**
TK-24 Heavy duty galvanised pair of T & K brackets, 24 inches total length **£24.95**
TK-18 Heavy duty galvanised pair of T & K brackets, 18 inches total length **£19.95**
TK-12 Heavy duty galvanised pair of T & K brackets, 12 inches total length **£17.95**
SO-9 Heavy duty galvanised single stand off bracket, 9 inches total length **£9.00**
SO-6 Heavy duty galvanised single stand off bracket, 9 inches total length **£6.00**
CHIM-D Heavy duty galvanised chimney lashing kit with all fixings, suitable for upto 2 inch **£19.95**
CAR-PLATE Drive on bracket with vertical up stand to suit 1.5 or 2" mounting pole .. **£19.95**
CROSS-2 Heavy duty cross over plate to suit 1.5 to 2" vertical to horizontal pole **£14.95**
JOIN-200 Heavy duty 8 nut joining sleeve to connect 2 X 2" poles together **£16.95**
PTM-S Pole mounting bracket with SO239 for mobile whips, suits upto 2" pole . **£19.95**

Antenna Rotators *See website for full details*

We stock all the most popular rotators to suit all requirements

AR-300XL Great entry level rotator, but strong enough for all VHF/UHF yagi antennas **£79.95**
Yaesu G-250 Entry level again from Yaesu, ideal for all VHF/UHF yagi antennas.... **£109.95**
Yaesu G-450 Medium duty rotator complete with 25m of control cable **£299.95**

Telescopic Masts (aluminium/fibre-glass opt)

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed **£99.95**
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed **£189.95**
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed **£129.95**
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed **£179.95**
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed **£199.95**

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**
TRIPOD-P Lightweight aluminium tripod for all above **£44.95**

20ft Mast Sets

(5ft Sections)

These heavy duty masts sets have a lovely push fit swaged sections to give a strong mast set. Ideal for portable or permanent installations . . . also available singly

MSP-125 4 section 1.25inch OD mast set... **£29.95**
MSP-150 4 section 1.50inch OD mast set... **£39.95**
MSP-175 4 section 1.75inch OD mast set... **£49.95**
MSP-200 4 section 2.00inch OD mast set... **£59.95**
MSP-150S 4 section 1.50 inch 5mm scaffold gauge (very heavy duty) **£69.95**

Patch Leads

PL58-0.5 ½m Standard RG58 PL259 to PL259 lead **£2.95**
PL58-10 10m Standard RG58 PL259 to PL259 lead **£7.95**
PL58-30 30m Standard RG58 PL259 to PL259 lead **£14.95**
PL58M-0.5 ½m Mil Spec RG58 PL259 to PL259 lead **£3.95**
PL58M-10 10m Mil Spec RG58 PL259 to PL259 lead **£10.95**
PL58M-30 30m Mil Spec RG58 PL259 to PL259 lead **£24.95**
PL213-10 10m Mil Spec RG213 PL259 to PL259 lead **£14.95**
PL213-30 30m Mil Spec RG213 PL259 to PL259 lead **£34.95**
PL103-10 10m Mil Spec Westflex 103 PL259 to PL259 lead **£29.95**
PL103-30 30m Mil Spec Westflex 103 PL259 to PL259 lead **£59.95**

(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)

Connectors

PL259/6mm Standard plug for RG58 ..... **£0.75p**
PL259/9mm Standard plug for RG213 ..... **£0.75p**
PL259/7mm Standard plug for Mini8 ..... **£1.00p**
PL259/6C Compression type for RG58 ..... **£1.95p**
PL259/9C Compression type for RG213 ..... **£1.95p**
PL259/103C Compression type for Westflex 103 ..... **£5.00**
NTYPE/6 Compression type plug for RG58 ..... **£3.50**
NTYPE/9 Compression type plug for RG213 ..... **£3.50**
NTYPE/103 Compression type plug for westflex 103 .... **£6.00**
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 **£3.50**
NTYPE/PL Adapter to convert N-Type to PL259 ..... **£3.50**
BNC/PL Adapter to convert BNC to PL259 ..... **£2.00**
BNC/N Adapter to convert BNC to N-Type male **£3.50**
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 38th thread **£3.95**

Check on-line for all updates, new products and special offers

ALL PICTURES ARE FOR REFERENCE ONLY

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Opening times: Mon-Fri 9-5.30pm **sales@moonraker.eu**
CRANFIELD ROAD
WOBURN SANDS, BUCKS MK17 8UR

Manufacturers of radio communication antennas and associated products

HF Verticals

Heavy duty design HF verticals, with high power preparation, all with great performance

VR3000	3 Band 10-15-20M, Length 3.8M, Power 2000 Watts (without radials)	£149.95 **now £99.95**
EVX4000	4 Band 10-15-20-40M, Length 6.5M, Power 2000 Watts (without radials)	~~£159.95~~ **now £119.95**
EVX5000	5 Band 10-15-20-40-80M, Length 7.3M, Power 2000 Watts (without radials)	~~£199.95~~ **now £150.00**
EVX6000	6 Band 10-15-20-30-40-80M, Length 5.0M, Power 2000 Watts (including radials)	~~£349.95~~ **now £275.00**
EVX8000	8 Band 10-12-15-17-20-30-40 (80M Optional), Length 4.9M, Power 2000 Watts (including radials)	~~£349.95~~ **now £275.00**
EVXKIT-80	Radial kit for above to add 80M includes radial plus extension top section	**£129.95**

VHF/UHF Mobiles

GF151	Glass Mount 2/70cm, Gain 2.9/4.3dBd, Length 78cm complete with 4m cable and PL259	**£29.95**
MRM-100	MICRO MAG 2/70cm, Gain 0.5/3.0dBd, Length 55cm, 1" magnetic base with 4m coax and BNC	**£19.95**
MR700	2/70cm, Gain 0/3.0dBd, Length 50cm, 3/8 fitting	**£9.95**
MR777	2/70cm, Gain 2.8/4.8dBd, Length 150cm, 3/8 fitting	**£17.95**
MRQ525	2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality)	**£19.95**
MRQ500	2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality)	**£24.95**
MRQ750	2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality)	**£34.95**
MR2 POWER ROD	2/70cm, Gain 3.5/6.5dBd, Length 50cm, PL259 fitting (fibreglass collinear)	**£24.95**
MR3 POWER ROD	2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass collinear)	**£29.95**
MRQ800	6/2/70cm Gain 3.0dBi/5.0/7.5dBdBd, Length 150cm, PL259 fitting (high quality)	**£39.95**
MRQ273	2/70/23cm Gain 3.5/5.5/7.5dBdBd, Length 85cm, PL259 fitting (high quality)	**£49.95**

Mono Band End Fed Verticals

Great single band antennas at great prices!

HV-2	2m ½ wave, Gain 2.5dBd, Length 130cm, SO239	**£29.95**
HV-4	4m ½ wave, Gain 2.5dBd, Length 200cm, SO239	**£44.95**
HV-6	6m ½ wave, Gain 2.5dBd, Length 300cm, SO239	**£49.95**
HV-658	6m 5/8 wave, Gain 4.5dBd, Length 375cm, SO239	**£59.95**

Mono Band Collinear Verticals

Totally encapsulated GRP fibreglass antennas which require no tuning!

BM33	70cm 2 X 5/8, Gain 7.0dBd, Length 100cm, N-Type	**£44.95**
BM45	70cm 3 X 5/8, Gain 8.5dBd, Length 155cm, N-Type	**£54.95**
BM55	70cm 4 X 5/8, Gain 10dBd, Length 250cm, N-Type	**£74.95**
BM60	2m 5/8, Gain 5.5dBd, Length 155cm, N-Type	**£54.95**
BM65	2m 2 X 5/8, Gain 8.0dBd, Length 250cm, N-Type	**£79.95**
BM75	2m 3 X 5/8, Gain 8.0dBd, Length 430cm, N-Type	**£99.95**
BM140	4m 1/2, Gain 2.75dBd, Length 230cm, N-Type	**£69.95**
BM260	6m 1/2, Gain 2.75dBd, Length 285cm, N-Type	**£89.95**

HF Mobiles

Get great results with the Moonraker range of HF mobiles !
... from as little as £17.95!

AMPRO-10	28MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-12	24MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-15	21MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-17	18MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-20	14MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-30	10MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-40	7.0MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-80	3.5MHz, Length 220cm, 38th fitting (slimline design)	**£19.95**
AMPRO-160	28MHz, Length 220cm, 38th fitting (heavy duty design)	**£49.95**
ATOM-20S	14MHz, Length 130cm, PL259 fitting (compact design)	**£24.95**
ATOM-40S	7.0MHz, Length 165cm, PL259 fitting (compact design)	**£26.95**
ATOM-80S	14MHz, Length 165cm, PL259 fitting (compact design)	**£29.95**

Tarheel Motorised Mobile

The best USA motorised antennas available here from Moonraker the European distributor – All models in stock now!

Little Tarheel II	3.5-54MHz 200W max length 48"	**£349.95**
Tarheel 40A HP	7-34MHz 1.5Kw max length 8ft	**£429.95**
Tarheel 75A	7-34MHz 250W max length 8ft	**£429.95**
Tarheel 100A	3.4-30MHz 1.5Kw max length 10.4ft	**£449.95**
Tarheel 200A HP	3.4-28MHz 1.5Kw max length12ft	**£479.95**
Tarheel 300A	1.7-30MHz 250W max length 11.4ft	**£449.95**
Tarheel 400A	1.7-30MHz 250W max length 12ft	**£479.95**

GP2500

All Band HF Vertical

This is the perfect answer for anyone with limited space and requires no radials. Covering 80 through to 6M with a VSWR below 1.5:1 !!

Frequency 3.5-57MHz without tuner, Power 250 Watts, Length 7.13M

All at an amazing £199.95 !

Dual and Triband Collinear Verticals

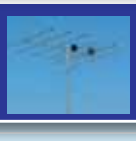
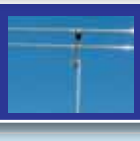
Diamond quality – Moonraker prices ! These high gain antennas have been pre-tuned for your convenience, easy to use, easy to install, and a choice of connection ... look no further

SQBM105P	2/70cm, Gain 2/4.5dBd, RX 25-2000MHz, Length 70cm, SO239 (Radial Free)	**£39.95**
SQBM105N	2/70cm, Gain 2/4.5dBd, RX 25-2000MHz, Length 70cm, N-type (Radial Free)	**£44.95**
SQBM110P	2/70cm, Gain 3/6dBd, RX 25-2000MHz, Length 100cm, SO239 (Radial Free)	**£54.95**
SQBM110N	2/70cm, Gain 3/6dBd, RX 25-2000MHz, Length 100cm, N-Type (Radial Free)	**£59.95**
SQBM200P	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239	**£54.95**
SQBM200N	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, N-Type	**£59.95**
SQBM500P	2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, SO239	**£64.95**
SQBM500N	2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, N-Type	**£69.95**
SQBM800N	2/70cm, Gain 8.5/12.5dBd, RX 25-2000MHz, Length 520cm, N-Type	**£129.95**
SQBM1000P	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239	**£79.95**
SQBM1000N	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, N-Type	**£84.95**
SQBM223N	2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type	**£69.95**

Multiband Mobile

Why buy loads of different antennas when Moonraker has one to cover all! SPX series has a unique fly lead and socket for quick band changing

SPX-100	9 Band plug n' go portable, 6/10/12/15/17/20/30/40/80m, Length 165cm retracted just 0.5m, Power 50W complete with 38th PL259 or BNC fitting to suit all applications, mobile portable or base … brilliant!	**£44.95**
SPX-200	6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, 3/8th fitting	**£39.95**
SPX-200S	6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting	**£44.95**
SPX-300	9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, 3/8th fitting	**£54.95**
SPX-300S	9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W,PL259 fitting	**£59.95**
AMPRO-MB6	6 Band mobile 6/10/15/20/40/80m, length 220cm, 200W, 3/8th fitting, (great for static use or even home base – can tune on four bands at once)	**£69.95**
ATOM-AT4	10/6/2/70cm Gain 2m 2.8dBd 70cm 5.5dBd, Length 132cm, PL259 fitting (perfect for FT-8900R).	**£59.95**
ATOM-AT5	5 Band mobile 40/15/6/2/70cm, Length just 130cm, 200W (2/70) 120W (40-6M) PL259 fitting, (great antenna, great price and no band changing, one antenna, five bands)	**£69.95**
ATOM-AT7	7 Band mobile 40/20/15/10/6/2/70cm, Length just 200cm, 200W (2/70) 120W (40-6M) PL259 fitting, (great antenna, great price and no band changing, one antenna, five bands)	**£79.95**

If we advertise it – we stock it!

Yagi Antennas

All Yagis have high quality gamma match fittings with stainless steel fixings! (excluding YG4-2C)

YG27-4	Dual band 2/70 4 Element (Boom 42") (Gain 6.0dBd)	**£49.95**
YG4-2C	2 metre 4 Element (Boom 48") (Gain 7dBd)	**£29.95**
YG5-2	2 metre 5 Element (Boom 63") (Gain 10dBd)	**£49.95**
YG8-2	2 metre 8 Element (Boom 125") (Gain 12dBd)	**£69.95**
YG11-2	2 metre 11 Element (Boom 185") (Gain 13dBd)	**£99.95**
YG3-4	4 metre 3 Element (Boom 45") (Gain 8dBd)	**£59.95**
YG5-4	4 metre 5 Element (Boom 104") (Gain 10dBd)	**£69.95**
YG3-6	6 metre 3 Element (Boom 72") (Gain 7.5dBd)	**£64.95**
YG5-6	6 metre 5 Element (Boom 142") (Gain 9.5dBd)	**£84.95**
YG13-70	70 cm 13 Element (Boom 76") (Gain 12.5dBd)	**£49.95**

ZL Special Yagi Antennas

The ZL special gives you a massive gain for the smallest boom length ... no wonder they are our best selling yagi's!

ZL5-2	2 Metre 5 Ele, Boom 95cm, Gain 9.5dBd	**£49.95**
ZL7-2	2 Metre 7 Ele, Boom 150cm, Gain 12dBd	**£59.95**
ZL12-2	2 Metre 12 Ele, Boom 315cm, Gain 9.5dBd	**£99.95**
ZL7-70	70cm 7 Ele, Boom 70cm, Gain 11.5dBd	**£39.95**
ZL12-70	70cm 12 Ele, Boom 120cm, Gain 14dBd	**£49.95**

HB9CV

Brilliant 2 element beams ... ideal for portable use

HB9-70	70cm (Boom 12")	**£24.95**
HB9-2	2 metre (Boom 20")	**£29.95**
HB9-4	4 metre (Boom 23")	**£39.95**
HB9-6	6 metre (Boom 33")	**£49.95**
HB9-10	10 metre (Boom 52")	**£69.95**
HB9-627	6/2/70 Triband (Boom 45")	**£69.95**

Halo Loops

Our most popular compact antennas, great base, mobile, portable, or wherever!

HLP-2	2 metre (size approx 300mm square)	**£19.95**
HLP-4	4 metre (size approx 600mm square)	**£29.95**
HLP-6	6 metre (size approx 800mm square)	**£39.95**

G5RV Wire Antennas

The most popular wire antenna available in different grades to suit every amateur .... All from just £19.95!

G5RV-HSS	Standard Half Size Enamelled Version, 51ft Long, 10-40 Metres	**£19.95**
G5RV-FSS	Standard Full Size Enamelled Version, 102ft Long, 10-80 Metres	**£24.95**
G5RV-DSS	Standard Double Size Enamelled Version, 204ft Long, 10-160 Metres	**£49.95**
G5RV-HSH	Half Size Hard Drawn Version, pre-stretched, 51ft Long, 10-40 Metres	**£24.95**
G5RV-FSH	Full Size Hard Drawn Version, pre-stretched, 102ft Long, 10-80 Metres	**£29.95**
G5RV-HSF	Half Size Original High Quality Flexweave Version, 51ft Long, 10-40 Metres	**£29.95**
G5RV-FSF	Full Size Original High Quality Flexweave Version, 102ft Long, 10-80 Metres	**£34.95**
G5RV-HSP	Half Size Original PVC Coated Flexweave Version, 51ft Long, 10-40 Metres	**£34.95**
G5RV-FSP	Full Size Original PVC Coated Flexweave Version, 102ft Long, 10-80 Metres	**£39.95**
G5RV-HSX	Half Size Deluxe Version with 450 Ohm ladder, 51ft Long, 10-40 Metres	**£44.95**
G5RV-FSX	Full Size Deluxe Version with 450 Ohm ladder, 102ft Long, 10-80 Metres	**£49.95**

Accessories

G5RV-IND	Convert any half size G5RV to full with these great inductors, adds 8ft on each leg	**£24.95**
G5RV-CHOKE	inline balun to reduce RF feedback	**£39.95**
TSS-1	Pair of stainless steel springs to take the tension out of a G5RV or similar	**£19.95**

Trapped Wire Dipole Antennas

Commercial quality trapped wire dipoles that resonate, so require no ATU!

MDT-6 FREQ:40 & 160m LENGTH: 28m POWER: 1000 Watts **£79.95**

MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts **£69.95**

MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts **£79.95**

MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts **£129.95**

MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts **£69.95**

MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts **£119.95**

(MTD-5 is a crossed di-pole with 4 legs)

UK Ham Week 2010

New venue for the bigger and better RSGB Convention, Horwood House has more facilities on offer.

TEN DAYS IN OCTOBER. On 1 October the National Hamfest opens its doors to the public. Just over a week later, on 10 October, the RSGB Convention closes with a speech by RSGB President Dave Wilson, M0OBW.

WHAT HAPPENS IN BETWEEN THESE DATES? Other than the two events themselves, the answer is not a lot – *at the moment*. The RSGB is therefore asking its members if we can all do something about that. It is proposed that we all work together to organise a series of events and activities up and down the country – events that amateurs and members of the public can participate in and have some fun. The RSGB will promote the activities and we will try to get as many people as possible to participate, amateur and public alike.

WHAT SORT OF EVENTS? Well, anything really. Ideas we have had include 'open shack' periods, which we see as very much like the 'open garden' event. Simply open up your shack for visitors that week and encourage them to perhaps donate to the Spectrum Defence Fund bucket you happen to have handy. The RSGB is planning to ensure that the new amateur radio pavilion and amateur radio station at Bletchley Park is open all week for amateurs and the public to visit and use. We will also encourage all other permanent special event stations to open their doors that week. This isn't the limit of what could be done either; might this be a good week for a SOTA challenge? How about a special effort on the 144MHz club championship (Tuesday 5th) or the 21/28MHz contest on Sunday 3rd? There's lots that any of us can do – so what will YOU do?

Within minutes of the gates opening, the National Hamfest was busy.

WHAT IS ALREADY PLANNED?

NATIONAL HAMFEST, 1-2 OCTOBER.

The National Hamfest organised by the Lincoln Shortwave Club in conjunction with the RSGB is planning great things for its second year. Having listened to the surveys carried out on visitors and traders there will be improved catering and better layouts this year. There is much besides this with many traders planning bigger and better exhibits for the 2010 event. Luso Towers are planning an even bigger exhibit this year and there may be as many as three towers to drool over! We can already confirm that the following are attending this year: Icom, Kenwood, bhi, KMK UK Ltd, LAM Communications, LUSO, Moonraker, PW Publishing, Sandpiper, Tecadi and more. Details are at www.nationalhamfest.org.uk.

RSGB CONVENTION, 8 – 10TH OCTOBER

***** NEW VENUE ***.** The RSGB convention has now become one of the most popular and well-attended events of the year. Those who have attended the event over the years will recall that the move to Wyboston was made to accommodate the event's increased attendance. However, we have now outgrown this venue too. As a result we have decided to move the 2010 RSGB Convention to Horwood House near Milton Keynes.

Horwood House provides the RSGB Convention with new purpose-built meeting rooms, comfortable lounges and bars, delightful country surroundings and 182 en-suite bedrooms. All bedrooms are within the complex and have easy access to the lecture rooms that we will be using. Within a short distance of Bletchley and Milton Keynes stations and the M1 motorway, this new venue is easy to access.

The Convention programme will be announced soon and it planned to further expand the popular lectures and increase the activities for the visitors. For details see www.rsgb.org/rsgbconvention.

WANT TO BE PART OF HAM WEEK?

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Antennas

More on the Hustler 6BTV, and did *RadCom* "Goof"?

PHOTO 1: The Hustler 6BTV installation of Duncan Tribute, G1OEQ.

THE HUSTLER 6BTV. Early this year I described G3JKV's experiences with the Hustler 6BTV vertical antenna using raised radials **[1]**. He compared the performance of the 6BTV with a 40ft high dipole antenna on long haul paths such as VK and ZL.

This raises two issues regarding antennas. First, it is more important where an antenna is than what it is. The second is a question of expectations. For example, Duncan Tribute, G1OEQ, also has a Hustler 6BTV, which he uses from a pint-pot size garden in Truro. He claims remarkable success with this antenna now for over a year, without the use of any radials. He goes on to say "The picture (**Photo 1**) tells the story of my installation, which is located between the house and an external garden wall and surrounded by overhead power lines and telephone wires. The mount of the antenna was prepared in accordance with the manufacturer's instructions using a 4ft length of 1½in aluminium mast, driven into the ground to leave 18in exposed to which the 6BTV is attached".

G1OEQ runs 100 watts to the 6BTV using an Icom 706 MKIIG. At the time of writing his longest distance QSOs have been into Ontario and Milwaukee on 20 metres and Malta on 40 metres. He also gets good reports across Europe on 80 metres, plus one contact in Newfoundland. All these contacts were using SSB. Duncan is content with these results because he was previously operating from a location in Surrey on VHF and UHF so an occasional transatlantic QSO is very satisfying.

It is interesting to read the experience of others with the Hustler 6BTV. Check out the eham.net **[2]** website, who publish reviews on all manner of equipment including the 6BTV. In general, the reviews on this antenna are positive, particularly if a radial system is used.

RADCOM ARTICLE BOOB? In November 2009 I reviewed two antennas from Vine Antennas, one for 6 metres and the other 2 metres, plus their baluns. In response to this the designer of these antennas, Justin Johnson, G0KSC, placed an item on his website **[3]** under the heading RadCom Article Boob. In this, he said, "Whilst he (G3LDO) reported the best patterns he had seen, the real world polar plots showed pattern distortion yet he failed to mention the reasons why. Furthermore, I am surprised he did not contact me and question this problem at which time I could have given him the answers he should have reported.

"The patterns for both a 4 element 6m version and a 9 element 2m version showed a small amount of distortion around the base of the antenna and particularly within the rearward lobes. This is the result of the antenna being fed WITHOUT a true 1:1 balun. This fact can be proven by switching the coax from side to side (reversing connections) which will swap the distortion from one side of the antenna to the other.

"Within the article Peter experiments with both the Vine supplied Choke balun (coiled coax) and a toroid variant of the same. However, while these are called baluns, they do nothing to rectify the mismatch between an unbalanced feedline (coax) and a balanced antenna (the Yagi). The Choke balun merely helps prevent the resulting common mode currents from travelling back down the coax, radiating and de-tuning the Yagi. This said, one or the other baluns being used in the article (perhaps both) where not effective in this task as the antennas bandwidth moved when switching between the two clearly indicating the coax WAS becoming apart of the antenna and as a result, de-tuning the array.

"By not using a true 1:1 balun at the feed point, pattern distortion will be seen. The resulting pattern is typical of that found within Yagis fed with a gamma match which is an unbalanced matching arrangement. A true 1:1 balun connects to the unbalanced coax with an unbalanced feedpoint one side and provides a balanced output at the antenna side of the balun which in turn, keeps the radiation pattern symmetrical. I have several examples of these upon my 'creating a balun page', my favourite being the Grounded Pawsey Stub.

"Be sure not to make the same mistake with your next Yagi and ensure a true 1:1 balun is used at the feedpoint for best results!"

REVIEWING ANTENNAS. As I understand it, the purpose of a review of any item of equipment is to comment on various aspects of construction and performance of it *as supplied* and check out how it compares with the literature and specification provided by the manufacturer. The literature in this case comprises radiation diagrams using computer free-space models and SWR plots, all of which can be found on the G0KSC website [3]. A stated key feature of these antennas is 'Low Noise', a characteristic recently described by Ian White, GM3SEK **[4]**. In essence, this means small rear-facing lobes.

The G0KSC model of the 144MHz 9 element Yagi produces a very symmetrical plot in azimuth and (because it is a free space model) in elevation. The model also indicated that this antenna had very small minor lobes, as shown in **Figure 1**.

The field strength measurement method of the 144MHz 9 element Yagi was described in **[5]** and the results indicated a nice symmetrical main lobe although there were small irregularities in the minor lobes as

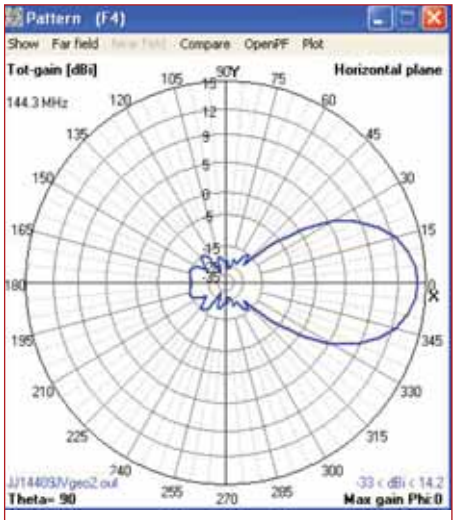

FIGURE 1: The G0KSC free space model of the 144MHz 9 element Yagi using NEC4.

PHOTO 2: Coiled coax choke balun as supplied by Vine antennas.

shown in **Figure 2**. In the review I said it was a good antenna.

The supplied baluns for both the 6m and 2m antennas were nicely constructed and one of them is shown in **Photo 2**. Both these baluns were the same size. At the time I knew less about baluns than I do now although I didn't think a single size balun would cover the 6m and 2m bands. Later, a test showed this balun had a parallel resonance at 61MHz and a series resonance at 127MHz. At 51.15MHz the impedance was R560 +j950Ω.

I tried various baluns and feed arrangements but the result shown **Figure 2** was the best that could be obtained. I did try swapping over the connections from balun to the driven element but this did not cause any measurable minor lobe pattern changes. It is for this reason that I didn't say what caused these asymmetrical minor lobes – I just didn't know.

THE PAWSEY STUB. G0KSC believes that I was using the wrong sort of balun and that a 'true 1:1 balun' should be used for best results, preferably a Grounded Pawsey Stub as shown in **Photo 3** (from the G0KSC site, [3]).

Although I was unable to find a description of a 'true 1:1 balun' in any of my antenna literature the Pawsey Stub was another matter. It was apparently invented by Australian radio astronomer Dr J L Pawsey (1908-1962) **[6]**. However, it also appears in **[7]** (1945) without a device name, just the description 'Balanced output from concentric feeder – second method'. The same device is also described in **[8]** (1955) as a Balanced Bazooka. It has appeared in many antenna books to the present day and they all agree on the construction as shown in Figure 3.

This device uses the characteristics of a twin line quarter wave stub constructed by adding a quarter wave section of coax as shown in **Figure 3**. This added section is shorted to the outer braid of the feedline a quarter of a wavelength from the antenna feedpoint. This transforms to a very high impedance on the outer braiding of both sections of coax and is very effective in preventing common mode currents on the outside of the feeder without affecting the impedance of the main feeder. For this stub to work the same precautions are required as

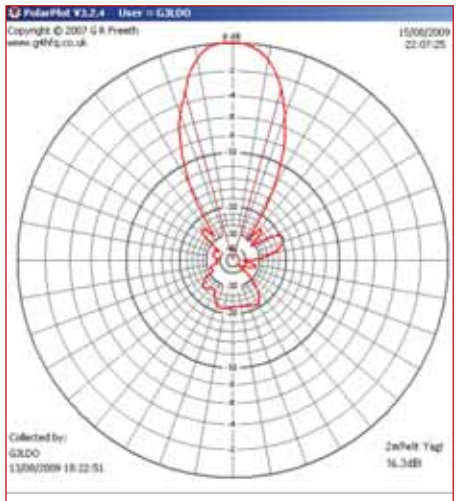

FIGURE 2: Test range measurements on a Vine/G0KSC 144MHz 9 element Yagi.

for any twin line feeder – to be mounted clear of any metal structure and certainly not rolled up into a coil. It is clear that by comparing Figure 3 and Photo 3, the device in Photo 3 is not a Pawsey Stub.

CHOKE VERSUS TRANSFORMER BALUNS. There has been some debate regarding the effectiveness of transformer (voltage) baluns and that choke (current) baluns are way to go. An interesting exchange on the subject appeared on the web page RadioBanter **[9]** and I quote the input of Roy Lewellen, W7EL, to the discussion.

"The difference between a 1:1 current balun and a 1:1 voltage balun is that the latter has a third (tertiary) winding. I'll assume for a moment that the baluns are perfect, ie, have an infinite common mode impedance.

"If the load is balanced, that is, if the two load terminals have equal impedances to the 'cold' side of the balun input, the third winding of the voltage balun carries no current, and there will be no current on the outside of the coax. Because the third winding has no current, it can be removed with no effect, so the voltage balun acts exactly like a current balun when the load is balanced. However, if the load isn't perfectly balanced relative to the input terminal of the balun, a current balun will still prevent current from flowing on the outside of the coax. The voltage balun, however, will force the voltages at the two output terminals to be equal and opposite relative to the cold side of the balun input. This will cause unequal currents from the two terminals. The difference flows along the outside of the coax.

"In summary, the best a voltage balun can do in preventing current flow on the outside of coax is to be as good as a current balun, and this happens only if the load is balanced.

PHOTO 3: The G0KSC-recommended balun, described as a Grounded Pawsey Stub, from [3].

In all other cases, using a voltage balun will cause current to flow on the outside of the coax while a current balun will prevent this flow. For more information, see the article posted at **[10]**."

From this it would appear the device in Photo 3 is a 1:1 transformer.

FINALLY. The G0KSC model of the 144MHz 9 element Yagi produced a very symmetrical plot (Figure 1). It is a free-space model where the antenna mounting and general environment is not considered. Although environment can be modelled, it is not a realistic option for an antenna designer/manufacturer because an antenna's eventual location is unknown. The feed point in the model is assumed to be perfect with a balanced feed with no feeder common mode currents to disturb the radiation pattern. For these reasons the radiation pattern symmetry of a real antenna is unlikely be as good as predicted by a model.

From W7EL's analysis above, the best option is to use a current balun and that the driven element be adjusted for balance. This should be achievable with the G0KSC antenna because each side of the driven element loop can be adjusted in size, while monitoring with two clip-on RF current meters for balance and a SWR meter for matching.

REFERENCES

[1] Antennas, *RadCom* January 2010
[2] www.eham.net/reviews/detail/248
[3] www.g0ksc.co.uk
[4] In Practice, Ian White, GM3SEK, *RadCom* November, 2009
[5] Antennas, *RadCom* November 2009.
[6] *Amateur Radio Astronomy,* John Fielding, ZS5JF
[7] *R.A.F Signal Manual* AP1093 (1945)
[8] *Beam Antenna Handbook*, Bill Orr, W6SAI (1955)
[9] www.radiobanter.corn/showthread.php?t=69938
[10] www.eznec.com/Amateur/Articles/Baluns.pdf.

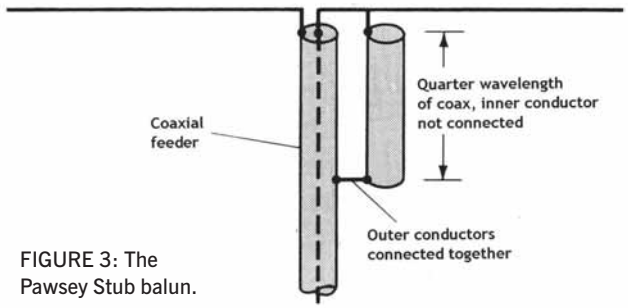

FIGURE 3: The Pawsey Stub balun.

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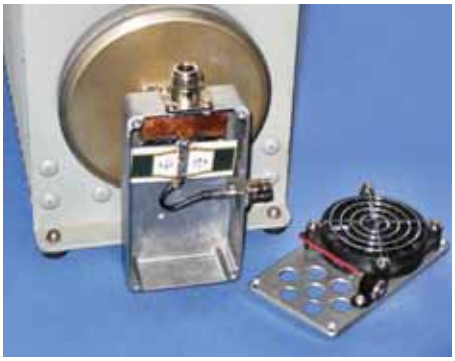
In Practice

40dB attenuators for high power transmitter testing



High-power 40dB attenuator attached to a large dummy load.

Q: How can I monitor the output signal from my transmitter or power amplifier without risk of damaging my receiver?

A: The threshold of physical damage to a receiver is 10-100 milliwatts, but the monitoring receiver will be grossly overloaded at that signal level, so avoiding damage is only half an answer. For accurate monitoring of the transmitted signal quality, the input level to the receiver needs to be attenuated to as little as one microwatt. From 100W down to 1μW is a difference of 80dB, which is far too much attenuation to attempt in one swipe – you can design an 80dB attenuator, and even build it, but you'll find that its performance is dominated by direct leakage from input to output. Experience shows that it's far better to divide the required attenuation into a number of individually screened chunks of no more than 40dB each. Another important practical point is that components at the RF input end must be capable of handling significant power, but once the power level has been reduced below about 100mW we can change to a different style of construction using much smaller components. For all of these reasons, it makes good sense to divide the total attenuation into two separate chunks as shown in **Figure 1**, using:

* A fixed attenuator of about 40dB that can handle the RF input power, followed by
* A further 40–60dB of switched attenuation to avoid receiver overload, and also to provide the accurate steps of 3, 6 or 10dB which may be needed for testing.

The reasons for drawing the dividing line at about 100mW are well explained in an excellent little book called *Managing Interstation Interference* by George Cutsogeorge, W2VJN **[1]**. The book is primarily about techniques to allow two or more HF contest or DXpedition stations to operate on different bands from the same site without interfering with one another. It obviously cannot be guaranteed that all receivers will survive 100mW at the antenna socket, but a 40dB attenuator will reduce 400W to only 40mW which is very unlikely to cause damage.

The rest of this article will be about building a high-power 40dB attenuator – first for 100W and then scaling up to handle 400W or more – and particularly about choosing suitable components. There have been several articles about building switched attenuators for much lower power levels, where component selection can focus on accuracy rather than power handling **[2]**. Accurate switched attenuators are often available on the surplus market, and frankly this may be the most cost-effective route because home construction requires resistors of many different and non-standard values.

DESIGN REQUIREMENTS. For consistent performance across a wide range of amateur bands, the frequency response of the entire measurement system should be as level as possible. The same is true for measurements of harmonic levels relative to the fundamental signal, because you don't want the results to be biased by any underlying 'tilt' in the frequency response of the measuring equipment. Accurate measurements will always require detailed corrections for the frequency response of the test equipment, but if the frequency response of the entire measuring system is level within say ±1–2dB, this will be more than adequate for a routine 'quick look'. Another useful feature would be the ability to use the same 40dB attenuator either as part of a dummy load for bench testing, or as an inline 'sampler' that lets the rest of the RF power through to the antenna.

Taken together, these design requirements point us towards the configuration shown in **Figure 2**. This circuit can be viewed in two ways: **Figure 2a** is drawn conventionally as a π-attenuator, which absorbs almost all the RF input power in R3 and delivers its output at –40dB into a 50Ω load attached to SK3. Figure 2b is exactly the same electrical circuit, but now re-drawn to show R1 and R2 packaged separately as a voltage divider; SK1 is still the input and SK3 the output at –40dB, but SK2 now provides a through connection so that R3 can be attached externally; so as well as being a useful accessory for a 50Ω dummy load, the same network can also be connected inline between the transmitter and the antenna. Provided that the output port SK3 is connected to an accurate 50Ω load, the attenuation SK3 is always 40dB relative to SK1, regardless of the value of impedance connected at SK2.

COMPONENTS AND CONSTRUCTION. We now need to analyse the component values in more detail. The design objectives for this attenuator are:

* Input impedance of 50Ω, looking into SK1
* Output impedance of 50Ω, looking back into SK3
* 40dB of attenuation between input at SK1 and a 50Ω load attached to SK3.

Figure 2a shows the resistor values that are required to achieve all this [1]. To the nearest 0.1Ω, R1 and R3 should both be 51.0Ω while R2 is much larger at 2499.8Ω. R3 only determines the input impedance

PHOTO 1: Practical construction of W7ZOI's 100W inline sampler (ARRL).

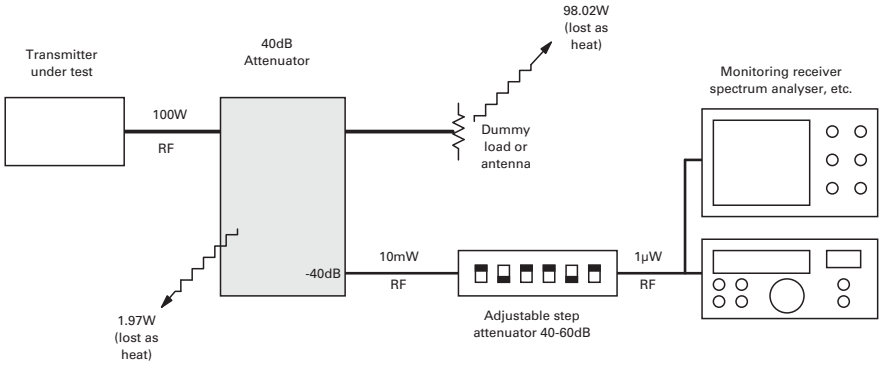


FIGURE 1: Large amounts of attenuation should be divided into separate screened units.

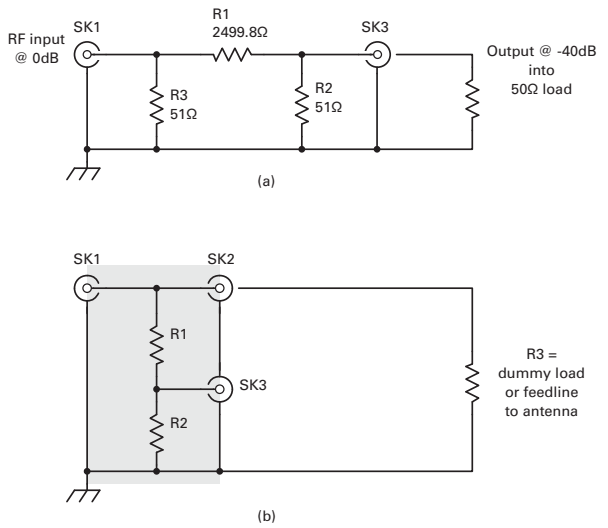


FIGURE 2: (a) 40dB π attenuator, (b) same circuit re-drawn as an inline sampling network.

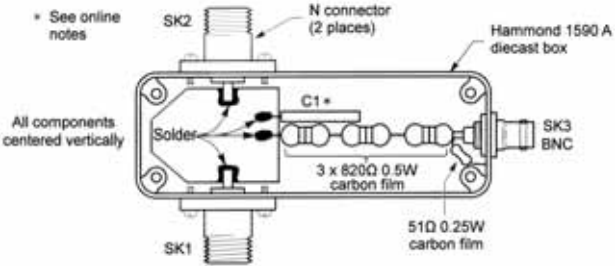


FIGURE 3: W7ZOI's 100W inline -40dB sampler (ARRL).

PHOTO 2: Inside the 400W+ inline sampler (see lead photo).

looking into SK1, and although the 'correct' value should be 51Ω, in practice you can use an existing 50Ω dummy load for R3 – your transmitter will never notice the difference. For 100W RF power input, 98.02W is absorbed in R3 (or passed through to the antenna) leaving R1 with a power dissipation of 1.96W and R2 with a power dissipation of 0.01W **[3]**. We now need to select components for R1 and R2 that are close enough to the correct resistance values, can handle the RF power dissipation – and, crucially, have the low internal inductance and capacitance that's necessary to achieve a reasonably flat frequency response up to at least 100MHz. R1 is the tricky one, because high-power, low-inductance 2500Ω resistors don't exactly grow on trees.

At the 100W power level, it isn't too difficult to find suitable components – it's more a matter of avoiding the bad choices. W7ZOI has developed a very successful 40dB sampler based on carbon film resistors and, if you follow the construction details exactly, the frequency response will be flat within 0.1dB from DC to 500MHz. I really did mean 'DC', by the way, because a huge advantage of resistive attenuators is that they can be checked for accuracy by simple DC measurements. These obviously don't tell us anything about the performance at RF, but verified accuracy at DC is always a good start.

Figure 3 and **Photo 1** show the W7ZOI 40dB sampler and there are further details on the web [1]. You'll notice that R1 has been specified as three series-connected 820Ω 0.5W carbon film resistors, while R3 is 51Ω 0.25W. These are standard resistor values and there's little problem in achieving a flat frequency response because the carbon film resistors are physically small enough to have a low internal inductance (see the August 2009 column and its online notes [1]). The specially shaped piece of sheet brass or copper between SK1 and SK2 is designed to approximate a short section 50Ω transmission line, to avoid changes in impedance when the sampler is inserted ahead of a 50Ω load. Altogether, the W7ZOI design makes a very acceptable solution for RF power levels up to 100W; build it exactly as described, and it will perform as promised. G4AON's website shows how the sampler can be used as part of a very simple spectrum analyser for close-in signal analysis [1].

Measurements at the 400W legal limit create additional problems, mainly because the power dissipation in R1 increases to 8W. It isn't good practice to operate components at high temperatures if you're also relying on them to hold an accurate value over time. Therefore R1 should have a rated power dissipation of at least 10W, and for extended key-down testing at the 400W level a rating of 15–20W would be even better. It is quite hard to find a 2500Ω resistor with that kind of power rating and the necessary low levels of internal inductance and capacitance. After testing several alternatives, the best option proved to be a pair of 5kΩ resistors in parallel as shown in the **lead photo** and **Photo 2**. The resistive element is a metal film deposited on a ceramic wafer, so these resistors are designed to be operated in free air and do not need to be bolted to a heat sink (which would create too much shunt capacitance to ground). The resistors shown in Photo 2 are 5kΩ 10W, which are not easy to find in the UK, but the slightly smaller 5kΩ 5W resistors are readily available [1] and an attenuator using a pair of these will handle the UK legal power limit.

R2 isn't difficult to specify because the power dissipation is minimal. Photo 2 shows a pair of 100Ω 1W chip resistors in parallel, but many other types of resistor also have a suitably low internal inductance.

The high-power attenuator is constructed in a slightly larger diecast box than W7ZOI's 100W version, and for practical reasons I wanted to place SK1 on the end of the box and SK2 on the rear as shown in the lead photo. The 'In Practice' website [1] includes a template for the piece of bent copper in Photo 2, which again approximates a 50Ω stripline. For the best high-frequency performance, all connections must be made with lead lengths as close to zero as practicable. Having soldered the copper stripline into place, I added the two metal/ceramic resistors that comprise R1, and then positioned the solder tag for R2 by eye. For the -40dB output at SK3 I used a bulkhead-mounted BNC socket with a short tail of RG174, so the socket could be located wherever convenient.

Power handling can be greatly improved by forced-air cooling of R1. The photograph shows a small 12V fan on the lid of the box, which blows air directly onto those two metal/ceramic resistors. The warm air is then vented through more holes below the fan (see the online notes for a drilling template [1]). The 12V DC supply for the fan is only plugged in when it's needed for high-power testing.

As noted earlier, we are using slightly incorrect values for R1 and R2, and then there are component tolerances to be considered, but the prototype has worked out reasonably well. When the sampler is terminated with a precision 50Ω load, the VSWR remains very close to 1.02 (as predicted from Ohm's Law) up to at least 150MHz. The attenuation varies between 40.05dB at DC and 39.2dB at 50MHz – not as level as W7ZOI's lower-power version, but well within acceptable limits.

NOTES AND REFERENCES

[1] Please follow this month's links from the 'In Practice' website:http://tinyurl.com/inpractice

[2] See various RSGB and ARRL publications and Google for 'rf attenuator construction'.

[3] The power dissipations in R1, R2 and R3 add up to only 99.99W and that's perfectly correct. The remaining 0.01W is the output power delivered into the 50Ω load attached to R2… exactly 40dB below the input power of 100W.

[4] Interestingly, the attenuation decreases with frequency, which suggests that the main parasitic effect in these metal/ceramic resistors is not series inductance but shunt capacitance.

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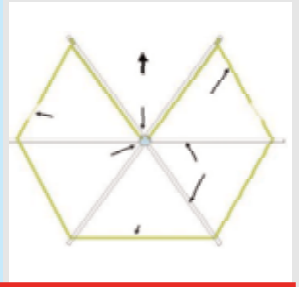

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Meteor Scatter

G4DEZ explains how to work distances on VHF that you never thought you could ever reach.

The winds can be high in Wolds, the site is completely unscreened to storms coming in off of the North Sea!

METEOR SCATTER. First of all, what is Meteor Scatter propagation? It is where two stations try to work each other using the burning reflective trails of meteors that are caused when the meteors enter the atmosphere. Caused by friction, the RF reflective trail can be metres to kilometres long and may last anything from a few hundreds of a second to 2 or even 3 minutes!

I started Meteor Scatter (MS) way back in around about 1972 on 2m using SSB – all I was allowed as G8DOT, we weren't allowed to even try CW without a full licence. Later, when I got my full licence as G4DEZ, I used CW – or more correctly, high speed CW. The equipment started out with an FT-225RD and a NAG 2m linear, which could, at a push, get about 200W out before the valve would expire, which often happened. Two minute periods were a killer for that amplifier! I also used a cassette recorder that could be slowed down using a pulsed DC supply and a homebrew memory keyer system that used a recycling memory chip. I had, I think, six separate switched memories so that I could go from one memory to another when (or if) the contact progressed. To program the memories I had to use a Morse key to place the text in the keyer. No computers to do all the hard work then. Timing in those days was taken from the speaking clock from GPO and my watch reset at start of each QSO. A little different now.

With that system of around 200W out and a 16-element Yagi I worked across Europe regularly. Later I progressed to a Henry 6N2 amplifier that could run a full 400W without blowing up.

Schedules were set up in any way we could find, sometimes on 14.345MHz if the band was open to EU, or by telephone – that was rather expensive – or by word of mouth when somebody would mention that they had heard a station or knew of an expedition. All very hit and miss.

More notable MS tests (if only partly successful) were made from Cornwall back in that era with a VE1 station. At the peak of the Perseids meteor shower, in August, during a six hour test, we (G3SEK, G4DGU, G4ANB, etc) recovered some 60 milliseconds of the VE1s callsign. We used Rx-Tx separation of something like 500kHz so that no-one could interfere with the signals – piracy and deliberate interference happened even back then!

UP TO DATE. I have had QSOs with just 3W each way with stations such as 9A5CW for one – granted I have a big antenna system. I've had many QSOs with 50 to 100W stations as well, all over the EU.

Meteors are coming into the atmosphere *every* day, *every* hour and just about every minute (these are called Random Meteors) so don't believe anyone who says there are no meteors today: it is just not true. Throughout the year there are also many minor showers as well as the major showers. For a good list of the meteors showers, check out www.meteor-scatter.net/showers.html.

Moving on to the present time, MS has become very much easier. All you need now is a radio with SSB capabilities, an antenna (horizontal is conventional), a keyer, a timing system that is accurate (to the second or better) and a computer. SSB and high speed CW MS is still practiced by a few and can be good fun at times but hard on the voice and sending CW manually for 30 seconds at a time gets to be a bit of a chore (although WSJT can send CW).

You will also need the requisite software to enable you to use the more modern modes of FSK or JT systems. The software is free for both the decoding and transmission system as well as the timing systems that are connected to atomic clocks somewhere on the planet. Obviously you will also need a reasonable PC system. The computer does not have to be the latest all singing and dancing games multimedia system, just something that works and the operating system can be windows 98 Windows XP or Vista - it doesn't matter. Once you get into it you can also find out how to use Apple Mac and Linux systems if necessary.

GETTING STARTED. What do you need in order to get started on MS? The main thing is your radio that has an SSB function.

Next is the antenna. Horizontally polarised antennas are best but even with a vertical some stations can be worked but that is a lot more difficult because of cross polarisation losses. That could be as much as 23dB – or in layman's terms you would only hear 1/200th of signal compared to what you would hear if both ends were using same polarisation! That goes for both Rx and Tx so stick with horizontal polarisation if you want best results. However, sometimes cross polarisation does not have such a marked effect.

You need a computer with sound card and either a serial or USB connection as well as some form of digibox (look up in *RadCom* for various makes and prices). The digibox will cost you anything from say £60 or so up to a couple of hundred pounds. You *do not* need the most expensive ones. These digiboxes will come with either serial or USB input. If your computer does not have a serial input socket then you can buy a serial USB converter for around £10.

To send and decode the digital modes you need the right software. WSJT is what is used most and it can be downloaded free from internet (just search on WSJT). You will also need timing software as your computer's clock is *not* accurate enough, so download Dim4 or Tardis (both free of charge). Some Vista systems already have Tardis loaded. When used correctly they can keep your computer clock accurate to a second or less. I use Tardis, which keeps my clock accurate to a few milliseconds and is updated every minute (that's why broadband connections are so useful).

I suggest that you also log on to the ON4KST website, again it is free (there are NO popups or advertising) and it is used for discussing VHF/UHF topics and for setting up schedules. There are various chat rooms, the

The 2m (4 x 12 ele M2) and 70cm (4 x 28 ele M2) arrays put up for EME.

most used are for 144/432 and 50/70MHz. Just log in and take a look, you can learn a lot just by reading it.

If you are feeling flush then some form of linear amplifier is useful but *not* absolutely necessary, but it sure does help! *Remember do not over stress any amplifier as you will be running for 100% duty cycle for periods of 30 seconds at a time, serious damage could be caused if you run your amplifier at full power all the time.* I would suggest that you run the amplifier at around 30 to 40% full output to ensure long life of your amplifier valves or transistors.

Finally, you should arm yourself with a stack of QSL cards for all those new DXCCs and grids worked!

HINTS AND TIPS. There are specific calling frequencies for MS on 2m and 6m (on 4m there is nothing specific as the band allocation is different in so many countries).

On 2m it is 144.370MHz (FSK441) and on 6m it is 50.230MHZ (JT6M). If you call CQ on either of those frequencies then you must transmit on the second 30 second period (because in the UK we are beaming east most of the time for contacts). Do not go into the first period Tx if you are trying to work, say, EI. If you do this on the calling frequency you will wipe out the Rx period for all local amateurs in the UK and possibly near EU as well. If you want to work somebody to the West then use any other frequency away from the calling frequency and it will not matter which period you use. I suggest that you do not go above 144.399MHz as this becomes part of the beacon band above decimal 400 nor should you go below say decimal 340 so as not to antagonise anybody on SSB phone. On 6m anywhere from say 50.210MHz up to just below 50.500MHz is OK. On 4m it is different as some countries have a very limited allocation, so basically anywhere except 70.200MHz, which is the SSB calling frequency in the UK. If in doubt, consult the bandplan.

Timing is of the essence. If your Tx period does not end exactly on the end of the 30 second period, then even a one second error means that the other stations using the frequency will lose 1/30th of the Rx time or about 3% because of your QRM. So when using either Dim4 or Tardis ensure it is set up so that the PC time is updated as often as possible. Some stations have update time set at an hour, but a PC clock can drift markedly in an hour.

When you download WSJT you will need to set up the parameters for EU use (it defaults to USA system, which is different from the EU). The following is how I have set up WSJT for myself.

- Log in to WSJT and go to main screen click on setup and then options.
- Left hand column
- Your callsign, full locator, timing interval 15, PTT Port (you will have to find that one out yourself, but found mine to be 4 on desktop but could be any of 1 to 4. Click on km.
- Middle column.
- Click on Grid and EU
- Text 1 %T %M
  Text2 %T %M %R %R %R
  Text 3 %T %M R%R R%R R%R
- Text4 RRRRRRRR %m
  Text5 73 73 73 73 %M
  Text6 CQ %m %Gxx where xx is the last two letters of your grid locator in capitals. Mine is AE as my locator is JO03AE.
- Right hand column *no* changes to the defaults.
  When completed close the window.
  A screenshot of my setup can be seen in **Figure 1**.

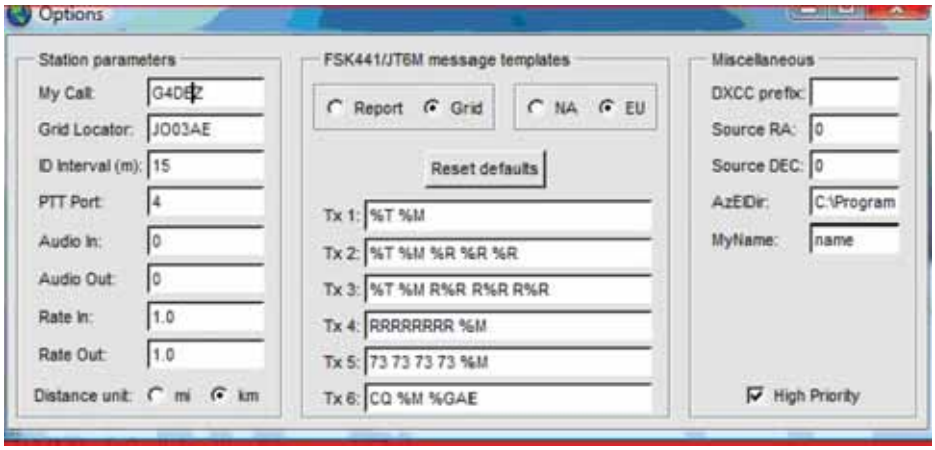

FIGURE 1: A screenshot of Bryn's setup.

MAIN SCREEN. Once you have completed the set up, you need to go back to the WSJT main screen. You need the callsign of the station you are about to work. Type that into 'To Radio' (if the call is on your screen then just place cursor over the callsign, highlight it and it will be transferred to 'To Radio' box automatically). Click on 'Lookup' and this will put the station's grid locator into the 'Grid' box. If it remains empty then that call is not in the WSJT database so you could get it from ON4KST by typing in /shloc callsign. If it's not on the KST database then try QRZ.com, Buckmaster or MMMonVHF. When you finally get the locator type it in and press 'ADD' this will add the call and grid to your own WSJT database for future use.

When this is completed, WSJT will give you the distance between the two stations and the direction (actual and the HOT A or HOT B direction depending upon the time of day). HOT A is the slightly different direction caused by the way the meteors come into the atmosphere and is the most likely 'best' direction – but not always! I usually tend to stick my antennas somewhere between the two figures. For short distance QSOs it can be useful for both stations to aim at the same area and try to work on sidescatter. This quite often works for stations up to 500km apart.

For FSK441 (the preferred MS mode on 2m) set S to 0 (default). Clip 0 (default), Tol 400 (default). For looking deeper into the noise you can change S to a negative number by clicking on the field, but remember that you could induce bad decoding due to garbage being used for decoding. Background noise is never just a steady signal.

The default is with 'Tol' at 400, this is the bandwidth being listened to. This can be reduced but if you go too small then you risk losing a signal altogether. How do you know what bandwidth to set? Well take a look at the first signal that actually decodes and look at the 'DF' figure on the WSJT Screen, the DF is the difference in frequency from where you are listening and where the other station is transmitting. A DF of, say, -98 means the transmitting station is 98Hz below your receive frequency, so you can safely go to 'Tol' 100 and still copy him, unless he drifts out of passband. So, until you are sure that his (and your) signals are stable, set 'Tol' to 200 to be safe.

If the frequency you want to use has a carrier on it, perhaps from a local PC, then use a different frequency. If it is the calling frequency that has the carrier then you have a problem. You can click on 'ZAP' on main WSJT screen and this will remove the carrier from being decoded erroneously even though you will still hear it.

MOVING ON. Now to the SpecJT screen. I set the speed of trace across screen to H2, where each trace is 30 seconds long. There are three 'sliders' along bottom screen, Set the left hand one to just above half way, the contrast to half way and the digital gain to wherever you get to 0dB (optimum). If the 0dB point is right at end of slider then adjust the computer output to allow the setting of 0dB at somewhere near the middle of the slider.

WSJT is now set up for serious use. However, I suggest that initially you find out what QSOs are actually taking place and listen first (using ON4KST). Never, ever cut and paste a signal on KST that would allow the two stations in QSO to know what reports are being sent. This would invalidate their

QSO. The cutting and pasting of data is, for example, when someone is calling CQ as it lets them know they are being heard, or at end of your own QSO when you have received RRR or 73.

Try to ensure that your Tx/Rx frequency is accurate. If in doubt, ask for assistance from someone on ON4KST. I know that my readout is 200Hz low so I take this into account when I set a QRG.

When you think you are ready to make your first QSO then I suggest that you use KST and set up a schedule with someone local who can tell you if the signal is clean and that it can be decoded easily – and that your procedures and timing are correct. If you are in UK then I can probably help you, just contact me on KST to set up a test. I am on the 6, 4 and 2m bands as well as 70cm.

The reporting system is fully described in the *Amateur Radio Operating Manual*. It is just two numbers with no duplication, 2 3 4 5 for meteor burst length and 6 7 8 and 9 for signal strength of the burst. More information can also be found on the ON4KST website.

Briefly, the reporting system looks like this:

2 = bursts up to 5 seconds
3 = bursts 5 to 20 seconds
4 = bursts 20 to 120 seconds
5= bursts over 120 seconds
6 = up to signal strength 3
7 = S4 to 5
8 = S6 to 7
9 = S8 and stronger.

However, I must admit to not seeing the system used to report missing information for the last 20 years and certainly not when using WSJT system.

When you have selected a signal report for the station you are hearing, type it into the Rpt box and hit Generate Standard Message. This will take the callsign and report and put them in to the text boxes. In order to start receiving signal trace press Monitor (which will go to green) to transmit, make sure Auto is off and it will go to red.

Never, ever, change the report once sent even if suddenly signals are much stronger (or weaker). If you start sending 37 stay with 37 until the QSO is completed.

During the QSO keep a watch on the SpecJT screen and the trace, if you see (or hear) a burst or even a ping then you can put the PC cursor right on the spike and do a left or right mouse click, (there are two different algorithms, one on left and one on right click). If anything is decoded the results will be placed in the main WSJT screen. WSJT will actually try to decode a ping or burst without any intervention from the operator, but you will still need to be around in order to change text being sent by you. So we haven't yet reached the days of unattended MS operation thankfully.

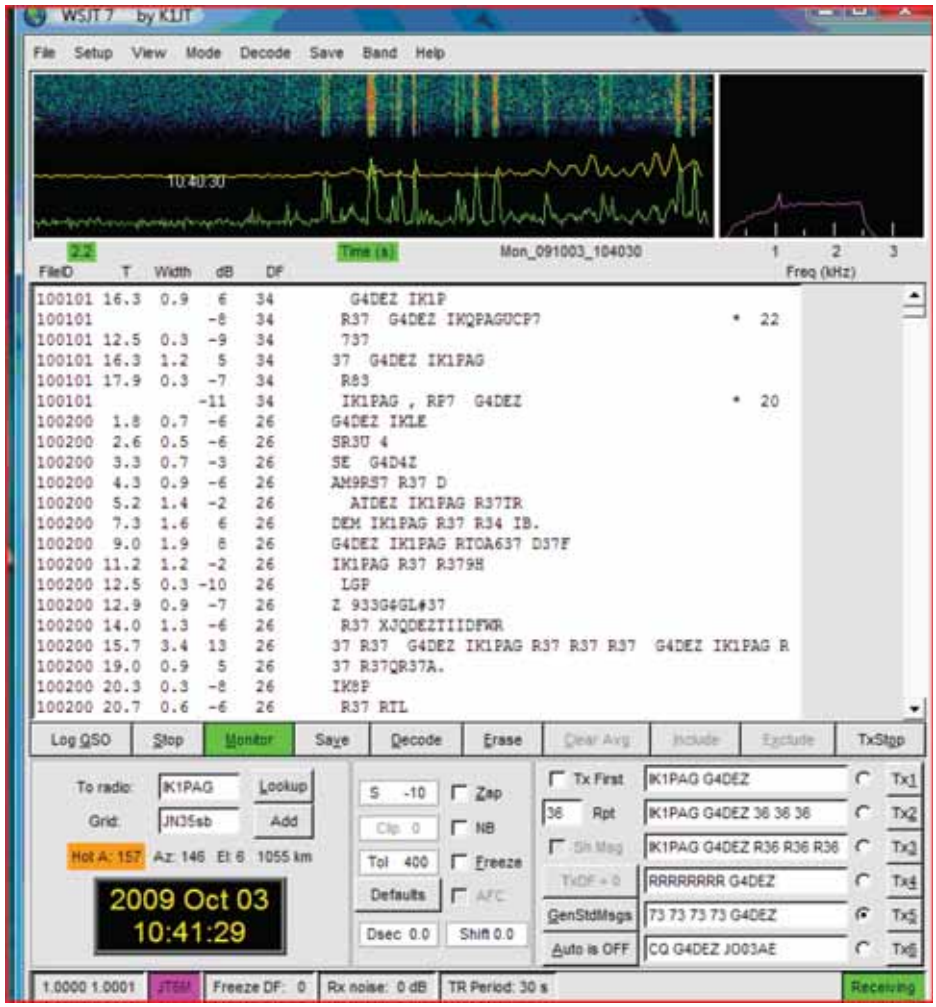

FIGURE 2: The start of the QSO with IK1PAG.

For a QSO you need to copy both callsigns and a report and a Roger report and, finally, RRRRRRs. The exchange of 73 are only a courtesy and do not make or fail a QSO.

As you must get the callsign of the station being worked, if you were just looking, say, on decimal 370 and copied the callsign then you can go back in the next period with your call, his call and a report (as noted before). Hopefully he will hear or see you on the screen and reply to you. What you need is both calls from him and a report. The calls and report do not have to come in the same burst, they can – and often do – come in multiple pings and bursts. To check if the bits are coming from the right station, look at the DF of the signal that you initially heard and, if it is him, then the DF will be the same or very close to it, (depends on drift and maybe Doppler effect).

Once you have received both calls and report then, and only then, can you go back with a Roger report (remember never change the report). You just click on Text 3 and send calls and R37 or whatever.

You need to follow the same procedure for this stage in that you must either copy his R report in full (or if you were sending the R report) a string of RRRRRRRs, which means he has got everything from you and QSO is complete. You can then send 73 (Text 5).

Bryn, G4DEZ working MS on a laptop. Later that was fried by a lightning strike which took out the PC modem and the PC!

The received signal can again be in full or made up of bits and pieces ensuring that the bits came from the same station by checking DF. On say 144.370MHz, which is the calling frequency there could be many stations on or around the same frequency transmitting in your direction but working somebody else.

If you are making a scheduled test then when you start calling, all you would send would be your callsign and his, no reports yet as you haven't heard him! The QSO would then proceed as detailed previously once you actually start copying anything.

If you are on 6m you would use mode

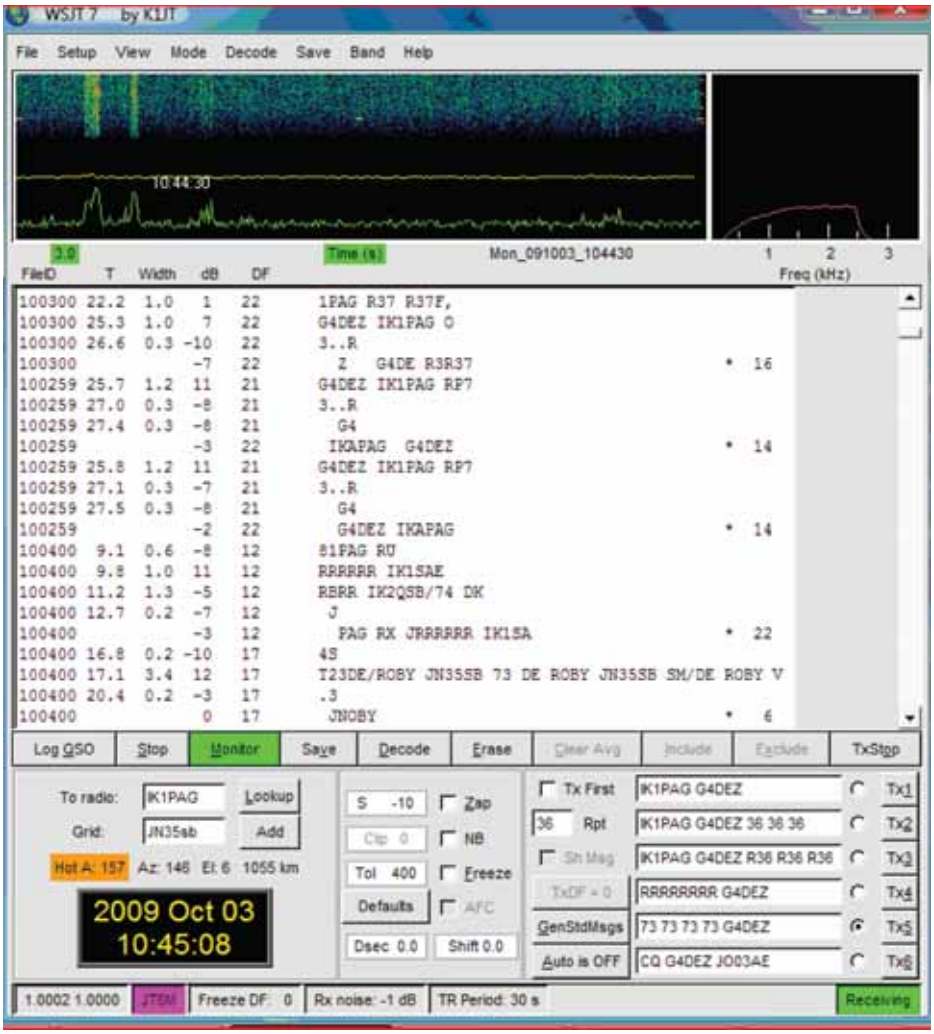

FIGURE 3: The final part of the QSO with IK1PAG.

JT6M for MS instead of FSK441 but the procedure and reporting is exactly the same. On 4m, both FSK441 and JT6M are used seemingly in a random fashion. Just make sure that you are both using same mode (not like me this morning when I was calling LA4ANA on 4m FSK and receiving him on 6m JT6M! He corrected my error by changing over to FSK). Well I am getting old and had only just woken up – that's my excuse! I was using an FT847 on 4m and an IC7400 on 6m with two different PCs and digiboxes! You can tell the difference audibly by the ringing tones of JT6M and the 'Brrr' of FSK441.

In periods of high activity (during major showers) it is normal to call CQ on the calling frequency but indicate in Text 6 to the listening stations the receive frequency ie CQ G4DEZ 376 JO03AE, means I am listening on 144.376 and when I receive a signal I will transmit on 376 in order to complete the QSO. This goes for all bands 6, 4 or 2.

As a matter of interest 70cm MS QSOs can be made but really require higher power and a major shower; random QSOs are very few and far between.

There are limitations to the distances that can be worked on pure MS, the norm is around 2350km maximum. This has been exceeded but is unusual and requires high power and high antenna gain as well as and clear take off. Sometimes an MS QSO can be aided by ionoscatter propagation or even Sporadic-E. You will be aware of that if it happens! On 6m I and many others have worked USA on digital JT6M using Es propagation.

There are many stations active on 2, 4 and 6m using only up to 100W (and sometimes substantially lower power) and relatively small antennas who make regular MS contacts. The good thing about MS is that the meteors are always there, not like tropo or ionoscatter propagation.

There are other modes available with the WSJT program. In time you will get used to them all and EME can be worked with relatively low power as long as the station at other end is a big gun! If you are interested then the first thing to do is download the WSJT program and carefully read the operating instructions. If you have any problems with the WSJT procedures set up or anything else then my e-mail address is at the top of the page.

EXAMPLE QSO. The following text is a QSO I had on 3 October 2009 starting about 0958UTC, using random meteors (no major shower at that time).

I heard Roby on 50.230MHz calling CQ, so I decided to give him a call using JT6M (the preferred mode on 6m MS). I gave him a 36 report as his signals were not particularly strong but were sometimes more than 5 seconds long.

095959 9.1 3.4 18 40
CQ IK1PAG JN35 CQ IK1PAG JN35 CQ IK1PAG JN35
100101 -8 34 R37 G4DEZ IKQPAGUCP7
* 22100200 -4 26 R37
As you can see at 1001UTC he had heard me and sent the reply (at all times I could actually hear the signals loudspeaker copy).

100300 22.2 1.0 1 22 1PAG R37 R37F,
100259 -2 22 G4DEZ IKAPAG * 14
These two lines are examples of fragmented data, which could have been used to piece together reports if I had not already got everything ok. At this point I started to send Roby RRRRs.

100400 17.1 3.4 12 17 T23DE/ROBY JN35SB 73 DE ROBY JN35SB SM/DE ROBY V
This line shows that he received my RRRRs correctly and just to confirm QSO complete he sent 73s.

10:05:27 IK1PAG Roby 2/6m MS JT TNX for QSO Bryn good signal always good is your signal

100700 12.8 3.4 16 9 K1PAG JN35 CQ IK1PAG JN35 CQ IK1PAG JN35 CQ I

The line at 10:05 was cut and pasted from the ON4KST web page and was further confirmation that QSO was completed correctly.

During the short QSO I received up to seven bursts in a single period, the best was over 20 seconds long. All were decoded either in full (on bursts) or partially (on pings), remember this was on random meteors.

The screenshots in **Figures 2** and **3** show the actual QSO in progress.

CONTESTS. During the Scandinavian 6m Activity Contest (NAC) on Thursday 8 October, I worked 15 MS contacts in about three hours. Some QSOs lasted around three minutes; none lasted more than 15 minutes and all were successful. So MS is a wonderful way to work some DX. Distances out to around 1850km and with 400W and a 7-element antenna were worked with many of the stations running around 100W to 4 or 5-element beams.

JOIN IN. I hope this short article will give some of you the incentive to try MS on one band or another, it is great fun, but can take up a lot of time. Luckily my wife is also licensed, so she doesn't mind too much!

Remember if you use ON4KST chat rooms, I am there most of the time and I can answer any queries you may have.

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Yaesu FNB-101LI 7.4V 1100mAh Lithium Ion Battery £45.94

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Yaesu MH-74A7A Waterproof Speaker Microphone £43.89

Yaesu NC-85U AC Charger for BH-1/BH-2 ..... £22.44

Yaesu NC-86U AC Charger for VX-8 ..... £10.17

Yaesu VX-8E (Mini-Manual)
Sixteen high-quality laminated pages, loaded with detailed instructions. Ideal for setting-up and operating the VX-8R quad-band transceiver £14.99

Yaesu FT-450 HF Base Transceiver with & without ATU. HF & 6m Full DSP

FT-450 shown with optional Bail Stand.

The Yaesu FT-450 is a major new HF & 6m transceiver offering full a 400MHz IF DSP design at a very low price. Available with or without internal ATU, this new rig offers serious performance for those who are not bothered about the upper V/U bands.

Yaesu FT-450 without ATU: £589.95
Yaesu FT-450AT with ATU: £639.95

Options:
MyDEL MP-8230 23Amp PSU £69.95
Stand-FT450 Bail Stand £19.95
ATU-450 Optional internal ATU £163.43
MMB-90 Mobile Bracket £19.36
MHG-1 Carry Handle £10.17
MH-36E8J DTMF Mic £71.48
MD-100 Desk Mic £149.95
MD-200A8X Super Deluxe Desk Mic £199.95
YH-77STA Headphones £56.14
MLS-200 High Power weatherproof speaker £28.55
ATAS-120A Fully Auto Mobile 7.50MHz Antenna £239.95

Yaesu VX-3E. ML&S £138.95
Micro Handie 2/70 with scanner. Complete with Li-ion battery, charger & antenna.

Yaesu FT-60R. ML&S £145.95
Latest twin band handie complete and ready to go.

Yaesu VX-6R. ML&S £199.95
Yet another 2/70 handie from Yaesu.

Yaesu VX-7R. ML&S £259.95
The UKs best selling Triple Band Handie.

Yaesu FT-7800E. NOW ONLY £199.95
Bar make the tea it'll give you 2m/70cm @50W/40W. FREE YSK-7800 Remote Kit!

Yaesu FTM-10R. ML&S £269.95 A small compact dual band 2m/70cm transceiver with high power output of 50W on 2m and 40W on 70cm, (adjustable power levels of 50/40W, 20/20W, 5/5W). Receive range from 0.5–1.8MHz, 76–108MHz, 137–222MHz and 300–999MHz.

Yaesu FT-8800. ML&S £295.95
Similar to the FT-7800 but can receive on 2 & 70 simultaneously.

Yaesu FT-8900. ML&S £329.95
High-power FM on 10m, 6m, 2m & 70cm. When your local repeater is busy, slip onto 10m & work DX!

Yaesu FT-897D
High Power version of the FT-897. Use as a transportable, (20W) or as a base/mobile (100W)
Bundle Price: £CALL (Rig only: £669.95)

Yaesu FT-857D The Ultimate HF Mobile Installation! Plus ATAS-120D 40m-70cm Auto Antenna
Bundle Price: £CALL (Rig only: £554.95)

Yaesu FT-817ND
The world's only all-band portable transceiver.
Only £449.95 with FREE CSC-83 Carry Case worth £19.95

All ML&S FT-817NDs include; 2 Years warranty, metal hydride batteries, charger, mic, etc.

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

Open six days a week. Mon - Fri: 9.30am - 5.30pm Sat: 9.00am - 5.00pm

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E-mail: sales@hamradio.co.uk

FT-817ND

YAESU

After almost 9 years you would think there would be competition for the FT-817. Still the ONLY truly hand-portable 160m-70cm all mode transceiver available today.

£449.95 with Free CSC-83 Carry Case worth over £20.

NEW! Yaesu FT-dx5000MP

HF/6M Transceiver with 112dB Dynamic Range & IP3 of +40dBm

Coming soon! See web for further details.

Yaesu FT-857D & ATAS-120A Package

Still our best selling HF Mobile Radio.

By adding the remarkable ATAS-120A Auto Antenna you have 40-10M at the press of a button without getting out of your car! No other manufacturer has been able to offer this unique feature together with their mobile radio. Having used the ATAS on 40m I was amazed how a mobile antenna so small performs so effectively. My single band whips have been consigned to the garage ever since!

FT-857D only £554.95 or with ATAS-120A £759.95

ICOM

GB7ML
D-Star repeater is back on air!
See: 439.4625MHz
Default reflector 13.B

Icom HF products

IC-718	Basic HF Radio, 12V, 100W output	£459.74
IC-706mk11G	100W HF/6m + 2/70 Multimode Mobile	£735.95
IC-7200	Mr T's choice for tough HF/6M Operation	£775.95
IC-7000	Full DSP, TFT Screen, 100W HF/6m + 2/70	£939.95

IC-7400
100W HF/6M/2M Base, full DSP, Auto ATU £1199.95

IC-7600	100W, Twin RX, Huge Display. No psu	£Call!!
IC-7700	Superb 200W HF/6M Base, PSU/ATU	£Call!!
IC-7800	Icom's Flagship radio has gone up again	£Call!!
IC-PW1Euro	1kW Fully automatic HF/6m Linear Amp	£Call!!

Icom V/U Products

IC-E92ED	As above c/w D-Star fitted & splash–proof	£379.95
IC-E2820	Proper dual band, dual display, remote etc	£395.95
IC-E2820+D	Supplied with UT-123 D-Star board	£549.95
IC-910H	Multimode 2/70 Base Station	£1269.95
IC-910X	As above but with optional 23cm UX-910	£1469.95

Icom Receivers

IC-R9500	Flagship Base Receiver, 50kHz-3335MHz	£Call!!

ICOM PC Controlled Receivers

Icom IC-R1500 & IC-PCR2500
All Windows XP, Vista or Windows 7 Controlled via USB

IC-R1500	10kHz-3300MHz All Mode with remote head	£449.95
IC-PCR2500	Twin Receiver version of PCR-1500	£499.95
IC-R2500	As above but with remote head	£559.95

NEW Icom IC-9100 All-Rounder
HF through to 23cms Base Transceiver

Click on our website to see a video from Tokyo Hamfair August 2009!

V/UHF Satellite + HF/50MHz bands + D-STAR DV mode

- HF/50MHz 144/430(440)MHz & 1200MHz coverage
- SSB, CW, RTTY, AM, FM & DV modes
- 100W on HF/50/144MHz, 75W on 430(440)MHz. 10W on 1200MHz
- 32-bit floating point DSP & 24-bit AD/DA converter
- Double superheterodyne with image rejection mixer
- Optional 3kHz/6kHz 1st IF (roofing) filters (for HF/50MHz bands)
- Satellite mode operation
- Optional D-STAR DV mode operation

Price: TBA

Icom IC-7600

See our website for first full detailed review by Adam Farson VA70J

The successor to the IC-7565Pro111, the eagerly awaited new mid-range HF/6M Transceiver will try and set another bench mark like that of its predecessor.

KENWOOD

Kenwood HF Products

TS-480SAT	Remote head HF/6m 100W inc ATU Transceiver	£749.95
TS-480HX	200Watt version of above, no auto-ATU	£849.95
TS-2000E	100Watt all mode HF/2/6M with auto-ATU etc	£1499.95
TS-2000X	As above but fitted with 10Watts on 23cm (all mode)	£1799.95

Kenwood V/U Products

TH-F7E	The only 2/70 FM Handie with SSB/CW WB Receiver	£229.95
TM-V71E	First Class 2/70 FM Mobile with remote head	£289.95
TM-D710E	The only 2/70 FM Mobile/Base with APRS/TNC etc	£429.95
TM-D710E+AvMap	Bundle. Personal Navigator for GPS located APRS	£Call!!

New! Alinco DJ-G7E

"As used by Howard, G6LVB". Unique 2/70/23cm Handie. Ideal for hand-held Satellite operation.

Special Price! ML&S: £299.95

NEW!

MicroBit Remote Rig Interface

A complete remote control system for Amateur radio

Using Microbit's advanced technology, full remote control of your rig is available today.

Imagine going on holiday but missing your HF system back home. Well no more! Using the RRC-1258 system all that is required is for you to take the head unit of say your IC-706 or TS-480 together with one half of the RRC-1258, plug into a LAN connection connected to the web and within seconds you are "ON AIR" as if you were sitting in your shack at home. (Minus the cat, TV and any other external interference!)

The previous model is still available.

Microbit-1258 mkI £349.95. Including Lead Set
Microbit-1258 mkII £399.95. Leads included
For more info see **www.hamradio.co.uk/rrc-1258.shtml**

ML&S are the sole UK & Ireland distributor for Microbit.

Latest version of the Remote Rig. One version for ALL radio models.
Like the original RRC-1258, the MkII is sold in pairs, assembled and tested but not configured. Included in the package is one USB cable, Power cables (2 pc), Cat 5 cable for making IC-706 cable and a 2xRJ-45 extender.

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

Confused about D-Star? Then don't be!

D-Star Day – Saturday, March 13th at ML&S Ltd. 10:00-14:00Hrs

Representatives from Icom UK, Declan M0TMX D-Star repeater keeper and many others will be on hand to discuss the operations of this new and exciting Digital Mode. Full demonstrations on how to set your D-Star radio will be available with expert help and refreshments available throughout the day.

Additional discounts will be available for all D-Star products including accessories when purchased on the day.

Please E-mail **D-star@HamRadio.co.uk** and let us know how many of you wish to attend!

DV-Dongle

Want to dabble in D-Star without the expense of a radio? The new DV-Dongle is ideal.

The DV Dongle connects to your PC or Apple Mac via a USB port and provides encoding and decoding of compressed audio using the DVSI AMBE2000 full duplex vocoder DSP chip. AMBE technology is used in all D-Star radios to provide efficient voice transmissions. It is also used in some HF digital protocols by vendors like AOR. The DVTool application used with the DV Dongle may be installed and run on Microsoft Windows XP/Vista, Mac OS X Leopard, or many flavors of Linux.

NEW

In stock, works with MAC or PC. £199.95

HB-1A Ultra Compact 3 Band CW Transceiver

Offering up to 4 Watts output on 40/30/20M Bands, this tiny HF portable is powered by 8 x AA cells and is aimed at the serious QRP enthusiast and has performance similar to that of the Elecraft KX-1.

- 20 meters, 30 meters and 40 meter amateur bands.
- CW Transceive, SSB receive.
- Receiving from 5 MHz to 16MHz.
- Maximum transmission power of about 4 watts on external 12V.
- Weight 350Grams (approximate).
- Battery compartment to hold 8 rechargeable AA cells.
- Built-in auto function keys.
- DDS VFO with 20 frequency storage memory.
- Digital dial with LCD technology.
- Automatic keyer with the CQ programmable with your call.
- RIT 10 Hz, 100 Hz.
- Frequency conversion super- heterodyne receiver.
- Unit will operate with voltage supply from 8-14 VDC.
- Built in AGC function.

ML&S Price: £249.95.

Call or see website for further details.

NOW IN STOCK - very limited quantity.

The SR2000A Frequency Monitor

ML&S: £1999.95

Combines a spectrum display unit and receiver in a single cabinet. Up to 40MHz display bandwidth may be selected and minimum 1kHz RBW. The embedded receiver provides continuous coverage from 25MHz to 3GHz in AM, FM & WFM modes. The FFT SEARCH function enables you to locate elusive transmissions FAST, a free PC package (from the AOR web site) further enriches operation. Video images can be displayed on the LCD (PAL + NTSC). The interconnections are incorporated "in the box" along with an internal speaker.

VENTUS WX-928-ULTIMATE

The NEW WX-928 really is the ULTIMATE in professional weather stations, offering the usual feature set of the WX-831 but uses a Anemometer with solar cells , Satellite Meteotime forecast over the next 4 days and a massive split screen.

Description

This weather station is as called the ultimate weather station. It provides you with local weather data from anemometer, rain gauge and thermohygrometer sensor. All these local measurements from your garden can you save on your pc by using the pc-software included. Furthermore it receives a 4 days forecast by satellite from cities all around in Europe. Just find your city and the weather station updates automatically.

Intro offer only £199.95 - in stock now!

VENTUS WX-831

This new much improved wireless Weather Station is built to a very high standard and even includes O-Ring seals on battery compartments that are mounted externally. The quality of external hardware is built to last for years and really moves the game on when it comes to "Professional Weather Stations"

ML&S Price: £119.95.

Options: Additional wireless temperature monitors: £24.95. PSU to run the WX-831 from 240V: £19.95

ONLY £49.95

VENTUS G730 GPS-LOGGER

This USB memory stick sized unit is a fascinating pocket device with multiple commercial and personal uses for individual movement tracking. It's very light, extremely easy to use and logs your route automatically. It also adds your GPS location to digital pictures. It presents the route you have taken in 3D via Google Earth™ on your PC and it can export in different formats.

Begali

For the entire range with choice of bases and contacts and prices please see our website or BEGALI on www.i2rtf.com

The finest range of keys available today.


Begali Sculpture


Begali Signature


Begali Camel Back

Begali chose ML&S because they wanted a quality company to see the very best Morse Keys in the World.

ML&S are sole distributors for these beautifully crafted keys in the UK. For full details see our website or send 40p in stamps for full colour catalogue.

Begali Spark	Straight Key gold base	**£122.56**
Begali Camel Bac	Straight Key black base	**£126.87**
Begali Blade	Straight Key black base	**£218.34**
Begali Simplex-Mono	Mono Paddle gold base, silver contacts	**£149.97**
Begali Simplex-Mono	Mono Paddle gold base, palladium contacts	**£180.44**
Begali Simplex-Mono	Mono Paddle palladium base, gold contacts	**£180.44**
Begali Simplex-Mono	Mono Paddle palladium base, silver contacts	**£149.97**
Begali HST	Single Lever Paddle black iron base, gold contacts	**£218.34**
Begali Simplex-Dual	Dual Paddle gold base, silver contacts	**£133.32**
Begali Simplex-Dual	Dual Paddle gold base & contacts	**£163.92**
Begali Simplex-Dual	Dual Paddle palladium base, gold contacts	**£163.92**
Begali Classic	Iambic Magnetic return, gold base, silver contacts	**£196.29**
Begali Classic	Iambic Magnetic return, palladium base, silver contacts	**£196.29**
Begali Classic	Iambic Magnetic return, gold base & contacts	**£226.75**
Begali Classic	Iambic Magnetic return, palladium base, gold contacts	**£226.75**
Begali Signature	Iambic Magnetic return, gold base silver contacts	**£265.62**
Begali Signature	Iambic Magnetic return, palladium base, silver contacts	**£265.62**
Begali Signature	Iambic Magnetic return, palladium base, gold contacts	**£296.09**
Begali Signature	Iambic Magnetic return, gold base & contacts	**£296.09**
Begali Traveller Light	Iambic Travel Key with gold contacts	**£235.11**
Begali Pearl	Iambic Magnetic return, palladium base, gold contacts	**£297.74**
Begali Contour	Iambic Magnetic return, gold base & contacts	**£286.71**
Begali Graciella Jnr	Iambic Magnetic return, palladium base, gold contacts	**£341.85**
Begali Sculpture	Iambic Mag return Carbon Fibre, stainless base, gold C	**£410.72**
Begali Intrepid	Semi-Auto Bug, magnetic return, black base, gold C	**£457.64**

Kent Morse Keys

The best British range of keys money can buy!

The Kent twin paddle Morse key. £84.95. Kent Single Paddle Key. £72.85. Kent KT-1 Professional. £79.90.

Perseus VLF-LF-HF Receiver

PERSEUS is a VLF-LF-HF receiver based on an outstanding direct sampling digital architecture.

£699.95

ML&S are Sole Distributors for Perseus in the UK and Ireland NOW IN STOCK!

PERSEUS = Pretty Excellent Receiver for Software-Eager Unperceivable Signals

It features a 14 bit 80 MS/s analog-to-digital converter, a high-performance FPGA-based digital down-converter and a high-speed 480 Mbit/s USB2.0 PC interface.

A COMPLETE SDR RECEIVER FOR SHORTWAVES The PERSEUS analog front-end has been carefully designed for the most demanding users and includes a 0-30 dB, 10 dB steps, attenuator, a ten bands preselection filters bank, and a high dynamic preamplifier with a top-class input third-order Intercept Point of more than 30 dBm. The resulting third-order dynamic range is more than 100 dB in SSB and more than 105 dB in CW. Believe us, there's no other so performant and complete shortwave SDR receiver in the market today. The PERSEUS receiver can be operated also in a wide band mode as a 10 KHz - 40 MHz spectrum analyzer with more than 100 dB dynamic range in a 10 KHz resolution bandwidth.

SOFTWARE FOR DEMANDING USERS Being a software defined radio, the PERSEUS receiver relies on software applications to carry out the demodulation process. Besides providing all the required software signal processing for the PC platforms, the PERSEUS software has a comfortable graphical interface, is simple to use and runs under Microsoft Windows 2000, XP and Vista. All the controls a listener is used to see on a radio are there, in the application main window. The interface to third party software is provided in several ways, by means of the Microtelecom Software Defined Radio Developer Kit, virtual audio ports and virtual communication ports.

DX Engineering Products stocked at ML&S!

New! DXE-UT-8213 Coax Cable Stripper ONLY £45.99!

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).

VAT may have increased but many of our prices haven't!

Open six days a week. Mon - Fri: 9.30am - 5.30pm Sat: 9.00am - 5.00pm

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Web: www.hamradio.co.uk
E-mail: sales@hamradio.co.uk

New! GAP Antennas Available from stock

GAP ANTENNA PRODUCTS

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

Alpha Delta Antennas

ALPHA DELTA COMMUNICATIONS, INC.

Alpha Delta are a USA Manufacturer of high quality coax switches, lightning (surge) protectors and the best wire antennas money can buy.

Delta-2B	2-way position SO-239 switch (1kW) for use up to 1.3GHz **£54.15**
Delta-4B	4-way position SO-239 switch (2kW) for use up to 500MHz..... **£75.60**
Delta-4BN	4-way position N-type switch (1.5kW) for use up to 1.2GHz **£86.80**
AD-ATT3G50	0MHz to 3GHz (200W) surge protector. N-Female Connector **£49.95**
AD-ATT3G50/HP	0MHz to 3GHz (2kW) surge protector. N-Female Connector. **£48.89**
AD-ATT3G50U	0MHz to 500MHz (200W) surge protector. SO-239 Connector **£39.95**
AD-ATT3G50U/HP	0MHz to 500MHz (2kW) surge protector. SO-239 Connector **£44.95**
End Insulators	Dog Bones. They are extremely rugged, UV and RF resistant **£1.53**
Delta-DX-A	160m, 80m and 40m 1/4 twin slope trap antenna. This antenna combines the tremendous DX firepower of the 1/4-wave slope with the wide bandwidth of the 1/2-wave dipole. One leg is 67ft long and the other is 55ft long **£79.95**
Delta-DX-B	160m, 80m, 40m and 30m single slope trapped antenna. This antenna is designed for limited space installations, were room does not allow for large wire antennas; it only requires 60ft of space providing amazing DX performance at installation heights of 35ft **£84.96**
Delta-DX-CC	80m, 40m, 20m, 15m and 10m dipole. This antenna is parallel length dipole with no traps; overall length is 82ft **£136.90**
Delta-DX-DD	80m and 40m dipole. This antenna is parallel length dipole with no traps; overall length is 82ft **£89.95**
Delta-DX-EE	40m, 20m, 15m, 10m dipole, it can be used on 30m, 17m, 12m with an ATU. This antenna is not trapped, and has an overall length of 40ft..... **£119.95**
Delta-DX-LB	160m - 80m, and 40m Low Band dipole. This antenna performance and 2:1 VSWR bandwidth depends on the height and surrounding objects; overall length is 100ft. **£119.96**
DX-LB-PLUS	160m, 80m, 40m and 20m - 10m Low Band dipole. This antenna performance and 2:1 VSWR bandwidth depends on the height and surrounding objects; overall length is 100ft. **£162.45**
DX-Series	Full-size utilized monoband dipole. These dipoles are using the Delta-C Centre Insulator with built-in Arc-Purge Surge Suppressor. **DX-20:** 20m Monoband Dipole at 33ft long **DX-40:** 40m Monoband Dipole at 66ft long **DX-80:** 80m Monoband Dipole at 133ft long..... **£44.95**
DX-Ultra	Medium wave to 30MHz 80ft AM Broadcast Dipole. Efficient, low-noise dipole for military, government, etc., use. **£119.95**
Hardware Kit	contains the following: 1x Dipole Centre 2x Dog Bones 1x Surge Protection Block **£27.95**
Delta-SEP	Replacement/spare Arc-Plug™ Static Electricity Protector. This unit is usually attached to the back of the Alpha Delta Centre T Balun **£12.95**

Super Antennas USA

Super Antenna ChapStick
MP-1 80m-10M Portable Antenna supplied complete with tripod & 80m coil.Only £159.955

Super Antenna MP-1 Rotary Dipole
10-80M with (Incl. 80m Coils) Collapses into a small carry bag. .....Only £299.95
Or Deluxe version with Tripod. £389.95

Super Antenna YP-3 "Beam in a Bag" 80-10M (inc WARC) 3 ele portable beam supplied with carry bag £399.95

The complete range of Super Antenna products and accessories can be found on our web site

Hustler Antennas

HUSTLER

Base Station Range
Free standing, max 7.3m tall, 1kW

4-BTV	40/20/15/10m	**£178.95**
5-BTV	80/40/20/15/10m	**£218.95**
6-BTV	80/40/30/20/15/10m	**£245.95**
17-BTV-S	17m add on for 5-BTV or 6-BTV	**£53.95**

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.

Yaesu Rotators
The best available at very special prices.

Only £299.95

G-450C The most popular medium duty rotator available today. ML&S always guarantee to have the largest stocks in the UK and of course the best prices. With 25m of cable.

G-250 Ideal simple to use remote control Antenna rotator for light weight antenna installations. Ideal use for turning 4/6/9 element Tonna 2m antennas, 9/19/21 element 70 cm antennas. Also V/U Log periodic (i.e. Maldol LP-1300) and small single and HF dipoles .Only £109.95

G-550 Elevation rotator for satellite operation .....Only £259.95

G-5500 Heavy-Duty PC Controlled Vertical rotator for satellite and EME applications. .....Only £469.95

G-650 Medium duty with higher brake torque than the G-450. Supplied with 25m control cable.....£339.95

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. £399.95

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 and 40 metres of control cable, to simplify installation. Total rotation range: 450°, with presets.....£769.95

For the full range of the worlds most reliable Yaesu Rotator products, see our website.

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
CHA 250B 80m to 6m with no ATU and no gaps £306.48

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

DIAMOND

Base Antennas

X-30	2/70, 3/5.5dB, 1.3m Long	£51.04
X-50N	2/70, 4.5/7.2dB, 1.7m Long.....	£66.37
X-300	2/70, 6.5/9dB, 3.1m Long.....	£102.12
X-7000	2/70/23, 8.3/11.7/13.7dB 5m Long....	£204.30
V-2000	6/2/70, 2.15/6.2/8.4dB, 2.5m Long....	£127.67

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MX-3000N	2/70/23 Triplexer.....	£82.71

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HF

Low bands bring most DX news

FT5GA and 3D20CR – two of the 'top 25' countries that were active in 2009, putting a smile on many faces.

OFF TO A GOOD START. The year started with some great expeditions including TX3D (Australs), VP8DMN (Falkland), T32BJ (Christmas Island – the one in the Pacific), XR0ZA (Juan Fernandez), PY0XB/PY0 (Fernando do Noronha), etc. In the week leading to the CQWW 160 CW contest a typical night's Cluster spots on 160 looked more like what you might expect on 20m – JT1CO, PY2XB/PY0, C6ANM, XU7ACY, 9M2AX, VP8DMN, TX3D, ST2AR, XR0ZA, ZF2BJ, PJ2/W8WTS, OY6FRA and various JAs, as one typical example, all workable from the UK. On the higher bands there was DX to be worked. Don, G3BJ was telling me, though, that as T32BJ he found the 20m opening to Europe at pretty much the same time every day and signals peaked at good strength but the opening would only last for an hour or so. For those without the real estate for a big 160m antenna or for a 20m Yagi, 30, 40 and 80 again proved to be the mainstays for DX working.

DX NEWS. Kostas, SV1DPI, reports on activities from Mount Athos by Monk Apollo SV2ASP/A. He has been active quite regularly of late, mainly on CW and RTTY, his favourite mode as it is quieter and is less likely to disturb the other monks in the monastery. Monk Apollo has updated his qrz.com listing recently, with lots of information about himself, the monastery and his radio activities.

Jurgen, DJ2VO, and three friends plan to activate Burundi, 9U, as 9U1VO, 9UXEV (apparently!), 9U1RSI and 9U1KI from 22 February to 6 March, CW, SSB and RTTY with four 100 watt stations to vertical and wire antennas. QSL to the operator's home call, bureau or direct. They will be at the Safari Gate Hotel in Bujumbura.

I haven't seen a recent update, but JF3MYU and three US operators were due to be on the air from 28 March for two weeks as JD1BNK, JD1BNM, JD1BNN (plus JD1BNJ on RTTY) from Ogasawara, all bands and modes. It is rare to get an extended expedition from any of the JD1 islands as the Japanese seem to get very limited holidays, so this effort will be very welcome. A website should be up and running by the time this appears.

Tim, NL8F (ex VK4COF) will be on Cocos (Keeling) Islands (OC-003) from 2 to 10 March. He hopes to get the callsign VK9COF. After operating from Cocos his plans are to go to the South Cook Islands where he will be active as E51COF from 20 to 30 March. Activity is expected on 80 though 10 but mostly on his favourite band, 40m.

DL7AFS and DL7ZG will sign V21ZG from Antigua for 18 days starting 16 March. They will concentrate on RTTY, PSK31/63 and SSB.

Readers may be interested to know that the January issue of the Clipperton DX Club (CDXC) newsletter is now available (in English) on their website. There are interesting articles on the recent FT5GA and 3D20CR – Conway Reef DXpeditions, plus others. Our thanks to our French friends for making this English version available for the first time. And a preliminary account of the VP8DMN expedition appears on Michael, G7VJR's website.

The RSGB 73rd Commonwealth Contest runs on 13/14 March and several contest expeditions have already been announced, including 3B9/G3LZQ, 5X1NH (G3RWF), 9G5XA (G3XAQ), J38CW/J38SW (G3VCQ/M3VCQ), J6/G3PJT, J88DR (G3TBK) and VP2MCC (G4FAL). Remember, during the contest they only work Commonwealth stations, which helps to avoid those big pile-ups of European or US stations (and makes up for the recent ARRL DX Contests in which the DX stations only work North America!). The CQ WPX SSB contest is at the end of the month and usually brings out lots of unusual prefixes (keep your RSGB prefix guide handy).

60m REPORT (from G4TRA). At the time of writing, there are a number of Caribbean DXpeditions coming up on 60m. First, V31YN/DJ4KW and V31GW/DK9GG were due to be active until 28 February. Alex HH2/YV5SSB has operating permission until 30 March but the Haiti earthquake may well have changed his plans. Mike, W1USN and Bob, AA1M were due on from Montserrat VP2M from 28 February to 13 March. John, W5JON/J68JA will again be operating from St. Lucia 2 to 11 March. QSL via W5JON. J38SW Sharon, M3VCQ, and J38CW Colin, G3VCQ, 11 to 25 March are trying to get a 60m licence; which shouldn't be a problem. QSL to home calls.

Finally, a major spectrum consultation exercise has been launched by the Bahraini telecommunications regulator, TRA. TRA invites comments on its proposal, subject to SSCC approval, to offer amateur licensees in the Kingdom additional spectrum at 500kHz, 5.3MHz and 70MHz in order to participate in propagation experiments.

MOST WANTED. The DX Magazine 2009 Most Wanted Countries survey results have been published recently. Fortunately for DXers, but not so for the survey, three 'top 25 countries' had DXpeditions taking place during the polling period so the results may not be an accurate reflection at this point. P5 (N. Korea) remains at number 1, followed by KP1 (Navassa), ZS8 (Prince Edward Island), 3Y/B (Bouvet), 7O (Yemen), VK0 (Heard) and FT5W (Crozet). Of these, FT5W has seen recent low-key operation and we are all hoping that those who mounted the K5D Desecheo operation will now be able to open the door to Navassa. FT5G (Glorioso) was at number 8, but should have fallen quite a few places since the recent operation. FT5Z (Amsterdam Island) and VP8/S (S. Sandwich) complete the Top Ten. You will need to get hold of a copy of the magazine for a full breakdown by mode, continent, etc.

CORRESPONDENCE AND TABLES. Quite a batch of correspondence this month, as many of you have sent in end-of-year totals, along

COUNTRIES WORKED, 2009

(starting 1/1/09, final totals for 2009)

CALL	CW	SSB	DATA	MIXED
G3XYP	200	208	144	240
G3TBK	234	89	103	234
G0BNR	185	166	17	220
M0VKY	0	198	0	198
MW0JZE	0	189	0	189
G3HQT	171	0	126	183
G3JFS	153	93	114	176
MU0FAL	147	83	0	152
M0BVE	146	0	0	146
G4LMW	133	41	28	137
G4WXZ	78	85	33	128
MM0DXH	0	122	12	122
G0RPM	69	56	99	115
G4NXG/M	0	111	0	111
G3VMY	108	59	0	108
G4XEX	0	85	80	106
G4FVK	76	84	0	105
MM0RKT	65	15	80	95
G6CSY	71	60	75	92
G4DDL	83	58	33	89
G1UGH	0	88	0	88
MM3XXW	0	68	0	68
M0BKV	26	63	0	63

with some commentary. First, my apologies once again for mislaying a letter from John, G3BDQ, who remains my one (very welcome) correspondent by good old-fashioned 'snail mail'. As ever, John's focus has been on Top Band and he feels that his signal has been getting out better since the leaves fell off the trees in the autumn. I wonder if anyone else has this experience? John's log includes (along with plenty of US DX) 6V7S, VA5DX (Sask), 5N0OCH, ZC4VJ, 9L7NS, 9G5TT, PJ2/K8ND, 3V3S, JQ2VVH, T77C, CE1/K7CA and OY9JD. The CE1 was an all-time new one for him on the band and John now has over 170 entities on 160. He mentions that the vertical part of his antenna is only 35ft (with top- and linear loading), which goes to show that huge verticals aren't essential to do well on the band. Perseverance probably is, though!

Peter, G3HQT found lots of Japanese signals on 80m in the evenings recently. He also picks up GM3PPE's comments about 30m and says, "When I worked in the control room at Cable and Wireless, 10megs was used for VK for a large part of the 24 hours. If not on the short path then on the reverse of the aerials at Dorchester/Somerton on the long path". CW brought recent contacts with VE6WZ, JH4IFF, R1FJM (Franz Josef) and PY0FF on 80, 5I3A (Tanzania) on 20, A25NW and ST2AR on 17 plus 5R8IC and 9L1NH on 15. RTTY accounted for 9G5TT on 20 and VP2V/DL7VOG on 17.

Andrew, G7COD worked six new entities, in among yet another effort as 8Q7AK (see his website for news). Two of his new ones were KH2L (Guam) and XR0Y (Easter Island). Andrew has been out portable, experimenting with antennas he cannot put up at home, including a vee-beam with 260ft legs. Impressive! He will be on his travels again, from 20 to 28 March, as EA8/G7COD/A from Gran Canaria, 20 through 10, CW and SSB. Recent DX includes V31WV, JT1BH, J79WE, 3B8CF and R1ANB (Mirny research base, Antartica) on 40 CW, VO2FF, XR0Y, XV4D, 3V3S, ZF2AH, 5N3LQK, V31WV, HK1HW, and R1AND (Novolazarevskaya research base, Antartica) on 30 CW, 5N/LZ1QK on 20 CW, KH2L, FP/G3ZAY, V31WV and 3V3S on 17 CW plus 3V3S and 9G5TT on 17 SSB.

Peter, G3JFS sends an end-of-year total and mentions that his best DX of the year was K5D (Desecheo) on 80m while running just 5 watts and an end-fed wire. His QRP total for the year was 87. Damian, M0BKV mentions California on 80 SSB and KH7XS on 40 SSB, using his Cushcraft MA8040. Jim, MM0DXH caught a new one by way of YS1/HB9NKA on 20 SSB. Mark, M0DXR wrote in to mention a surprising contact with KH6MD (Hawaii) around 1708UTC on 40 CW. Mark was using just a Butternut HF-6V vertical and 100 watts at the time and the KH6 responded to his first call which, as Mark says, left him with a smile for the rest of the evening!

9 BAND TABLE NO 73

CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL	MODE
G3KMA	278	310	336	336	337	336	337	328	333	2931	Mixed
G4BWP	264	308	335	327	338	332	336	320	327	2887	Mixed
G3XTT	255	291	327	309	337	327	335	306	315	2802	Mixed
G3SED	267	301	322	318	329	323	320	289	295	2764	Mixed
GW3JXN	228	284	316	313	335	326	328	302	307	2739	Mixed
G4OBK	238	268	308	320	334	320	324	309	304	2725	Mixed
GM3POI	281	308	320	320	327	305	307	270	272	2710	CW
GM3YTS	234	287	321	326	334	306	319	258	286	2671	CW
G3GIQ	160	256	309	288	337	329	335	313	329	2656	Mixed
G0JHC	191	223	294	313	307	323	327	295	311	2584	Mixed
G4PTJ	127	249	288	282	332	293	327	280	308	2486	Mixed
GM3PPE	153	237	273	296	326	279	285	249	230	2328	Mixed
G3IFB	70	243	299	261	325	263	310	253	289	2313	Mixed
G3VKW	48	216	272	214	336	291	328	276	312	2293	Mixed
GM4FAM	189	254	285	285	284	277	256	221	188	2239	Mixed
G4DYO	73	203	269	143	331	294	328	242	319	2202	Mixed
G0EHO	105	196	237	255	309	270	289	236	250	2147	CW
G4WFQ	127	245	271	286	286	260	251	201	212	2139	Mixed
G4EZT	142	214	264	260	288	269	252	180	231	2100	Mixed
G4OWT	95	164	242	181	324	243	306	171	273	1999	Mixed
G0BNR	110	159	248	238	292	265	238	169	155	1874	Mixed
G4NXG/M	42	74	168	0	307	254	296	210	257	1608	Mixed
GM0UDL	116	163	188	152	278	205	230	39	206	1577	Mixed
G4FVK	45	89	121	78	210	115	202	88	180	1128	Mixed
2E1RDX	41	60	130	63	220	148	213	133	116	1124	Mixed
M0CNP	17	71	106	23	207	126	181	85	130	946	Mixed
AVERAGE	150	218	263	238	307	272	291	232	259	2229	

PREPARED BY G3GIQ 12 January 2010
NEXT DEADLINE 8 April 2010

Terry, G1UGH lists several interesting ones worked, including special event stations 3Z0RADIO on 40, CN10NY on 20 and HF12HAITI, all SSB. It is always fun to work these special event stations, though I do sometimes wonder at the supposed importance of some of these events, which appear sometimes to be very obscure or contrived! Dave, M0BVE, using 100 watts to an R7000 vertical, worked TY1MS, ST2AR, 8P5A, 5H3EE and 0J3A on 15, FG/F6AUS, C56SMY, UK8AR and 6W7SK on 17, 9G5TT, 9L7NS, D44AC, 7X2ARA and 5N7M on 20, plus P29NI, KP4MS, EK6RL and 4K9W on 30 and YN2NW on 40, all CW. Rob, G4LMW mentions 5N50K on 15 CW, PJ5NA, PY2XB/PY0 and C6ANM on 17 CW, ST2AR on 20 CW, SU1HZ on 20 SSB, VP8DMN on 40 and 80 CW, plus 9Y4VU and FG/F6AUS on 40 CW. Peter, G4XEX says, "Highlight of the month had to be a reply to my CQ call from FK8DD in New Caledonia. Now I am getting better at spotting these calls. This time I knew it was a 'rareish' one although I must admit I had no idea where New Caledonia was. I do now though!"

Nigel, G0BNR reflects on what, for him, has been an exceptional year, with 20 new DXCC entities worked to take his total to 308. The 20 new ones were K5D, JD1BMM (Minami Torishima), V63TO, H40MS, VK9LA, VK9GMW (Mellish Reef), YJ0TXF, A35KL, ZK2V, H44MY, T30GM, T2G, FT5GA, 3D20CR, TX5SPA, K4M (Midway), VP8DIF, TX5SPM, ZY0T (Trindade), TX3A (Chesterfield). FT5WO (Crozet) was one that slipped through the net, heard but not worked. Nigel plans to take more of a back seat this coming year, as he wants to get back to spending more time flying (he holds a PPL). Nigel's note is a timely reminder of how, nowadays, we rely much more on DXpeditioners than on resident locals for many of these new ones, and should be suitably grateful to those who give up time and spend significant amounts of money to activate these rare spots. What I can never understand are those who insist on trying to disrupt these expedition activities, which give so much pleasure to so many.

Finally, the end-of-year table appears this month. Congratulations are due to David, G3XYP for an amazing total, achieved in 10 months as he was inactive for the last two months of the year due to health problems in the family. Dave, G3TBK also spent a lot of time out of the country while amassing quite a score. So the DX has certainly been around. The new-style 9-band table appears once again, thanks as always to G3GIQ. Henry has culled a number of participants who haven't updated for a while. If you want to get back into the table, drop Henry a line. Incidentally, Neil, G0JHC mentions that his total has been achieved solely with wire antennas – verticals and low dipoles. The first of the new-style 2010 tables will appear next month; thanks to those of you who have already submitted scores.

THANKS. Special thanks go to the authors of the following for information extracted: OPDX Bulletin (KB8NW), The Daily DX (W3UR) and 425 DX News (I1JQJ). Please send items for the **May** issue by **Friday 26 March**.

WEBSEARCH
Clipperton DX Club: http://www.cdxc.org
G7VJR: http://www.g7vjr.org/
K1BV Awards: www.dxawards.com
SV2ASP/A: www.qrz.com/db/sv2asp

VHF/UHF

Norman Fitch, G3FPK, SK

A TRIBUTE

By RadCom Editor Elaine Richards, G4LFM

Mike Roach, G3TWJ, Paul Pique, G8KDQ, Bob Knight, G3DPW, Don Pike, G3WDY, John Stockley, G8MNY and Ken Rosier, G3DJK (who took the photo) had been meeting Norman for lunch, once a month or so, for several years.

Regular readers of the VHF/UHF column will be saddened to learn of the sudden passing of the author, Norman, G3FPK. He was found dead at his home in Purley on Friday 29 January after friends became concerned when he failed to turn up on a net that he'd worked daily for many years. Norman has been associated with VHF and UHF matters since the 1960s when he was the honorary Secretary of the Amateur Radio Mobile Society. Many readers of *RadCom* have been sending reports to G3FPK for many years and his input to the magazine will be sadly missed.

Those who worked with Norman over the years described him as a 'thorough professional and a pleasure to work with'. Those who met him at events like the VHF Convention have described him as a 'gentleman who was passionate about VHF and liked to encourage newcomers to try the bands'. He was a member of the RSGB VHF Committee for many years.

Norman first wrote an article in *RadCom* in March 1964 when he compiled a report on *The USS Independence, floating QTH of W4KNF/MM*. Later, he took on the role as VHF columnist for *Short Wave Magazine*. When the magazine was bought by *PWP* Publishing, he transferred his popular column to *Practical Wireless* in May 1987. He wrote that column for a couple of years and that's when I first met Norman – I was Technical Sub-Editor in those days. He was a joy to work with, always working to deadlines and making life as easy as possible for those he worked with.

In 1989, Norman took over the VHF/UHF column from Ken Willis, G8VR, when it was part of the Spectrum Analysis section of the RSGB's *Radio Communication* magazine. Over the years the column changed but the author didn't - he continued writing the column for almost 21 years.

Norman, G3FPK was a very private man with a wonderful sense of humour. Old friends tell us that, in his youth, he had a passion for fast cars! During his working life he was a building draftsman and travelled a great deal. Within amateur radio he had friends around the globe that he spoke to in regular skeds. In his later years he shared his home with his "guard-cat, Max", describing him as a "a very superior, 6kg cat & second op at G3FPK". Staff and volunteers at the RSGB send their heartfelt condolences to his many friends and family. We will all miss him.

INTRODUCTION. I would like to add my tribute to Norman. He was a very private person, although to those who met him or worked him on the radio, he was courteous and considerate, especially to VHF newcomers. He will be sadly missed.

We were fellow columnists for more than five years, during which time we discussed our common area of writing interest, namely 1296MHz EME. However, apart from this one common area, the worlds of VHF and Microwave have remained very much separate entities in the pages of *RadCom*, in spite of the obvious overlaps in the UHF part of the spectrum.

When I was asked to contribute a guest VHF/UHF column in *RadCom* I was delighted to accept. I have been a regular reader of the column, in its various guises, since 1971 when I first joined the RSGB and to be asked to contribute to a *RadCom* 'institution' is a great honour for me. To some extent it allows me to bring together the VHF/UHF and GHz bands columns, if only for one issue.

THE FUTURE OF VHF IN THE UK. There can be little doubt that the liberalisation of the UK licence and its elimination of the VHF/HF licence distinction increased interest in the HF bands at the expense of activity on VHF. However, that is beginning to change and I see growing interest in VHF once again. I am not sure there was as much impact on microwave activity. If anything, microwave activity has increased greatly in recent years thanks to chat facilities like *ON4KST* [1] and the formation of the UK Microwave Group [2] as an elected body that speaks for the UK amateur microwave enthusiasts on spectrum matters, technical developments and contest calendars. I have long held the view that there should be an equivalent VHF group in the UK, notwithstanding the activities of the 6 metre and 4 metre special interest groups [3, 4], repeater groups and emerging D-Star groups. There are now, perhaps, too many of these competing for interest?

I was extremely pleased to see the RSGB bringing together HF and VHF/Microwave subjects for the first time in the 2009 RSGB Convention. My hope is that this is the end of spectrum segregation and the start of a more integrated approach by the RSGB to the whole of the amateur radio spectrum.

There seems to be a greater acceptance of digital modes at VHF than on the higher bands. There are many reasons for this, some complex, but the principal one is that the available digital modes have, until recently, been largely unsuitable for use with the propagation characteristics of the microwave bands. The adoption of digital modes has opened up the VHF bands to many more operators, allowing, for example, regular very long distance communications on the bands up to 144MHz using meteor scatter, ionoscatter and moon bounce. Although these propagation methods are usable without digital modes, they are now available to more stations because of the lower power and relaxed antenna

PHOTO 1: A prime example of an assembled OZ2M 70MHz (28MHz IF) transverter kit. These kits are a popular and low cost way to access the 4m band.

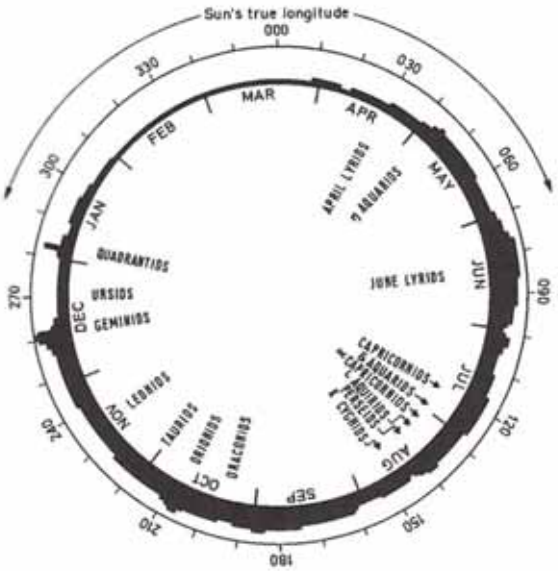

FIGURE 1: Seasonal variation of meteor scatter activity, from the RSGB 6 Metre Handbook, edited by Don Field, G3XTT.

requirements of the digital modes. However, I do not foresee any early demise of SSB or CW for DX working.

BAND ACTIVITY. February and March are traditionally 'slow' months for DX. The cold winter months seem to keep many operators away from their rigs and it's hardly the time of year to be working on antennas. Whether it is for those who are keen to boost their scores in the various award schemes, such as the Locator tables, DXCC etc. or just to work the DX, new ones are still there to be worked, using the right modes.

Meteor scatter (MS) on the 50, 70 and 144MHz bands is available all year round and can net contacts over distances of up to about 2200km. February and March are the months with the least meteor shower activity, but random meteors occur all year round. **Figure 1** is the well-known annual meteor shower activity diagram, showing when the principal meteor showers appear. I was discussing this with John, G4BAO, **[5]** who has specialist knowledge of meteor scatter through his PhD studies. He explained how random meteor activity can be used at this time of the year and I can do no better than to allow John to explain this in his own words.

"February and March are the only two consecutive months in the year without a major meteor shower. Shower meteors are thought to be the remnants of comet tails travelling around the sun with well known and predictable orbits and radiate from a fixed point in the sky. Their names relate to the constellation associated with that point. The period between the end of the Quadrantids on 4 January, and the onset of the Lyrids on 21 April is quiet in terms of shower meteors, but that does not mean there is no MS to be worked.

"Even in this period, millions of particles, or micrometeors, are swept up by the Earth each day in its orbit around the sun. The majority of these particles burn up in the E region of the ionosphere at a mean height of about 100km, leaving an ionised refracting trail behind them. The particles are generally small; varying in mass from 0.1μg to 10kg and in sizes from 200μm to 80mm in diameter. Their masses are distributed such that there is approximately the same total mass of each size of particle, so that there will be 10 times the number of 0.1μg particles as there are of 1μg particles etc. These random meteors travel around the sun with no particular orbit, and have no specific radiant point. The majority of useful (for communication) random meteors orbit close to the sun and close to the plane of the ecliptic, travelling in the same direction as the earth. This gives rise to a diurnal (daily) variation in meteor activity, with a peak at around 06.00 local time at the path mid point, and a minimum at 18.00. This can be explained by the fact that the morning side of the earth is travelling, with the orbital velocity, into the main flux of meteors and hence the relative velocities of Earth and meteors are greater. Similarly, the evening side of the earth is rotating away from the meteor flux, and only meteors with sufficient velocity are swept up by the Earth's atmosphere. There are also seasonal variations in average meteor velocity with a peak around mid July, and a minimum in February due to the fact that the random meteors are not distributed uniformly along the Earth's orbit.

"This time of year might be quiet, and you might not have too many contacts with 10W on 144MHz, but by choosing the right time of day it is still possible to use these random meteors to make successful meteor scatter contacts.

"This is the time of year where those JT digital modes and the lower VHF bands are the best way to guarantee some continuing interest for MS fans."

Thanks John.

As if to prove the point, Russ, G4PBP, sent in a report on his own, successful, meteor scatter activities on the 70MHz band in late January 2010. Using his new GI7B power amplifier and 150 watt RF output into a 5-element Yagi, he worked the following stations: ON4PS (JO29) and DL6BF (JO32) using JT6M, ON5QRP (JN29), OZ3ZW (JO54), ON5VW (JO10), LA4YGA (JO48), OZ2OE (JO45), OZIDJJ (JO46), OZ1JXY (JO46), DI2PM (JO30), LA/OZ2M (JP40) using FSK441, with just OZ8ZS (JO55) using hand-sent CW.

The rig was an IC-756 PRO 3 to an OZ2M transverter **[6]**. The OZ2M transverter, built from a kit, is shown in **Photo 1**. Russ comments that, yes, FSK441 is that good!

That is all I have room for in this guest column. There were lots more reports received, including moon bounce and tropospheric contacts, but they will have to wait for a future opportunity to be published. The future certainly looks bright for VHF and UHF.

I wish the new VHF/UHF columnist every success and I look forward to working with them in the future.

CONTINUING THE TRADITION. As we go to press, no decision has been made for a successor to the work of Norman, G3FPK. All VHF reports should be sent to the *RadCom* office, preferably by e-mail to radcom@rsgb.org.uk. There will be an announcement on GB2RS and in the April edition of RadCom regarding a new author.

WEBSEARCH

[1] ON4KST: www.on4kst.info/chat.
[2] UK Microwave Group: www.microwavers.org.
[3] UK 6 Metre Group: www.uksmg.org.
[4] UK 4 Metre Group: www.70mhz.org.
[5] G4BAO: http://homepage.ntlworld.com/john.g4bao.
[6] OZ2M transverter: www.rudius.net/oz2m/70mhz/transverter.

GHz Bands

Propagation and activity continues to be disappointing

PHOTO 1: January snow build-up on the Yagi antennas at the QTH of G4DDK. Note the moon behind the 80/40m vertical.

BAND ACTIVITY. December propagation conditions can only be described as typically winter-like. Beacon signal levels have been down on normal and there have not been many reports of QSOs from correspondents. In the second half of the month a cold northerly air flow covered much of the UK and brought significant amounts of snow in some areas. This was not portable operating weather, except for the hardy few.

I had expected that the cold ground and sunny, cloudless, days would have produced some thermal inversion propagation, but none has been reported. The cold conditions, together with low relative humidity, could have produced some excellent propagation on the higher bands such as 24GHz but, again, I received no reports for the higher bands. I can only conclude that the cold weather has kept many people away from their shacks and rigs.

RSGB LOW BANDS CONTEST. In an otherwise low activity period, the RSGB Low Bands contest, together with the UK Microwave Group 1.3, 2.3 and 3.4GHz and various NAC contests have been high points. All of these contests have been relatively well supported and emphasise the importance of contests in providing activity when otherwise there has been little to report.

One of the most consistent contest reporters during 2009 has been GM4CXM. Ray sent in a report on the December RSGB Low Bands Contest, showing what he managed to work and how he viewed conditions from up near Glasgow. Other reports from Scotland seem to indicate not only a revival of interest in the microwave bands, in GM, but also a level of participation in contests of which other parts of the UK should be envious.

Ray suggested that conditions on the 1.3 and 2.3GHz bands were well below par during the contest, but with a few signals showing normal or maybe above normal levels, even over significant distances. He reports activity as very good with 20 contacts in the log. He spent 20 minutes trying to work OZ1FF (JO45), but on this occasion they failed to make what was otherwise a regular QSO during the monthly Nordic Activity Contest (NAC) held on this same evening. GM4CXM's best contact of the evening was with G4EAT (JO01) at 572km. Thirteen of his contacts were over 300km, with six over 500km.

GM4GUF/P (IO85) reports seven stations active in Scotland during the contest. Robert was out for the first time with his new 40W PA and made a number of contacts south of the border in addition to those within Scotland.

Simon, G8ATB, (IO83) also participated in the same contest and reports that he worked 16 stations including two in Scotland (GM4CXM and GM4GUF/P) plus Gordon, GI6ATZ (IO74) in Northern Ireland, but struggled with G4BRK (IO91). Simon commented that "generally, while there were plenty of people on the band, with some new callsigns to me, conditions were flat to below normal".

Mike, G0MJW (IO91), sent in his report on the Low Bands Contest. Mike reports that GM4CXM was a good signal with him for most of the contest, but an attempted contact with GM0USI (IO75) failed. Mike heard him briefly by aircraft reflection but was unable to complete the contact.

No reports of 2.3GHz contest activity have been received. I was active on both 1.3 and 2.3GHz and worked just 2 stations on the 2.3GHz band, both of which were local. My comments in last month's column regarding increasing ERP are particularly important on 2.3GHz, where obtaining relatively high power, solid state amplifiers is not too difficult.

BEACONS. With a firm bias towards Scotland I can report that the new Central Scotland 23cm band beacon, GB3CSB, commenced operation on 22 December on 1296.985MHz. The beacon is located in IO75. GB3CSB uses a PA23r flat plate antenna, beaming at 150° true. Its 3dB beam width is approximately 60°.

According to information from GM4YLN (IO85) the beacon transmits JT4G on even minutes and carrier on odd minutes, with the callsign in CW at 10 seconds before each minute. The mark tone is the middle of the JT4G tone group and, with the space tone placed at approx 865Hz on the JT waterfall, it is easy to spot. The beacon is located alongside the GB3CS and GB3TC repeaters. It is GPS locked in frequency but timing is currently out by several seconds. This looks like being a most useful beacon for propagation monitoring and will nicely complement GB3ANG (IO86) on 1296.965MHz.

David, G0DJA (IO93), says that GB3CSB varies, at his QTH, from around -13dB signal to noise (with respect to 2500Hz bandwidth) down to around -23dB, which is the theoretical minimum for this mode under optimum reception conditions. The lowest signal levels seem to correspond with cold or humid days. This may be as much due to antenna de-tuning as to propagation. The distance from the beacon to the QTH of G0DJA is about 354km. **Photo 1** shows the snow build-up on my own antennas in the early January snow storms. This amount of snow will significantly detune most Yagi antennas.

I would like to thank GM4CXM, GM4ISM and GM4YLN for information on the new beacon and, of course, GM6BIG for building and installing the new beacon. The beacon is sponsored by the CSFMG (Central Scotland FM Group). Walter, GM8IIH, kindly provided the site.

GETTING STARTED IN MOON-BOUNCE. **Part 7 - Noise measurements.** Last month I introduced the topic of the EME low noise amplifier (LNA) and discussed some of the

FORTHCOMING MICROWAVE EVENTS - 2010

Rutherford Appleton Laboratories Microwave Round Table, April 17 and 18. Details: Brian, G4NNS, brian-coleman@tiscali.co.uk.

Finningley Microwave Round Table, July 10 and 11. Details: www.g0ghk.co.uk/table.php.

Crawley Microwave Round Table, no date available yet. Possibly September.

Martlesham Microwave Round Table, 13 and 14 November. Details: John Quarmby, G3XDY, G3XDY@BTinternet.com and http://mmrt.homedns.org.

EME Conference, Dallas, Texas: 12–14 August 2010. Details: www.ntms.org.

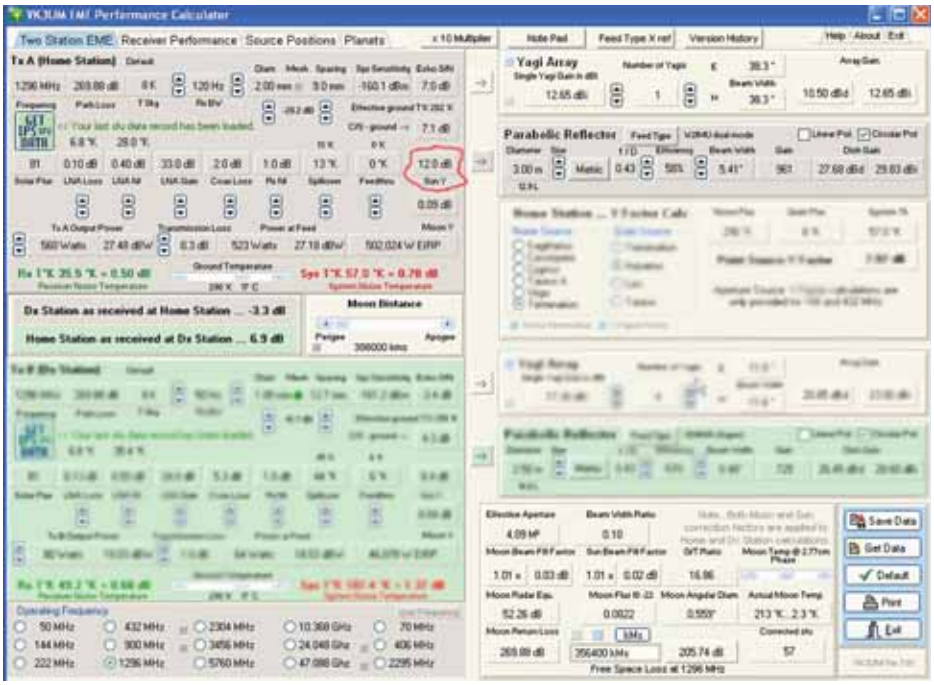

FIGURE 1: *VK3UM EME Calculator* window showing the data input for 1296MHz, 3m dish and 0.4dB preamplifier. With the entered dish parameters the sun noise is 12.0dB.

PHOTO 2: The three flat plate antennas of the 1.3GHz GB3CSB beacon, next to GB3SL, 50MHz beacon vertical antenna. Photo: GM8IIH.

devices that may be used to produce a modern LNA. But how do you know whether your LNA is good enough for the job? Maybe you could use a better LNA?

The starting point must be to get your LNA noise figure and gain measured. If you have the necessary measuring equipment you will already know how to do this. If not, take it along to a Microwave Round Table or other event where noise figure measurements are done. Armed with these figures, the next stage is to re-read last month's part of this article, ensuring you understand the concepts of noise temperature and noise power.

Next, attach the LNA to your dish feed, complete with any antenna changeover relay or protection relay and any connectors or adaptors you may need to use. Now, aim your dish towards a known 'cold' part of the sky. This should be between 3k and about 10k, as discussed last month.

With a suitable noise power measuring system attached to the output of your EME receiver (one will be described next month), you will measure a noise power that is the sum of the noise power from the sky, the LNA and the receiver.

Now move the dish so that it is pointed to the sun. The noise power output from your receiver should show a substantial increase. How much depends on several factors, such as the LNA noise figure, the dish beam width and efficiency, frequency (band), the solar flux density at that frequency and finally, but very important, any spurious signals in the pass band of the receiver during the measurement eg strong local beacons. Notice that I did not mention dish gain - this is incorporated in the beam width and efficiency figures.

This measurement is often called a 'sun noise measurement', but is more correctly named a 'cold sky to sun noise measurement' or CS/SN. To determine what this measurement means for an individual system I highly recommended that you download a copy of the free *EME Calculator* software by VK3UM from www.sm2cew.com/download.htm. This application enables any EME operator to determine the overall performance of their system, spot any weaknesses and allows effort to be directed towards improvements in the most productive areas.

Start by clicking the 'Receiver Performance Calculator' tab and enter the various parameters for the receiver system. Note that this is an interactive input window and you can simulate various conditions such as opening the antenna relay and terminating the LNA input into a room temperature 50Ω load or even turning the LNA on and off, just by 'pressing' buttons on the screen. This is an invaluable page for initial system testing.

Now click on the 'Two Station EME' tab. This opens a daunting-looking window with many numbers. It is actually much friendlier than it looks! You are not likely to be interested in the Echo performance at this stage, so confine yourself to noise parameters. At lower left, select the required band. At top left (*Tx A Home Station*) note that the frequency is showing that which you just selected. Click on 'Get SFU data' and a small window opens. As long as you are connected to the internet the application will now get the latest Solar Flux Data for the frequency you now specify (usually 2695MHz). If you're offline, it defaults to the last figure entered.

Enter the data requested, based on your LNA performance numbers, dish parameters etc. At top centre click on the chevron to select 'dish' and enter the dish size, focal length to diameter (f/d) ratio and feed type.

Back on the (*Tx A Home Station*) section locate the 'Sun Y' indication. See **Figure 1**. The 'Sun Y' number is circled in red. (Parts of the window not used in this description have been deliberately blurred).

If you have correctly entered the parameters for your system and have confidence in them, then the Sun Y (CS/SN) will be the number of dB increase that you measured when pointing your dish towards the sun, over cold sky. In all probability the number you measured will be (much) less. This is the stage at which you start playing with the numbers in the boxes to try to see why you did not get the results you expected.

Most EME operators initially tend to over estimate the performance of their systems and the results of these measurements can be a shock. So it is time to start refining the system, cutting out the odd 0.1dB loss here and improving the LNA noise figure by the odd 0.01dB there.

A full explanation of the scope and accuracy of the application would take up far more space than I have this month. Unfortunately, at the time of writing, no comprehensive guide to using *EME Calculator* is available. However, its use is straightforward and questions can be directed towards VK3UM if difficulties are encountered.

Next month we will look at how to make noise measurements on your system.

INPUT TO GHz BANDS. Input for the column is welcome at all times. However, band activity reports should be sent as soon after the event as possible. I generally start to compile the column around the end of each month.

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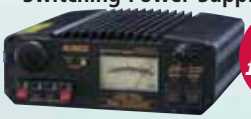

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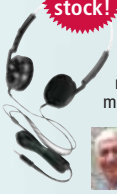

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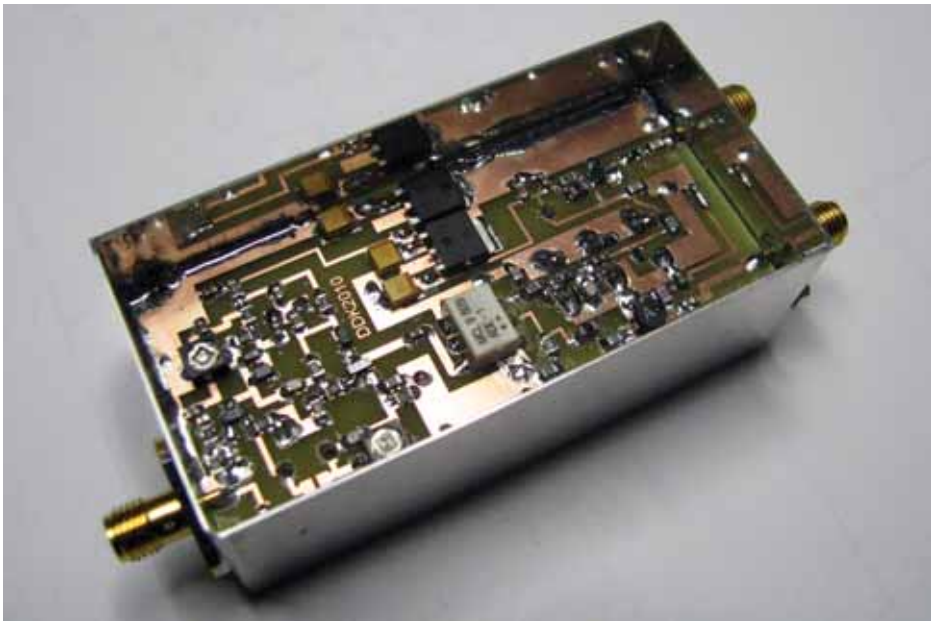


PHOTO 1: Component side of the DDK2010 144MHz to 28MHz converter.

INTRODUCTION. Many of the current Software Defined Radios (SDR) are limited to a maximum tuned frequency of 30MHz. One way to use these SDRs on the VHF, UHF or microwave bands is to use a frequency downconverter, bringing the upper frequencies within the SDR's range. In principle any output frequency up to 30MHz could be chosen for this 'intermediate frequency' (IF), but 28 - 30MHz is a common choice.

An older design of converter, such as the Microwave Modules MMC144, could be pressed into service but these tend to suffer in the presence of strong signals due to their high gain. They also tend to exhibit poor frequency stability and frequency offset limitations, sometimes being unable to net the local oscillator onto frequency. What is required is a low gain converter, with good frequency and gain stability, together with low noise sidebands. A very low noise figure is not required in this application as the converter is usually preceded by a relatively high gain, low noise transverter (for higher bands) or a masthead preamplifier for 2m. I decided to design and build a new 144MHz to 28MHz receive converter that would meet these requirements. The result is the DDK2010 described in this article.

EXTRA FEATURES. In order to make the converter even more useful, I decided to add the facility for connecting an optional external high stability local oscillator. If this is derived from a GPS or rubidium source then the receive converter will have exceptional frequency accuracy, as required for some SDR applications. In addition, the internal oscillator is accessible in order to allow it to be used as the LO for an accompanying transmit converter or with a second converter for use in a dual channel synchronous receive system suitable for EME polarisation-dependant reception or simple diversity reception. It is also possible to use this output to feed into an external Reflock unit (see Websearch). The Reflock can then phase-lock the internal 116MHz crystal oscillator. A block diagram showing the various stages of the receive converter is shown in **Figure 1**.

CIRCUIT DESCRIPTION. The DDK2010 receive converter circuit schematic diagram is shown in **Figure 2**.

Local oscillator. A familiar and reliable two stage 'Butler' overtone crystal oscillator is used to generate a 116MHz local oscillator signal that is fed into the LO port of the ADE 1 (MX1) double balanced mixer.

Contrary to normal practice, the oscillator maintaining stage (TR1) uses a switching transistor. High gain, low noise, transistors, can cause stability problems in this stage. I spent a great deal of time experimenting with different transistors in the Butler two stage overtone crystal oscillator and found that the BSV52 gave consistent and stable operation. Subsequent phase noise measurements (at Microwave Update 2009) confirmed the good performance of this arrangement. The second stage (TR2) is the oscillator limiter, biased for soft limiting so as not to seriously impact phase noise performance. This arrangement was chosen for simplicity over the more usual dual diode limiter. The oscillator output is untuned and delivers about +6dBm to the following mixer stage.

Since the first stage is basically a grounded base amplifier, its emitter input impedance is well defined, as 26/Ie (where Ie is the TR1 emitter current in mA). In normal operation this gives an input impedance of approximately 7Ω. By incorporating a series 43Ω resistor between the external input and the emitter of TR1, an excellent match to 50Ω will be obtained at the external IN/OUT connector. In practice, 39Ω can be used with little change in performance. The required input level is -6 to +6dBm. This same connector can alternatively be used as an output, to take a sample of the internal oscillator for use in either an accompanying transmit converter or second receive converter. In both cases the series resistor should be increased in value to minimise interaction with the oscillator, and then a buffer amplifier may be required. A suggested starting value for R14 is 510Ω when the port is used as an output.

Mixer and diplexer. A commercial double balanced diode ring mixer type ADE-1 from Minicircuits Laboratories is used in the DDK2010. Although this is a standard level 7 mixer (ie requiring an LO input at +7dBm), it is slightly under-run in this design because of the low output from the 'Butler'

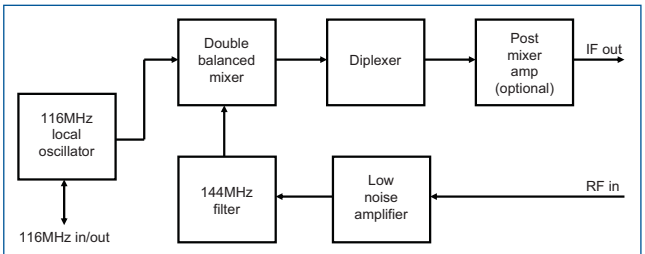


FIGURE 1: Block diagram of the DDK2010 receive converter.

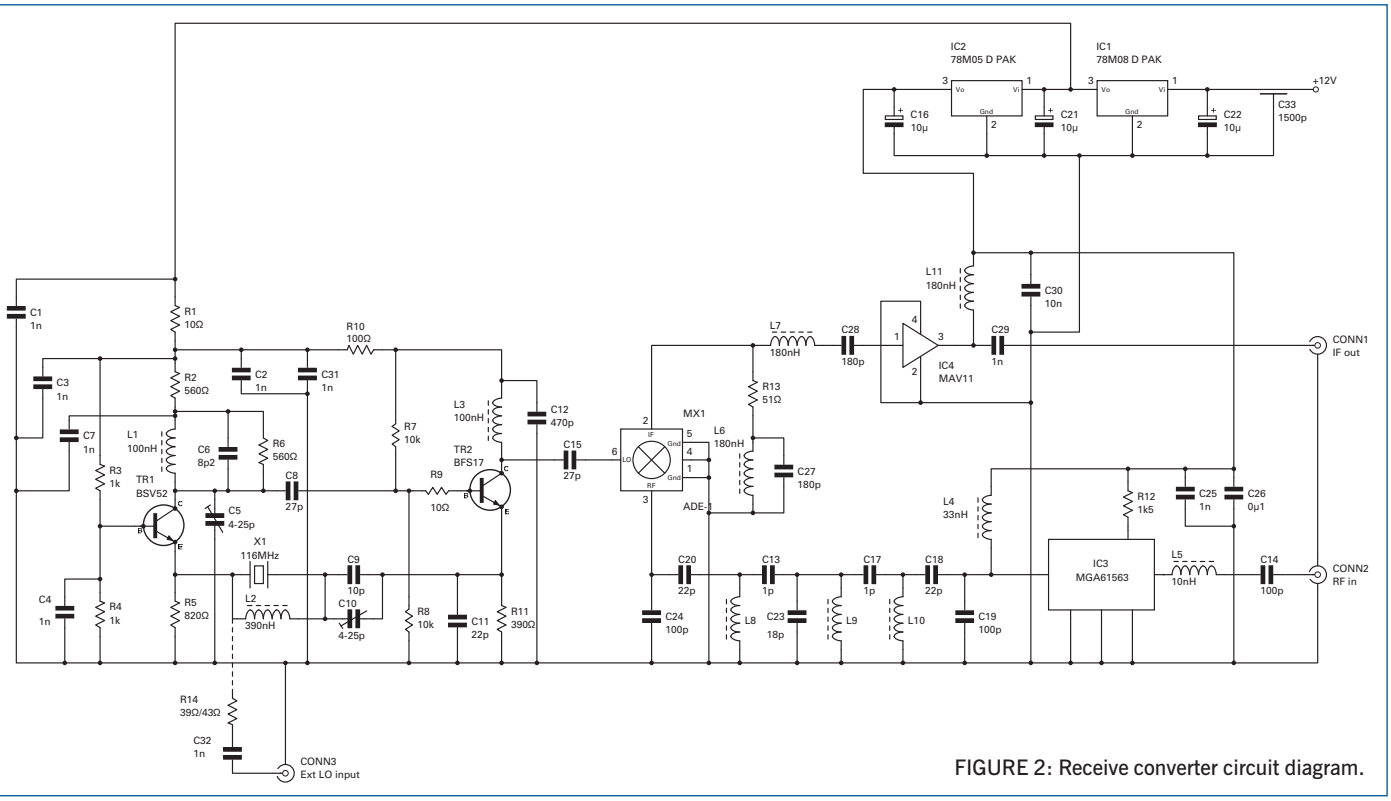


FIGURE 2: Receive converter circuit diagram.

oscillator. If this is a problem then the 8V regulator can be changed to a 10V low dropout device, which will cause TR2 to deliver slightly more output to the mixer.

A 28MHz diplexer consisting of R13, L6, C27, L7 and C28 terminates the mixer IF port in a good 50Ω match at all relevant frequencies. In practice this improves the conversion loss of the mixer and reduces the level of unwanted mixing and injection frequencies appearing at the IF output.

RF and IF amplifier stages. An Avago MGA61563 was chosen for the RF stage because of its good noise figure at 144MHz, high dynamic range and excellent stability. This amplifier provides about 20dB of gain at 144MHz. The MGA61563 is a GaASFET MMIC that is useable from below 100MHz to over 6GHz. Its dynamic range can be altered by the amount of bias current the device is programmed to draw. Resistor R12 sets the bias current to about 45mA from the 5V supply, which provides a high dynamic range whilst maintaining an acceptable total current draw for the whole converter. If for example the converter is to be battery powered, R12 can be changed to 3.9kΩ. This will reduce the current to approximately 22mA, but with a consequent reduction in dynamic range.

IC4 is a MAV11 silicon, broadband, low noise post-mixer amplifier. It is optional, depending on whether you need the extra 12dB of IF gain it provides. If it is not required, leave out L11 and strap across the input and output of the IC4 stage. Another possible reason to omit IC4 is to save a further 40mA.

Band pass filter. The 144MHz inter-stage band pass filter consists of three tuned circuits, top capacitively coupled, with capacitive tapping for 50Ω input and output impedance. The shielded inductors are tuned with aluminium cores. 5mm square Coilcraft 165 series coils were chosen because they are currently available. Some other candidate coils are now obsolescent or on long delivery times.

Power supply section. The oscillator section gets its supply from 8V regulator IC1, which also supplies the 5V regulator, IC2. The output from the regulator is already well filtered, but it is possible to improve the phase noise performance by a few extra dB by connecting a 100µF aluminium electrolytic capacitor across C21.

The 5V regulator supplies the MGA61563 and the MAV11 post mixer amplifier. As arranged, the MAV11 is slightly current-starved, because it should bias to 5.5V on its output pin. In practice the 5V limitation does not seem to affect the gain or noise figure, although its dynamic range may be slightly reduced. If this is a concern then the MAV11 could be powered directly from the 8V regulator but it will need an additional wire strap from the 8V regulator and a 43Ω current limiting resistor in series with L11. Use a 1206 size resistor due to the high power dissipation.

By using a 'low drop out' (LDO) 8V regulator for IC1, the converter could be powered from a 9V battery if required, since the LDO regulator will function down to about 8.5V input.

CONSTRUCTION. The receive converter uses an etched, 1.6mm thick, FR4, double sided printed circuit board. The mask for this is shown at 1:1 scale in **Figure 4**. The board has a continuous ground plane on the other side. All of the surface mount components go on the track side. Only the crystal, the three adjustable coils and the single insulated wire link are mounted on the ground plane side of the board.

0805 size surface mount parts are used wherever possible, but the pad spacing is such that 0603 size parts could also be used. Low value 0805 size capacitors and fixed inductors, often used in RF designs, are now getting harder to find. Both regulators are rated 500mA and are available in the common DPAK package.

Suitable SMD parts are available in the UK from many suppliers including Farnell, RS and Rapid Electronics. Specialist component part numbers are shown in the parts list. Since there are a large number of alternatives available for many of the other parts it would be impractical to list them all. The adjustable coils are only available in the UK from Coilcraft Europe Ltd. Web addresses for Coilcraft and possible 116MHz crystal suppliers are listed in the Websearch section.

The board is designed to be soldered into a 37 x 74 x 30mm size Schuberth tinplate box to provide screening from external signal pickup. These boxes are obtainable from the supplier listed in Websearch.

The PCB should be cut to 71.6 x 34.5mm in order to be a tight fit into the box. File small notches in the two diagonally opposite corners to clear the overlapping flanges in the box. Do not solder the box together at this stage.

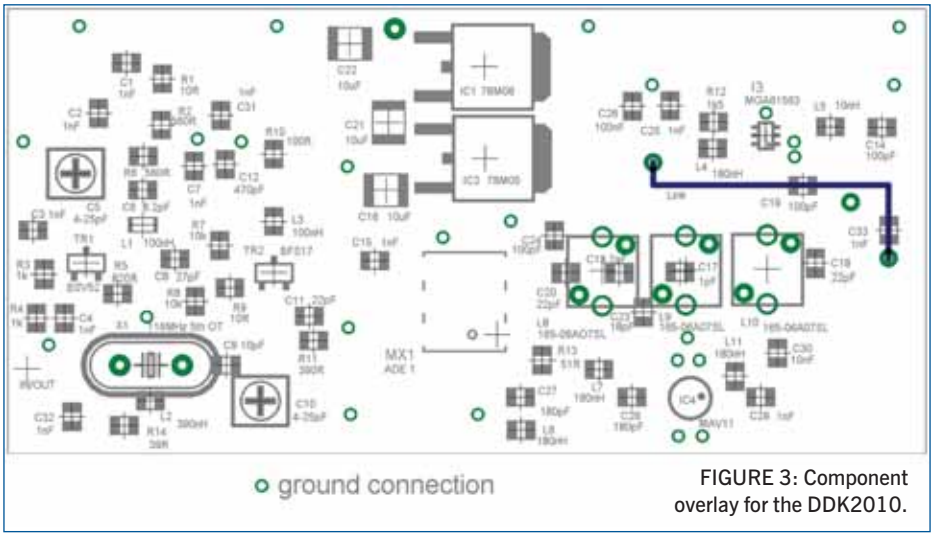


FIGURE 3: Component overlay for the DDK2010.

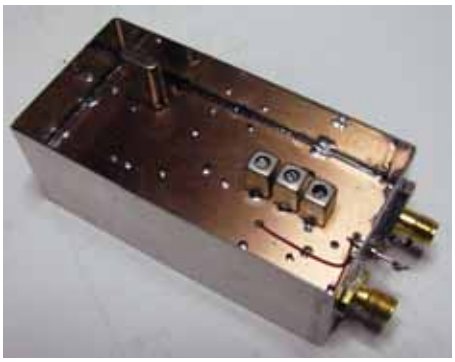


PHOTO 2: Ground plane side of the PCB, showing the 116MHz crystal and the band pass filter coils.

Prepare the PCB by drilling the various through-board holes. The drill size should be no larger than 0.6mm diameter, except for the lugs for the three adjustable coils. These holes should be drilled to 1mm diameter. Solder small-gauge tinned wire through the ground holes. To avoid unwanted short circuits, ensure that the top side (ground plane) copper is cleared around the holes for the pins of the adjustable coils and the crystal as well as the wire link holes and the regulator DC input. A hand-held 3mm twist drill works well.

Solder all SMD parts onto the PCB using a fine-tipped soldering iron and fine gauge pre-fluxed solder. Start with the resistors and capacitors, followed by the inductors and finally the transistors, integrated circuits and regulators. The regulator 'tabs' should be soldered to the PCB ground plane for heatsinking.

Prepare and solder the insulated single wire link on the ground plane side of the PCB.

Finally, solder the adjustable coils and the crystal to the board, ensuring they are fitted on the ground plane side of the PCB. The crystal should be pushed down snugly onto the ground plane, as should the three coil shielding cans. The coil cans should be soldered to the ground plane along their lower edge.

The most difficult part to mount is the MGA61563, IC3. This device uses a miniature 6-pin RF SOT363 package. Before soldering, ensure that the package is correctly oriented, with the input and output pins in the correct position. See **Figure 5** for pinout information. IC3 must be carefully soldered so that its 6 leads are just resting on the 6 PCB pads. It is probably best to initially tack solder one lead, then carefully manoeuvre the package with a pair of tweezers so that the remaining 5 leads lay flat to their respective pads. Take care not to break off any of the 6 leads from the package. Solder quickly, using a small soldering iron and very fine gauge solder – 28 SWG is recommended.

Mark the inside of the box so that the PCB ground plane will be positioned far enough below the rim of the box that the height of the crystal and the adjustable coils can be accommodated without protruding beyond the rim of the box. Also, and most important, mark the correct side of the box so that the corner notches in the PCB are on the right side to engage with the box overlapping flanges. It is easy to get this wrong!

Select and prepare three 2-hole SMA connectors by removing all but 0.5mm of the Teflon™ insulation from the spill of the connector. Mark the position of the three SMA connectors on the inside of the box and drill appropriate size holes (usually 4mm diameter) so that the insulation of the connector just protrudes into the box, but not so far as to interfere with the PCB. The holes for the connectors should be positioned so that the connector spills lay flat onto their respective connector pads. It is advisable to mark and drill holes for the three connectors at this stage as it will be found very difficult to do so after the PCB is mounted in the box, should you change your mind about needing the input/output socket at some later stage. Do not solder the connectors to the box at this stage.

Mark and drill a hole for the supply feedthrough capacitor. If using a Tusonix solder-in feedthrough, you will need a 2mm diameter hole in the box. Do not solder the feedthrough into the box at this stage.

ASSEMBLING THE BOX. In order to ensure the best fit of the PCB into the box use the following procedure. Solder one edge of the PCB into one half of the box by tack-soldering the ground plane side of the board. Ensure the corner notches are on the correct side. Now carefully fit the PCB and its side of the box into the lid of the box. Jig the remaining box side into place inside the lid. The PCB, two sides and the lid should fit comfortably together.

Place the top lid on the assembly and check that it also fits comfortably.

Remove the lower lid. Solder along the overlapping flanges of the box, forming a rigid box section.

Replace the lower lid and remove the top lid. Seam-solder the remaining exposed parts of the box flanges.

Having checked the PCB is level in the box, solder the previously unsoldered side of the PCB to the 2nd box side and then check that the lower lid still fits comfortably in place.

When you are happy that all is well, go back and complete the seam-soldering of the PCB to the inside of the box. This will need to be soldered on both the ground plane side of the PCB and along some of the track side.

Solder the connectors and the feedthrough capacitor on the outside of the box, making sure that you include a 2mm hole diameter solder tag under the feedthrough before soldering it in place. The lack of a suitable supply grounding point can be an annoyance when testing!

Solder the connector spills to their respective PCB pads.

Connect a short insulated wire from the feedthrough capacitor to the regulator input.

Photos 1 and **2** show the top and bottom of the completed converter.

ALIGNMENT. Before connecting any power, check with an ohmmeter that there is no short between the supply input feedthrough capacitor and ground. If all is well, connect a +12V current limited power supply set to less than 150mA to the feedthrough capacitor and 0 volts to ground. Check the total current taken, which should be no more than about 100mA, depending on whether IC4 has been fitted. If it is higher, check for faults such as short circuits, incorrectly placed components or reversed polarity tantalum capacitors. If all is well then proceed to set up the crystal oscillator. This is easily done by listening to the output from a receiver tuned to 116MHz. Most scanners and aircraft band receivers will cover this frequency. Use FM or AM to listen for a distinct change of noise from the receiver when C10 is adjusted. C5 will need to be set near minimum capacitance to allow the oscillator to operate at 116MHz. If the receiver is within a few metres of the converter the noise change will be very apparent. The final local oscillator frequency can be set more accurately later. The Butler oscillator is a very

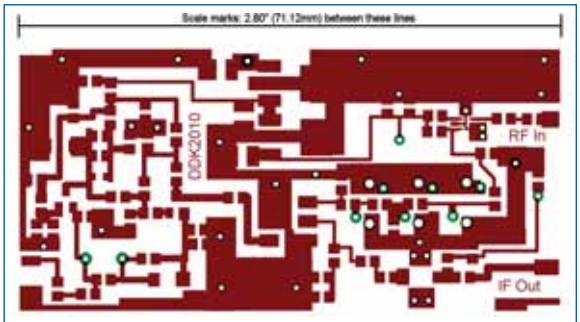


FIGURE 4: PCB foil pattern for the DDK2010, reproduced at 1:1.

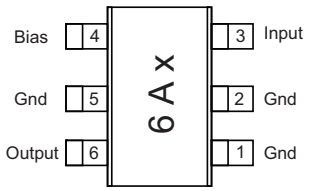


FIGURE 5: Pinout of the MGA61563. 6A is the device part code and x is the date code.

PHOTO 3: Another view of the 2m converter.

PARTS LIST

Resistors

R1, 9	10Ω
R2, 6	560Ω
R3, 4	1kΩ
R5	820Ω
R7, 8	10kΩ
R10	100Ω
R11	390Ω
R12	1.5kΩ
R13	51Ω
R14	39Ω or 47Ω

Capacitors

C1, 2, 3, 4, C7, C25, C29, C31, C32	1nF
C5, 10	4 - 25pF Trimmer
C6	8.2pF
C8, C15	27pF
C9	10pF
C11, C18, C20	22pF
C12	470pF
C13, C17	1pF
C14, C19, C24	100pF
C16, C21, C22	10μF, 16V
C23	18pF
C26	100nF
C27, C28	180pF
C30	10nF
C33	1500pF Tusonix feedthrough capacitor

Inductors

L1, L3	100nH
L2	390nH (may not be required)
L4	33nH
L5	10nH
L6, L7, L11	180nH
L8, L9, L10	Coilcraft 165-06A07SL

Semiconductors

IC1	78M08 (500mA)
IC2	78M05
IC3	Avago MGA61563
IC4	MAV11
TR1	BSV52
TR2	BFS17
MX1	ADE-1

Miscellaneous

X1	116MHz 3rd Overtone crystal, HC43/U
Connector 1, 2, 3	SMA 2 hole female bulkhead connectors
Box	Schuberth 34 x 74 x 30mm

reliable starter. This version, with the BSV52 first stage, is particularly docile. Even very lazy crystals should work well in this circuit.

If you have access to a spectrum analyser and signal generator, then you will probably already know how to set up the adjustable coils of the band pass filter by adjusting for maximum IF output at 28MHz with the signal generator set to 144MHz. Do not set the signal generator to greater than -20dBm output, to avoid saturating the converter output.

If you do not have access to test equipment then connect a HF receiver, tuned to the 28MHz band, to the IF output. Connect a 144MHz antenna to the RF input. Tune the receiver to a strong local repeater output channel or to a local beacon of known frequency. Assuming a signal can be heard, adjust L8, L9 and L10 for maximum signal. If no signal can be heard, you should still hear a small but noticeable increase in noise output as the 144MHz bandpass filter is adjusted to cover the correct frequency range. The limited adjustment range of the coils in the filter should prevent any chance of mistakenly tuning to the image at 88MHz. When correctly adjusted, the band pass filter will exhibit a nearly flat frequency response across the 144 to 146MHz frequency range.

If you can now hear a beacon or repeater, but it is slightly off frequency, adjust C10 to obtain zero beat when using the receiver on USB (or LSB) mode. It may be necessary to slightly adjust C5 to bring C10 within range. In the event that you cannot move the frequency of the oscillator onto exactly 116.000MHz it may be necessary to connect the optional inductor L2 across the crystal. This is probably not required, but may help. If you are not within range of a repeater or beacon use another, suitably accurate, signal source to adjust the local oscillator frequency.

There are no other adjustments to make and the converter is now ready for use.

PERFORMANCE. The measured performance of the prototype converter is shown in **Table 1**. Note that the alignment of the bandpass filter, whilst not critical, must be done carefully as small changes in filter loss, due to poor alignment, can result in an unacceptably high noise figure in such a low gain converter design. The overall noise figure of the converter is lower (better) without the MAV11 stage. This may not sound very intuitive but is due to the 'second stage' noise contribution of the MAV11 stage. The same degradation in noise figure will be experienced when the converter is fed into a typical 28MHz superhet receiver or SDR receiver.

EXTENDING THE USE OF THE RECEIVE CONVERTER. The provision of an external local oscillator input/output makes the DDK2010 very flexible since it is possible to connect an external, high stability 116MHz source in place of the internal crystal oscillator. If this is GPS-locked then the receive converter can become part of a completely frequency-locked receiver/transverter system for any of the bands on or above 144MHz. Alternatively, the internal 116MHz signal can be extracted from the input/output socket and used to feed into an accompanying transmit converter to produce a high performance transverter for 144MHz.

For 144MHz moon bounce (EME) enthusiasts, the 116MHz output can be fed into the corresponding input/output socket of a second DDK2010 receive converter (keep R14 as 39Ω or 43Ω) to produce a dual RF input system for use with a polarity sensing receiver that uses one converter on the horizontal antenna array and a second converter on the vertical one.

It is also possible to replace the MAV11 post mixer amplifier with a higher gain device such as the MAR6. The receive converter will have a similar noise figure with a gain up to 8dB higher, but the dynamic range will be reduced. An additional 91Ω resistor will be required in series with L11 to obtain the correct bias for the MAR6.

PROTOTYPE RECEIVE CONVERTER PERFORMANCE

Noise figure	2.5-3dB
Gain	17.5dB
Input 1dB compression point	-16dBm
Bandwidth	3.0MHz
Image response	Greater than -80dB
Current consumption	100mA at 12V

WEBSEARCH

Reflock: http://gref.cfn.ist.utl.pt/cupido/reflock.html
SMD parts are available from many suppliers including www.farnell.com, http://uk.rs-online.com/web and www.rapidonline.com
The Avago MGA 61563 data sheet can be downloaded from www.avagotech.com/docs/AV02-1471EN
The adjustable coils can be obtained from www.coilcraft.com/general/sales_eu.cfm
116MHz crystals can be sourced from www.quartslab.com or www.eisch-electronic.com
Schuberth Tinplate Boxes are available from www.alan.melia.btinternet.co.uk

DXpedition to Papua New Guinea

Gordon Rolland, G3USR relates some of his experiences on a recent four week DXpedition to three very rare IOTA groups in Papua New Guinea, P29.

Gordon, G3USR, Derek, G3KHZ and David, M0VTG enjoying one of their meals onboard *Barbarian II*.

INTRODUCTION. Papua New Guinea (PNG) is around 8,500 miles from the UK and 90 miles north of Cape York the northernmost tip of Australia. It is around 105 in the World Most Wanted list and around 90 in Europe. The few local licensed amateurs are not very active and recent P29 DXpeditions have been predominantly CW based – our DXpedition was to help balance this by including SSB and RTTY.

PNG is a democracy of 6 million people that is rich in natural resources including oil and gold. It has 286 islands listed for IOTA, collected into 23 OC-Groups. Many Groups are rarely activated and we planned to visit three - Tanga, Green and Woodlark. There are no scheduled flights so our access was restricted to chartered boat. Being 3° south of the equator that brings uncertainty and is consistent with PNG's reputation as 'the land of the unexpected'!

GETTING STARTED. We flew from London to Singapore and on to Port Moresby the capital of PNG and hence to Kokopo in north eastern New Britain. We then had a welcome overnight respite after nearly 40 hours of continuous travel. The next day we joined our boat, *Barbarian II*, a 45 foot motor vessel that was to be our home for the next three weeks.

After leaving Kokopo, we encountered some rough weather near Cape St George on New Ireland and had to take refuge in the village of Putt Putt Harbour, some 5 hours south of Kokopo. This unanticipated stop allowed us to activate an unplanned IOTA, New Britain, OC-008. We made 372 SSB QSOs in 4 hours on 20 metres, 65% were with Europe including 10 from the UK. The pile up was unexpectedly massive, a welcome portent of things to come! We sailed again early next morning.

LIF ISLAND. Lif Island is part of the Tanga Group, OC-102. It is required by 92% of IOTA claimants and lying north east of New Ireland, Tanga comprises six islands. We arrived around mid-day and then spent the afternoon seeking a suitable landing place and sites for our stations. We later learnt that Tanga is a reputedly difficult anchorage with many beaches approached by water over 80 metres deep to within less than 100 metres of the shore. Coral and other rocks then make an approach by small boat particularly difficult.

We eventually anchored in 70 metres of water off Lif Island. Party members went ashore, met Island Councillor Greg and negotiated two sites, one for CW, the other for SSB/RTTY. In the event, Greg was an excellent contact with a wider family of strong young men willing to carry our equipment.

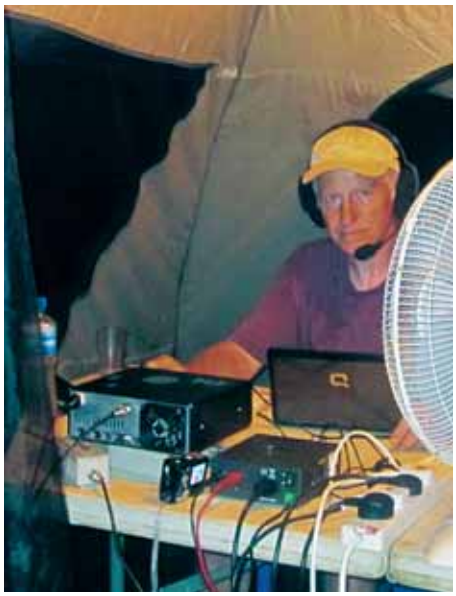
Early days on Lif coincided with the CQWW SSB Contest. This limited DXpedition SSB operations to 17 metres, however, CW remained straightforward. Band conditions were reasonable, particularly to Europe, but the close proximity of Malendok Island, 400m high to the north east, impacted our short path to North America. The long path was similarly inhibited by our hinterland, which rose sharply to the south west.

Despite the island's geographical features we made 4,475 QSOs in a reduced stay of 4 days. We tore down on Tuesday 27 October and, by early afternoon, we were ready to depart. But first we met with Greg and his villagers to thank them for their support. It was an unexpectedly emotional experience when they gave us coconuts, oranges, a yam and a hen to take with us. Living on such a remote island, the islanders practice subsistence based agriculture and live in simple traditional buildings with few comforts and no modern facilities. Their generosity and accommodation of our DXpedition was heartening.

NISSAN ISLAND. Tanga comprises islands which are the mountainous remains of long-extinct volcanoes. However, the Green Islands Group, OC-231, are an atoll that is principally coral. We were keen to compare our radio experiences from the two. But first we had to travel 60 miles from Tanga to Green. Now, the doldrums, that is the historically calm weather which characterises October and November in latitudes near the equator, have been very late in 2009, which was one reason for the rough weather encountered en route to Tanga. It continued on our trip to Green and 60 miles took 18.5 hours. At around 1200 local time, Pinipei, the first of the two principal Green Islands, came into view.

The HF vertical by the shore on Lif Island.

Our send off on Nissan involved the whole local village!



Gordon, G3USR gets down to serious operating.

However, our target, Nissan Island was further on as we favoured its large central lagoon as an anchorage. We arrived and settled in for the night.

At first light we motored to the eastern shore and contacted the local head man who referred us to Paramount Chief Patrick who was to be our contact on the western lagoon shore. Patrick agreed two locations with clear take-offs from north through south east. This was better than it sounds as they were on a beach with low lying adjacent land. It was our best trip location for North America.

The Green Islands group is required by 91% of IOTA participants and we operated from Nissan for three days, making 5,814 QSOs. Tear down was on Sunday morning, 1 November. This stay was one day shorter than planned but we wanted our final group, Woodlark, to have the maximum activation time possible as it had been activated only once before.

Before we left Nissan we met Patrick again. He involved his whole village in our departure and organised garland presents and pre-departure entertainment. The village children sang traditional PNG songs on the shore and we must each have shaken at least 200 hands. What fun and a truly delightful send off!

MADAU ISLAND. We set off from Nissan around 1100 on Sunday 1 November. The weather appeared settled and our skipper set a direct course for the Woodlark Group, OC-205. Our destination was Madau Island. The voyage of about 300 miles at 6 knots should take 50 hours. In the event it took 53. The latter stages were perhaps the worst we had yet encountered and even the usually unruffled crew were 'uncomfortable'.

On arrival we explored Woodlark's northern coast and in particular Madau Island where we identified two sites, negotiated access and set up stations. However, during our first night one generator failed irreparably so we then combined our operations into a single location for our final days with a rota to share band / mode slots.

Woodlark is required by 95% of IOTA participants and was certainly popular with massive pile ups, particularly to Europe and Japan. On SSB, these were initially very unruly with widespread 'continuous calling'. The initial QSO rate was desperately low, however, we developed a special split technique that favoured those callers who did listen and the QSO rate improved. That night we made over 400 SSB QSOs before 20 metres closed at 2330 local time.

A Madau highlight was a visit to the local island school. Shibaba, the headmaster, and four teachers welcomed us to their two classroom school – for over 200 pupils! We talked about radio to the children and distributed QSLs from previous P29 DXpeditions. We were gathered outdoors and much to our surprise, the children sang impromptu songs in the distinctive melodic tradition of the PNG islands – haunting and fantastic.

Our final Saturday night on Madau was difficult. From early afternoon there were repeated heavy rain storms that culminated in a noisy downpour just after start up at 1700 local. Operators became very cold and wet and the damp equipment buzzed with voltages! In the event, SSB/RTTY operators were forced to return early to the boat after just 124 QSOs on 20 metres.

We made 8,853 QSOs from Madau Island in five days. On Sunday we tore down and packed away but storm warnings caused our skipper to defer our departure until 0030 local on Monday. After sheltering for several hours en route we arrived at Alotau on mainland PNG, mid-Tuesday morning from where we began our return air journey to London arriving early on Friday 13 November.

EQUIPMENT. Our main antennas were largely homebrew. For CW, we had Spiderbeam poles supporting single band vertical wire dipoles for 30, 20 and 17 metres and a ground plane for 40, supplemented by a Butternut HF6 with a 160m coil. The SSB/RTTY station utilised a single 17m vertical dipole and a second HF6.

Our transceivers were an Elecraft K3, an Icom 706 Mk 2, a Kenwood TS-2000 and a Yaesu FT-450 kindly loaned by CDXC UK. Although we had amplifiers, these were not always utilised due to inter-station interference. In the event it was surprising how well 100 watts of SSB was received in Europe with an average real report of 5 and 5 and occasionally much more.

CONCLUSIONS. Overall, we made 19,817 QSOs with 8,266 unique calls in 119 DXCCs so world wide demand for P29 and our three IOTAs should have been significantly reduced. We certainly hope so!

We would like to thank our sponsors for donations towards logistics costs and in particular the RSGB DXpedition Fund. In addition, we could not have operated without the co-operation of the island people of Lif, Nissan and Madeau Islands to whom we extend our heartfelt thanks. Without exception they made us very welcome. Thank you also to all the stations who participated in the enormous pile-ups. We hope that you contacted at least one of our P29 activations. If you were unsuccessful, we hope that you enjoyed the fun of the chase!

WEBSEARCH

www.425dxn.org/dxped/p29_2009/.

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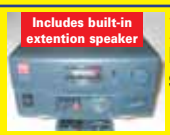

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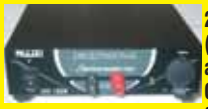

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Quality rotator for VHF/UHF. Superb for most VHF-UHF yagis, 3 core cable required. 3 core cable 50p per mtr.

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18" T & K brackets (pair) £22.99
24" T & K brackets (pair) £26.99

All bracket measurements are from wall to end of bracket

U-bolts (1.5" or 2") each.....£1.50
8mm screw bolt wall fixings.....£1.70
8-nut universal clamp (2" to 2").....£7.99
2" extra long U-bolt/clamp.....£5.50
2" crossover plate with U-bolts.....£14.99
15" long (2") sleeve joiner.....£18.99
3-way guy ring.....£5.99
4-way guy ring.....£6.99
Heavy duty guy kit (wire clamp, etc.).....£49.99
Set of 3 powder coated heavy duty fixing spikes (~0.7m long)....£29.99
30m pack (4.4m) 480kg B/F nylon guy.....£12.50
Roll of self-amalgamating tape.....£7.99

MFJ-1117

DC High current distribution unit.....£59.99

MFJ-1118 metered

High current distribution unit £99.99

The *RadCom* Interview

We talk to DARC's tireless EMC worker Thilo Kootz, DL9KCE

Thilo Kootz, DL9KCE chairing one of the many EMC meetings at Friedrichshafen in 2009.

UNSUNG HERO. Thilo Koots' name isn't very well known here.. But he is a tireless worker for amateur radio, both at national level for the German society DARC and internationally through his IARU efforts. I caught up with him at Friedrichshafen last year and asked him about his experiences with PLT in Germany.

How did PLT come to your attention?
In the beginning, in the late 90s, it was a theoretical fight. At the time the only perceived threat was from ADSL, which was on balanced lines and only at low frequencies. A group of technicians put their heads together and thought there might be a problem coming. They did some calculations and realised it could be a big threat.

The big thing that caught the technicians' attention was "Access" PLT – where broadband is delivered to the house via power lines. The first deployment was in Mannheim in 2002.

Did you get a lot of protests from Mannheim amateurs?
No! We were wondering why we hadn't heard any complaints from hams living in the city. We thought there must be some impact. I personally phoned the 150 or so DARC members in the area and asked every single one whether they had problems with PLT. It turned out that a few people had some disturbances, but they had lapsed their interest in amateur radio. They weren't interested in following up, doing measurements at home, seeing how the disturbances changed with time and so on. In the end there was only one amateur left who was willing to help with PLT: a foreign worker from Hungary! He was also listening to short wave radio in his home language, which was very important to him. So he put in an interference complaint to the authorities.

At that time Germany was the only country that had a limit on power line emissions: actually a footnote, NB 30, to the country's frequency usage laws. It specified the maximum emissions from a power line at 3m from nearly DC to about 200MHz. *Everyone* has laws on emissions from things connected to power lines, but we had the only standard for the power lines themselves.

The Bundesnetzagentur (the German equivalent to Ofcom) started doing measurements and, fortunately, the DARC EMC department was able to do parallel measurements at the same time. I did these measurements with Ulfried, DJ6AN. We were feeling fairly safe because of NB 30. But on the other hand we knew that Germany was reluctant to shut down the whole PLT experiment in Mannheim because of one chap who wanted to listen to Radio Hungary. So the officials did their experiments very carefully. But we both concluded that the emissions were 30-40dB over the limit – which is a factor, I would say!

We published all of our findings, but the officials stalled progress for a year or so. Ulfried, DJ6AN has very good connections to the media, so he managed to get a TV reporting team to film a story about it. We did some new measurements with the TV guys looking over our shoulders. It didn't have much impact, though. The regulator wouldn't comment, though the power company did.

In the house where the Hungarian radio amateur was living there was only one guy using the PLT service. On the day we did the tests we knocked on his door, explained the situation, and asked him to use the internet a lot so we got a really big signal. He agreed and downloaded some movies. Then something very unfortunate happened a few months later. The guy was friendly to our cause, but the Police had another opinion about him. He got arrested and jailed for unrelated reasons, so his PLT service was disconnected. No more disturbance, so no more reason to do anything. This was the most unfortunate thing that could happen.

There was a second case in Mannheim. It started a little later than the Hungarian guy, but this chap was not a member of the DARC. He took the Regulator to court privately, winning his first case, which would have meant that the power company would have had to shut down the PLT system in his street. Of course, the power company appealed and it was decided that the local court did not have jurisdiction. So a third case was launched, in the highest possible court. The court found that NB 30 was not properly ratified at EU level, and therefore unenforceable. NB30 was repealed from German law in spring 2009.

Turning to in-home PLT network adapters, by April 2009 our regulator Ofcom had received 86 interference complaints. What's the situation in Germany?
We have had zero complaints from amateurs about in-house PLT. Every complaint I've had was from Access PLT. There have been about three to six complaints from SWLs across the whole of Germany. We are having more problems with interference from plasma TVs. I've been working with Richard Marshall in the UK and we've both written papers for [the ITU meeting at] Osaka that address this. We've each described 4 or 5 individual cases. Also, there were some cases in South Korea and they turned in a paper too. So there is now a CISPR Task Force looking into the problems of compatibility among multimedia electronic entertainment products.

What are the standards like at the moment?
There are no TV radiation standards for anything below 30MHz. The theory is that for those low frequencies you need a long piece of wire to radiate, and in a TV you don't have space for such a wire. This was OK when we had CRT TVs because they could only radiate via the mains, aerial or signal (like SCART) ports. And these ports *do* have limits that go below 30MHz. Plasma TVs meet those specs, of course, but because of the way the plasma panels are driven the screens themselves can radiate. There are high power chips running at about 20MHz all round the screen edge. So the radiation

Thilo, DL9KCE with Christian Verholt, OZ8CY, IARU Region 1 EMC Working Group Chairman, at the 2008 IARU Region 1 Conference in Cavtat, Croatia.

actually comes from the side of the plasma panels. We have looked into this and we have a pretty good chance to actually change the standard and implement radiation limits. But here's the catch: due to internal procedures within CISPR and industry, this change cannot be fully implemented until 2016, by which time there won't be any plasma sets on the market.

What PLT chipsets are mainly used in Germany?
The main one is the Interlon chipset, used in the Devolo modem, the market leader in Germany. This complies with the American Homeplug 1.0 standard – which doesn't apply here. Homeplug 1.0 requires the (American) amateur bands to be notched by at least 30dB, and my experience is that there is no interference problem from these. A revised standard takes into account the wider worldwide amateur bands. But even then, there are still potential problems with intermodulation in our radios, which are only tested with 2 tones instead of the multiple equivalent tones of PLT. Preselector filters may be a cure for this. But some measurements were published in the EMC Journal, which found that the notches were getting filled up by 5-10dB. I wouldn't rate this problem too highly, because getting the notches in the first place is the important thing, protecting some radio services more than others for the first time in the history of standardisation.

I have to keep reminding the CISPR22 guys every time why amateur radio and broadcast need special protection and other services such as maritime do not. The reason is that maritime services do not live in residential areas. Broadcast and amateur radio are the only services that are co-located in residential areas with PLT.

What is your next move?
We have found that our most powerful weapon is politics. Many amateurs are into politics, myself included. If you are a member of a political party you can talk to the right people and make sure the Government hears. What you need is a lot of people doing the same thing at the same time, and that's how we get our relatively good EMC law. It was extremely bad when it was first published, but it's now something we can live with. If you read the law literally then the protection is pretty good, but the question is whether it will be enforced enthusiastically.

One very effective thing we did was use consumer power to send a message to the retailers. A lot of people bought PLT adapters on the same day, took them home and plugged them in. Then took them back to the shops, complained that they wiped out short wave radio reception, and asked for a refund. The shops suddenly got a lot of stock returned very quickly – hopefully that will have caused some managers to scratch their heads.

We have so many challenges to face at the moment at Eurocomm. There are so many papers that we need to read and report on – for example I will only be able to devote 60-120 seconds to the EU light bulb directive. At the moment the only alternative to incandescent bulbs is the low energy compact fluorescent, but there are big EMC problems with them. It's the law of unintended consequences and we need people studying these things. LEDs might be the answer, but there are odd things happening there too – I have some 0.04W mains LEDs that still glow when you turn the power off. There is enough capacitive coupling across the open switch contacts to light them. It really drives my wife crazy!

Spectrum Defence Fund

The Spectrum Defence Fund exists to help protect amateur radio frequencies from the threats of today and tomorrow. It is funding the UK fight against PLT spectral pollution to make sure that we continue to have useable bands in which to enjoy our hobby.

The Spectrum Defence Fund needs YOUR help. Please donate whatever you can spare - even a fiver helps. Donations can be sent by cheque to Spectrum Defence Fund, RSGB, 3 Abbey Court, Fraser Road, Bedford MK44 3WH, or online at www.rsgb.org/defencefund. Please help us keep our frequencies safe for future generations.

Short Circuits

Generating noise artificially.

PHOTO 1: A pseudo noise generator like this can provide very good results at low frequencies.

THE ULTIMATE LIMIT. Noise, man made or natural, is the limiting factor in weak signal communications and defines the minimum signal we can receive. If we want to measure our receiver's ability to demodulate or decode signals at low S/N ratios, it would be a great help if we could generate noise in a controlled way, with known amplitude and frequency spread. Ideally, a reference noise source would generate a signal with an absolutely flat response from DC to ultraviolet light. This is usually called 'white' noise (white light is flat and contains all frequencies). It is of course impossible to generate an infinite spectrum, although relatively straightforward to ensure a flat spectrum over most bands of practical interest for radio signals. Please note that the term 'noise power' is, technically, meaningless on its own; flat noise has a density measured in watts per Hz, so any absolute power level has to be qualified with an associated bandwidth. It is more normal to refer to *noise density* in watts/Hz, or dBm/Hz. As an alternative, for many purposes, RMS noise voltage is frequently specified in volts per root-Hz (or V/√Hz). The two are related by $W/Hz = (V/\sqrt{Hz})^2 / R$.

White Gaussian Noise – the sort occurring naturally – has a clear mathematical description, using the sort of equations of probability and randomness that insurance companies and lottery managers are familiar with. It is truly random and there is no theoretical upper amplitude limit that a small noise spike *could* reach, although the probability of it actually happening is arbitrarily low. But, if the instantaneous amplitude is measured at regular intervals, most of the amplitudes will fall within a certain range, around a 'middle' value. Progressively fewer and fewer instants will have higher and higher values. It turns out that this 'middle' or most popular value is the RMS voltage and, when read with a true RMS voltmeter averaged over a time, will show a pretty constant reading. So how can we generate flat white(ish) noise with a known RMS value?

One way is to generate a digital waveform with a random pattern of '1's and '0's. The logic level gives us an absolute known voltage to start with, and mathematics tells us that a truly random data stream will give an exact spectrum described by a SIN(X)/X shape such as that shown in **Figure 1**. (Ignore the spikes; they are clock leakage). Provided we only look at frequencies up to around 15% of the clock rate, this appears indistinguishable from true white noise. It is notoriously difficult to generate a truly random data stream – cryptographers would be delighted if it were so – but it is possible to generate a pseudo-random sequence, often called a pseudo noise, or PN, sequence. If we have a shift register of length K bits, by taking two or more outputs from the last and earlier stages, exclusive-ORing these and recirculating the result to the input, the result is a pseudo random data stream that repeats after *no more than* 2^K-1 clock cycles. Only certain tap patterns will give this maximal length sequence – other ones can end up with much shorter PN sequences, or can lock up in the all-ones state. Taps for maximal length sequences have been calculated and are tabulated in **[1]** and **[2]**.

Figure 1 shows the circuit diagram of a PN sequence generator formed from a 31 stage shift register clocked at 64MHz. This length is convenient as it allows just two taps with a single XOR gate for minimum delay (maximum speed) while giving a repeat length of 2^{31}-1 = 2147483647 clock cycles. It uses 74AC logic devices, which can be clocked up to at least 75MHz. 64MHz was used here as a suitable crystal oscillator was to hand, but it is worth trying higher clock rates to see what will work. The feedback is made complicated by the need to prevent the all-ones state from occurring, as this would cause lock-up. To prevent this situation from arising, an additional XOR gate is used to invert the recirculated data for a few hundred milliseconds after power is first applied. So, whatever state the shift registers happen to start in, a handful of ones and zeros will always be forced into the register input to kick off the random sequence generating process. The high value of time constant used here was needed due to the slow start on my bench PSU. At 64MHz the sequence repeats at $2.14*10^9$ / 64MHz = 34 seconds, which means the resulting noise actually consists of a comb of frequencies separated by the reciprocal of the period, or about 0.03Hz. Except for the very narrowest of DSP-based low speed data modes, this will appear as true white noise.

From **[3]** the RMS noise density of a PN sequence up to about 15% of the clock rate is given by $V_{RMS} = V_{PK-PK} .\sqrt{(0.5/F_{CLK})}$. So for our 64MHz clock and a logic level of 5V peak-to-peak, we get 442μV/√Hz.

The resistors on the two output 74AC00 output buffers act as if they were in parallel and, when taken with the few ohms internal resistance of the CMOS gates, give a quite well defined 50Ω output impedance. Driving into a 50Ω load, the voltage is halved, so we end up with 221μV/√Hz delivered into a matched load. The noise power density = V_{RMS}^2 /50, so we end up with 1nW/Hz or 60dBm/Hz for the range DC to about 10MHz.

For audio testing, we could do with around 2V pk-pk, and as a calibration source it would be nice if a known level could be generated, rather than just a power density. Going back to [3], a simple RC filter with a cut off of Fc Hz has a noise bandwidth of $\pi/2$, or 1.57* Fc. For communication purposes we usually aren't interested in frequencies much above 3kHz, so an RC filter with cut-off at around 6kHz will allow us to control the absolute output level and still give flat response over the region of interest.

The opamp and filter shown in Figure 1 result in an audio noise signal of known parameters: the low frequency gain is defined by the ratio of the input and feedback resistors (39k / (3.9k || 30k), which give a voltage

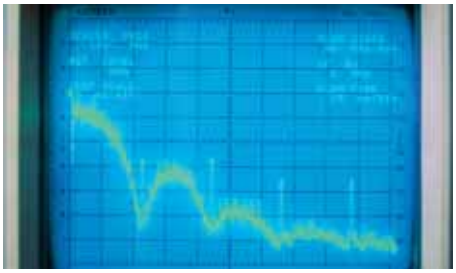


FIGURE 1: Truly random digital noise gives a SIN(X)/X shaped spectrum (ignore the spikes, which are from clock breakthrough).

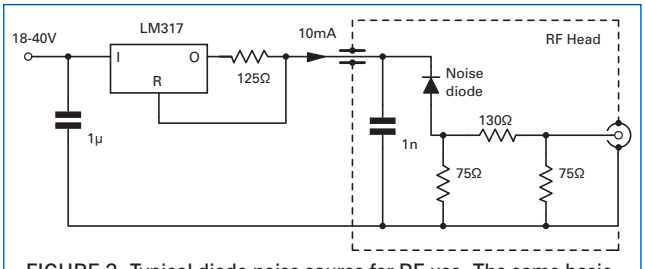


FIGURE 2: Typical diode noise source for RF use. The same basic circuit can be used from HF through to the highest microwave bands, depending on the diode used.

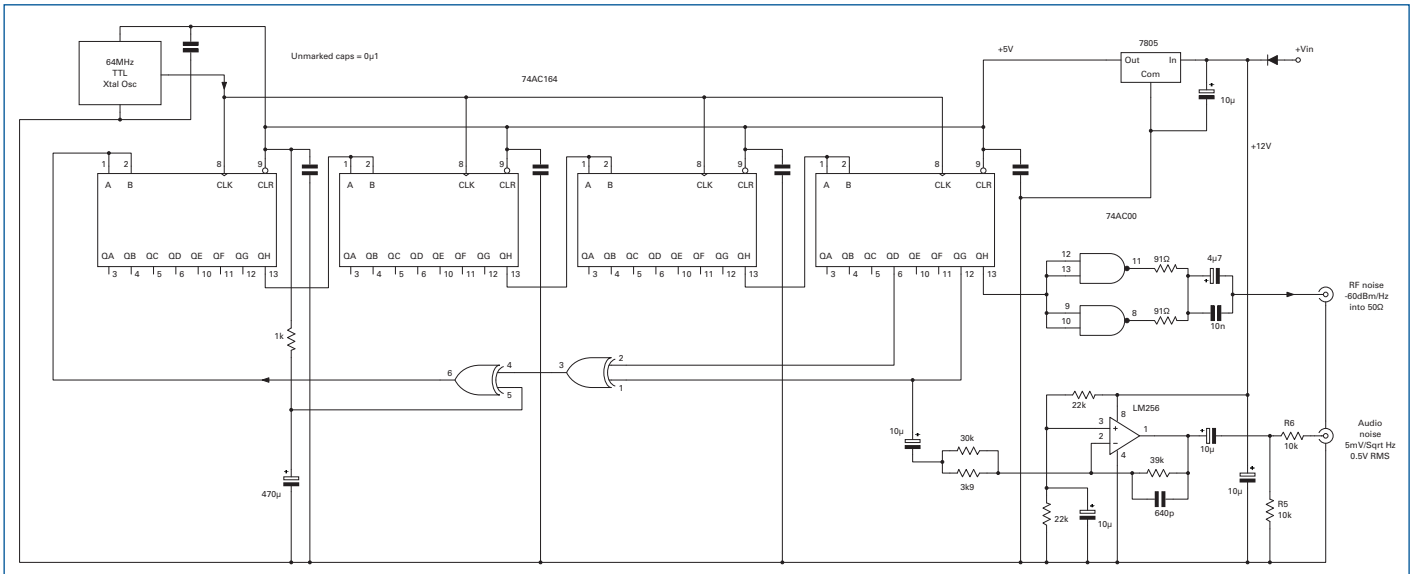


FIGURE 3: Pseudo noise generator made from a 31 stage shift register clocked at 64MHz, with RF and audio outputs.

gain of 11.3. This raises the 442μV/√Hz source waveform to a nice round value of 5mV/√Hz. The 640pF capacitor across the 39k feedback resistor gives an RC filter with a cut-off of 6380Hz. The noise bandwidth is 1.57 times this, or 10kHz, which keeps numbers simple: 5mV * √10kHz = 0.5V_{RMS}.

NOISE SOURCE FOR VHF TO MICROWAVES. A PN generator runs out of steam above a few tens of MHz so we need to look at other ways to generate noise. Unfortunately there is no way of making a noise source with an absolutely known RF output amplitude, although it is not too difficult to make a noise generator that can subsequently be calibrated. A reverse biased diode junction operated into its avalanche region (similar to a Zener diode) generates an appreciable amount of RF noise. A bipolar transistor base-emitter junction works remarkably well for frequencies at least up to the Ft of the device – usually up to a few hundred MHz. For higher frequencies, most Schottky type microwave mixer diodes will break down when reversed biased with 10 – 20V. The noise power generated is typically at a level of 20 – 40dB above thermal noise **[4]**.

The circuit in **Figure 2** shows how simple a noise generator can be. The diode can be a small-signal microwave mixer diode (eg from a satellite LNB) for up to 10GHz or so. Use construction and layout techniques appropriate to the frequencies of interest, and beware: these diodes are very static sensitive, so take suitable precautions. Almost any silicon transistor's B-E junction is worth trying for the HF-UHF bands. An LM317 constant current source drives the diode into reverse breakdown while passing 10mA. A proper current drive is important as the noise level depends heavily on the current passing through the junction during avalanche breakdown, and this has to be maintained over time between calibration and testing sessions if comparative results are to be meaningful. The noise generated by the diode is passed through a 15dB attenuator. This serves a dual purpose: primarily, to ensure a constant 50Ω impedance whether the noise source is on or off, and to bring the generated noise, typically 30dB above thermal, down to a level more suited to measurement of low noise receivers.

COMMERCIAL NOISE SOURCES. Noise heads can be found on the surplus market, usually made by companies like HP (Agilent) or Nore Microwave. They usually need a constant current drive, often 10mA, although some have a current source built-in and are designed for powering from 28V DC.

CALIBRATION. Absolute calibration of noise sources is a specialist art, but if a commercial noise figure meter is available then the home made source can be calibrated by substitution with the noise head on the commercial unit. Such equipment and calibration facilities, with any assistance needed, are often available at the various Microwave Round Tables held around the country.

As thermal noise is directly and exactly related to temperature, heating or cooling a 50Ω resistor will generate an exact noise power density. Calibration laboratories use precision loads in liquid nitrogen and boiling water to generate two absolute levels of noise for comparison.

For low noise EME systems, absolute noise performance of a receiver can be measured using sun, moon or galactic noise (see this month's GHz Bands). Once the receiver noise figure has been determined, this can be used backwards to calibrate an unknown noise source.

A SOFTWARE SOLUTION. As an alternative to hardware, noise can be generated by software, where it can be added to digitised data such as .WAV files for subsequent computer processing of the signals. Gaussian noise with an RMS value of unity can be generated given a sequence of random numbers in the range 0 to 1. All high level programming languages provide such a function, frequently called *RND*:

*X = √(-2 * LOG(RND) * COS(RND * 2 * PI)*

(Note that the RND function is called twice for two different random numbers in the range 0 – 1; LOG is the natural log function).

This gives a really true Gaussian waveform with very small but finite probability of very large positive or negative values. The value obtained will have to be scaled to suit the data format with which it is to be mixed.

An alternative algorithm is:

sum = 0
loop N times
*sum = sum + 2 * rnd – 1;*
X = sum / N

That again gives a sequence of values with an RMS amplitude of 1. Here the absolute maximum amplitude could only ever reach N, making this algorithm more suited to cases where numerical overload could occur. Suitable values of N range from 10 – 100.

REFERENCES

[1] Shift Register Taps for PN sequences - www.xilinx.com/support/documentation/application_notes/xapp052.pdf
[2] More Tables of shift register taps - www.g4jnt.com/srtaps.zip
[3] *The Art of Electronics*, Paul Horowitz and Winfield Hill, 2nd edition (ISBN 978-0521370957) Section 9.34, page 658.
[4] Thermal noise is a result of thermal agitation due to temperature. The noise density is given exactly by kT watts/Hz, where k is Boltzmann's constant, 1.38*10-23, and T is the absolute temperature in Kelvin. At a room temperature of 290K this gives a flat noise spectrum of -174dBm/Hz.

HF bicycle and pedestrian mobile

Operating bicycle mobile by the sea with the QRO trailer.

BACKGROUND. HF bicycle mobile may seem like a strange mode of transport for HF amateur radio communication, but for many years I have been operating HF car mobile close to the sea and I have always had good results due to the enhanced ground-plane of the saltwater. However, I could never get really close to the water's edge with the car as I was restricted to access via roads and tracks. So, a few years ago I decided to put an old Yaesu FT-817 and short home-made centre loaded vertical for 14MHz on my bike. Running just 2.5W, I operated from the promenade in Blackpool, very close to the sea. I managed several contacts into the USA with good signal reports. Even at QRP, the performance when riding close to the sea was outstanding. I was now truly hooked on operating HF Bike Mobile close to the sea. What I needed to do now was to improve the system to get better results!

ONGOING IMPROVEMENTS. My bicycle mobile system has been developed over the last few years into a much more efficient full-blown radio station on two wheels. It is now fitted with more efficient (and bigger) home-made mono-band antennas for different HF bands, multiple 12V gel batteries, a tuned ground plane, computer logging, weather monitoring and digital voice recording equipment. It's now my 'shack on a bike' and, when operating close to the sea, competes well against much bigger home stations.

G4AKC/BIKE MOBILE. The bike itself is an inexpensive 16-speed mountain bike. It is now equipped to operate on all HF bands whilst on the move, mainly from locations very close to the sea in Blackpool, near to where I live.

The radio I use now is a handlebar-mounted Alinco DX-70TH in a zipped waterproof cover (in case of a downpour). The radio is powered by two pairs of 7AH 12V gel batteries. The Alinco DX70 has been modified to provide continually variable power from 10mW up to a maximum of 50W output. The batteries give a total of about four hours of use at the maximum output power. Two of the batteries are mounted on the rear pannier and the other two batteries mounted under the cross bar. Lots of RF toroid filters are used to eliminate RF feedback problems, because the antenna is only a short distance away from the transceiver.

The antennas for 15, 17, 20 and 40m are home-designed, home-made 'hi-Q' mono-band top-loaded verticals. They are all 3.5m long, and each has a dedicated 75mm diameter air-spaced coil, stored for transport in the red side bag on the bike.

HIGH POWER BICYCLE MOBILE. From time to time, when I'm feeling energetic, I also use a small trailer. This contains two 12V 40AH gel cells in parallel, which power a modified RM KL500 linear amplifier. This can run up to 300W output, although I generally run it at about 150W to conserve battery power. I get about four to five hours operational use at this level. A band-switchable, coiled-up quarter-wave coax line is used between the radio and the input to the amplifier to help achieve good RF stability. The downside is that the trailer weight – about 100kg – makes it very difficult to pedal up the hills! Fortunately, there are few hills in Blackpool.

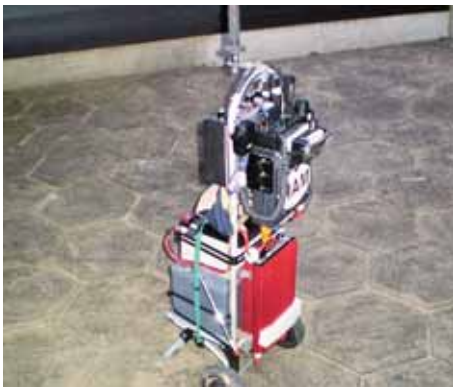
GROUND TUNING UNIT. The limited size of the bicycle frame does not provide an ideal ground-plane for the vertical antenna to work against. As the bicycle is usually moving, it is impractical to attach a trailing wire to the bike. However, the sea provides a perfect ground-plane: all that is needed is a connection method. This is achieved by breaking the braid of the coax cable where it would normally connect to the frame of the bicycle. The braid is then connected via my 'ground tuning unit' (GTU, as opposed to ATU). This consists of a roller coaster inductor and switchable capacitor; the return side is connected back to the bike frame. The GTU has an RF current meter built and in use is adjusted manually for maximum ground current. This can be quite high when operating near to the sea (and especially so when using the amplifier). Tuning is dependent on high or low tide and different types of ground. The performance of the whole system is greatly improved when using the ground tuning, especially when operating close to the sea.

LOCATION, LOCATION, LOCATION. The operating location is perhaps the single most important factor in getting good results. Here in Blackpool, on the northwest coast of England, I am very lucky to have a truly fabulous location for the HF bands when out on the bike. I am lucky enough to have a perfect take-off over the sea to the north, south and west, but I am screened by sand hills to the east and hence I can only work long-path into VK, ZL, and the Pacific area. I have excellent short-path results into North and South America.

The sea provides the perfect ground plane for the vertical antenna to work against: it creates what we have nicknamed 'God's linear amplifier' on both transmit and receive!

PEDESTRIAN MOBILE. My pedestrian mobile system was constructed as an alternative system to get even closer to the sea and also to provide a more flexible system for practical use. I operate pedestrian mobile on 15, 17, 20 and 40m SSB and get really close to the sea using a small, lightweight, two-wheel trolley (or cart). The transceiver is another Alinco DX-70, whose RF power is again adjustable between 100mW and 50W. The radio can be quickly removed from the cart for those times when I can't pull the trolley on the beach; it is then carried in a dedicated backpack. Power is provided by a 24AH gel battery in the trolley, or a smaller (and lighter!) 7AH battery when in the backpack.

The Alinco DX-70 mounted in a weatherproof covering on the bike handlebars.



Pedestrian mobile trolley with DX-70 and amplifier at the front, batteries and ATU at the back.

A recent addition to the pedestrian mobile trolley is a KL500 linear amplifier, with power levels continually adjustable down to 100mW on low power to a maximum of 300W on high power. A separate 38AH gel battery mounted at the bottom of the trolley powers the amplifier. The battery life is quite limited at high power, so I usually run a maximum of 150W output. The antenna is a very lightweight home-made top-loaded vertical, similar to the ones for the bike. As with the bike, it is tuned against the frame

Operating backpack pedestrian mobile – note GTU on aerial mast.

of the backpack or trolley using a similar, but physically smaller, ground tuning system. I have also added digital voice recording to the pedestrian mobile trolley, which enables me to play back the contacts I make and manually enter them into my computer log when I get home.

WORLD RECORD. During November 2007 my good friend Keith Sharples, G7LPW, made a DXpedition with an HF backpack to Christchurch in New Zealand. The trip was made to try to set a new world record operating HF backpack to backpack and bicycle mobile on 20m SSB. Keith operated as G7LPW/ZL3/ pedestrian mobile.

After lots of development and forward planning we achieved this record at 0800UTC on 15 November 2007 over a long-path distance of about 21,000km. A two-way contact was also made at 5W each way, backpack mobile to backpack mobile. This was at the bottom of the sunspot cycle with zero sunspots and a solar flux index of 70. This record is confirmed by the "World Records Academy" in the USA.

TRY IT! HF bicycle mobile really is a lot of fun, especially when the weather is good. It works really well, too! I would encourage anyone who enjoys bike riding to give it a try: it's amateur radio and it helps to keep you fit and, to tell the truth, I don't think I've had as much fun playing radio since I first got licensed. Here's the best part: lots of stations say, "I've been a ham for 30 years or more and this is the first time I've talked to a guy on a bicycle."

There is more information about bicycle mobile, including some digital voice recordings, at www.qrz.com/db/g4akc.

TR-2200GX CTCSS

GIFT HORSE. I was recently given a defunct TRIO TR-2200GX that had a set of repeater crystals plus S20 and S22, but tone burst rather than CTCSS. After a few hours fixing its quite basic faults I got it working. My junk box yielded a Tone Encoder/Decoder type TS-32 by Communications Specialists Inc, which I decided to connect up.

ADDING CTCSS. The encoder tone must be fed in as close to the modulator as possible, avoiding any LF cutoff filtering in the mic path. A convenient point on the TR-2200GX is the tone burst input terminal, NT, on the centre of the PCB.

The TR-2200GX does not appear to have a low frequency filter on the Rx side, meaning that the set would 'growl' when receiving a sub-audible tone. Fortunately the TS-32 includes a suitable filter, so I removed the feed to the volume control and connected this to the audio filter input on the TS-32 board. The audio filter output then went back to the volume control. This mod cleans up the LF end of the audio and gives a more pleasing sound.

The next step is to fit the tone decode and override when no CTCSS is present. The feed to the TS-32 should be before any LF filtering, so a point next to the demodulator diodes is best. The top of R39 is an ideal place to connect the Decoder Input of the TS-32. The decoder will lift the clamp on the high pass filter and the repeaters signal will be passed. At this point, after setting the transmit deviation, the set will open a repeater if the correct tone is selected and will not growl when receiving a signal.

ENABLE/DISABLE. If the tone frequency is not set correctly or you are operating on a simplex channel, the decoder clamp has to be disabled. I found the best way was to short OUT-1 to 0V. This switch can be placed anywhere, but I fitted mine to the mic and re-purposed the second earth wire in the mic to carry the signal.

I fitted the TS-32 unit with a bit of hot glue in the battery area of the TR-2200GX. The set makes a handy portable when out hilltopping, looking for repeaters. I find it works better from a 12V gel cell than it did on internal batteries; a Slim Jim completes the ensemble.

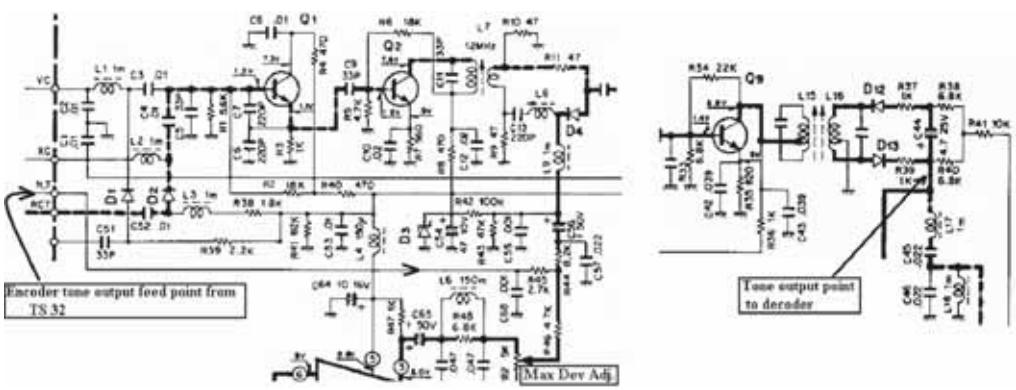


FIGURE 1: Extracts from the TR-2200GX circuit diagram showing the tone input, output and adjustment points.

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ATV

Video transmitter deviation

FIGURE 1: ATV signal with 3.5MHz peak deviation and 6MHz audio subcarrier.

FIRST, A P-GRADE QUESTION. A reader said his P2 and below reception had more grey and was less 'streaky' than the presented P grade pictures. There can be several variations due to the type of equipment used and how well frequencies and pre and de-emphasis are set up. The human eye and brain combination cleverly integrates and filters movement or noise in a video picture to make best sense of it. A photograph only gives a basic representation of what it captures in an instant, and does not have these averaging effects. A further effect of analogue pictures displayed on a 'digital' screen, such as a LCD panel of any description, is that the noise is often 'pixelated' and emphasised. However, the text descriptions of the pictures remain substantially true for all such variations.

ATV TRANSMITTER DEVIATION. A classic requirement of all communications systems is restricting the bandwidth of a transmission to minimise interference to other users, while still retaining adequate quality. This is a relatively complicated subject for ATV because, amongst other things, it involves the use of pre-emphasis with corresponding de-emphasis at the receiver, not to mention the presence of audio 'subcarriers'. As you might expect, the standards used for ATV have been adapted, with subtle differences, from those developed for the broadcast television industry.

The major issue for amateurs is correctly setting the FM deviation. ATV with deviation of 3.5MHz peak to peak produces good pictures when correctly set up, and provides good spectral efficiency - a channel width of about 16MHz. So, what are the basics?

When an RF carrier is frequency modulated it moves frequency each side of the original carrier frequency at a rate dependent on the frequency and amplitude of the modulating signal [1]. With analogue ATV, an audio subcarrier is also added in with the video modulation. The result is the spectrum display of **Figure 1**. Unfortunately, due to the nature of things (Bessel functions), not only is a subcarrier produced each side of the modulated carrier but so are multiples of the subcarrier frequency. What is more, in addition to the applied FM audio shift of the subcarrier, it is also FM modulated by the video component. Hence, the carrier, any subcarrier and multiple of it, and for that matter any other frequencies or products in the modulation process, follow the video modulation.

The signal in Figure 1 has the ATV-adopted 6MHz subcarrier, with the level set 18dB lower than the peak carrier level (-18dBC). This ensures that the subcarrier multiples are at an acceptable level. One of the most significant 2x6MHz products can just be seen on the right of the display, at approximately -37dBC. Subsequent products will be typically -50dB or lower. Due to the method of recovery of the FM audio in the receiver, the lower subcarrier level is compensated for and good audio quality can be obtained even with a weak received signal. The peaks marked X in Figure 1 are the 4.43MHz colour burst.

Occasionally, additional audio subcarriers are used, particularly on repeaters, for example to provide a relay of the 144.75MHz calling/talkback channel.

The easiest way to set up the deviation of an ATV transmitter is with a spectrum analyser, however not all amateurs have access to one. A suitable ATV receiver fitted with a (carrier) signal strength meter could be used to set up deviation using the 'Carrier Null' method, given an appropriate signal source/oscillator. This method is described in [2]. An old satellite receiver such as the PACE Prima would enable audio subcarrier frequency and audio level to be checked.

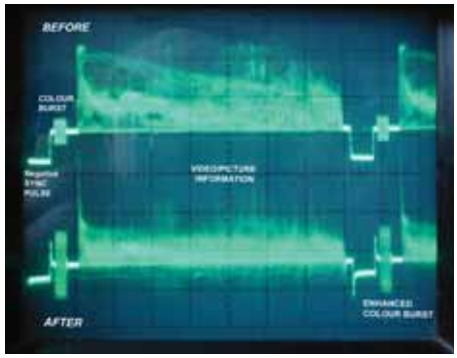


FIGURE 2: A 'Picture Line' before and after pre-emphasis.

WHY PRE-EMPHASIS? System noise increases with frequency. A trick used for many years with voice transmissions, which applies equally to video, is to increase the level of modulation as the video frequency increases – known as pre-emphasis. When readjusted in the receiver, the level of the higher frequencies is brought back to what they should be (by de-emphasis), resulting in the accompanying 'noise' being significantly reduced. For television transmissions, standardised networks have been designed to provide suitable pre-emphasis and de-emphasis performance [3].

A typical domestic television picture is built up from 625 horizontal lines. **Figure 2** shows one line of video from a correctly terminated camera. (Correct termination, 75Ω, is very important to set proper DC levels and the correct output level, 1Vp/p ±3dB (as a voltage ratio)).

The lower trace in Figure 2 shows how pre-emphasis changes the waveform. Note that the amplitude scales are not identical, in order to show the high frequency spikes produced. The colour burst has been significantly increased, which improves the colour-hold capability with weak and noisy signals.

SETTING UP ATV TRANSMITTERS. I have recently completed work on some commercial requirements using Comtech modules. Extensive measurement showed exactly what a range of 'standard' transmitter modules could do. For ATV, a few additional components and correct termination readily produced the necessary CCIR pre-emphasis. Two extra components gave adjustable 'sharpen up' performance for a wide range of cameras and video sources. As supplied, the subcarrier level is below -25dBc, but this can be improved with a single component change.

How to do it all without professional equipment needs just a little more thought, experimentation and more column space than is available this month. Likewise, promised simple technical tips will have to wait for another time.

DIGITAL ATV SNIPPETS. The G8ADM 70cm digital operator list has grown in numbers and now includes several European stations. I have also recently seen details of a new 3cm ATV beacon in Italy that transmits DVB-T and DVB-S side-by-side. Initial information was gleaned from a copy of an Italian magazine article, in which the callsigns IW2FYT, IW2EAX and IZ2DVI featured prominently. More details as they become available.

REFERENCE

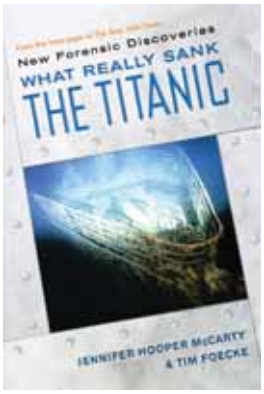
[1] *VHF UHF Handbook* Ed.4, 5.25.
[2] Setting Up Yur Deve', *CQ-TV 157* (can be downloaded free at www.batc.org.uk/cq-tv/archive/1992.html).
[3] CCIR 405-1.

Book review

A heavy bias towards aviation this month

What Really Sank The Titanic

By Jennifer Hooper McCarty & Tim Foecke



The authors of this book have researched the history of the Titanic, been on some of the surveys of the wrecks and examined some of the artefacts. Whilst the collision is not in doubt they have views on the severity of the impact and why the ship sank as fast as it did.

The book starts by looking at the shipyard involved with the construction of the Titanic and what work conditions were like at the time. They paint a picture of an overstretched workforce being asked to complete more and more work as construction was falling behind schedule. The authors conclude that the riveting of the seams wasn't done to the highest standards because of pressure of time – riveting was a highly skilled job as the metal had to be heated to precisely the right temperature before being used to rivet the metal plates together. By examining eye witness accounts and photographs of the wreck, they have pieced together how the iceberg impacted the ship and the damage that this caused. They then go through the various pieces of information and draw their conclusions.

It's a very interesting book as it goes into great technical depth about metal from their creation and use to the effects of sea water and corrosion. They have many excerpts of eye witness account that paint an interesting story of the moments just after the collision. The photographs in the middle show the Titanic during construction, artefacts from the wreck and illustrations demonstrating the art of riveting.

Almost 100 years on, the story of the Titanic never fails to be interesting and it still captivates the reader.

231 x 157mm, 256 pages
ISBN 9780-8065-2896-0
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(25% discount)

Haynes Owners' Workshop Manual Supermarine Spitfire

by Dr Alfred Price and Paul Blackah

Haynes Owners' Workshop Manual Messerschmitt Bf 109

by Paul Blackah and Malcolm V Lowe

Having completed renovating my Avro Lancaster and Apollo 11 in July last year, I've been looking around for another project. Unfortunately, I was out-bid at the last moment on eBay for a squadron of Messerschmitt Bf 109s but managed to get a few spares-or-repair Spitfires at a decent price. I was therefore delighted to discover those nice people at Haynes have written an owners' workshop manual for this iconic aircraft. Just the job!

In fact, these books are in very much the same vein as the Lancaster and Apollo books of the same series. They start by taking a detailed look at the story of the aircraft, including its development, variants and service history. Next, the discussion turns to how you can return an old Spit or 109 to airworthiness – including a large number of technical drawings and photographs. There's even a section on the availability of spare parts, but it would be fair to observe that this section falls a little short of a step by step get-your-wreck-in-the-air guide.

In both books, the next three chapters look at the aircraft from the point of view of the owner, the pilot and the engineer. I was surprised to find out that, typically, a rebuilt Spitfire might fly for only 25 hours per year – and the insurance cost alone could well be over £2000 per hour! It makes the fuel cost, some £200 per hour, look quite reasonable. For those with shallower pockets, a Bf 109 may work out slightly cheaper to insure.

Like the others of their ilk, these are fantastically well illustrated books with hundreds of the highest quality photographs and drawings, giving insights that you would be hard-pressed to achieve in any other way. Produced in conjunction with the Royal Air Force Battle of Britain Memorial Flight, they are a superb tribute to these two iconic aircraft. Highly recommended.

As a special offer, we are offering Members the opportunity to buy the books as a pair for a generous discount.

Haynes Owners' Workshop Manual
Supermarine Spitfire
272 x 214mm, 160 pages
ISBN 978 1 84425 462 0
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Haynes Owners' Workshop Manual
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Published by Haynes Publishing
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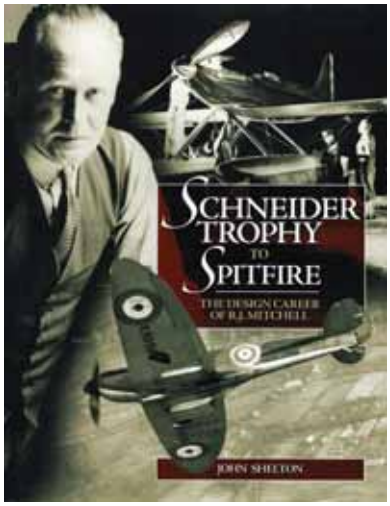
Schneider Trophy to Spitfire – The Design Career of R J Mitchell

by John Shelton

Continuing the aviation theme this month, this lavishly illustrated book is a fantastic tribute to the work and life of that most prolific of aircraft designers, Reginald (RJ) Mitchell. I was interested to learn that Mitchell had no formal training in aircraft design; he worked everything out from scratch plus trial and error – a fantastic achievement.



Mirchell was born in 1895, and was eight years old when the Wright Brothers made their first powered flight. By his early teens he was building models of the famous aircraft of the day; after an engineering apprenticeship he made the fateful decision to apply for the job of personal assistant to the Managing Director at the Supermarine Aviation Works at Woolston, Southampton. I suppose I should declare a personal interest: I lived in Woolston for some years, not far from the Supermarine site, and had my first flying lessons at the former Supermarine site at Eastleigh, now a busy commercial airport.

At the start of RJ's career the aviation scene was very different from today. Sea-going aircraft were thought to be a perfectly natural way forward, on a more or less equal footing with landplanes. In fact, for an island nation, amphibious aircraft made a lot of sense – in an era of relatively unsophisticated engines it must have been a relief to know that the Channel was a perfectly safe landing strip!

I was amazed at the sheer number of aircraft that came from Mitchell's drawing board, particularly as he had no formal training in aircraft design when he started at Supermarine. Many of his aircraft made their mark in competitions such as the Schneider Trophy, or commercially. But his greatest legacy, surely, must be the Spitfire.

This book contains a wealth of detail about the various Supermarine – and competing – aircraft, and puts them in historical and chronological context. Using a mixture of photographs, supplemented by drawings, it gives you a really good 'feel' for the way Mitchell's aircraft looked and performed. Add to this a lot of insights into the man himself and you have a fascinating and informative book that you will return to time and time again.

278 x 214mm, 288 pages
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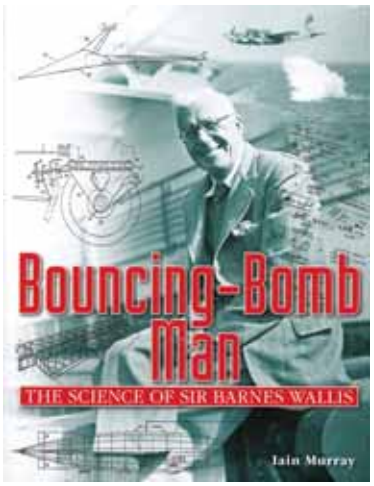
Bouncing Bomb Man

The Science of Sir Barnes Wallis
by Iain Murray

Almost everyone knows that Barnes Wallis was the man behind the Bouncing Bomb; the 1954 film Dambusters (re-released in 2007) has ensured that. What is perhaps less well known is that his aeronautical work started much earlier – and went on well after the war.



Having served an apprenticeship in shipbuilding, Wallis found his way to the senior airship design team at Vickers around the start of the First World War. A few years later, after working as a maths teacher in Switzerland, he was constructing the R100 airship at Cardington, Bedfordshire – where the sheds still stand today, barely 2km from the RSGB offices.

There is a detailed section dealing with the design of the WWII bouncing bombs, including some fascinating glimpses into the patient test and development work that was done. I didn't know that he was also the prime mover behind the later 'Earthquake' bombs – Tall Boy and Grand Slam – and other military innovations; you live and learn!

Barnes Wallis' inventiveness didn't cease with the coming of peace. He was instrumental in the design of a number of supersonic aircraft that were never taken beyond (generally successful) model test stage; experimental ducted wings and all manner of other aeronautical innovations.

In my experience it's rare for a biography to contain much in the way of technical information but I was very pleasantly surprised by this one which, additionally, has a number of very informative appendices. I learned a lot from this book, which I found fascinating throughout. Apparently, this is the only complete history of his work. Well worth reading.

278 x 214mm, 288 pages
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Sport Radio

A DXpeditioner's tale about the Commonwealth Contest

Sharon, M3VCQ/J3 and Colin, J38CW (G3VCQ) in their shack in Grenada.

THE COMMONWEALTH CONTEST. Back in December 2008, Colin, G3VCQ decided that he would like to be a traveller in the 2009 Commonwealth Contest, which is often regarded as being a rather gentlemanly event. It would be the 72nd Commonwealth Contest but he had never entered before, not even from the UK. Having spoken with Nick, G4FAL, Colin was pointed towards Dave, G3TBK, who suggested one or two islands in the Caribbean that would be worth considering. Despite Colin's partner Sharon having a licence (M3VCQ), it needed to be a holiday where other activities would be available other than just radio, so the hunt was on to find an island that would suit both radio and other activities such as sunbathing, swimming, shopping, sightseeing, eating, drinking and dancing, etc. Somewhere with a good take off to the North (VE and G, with a good path to VK/ZL too) was needed. A few beers and some food would also be required at some point! The Grenadian (by Rex Resorts) on the island of Grenada seemed to fit all the requirements and with a little further assistance from G3TBK, Colin contacted the local authorities for a J3 licence (J38CW) and the flights and hotel were booked. The local authorities were, incidentally, most helpful.

"In the first week of January [2009] I was asked along to a meeting of the Rest of The World (ROTW) team at the home of Dave, G3TBK, near Grantham, where I met other members of the team." Colin was invited to join the team, which included Dave, G3TBK (J88DR); Bob, G3PJT (9H3JT); John, G3LZQ (J79WR) and Nick, G4FAL (V47CD) and others. The antennas that Colin decided on were dipoles for 80m and 40m (with one feed point) and the YP3 'beam in a bag' from Super Antennas. "If you have never seen a YP3, it all folds down into a bag that is only 3ft long and weighs 12lb all in", he says. Add to this a Yaesu FT-857D, a Watson 25F power supply and an SPE Expert 1K-FA solid state amplifier with built-in ATU, coax, a laptop PC running Wintest, a mini paddle by Palm Radio, coax, a Heil headset and a 'just in case' kit that included an antenna analyser, wire cutters, thin nosed pliers, a multi optional screw driver, PVC tape, cable ties, a knife and loads of string. "You can't take enough coax I am always told and, having done a few portable events in my time, I agree", so lots of Aircell 7 was packed. Luckily, carrying this little lot was not an issue because Colin was flying with Virgin and they have an extremely generous baggage allowance, meaning he and Sharon could even take a few clothes.

Colin takes up the story again, saying, "The hotel reception team allocated us an excellent room on the top floor and just 20 metres from the sea. Next day things just got better. The General Manager of our hotel, Ken Flockhart, who met us on arrival, gave me access to the roof above our room and one of his excellent maintenance team to assist me with getting my antennas in the air.

"I headed to the roof with Les – a Canadian chap I had been speaking with in reception earlier. Les had never heard of our hobby and probably wishes he never did! He took great interest in our activity and being an engineer stated that putting the beam together would be a doddle for him." Apart from problems with U-bolts that needed to be overcome with cable ties, it was. Backup antennas were added to the system. "I checked all the antennas with the analyser once back in the room and all were okay and within the limits of where I wanted them for CW. The low SWR showing on all the antennas meant the auto ATU in the Expert would have no problem in tuning any of them. In fact, if it was possible, I would have switched the ATU out."

"The first CQ on 20m on CW would be the only one for about two hours. The pile-up was never ending, but great fun! The FT857D (with CW filter) was not a match for the FT-2000 sat idle at home, and sometimes it was hard to pull out complete callsigns first time. I got better at it, as did the callers in the pile-up who learned my listening habits. SSB operation was easier, but with no fewer callers. Reports in and out were excellent and mostly exceeded S9 both ways on all bands." Having confirmed that everything was working, Colin and Sharon retired for the night. They would need to be awake early the next day, but "getting up at 0530 (local time) was helped by the fact our body clocks were still working in GMT".

"0600 Saturday and we were off. 40m was buzzing with VEs and G stations. Finding a clear frequency on which to call CQ was going to be tricky and I could hear some other members of the team already with pile-ups. After my first CQ the pile up started. It was amazing. It was hard work but great fun! By lunchtime, conditions on 20m seemed to favour USA and VE. Despite everything and being told time and time again, US stations called and called, making it harder to hear the weaker G stations and other DX in the pile-ups. To make matters worse, the air conditioning started to make strange noises and our room started meeting the temperature of 30°C outside very quickly. Over the next twelve hours came the mosquito bites – about 31 in total, mostly round my feet and ankles. Just when you think things couldn't get much worse, 40m seemed to drop out. This wasn't really much of a surprise, because time was getting on and I really needed be on 80m. The trouble was there was very little I could hear on 80m, because high noise levels and weak signals are not a good combination when it comes to trying to make QSOs. 80m was hopeless, although I managed a few contacts before it died completely. I QSYed back to 40m to hear Nigel, 6Y8XF (G3TXF) bashing away, working one after another. I gave it another go, but nothing doing. I was not being heard and to be honest I could hear very little anyway. Things did start to pick up again in the last hour or so, as we got near dawn, but of course by then it was too late. It was all over at 0600 Sunday and I was in bed and asleep, dreaming of CW QSOs by about 0602. It's strange how CW can carry on in your head hours after you stop operating. Maybe not everyone suffers with this, perhaps it's just me. Normal holiday hours and activities began on day four and everyone I met in the hotel wanted to know how it had gone. The whole hotel seemed to know what I had been doing in my room for the past 24 hours! I remember thinking to myself that anything that heightens awareness of our hobby has to be good.

RSGB HF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Mar 1	80m Club Championships	2000-2130	Data	3.5	RST + SN
Mar 10	80m Club Championships	2000-2130	CW	3.5	RST + SN
Mar 13-14	Commonwealth Contest	1000-1000	CW	3.5-28	RST + SN (HQ stations also send "HQ")
Mar 18	80m Club Championships	2000-2130	SSB	3.5	RS + SN

RSGB VHF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Mar 2	144MHz UKAC & Club Championship	2000-2230	All	144	RS(T) + SN + Locator
Mar 6-7	144/432MHz	1400-1400	All	144/432	RS(T) + SN + Locator
Mar 9	432MHz UKAC	2000-2230	All	432	RS(T) + SN + Locator
Mar 14	70MHz Cumulative #2	1000-1200	All	70	RS(T) + SN + Locator
Mar 16	UHF UKAC	2000-2230	All	1.3/2.3	RS(T) + SN + Locator
Mar 23	50MHz UKAC	2000-2230	All	50	RS(T) + SN + Locator
Mar 30	70MHz UKAC	2000-2230	All	70	RS(T) + SN + Locator

BEST OF THE REST EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange (info)
Mar 6-7	ARRL International DX Contest	0000-2359	SSB	1.8-28	RS + tx power (Ws send State, VEs Province)
Mar 20-22	BARTG HF RTTY Contest	0200-0200	RTTY	3.5-28	RST + SN + time
Mar 20-21	Russian DX	1200-1200	CW, SSB	1.8-28	RS(T) + SN (Russians send Oblast code)
Mar 27-28	CQWW WPX SSB	0000-2359	SSB	1.8-28	RS + SN

A look up at the antennas used by J38CW for the 2009 Commonwealth Contest.

"Operating became less intense for the remainder of the holiday, with us having the odd hour on-air in the early evening and a couple of hours before bed most days. We made around 1500 QSOs during our stay, which was not as many as we would have liked.

"We are all set to go this year from 11-25 March, so J38CW will be part of the ROTW team again. Sharon will be J38SW this year and active after the contest. Sharon and I will be getting married on 7 March, prior to our trip, so it's a joint contest DXpedition and honeymoon this year. Not many of us get to take a rig on honeymoon." You said it!

DUPLICATE CONTACTS. In the days of manual contest adjudication it was a brave – or foolish – operator who claimed points for a duplicate contact in a contest log, because there was a significant penalty for doing so. With the adoption of the Cabrillo standard for contest logkeeping, those days are now long gone.

Nowadays there is in fact a very good reason not to remove what you think is a duplicate contact from your log before submitting it. The reason for this is that if you remove what is a dupe in your log – but it is not a dupe in the log of the other station – he will lose the points for it. Now suppose the contact that the station at the other end of the QSO loses the points for was also a new multiplier. He will lose not only the QSO points but also the multiplier. In extreme cases this could lead to stations moving down in the results table. In really extreme cases it could make the difference between winning and coming second, which is exactly what happened in the IOTA Contest last year. The top two island DXpedition stations were separated by a miniscule amount and the loss of one QSO (and its associated multiplier) caused what would have been the winner to drop to second place.

BEHIND THE SCENES. This month I was hoping to bring you the second part of G4CLA's item on the RSGB log entry robot, but lack of space means it needs to be held over to next month.

THIS MONTH'S EVENTS. On HF, the data session of Club Championships is what starts the month on the 1st. Nine days later the CW session takes place. This is closely followed by what many regard as the most gentlemanly of RSGB events – the Commonwealth Contest (on 13-14th). It's a worldwide 24-hour CW event that's largely free of Continental European activity, because the only contacts that count are between Commonwealth countries. Every year some quite rare entities are activated by DXpeditioners and this year will be no different. A list of Commonwealth Call Areas can be found at www.rsgbcc.org/hf/information/codes.shtml. Finally, there's the SSB session of Club Championships on the 18th.

On VHF, in addition to the UKACs (there are five Tuesdays this month, so there's also a 70MHz session), there are two other events. This first of these is quite a major one, being the 144/432MHz Contest on 6-7th. The weather often makes portable activity a real challenge for this event, but the hardiest of souls will always find a way of getting on the air from a hilltop, in spite of snow or gales. The second session of the 70MHz Cumulative Contest takes place on the 14th. There will be three further sessions across the coming months.

Non-RSGB events begin with the SSB leg of the ARRL International Contest on 6-7th. The CW leg took place last month, so please see February's column for more information.

The British Amateur Radio Teledata Group's (BARTG) HF RTTY Contest takes place on 20-22nd. Please note the unusual start/finish time. Exchange a signal report, a serial number and the time in GMT. The multipliers are countries (plus call areas for W, VE and JA and VK) and continents. For single-operator stations there are time-limited 6-hour all-band and 30-hour all-band / single-band categories. Only multi-operator stations – single- or multi-transmitter – can operate the full 48 hours.

The penultimate event that I would like to highlight this month is the Russian DX Contest on 20-21st. There are numerous entry categories, for single- and multi-band, single- and multi-mode, multi-op, various power levels, clubs, etc. An interesting aspect of this event is the possibility of submitting two single-band entries, eg 10m and 80m. Work everyone and send a signal report and serial number, but expect Russian stations to send you a signal report and a 2-letter Oblast code.

The SSB leg of CQWW WPX rounds off the month on 27-28th, the RTTY leg took place last month, so please see February's column for more information.

ARDF

Organising an ARDF Event – Part 2

ON THE DAY. In the January issue, the article about organising an ARDF event looked at the things that need to be arranged prior to the day of competition. This month we look at running things on the day itself.

KEEP IT SIMPLE. The over-riding principle should be KISS (keep it simple, stupid). Don't involve half the Club in the running of the event; two people should be sufficient. One is required to place the hidden transmitters in the area and to make sure they all start operating before the first designated start time. The second needs to run the 'front of house' by greeting the competitors, getting them signed in, collecting the fees and adding their names to the start list, issuing the information sheet and control cards (assuming pin punching is being used to confirm that each transmitter has been located). This person will also act as starter and finish time-keeper. If the transmitters are all operating as they should, the first person will be able to assist once the competition has begun.

The disadvantage of having a lot of people involved in the running of the event is that it rapidly becomes a chore and there is limited enthusiasm for repeating the exercise. With just two individuals running the competition, it can easily be a different two people when you decide it was all lots of fun and you want to have another event later in the year.

SYNCHRONISING THE TRANSMITTERS. If it is a first ARDF event for your Club, then the advice is to restrict it to a competition on only one of the two frequency bands that are used for ARDF (3.5MHz and 144MHz). The transmitters will need to have their batteries charged prior to the day of the event and then have to be synchronised so that the PIC controller chips know what is 'time zero' and can then calculate their timing based on this. The 'delay' time from when synchronisation is carried out to the time at which the first transmitter starts sending is set on the DIP switches in the transmitter. These are set to bring the first transmitter on the air about 15 minutes prior to the start time of the first competitor.

Synchronisation is achieved by opening a switch connected to all the sync ports of the transmitters being deployed. Typically this is done by the course planner immediately prior to taking them out into the area to be placed in position. However, some sets of transmitters have the crystal controlled clocks on the PIC chips carefully adjusted to the same frequency and these transmitters can be put out on the evening before the competition.

PAPER WORK. Some paper work is needed. An information sheet should be prepared giving all the details about timings, frequencies, out of bounds areas, transmitters to be hunted by each age group, map scale and so on. There is a specimen information sheet available for download on the RSGB ARDF website. Forms for start lists and for recording finish times and calculating the results are also available from the RSGB site (www.rsgb.org/radiosport/ardf/index.php). The maps of the area are not normally issued to competitors until five minutes prior to their start time. These maps have only the start and finish marked on them using a triangle for the start and two concentric circles for the finish.

The competitors are then started at five minute intervals and each start time coincides with the instant that the first transmitter in the sequence of five starts its one minute transmission. This first transmitter sends the identifier MOE and will also send the callsign of the licensed amateur who is supervising the unattended operation of the transmitters, in accordance with the terms of the UK transmitting licence. The remaining four transmitters follow in turn sending the identifiers MOI, MOS, MOH and MO5. After that MOE comes on the air to start the next repeat of the cycle.

Past RSGB President Bob Whelan, G3PJT awaits the start signal from Geoff Dover, G4AFJ at an ARDF event organised to KISS principles.

AT THE FINISH. When competitors finish they are usually interested in two things (apart from getting their breath back): how does their time compare to others and exactly where the transmitters were located. One of the things about ARDF is that it is very easy to lose 'contact' with the map when getting close to a transmitter and trying to run it down in the 60 seconds that it is on the air in each cycle. As a result a competitor may only have the vaguest idea of where it was that he or she found the transmitter.

The first requirement is easily met in a small competition by writing the name of each competitor on a white board or large piece of paper stuck to the side of a car, with the time taken and the number of transmitters found. The latter is established from the pin punch marks on the control card handed in by the competitor at the finish.

The second need is met by posting a copy of the map with all the transmitter locations shown. Obviously this has to be done after the last competitor has started.

The competitors are usually quite amenable to collect the transmitters after the competition is over. All that then remains is to get the results posted on the website, pay the agreed fees to the hosting orienteering club or to the landowner if there in no orienteering club involved, write the 'thank-you' letters to the people who have gone out of their way to help you and finally relax with that 'job well done' feeling.

ARDF events for March:

Saturday 13 March: Sutton Park near Birmingham. Use Hartopp Gate Grid Ref SP 112974. First start 1030. 144MHz in the morning and 3.5MHz after lunch.

Start Here

Effective use of the DX Cluster

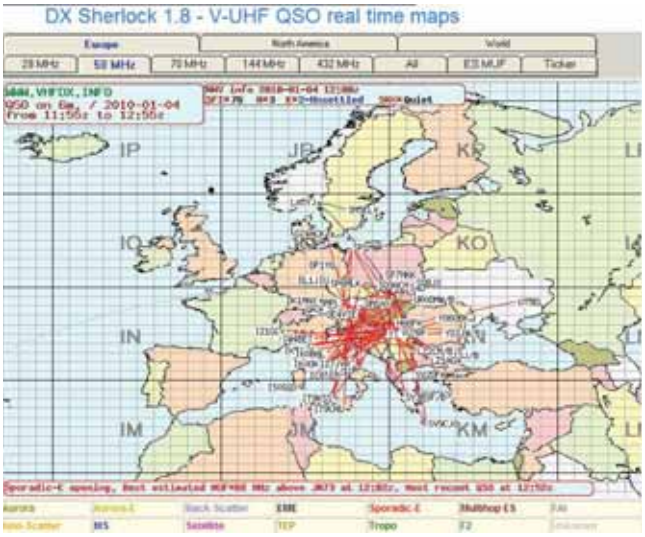

FIGURE 1: Online map built from Cluster data showing paths being worked.

A FANTASTIC HELP. The DX Cluster is a tool that's often used to help amateurs locate rare stations (DX) and identify potential propagation openings on various bands. In this article, we explain the Cluster and look at the differences between Cluster use on HF and VHF and above. We will also offer some advice on how you can contribute and extract data from it.

Today, the DX Cluster is usually accessed via various Internet sites, with the DXSummit, by OH8X perhaps being the most well known (see Websearch). It's also possible to access it using packet radio. You can connect to it either locally on VHF or over the Internet using a system known as Telnet.

A typical entry or 'spot' on the DX Cluster looks something like the following:

Spotters Call	Frequency	DX Call	Comments	Time and Date
MM5FUN	14160.0	MM6TAT	tks fer new # dxcc 73	1817 12 Oct

Before we go on, let's consider two situations when you might want to use the DX Cluster. First, suppose you wish to work a station in Taiwan (BV). Using the DX Cluster, you can search by prefix in the DX call column for BV. Depending on how you access the Cluster, you'll normally receive back a list of around 10-100 Cluster entries that contain BV in the callsign in the DX call column. This data may stretch back up to a year or more, so by looking through the date and time, you can see when stations from Taiwan have been active on various bands and modes and therefore plan your radio activities to match.

Secondly, if you're taking part in a contest, you can use the DX Cluster to help you to find missing multipliers or to keep an eye out for those rarer stations that might slip by while you're sidetracked by contesting [1].

On HF, the Cluster is mainly used for finding out where DX or special event stations are operating. For this reason useful Cluster spots contain information about where the station is listening, signal strengths, and if appropriate, QSL information. On the other hand, poor spots tend to contain useless information such as "Who is the DX?", "Bingo, 599+" and "Thanks for the QSL card". For the first case, if you have access to the Cluster, you should almost certainly be able to work out who is on the frequency. In the second case, this could be useful if the station isn't working split but, if they are, then the rest of us would like to know where you worked them! Finally, this one doesn't crop up that often, but sometimes after a large DXpedition, there are numerous spots complaining about slow QSL services or boasting that their card has already arrived.

Having found some spots that look useful, let's consider how to work out which ones may be useful to you. Probably one of the first things you should consider is the location of the station or stations spotting the DX. If you are located in the UK and a UK station spots the DX then it's likely you'll stand a chance of hearing and making a contact. However, if the station spotting is much further afield, then it's more likely that the DX signals may be skipping over your head or at least be substantially weaker. This shouldn't deter you from listening for the DX as we certainly don't fully understand propagation yet, but it provides a useful benchmark for the usefulness of a Cluster spot. It's also worth taking a look at who spots regularly and seeing if there's a station that is similarly equipped to you, so when you see spots from this station you know there's a good likelihood that you can make a contact. Finally, spots that contain information about propagation such as optimal beam headings or propagation modes, such as aurora or scattered signals can help you form a better picture of global propagation and DX opportunities.

VHF DX. On VHF, the Cluster tends to be mainly used for weak terrestrial signals or satellite work, rather than for reporting local FM contacts. For this reason, the most useful Cluster spots contain the six-figure locator squares of the stations involved and often an abbreviation for the mode of propagation. For instance, JO00DX (TR>IO86OI implies a tropo contact from the South East of England to the east coast of Scotland. Whereas JO00DX (ES>KP00AA implies a more unusual contact further afield via Sporadic-E propagation.

Formatting Cluster spots this way allows computer software to be used to build up a picture of the propagation available. Gabriel, EA6VQ, runs an excellent website (see Websearch) that allows you to display various maps from around the world with colour coded propagation lines between contacts that it interprets from the Cluster. This is really useful when trying to spot Sporadic-E openings and tropo ducting (see **Figure 1**).

USING IT FOR REAL. There are a few general issues that go with using the DX Cluster. The main issue is really what should you spot? Most people in general prefer not to read every single contact you make, particularly if they are nothing out of the ordinary. However, is it really worth adding to the huge volume of spots during a contest or large propagation opening if the information that you're spotting is already easily available? By all means, feel free to spot stations that haven't made it to the Cluster or are the result of new propagation openings. Finally, self-spotting and using the Cluster to confirm QSOs is frowned upon. The best way to use the Cluster is to become familiar with reading it before jumping in and sending spots. You'll soon work out what type of spot works best for you.

WEBSEARCH

http://www.dxsummit.fi/DxSpots.aspx?count=25&range=1
http://www.vhfdx.net/spots/map.php

[1] You can use the DX Cluster in any contest provided if you choose to submit a log you put yourself in an assisted category or submit a check log if using the Cluster is not allowed by contest rules.

Portable

Testing Portable VHF Antennas – not as easy as you might think!

Trouble for the antenna tester?

AERIAL TESTING. This week I decided to do a SOTA activation of one of my favourite hills. Moel Gyw is located at the southern end of the Clwydian Hills, between Mold and Ruthin in North Wales. At just 467m (just over 1,500ft) it's no giant but it is a lovely quiet hill; indeed over the last seven years I have activated it six times and have yet to see anyone else up there.

When I arrived at my normal parking spot, the wind was howling and was sufficiently strong to rock the car. That, coupled with occasional squally showers, nearly caused me to abandon the activation. However, I have good waterproof clothing and knew the hill well so I decided to go anyway. The walk in was pleasant considering the conditions and I was soon on the final ascent up a grassy path weaving its way through the heather.

There is little shelter on the summit, the choice being the trig point or a stone marker for the Clywdian Hills Area of Outstanding Natural Beauty (AoNB). I chose the stone marker to shelter behind and soon had my antenna, a VHF vertical, set up.

My plan was just to do a simple activation on 2m FM – there being plenty of activity on 2m in the North West of England. QSOs came fairly easily and I soon had 11 contacts logged including summit-to-summit contacts with Walt, G3NYY on Ruardean Hill in Gloucestershire (146km) and Gerald, G4OIG on Whitbarrow in the Lake District (132km).

After that, the contacts dried up. Sadly the weather did not do the same and it was raining heavily. Still, I was comfortable behind my stone and decided to make good use of the time by doing some aerial tests while waiting for the weather to improve.

COMPARISONS. My VHF vertical was a known good performer and had been used on many hills and mountains. I had a helical antenna with me for the 2m radio that would be good for comparison purposes. The first signal that I used was a repeater. Swapping from one antenna to the other a few times gave a disappointing result. The helical was significantly better than the vertical. Thinking this might be due to some odd reflections (unlikely on this very open hilltop), I moved the vertical but to no avail, the handheld always indicated a stronger signal on the helical. I did further listening tests on more distant stations but each time the result was the same. This seemed odd and so I packed up, concluding that the vertical must have developed a fault – portable aerials have a hard life after all!

NOT FAULTY. On my return home, I tested the vertical. It was perfect; it was not faulty. Furthermore, subsequent tests showed that it was always substantially better than the helical antenna. This was deeply puzzling; why would an aerial work better in one place than another? More thought and I eventually came up with a possible explanation for my observations.

The first clue was that all my tests were done by receiving signals; I did not do any transmitting tests. Moel Gyw, while not a fantastic VHF site, is certainly better than most people will be used to at home. This means that it has a clear line-of-sight to many other hilltops, a good number of which will have communications masts on. The nearest in this case was just a few kilometres away across the other side of a valley.

DESENSITISED. My theory is that my test radio (a handheld) was being desensitised by strong out-of-band signals from this mast (or others). These signals were significantly stronger on the VHF vertical than on the helical and thus the radio was being desensitised worse with the better aerial. This made the received signals appear weaker on the better aerial. To be sure of this I would have had to do some transmitting tests as well as the receiving tests. Certainly this is something that needs a little more investigation.

DEJA VU. On another occasion, I was taking part in the RSGB Backpackers Contests from Brown Clee, a hill in Shropshire. I was using a 2m beam which had been optimised for good front-to-back ratio performance. Some way into the contest I began to notice that the front-to-back ratio was not as good as it should be. Indeed the whole pattern of the aerial seemed rather odd.

Once again it was a proven antenna and so I began to suspect a fault. I quickly lowered the antenna; all was well. While checking it, I started to pay more attention to the local environment and it soon dawned on me what the problem was. Once again, it had nothing to do with my antenna, but rather to what was around it. What I was seeing was reflections of the various masts on the hilltop. These were ruining what was normally a clean antenna pattern! You can't be too careful when doing tests it seems.

Comments and suggestions for the column are always welcome.

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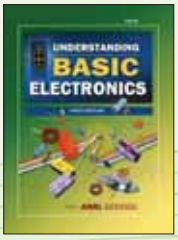

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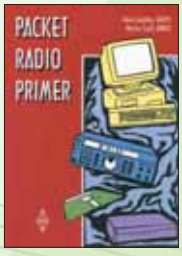

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1 SCOTLAND SOUTH & WESTERN ISLES

AYR ARG
Charlie, MM0GNS, 01563 551704, cgnstewart@hotmail.com
3 Project Construction
17 HF Operating
30 DVD Night

COCKENZIE & PORT SETON ARC
Bob, GM4UYZ, 01875 811 723
5 Normal Club Night
19 Forensic Science by Paul, 2M0BUY

FALKIRK & DARS
Peter, GM8GAX, 01259 761012
21 Junk and Surplus Equipment Sale

KILMARNOCK & LOUDOUN ARC
Graham, MM3GDC, mm3gdc@btinternet.com
9 Club Night
23 The work of the repeater group by Crawford Ross

LIVINGSTON & DARS
Norman, 07740 946192, uk.groups.yahoo/group/ms0liv
2, 16, 30 Club Evening
9 Operating Evening
23 Morse Code Practice

LOTHIANS RS
Andy Sinclair, lrs_secretary@moosedata.com
10 Borders Search and Rescue Unit by Stuart Fuller-Shapcott

PAISLEY (YMCA) ARC
Bill Anderson, 2M0BZZ, 01505 613633, bill@3bis.co.uk
10, 24 Training

2 SCOTLAND NORTH & NORTHERN ISLES

REGIONAL REP: DENNY MORRISON, GM1BAN, GM1BAN@RSGB.ORG.UK

ABERDEEN ARS
Lewis, GM4AJR, 01224 575 663, www.radioclubs.net/aars
4 Junk Sale
11 Talk by George, GM3OXX
18 Video Night
25 Construction / On the Air

3 NORTH WEST

REGIONAL REP: KATH WILSON, M1CNY, M1CNY@RSGB.ORG.UK

BOLTON WIRELESS CLUB
boltonwireless@gmail.com
8 More Miles on VHF by Richard, G4HGI
22 Building simple aerials activity night

CHESTER & DARS
Barbara Green on 07957 870770, www.chesterdars.org.uk
2 45 Years of Ham Radio by Brian, G3TXH
9 Committee Meeting
16 The Racal Story by Dave, G4JMF
23 Radio Operations

SOUTH CHESHIRE ARS
Chris Wiseman, G0RDK, 01782 773185
4 No meeting so on air club net, S14
11 Portable Antennas by Ray, M1REK
18 No meeting so on air club net, S14
25 SDR Radio by Paul, M1BKL

SOUTH MANCHESTER R&CC
Ron, G3SVW, 0161 969 3999
4 Antenna clinic with Ron, G3SVW
11 Digital photography by Robin, G3RJQ
18 PC clinic with Dave, G4UGM
25 Military transport of World War 2 by Jerry
29 Monthly Technical Forum

THORNTON CLEVELEYS ARS
John Foster, 2E0EZY, 01253 399377
1 Natter night/Book sale
8 Marconi by Phil, M3UHJ
15 Brains Trust by Mick, G4EZM
22 Discussion NARSA Rally
29 Final preparation NARSA Rally

4 NORTH EAST

REGIONAL REP: HAROLD SCRIVENS, G0UGE, G0UGE@RSGB.ORG.UK

ANGEL OF THE NORTH ARC
Nancy Bone, G7UUR, 0191 477 0036, nancybone2001@yahoo.co.uk
1, 12, 22, 29 Take to the air; natter night
8 Modern encryption in your life by AiXi Taylor

EAST CLEVELAND ARC
Alistair, G4OLK, 01642 475 671, alistair.mackay@talk21.com
5 Radio magazines evening
12, 26 Night on the air
19 Bring in something interesting evening

HALIFAX & DARS
Anthony Vinters, 01422 822636, tony@g0wfg.demon.co.uk
16 Waterways part 2 by Geoff, G0PFH

HORNSEA ARC
Gordon MacNaught, G3WOV, 01377 240573, gmacnaughtwov@yahoo.co.uk
3 DF Foxhunting Theory G4YTV/G3RMX
10, 24 Club Night CW Class
17 Talk by Tony, G0AZQ
31 DF Foxhunting Practice G4YTV/G3RMX

OTLEY ARS
Paul, 2E0PAK, 07768 996370, m6wat@pekae.co.uk
2 144MHz UKAC
9 Foundation Course
17 Foundation Exam
23 50MHz UKAC & Village Hall (Tech Chatter)
30 70MHz UKAC

SHEFFIELD ARC
Trevor Wood, M0TWS, trevorwood6@yahoo.co.uk
1 Social night
8 Sunspots & the ionosphere by G3PHO
15 National science week club open night
22 Contest workshop 3 followed by video
29 AGM

5 WEST MIDLANDS

REGIONAL REP: TREVOR BAILEY, M0KMB, M0KMB@RSGB.ORG.UK

CHELTENHAM ARA
Derek Thom, G3NKS, 01242 241099, G3NKS@blueyonder.co.uk
5 Constructional Exhibition (Prestbury)
18 Contest seminar (Brizen Centre)

COVENTRY ARS
John, G8SEQ, 07958 777363
5 Recollections of the RA by Mark, G6TIY
12, 19 Project 2010 construction night
26 President's night

GLOUCESTER AR&ES
Anne, 2E1GKY, 01452 548478, daytime, www.g4aym.org.uk
1 The new Tornado engine by Les, G0ULH
8 Operating Club Equipment
15 Bring and show your station
22 Workshop/operating night
29 Operating evening

KIDDERMINSTER & DARS
Barry, G4CTU, 01562 823966
2 VHF on the Severn Estuary by G0TUW

MIDLAND ARS
Norman, G8BHE, QTHR, 01214 229 787
3 General meeting, shack on the air
10 Committee meeting
17 Another of Ron's film shows
21 Visit to Wythall radio rally
24 Laptop computer training class, shack on the air
31 Field day planning meeting

MID-WARWICKSHIRE ARS
Bernard, M1AUK, 01926 420 913
9 Annual General Meeting
23 Technical topics

SOUTH BIRMINGHAM RS
Don, 0121 458 1603
1 Shack on the air
3 Lecture in main hall
5, 12, 19, 25 Construction evenings
8 Contest meeting
15 Getting ready for the Wythall rally
21 Club stand at the Wythall radio rally
22 Review of our stand at the rally
29 Field day planning meeting

STRATFORD UPON AVON DRS
G0CHO, 01608 664488, cousbey@theiet.org
8 Test Equipment Evening by G0JUQ
22 80m Kit Building by M0LDY

TELFORD & DARS
Mike, G3JKX, 01952 299 677, mjstreetg3jkx@blueyonder.co.uk
3 Open house/HF OTA/Committee
10 Main Construction Competition
17 Marconi event et al, G3UKV in the chair
31 AGM

6 NORTH WALES

REGIONAL REP: MARK HARPER, MW1MDH, MW1MDH@RSGB.ORG.UK

CONWY VALLEY ARC
Wynne, GW6PMC, 01745 855 068
3 Talk by Captain George Alker, MW3MEY

DRAGON ARC
Stewart Rolfe, GW0ETF, 01248 362229
1 The North Wales Fire Service and its approach to the Welsh language by Alun Rowlands, 2W0CYM
15 Discussion evening

MEIRION ARS
John, MW0VTK, 07868 738016, meirionars.multiply.com
4 Annual Bob Smith lecture

WREXHAM ARS
Glyn, MW0BNB, www.qsl.net/wars/
2 AGM
16 Quiz

7 SOUTH WALES

REGIONAL REP: JIMMY SNEDDON, MW0EQL, MW0EQL@RSGB.ORG.UK

NEWPORT ARS
Ross Clare GW3NWS. 01633 880146
5 Getting to know the club rig
12 R L Drake and the TR4 series by Ross, GW3NWS
19 GB4RC Ryder cup meeting
26 On the air and natter night

8 NORTHERN IRELAND

REGIONAL REP: PETER LOWRIE, MI5JYK, MI5JYK@RSGB.ORG.UK

GLENGORMLEY ELECTRONICS ARS
Peter Lowrie, MI5JYK, mi5jyk@rsgb.org.uk
8 Intermediate Course Registration Night

GREENISLAND ELECTRONICS AMATEUR RADIO SOCIETY
Mi5JYK, mi5jyk@rsgb.org.uk
22 Radio Propagation by Charlie, GI4FUE

9 LONDON & THAMES VALLEY

REGIONAL REP: ALISON JOHNSTON, G8ROG, G8ROG@RSGB.ORG.UK

AYLESBURY VALE RS
Roger, G3MEH, 01442 826 651
10 AGM

BURNHAM BEECHES RC
Dave, G4XDU, 01628 625 720
1 AGM
15 Pamphonics by Jeremy

COULSDON ATS
Andy, G8JAC, g8jac@btinternet.com
8 Film and video evening

CRAY VALLEY RS
Bob, 2E0RCV, 020 8265 7735 after 8pm
4 Annual construction contest
18 Natter night

CRYSTAL PALACE R&EC
Bob, G3OOU, 01737 552 170
6 History of Power Supplies Part 2

DORKING & DRS
Garth, G3NPC, 01737 359472, garth@swansons.org.uk
23 How Many Radials? by Garth, G3NPC

EDGWARE & DRS
Mike, G4RNW, 020 8950 0658, michael.stewart5@ntlworld.com
11 Plastic welding by John, G4GYS
25 The Falklands and South America by Mike, G4RNW

MILTON KEYNES ARS
www.mkars.org.uk
1, 15, 29 MKARS shack open night
8 Summits on the Air by Marc, G0AZS
22 General chat night

NEWBURY & DARS
Richard, G3ZGC, 01635 46241, richard.jolliffe@vodafone.com
24 IOTA 2009 DVD and planning IOTA 2010

RADIO SOCIETY OF HARROW
Linda, G7RJL on 0208 386 8586, www.g3efx.org.uk
12 Fuel Economy by M3OJH
26 AGM

READING & DARC
Pete, G8FRC, 01189 695 697
11 Five ways to steal your data by Andy, M0HAK
19 Foundation Licence Course
25 The power of the crystal by Lorne, M0NEL

SHEFFORD & DARS
David, G8UOD, 01234 742 757, www.sadars.co.uk
4 Machine control by Ian, G3ORG
11 AGM
18 Mini talks by members
25 TBA

SOUTHGATE ARC
David Sharp, M0XDS, david.sharp1@tesco.net.
10 Spring junk sale

SURREY RADIO CONTACT CLUB
Ray, G4FFY, 020 8644 7589
1 Surplus sale
15 Club fix-it and natter night

SUTTON & CHEAM RS
John, G0BWV, 020 8644 9945, info@scrs.org.uk
18 Operating digital modes on HF by Evan, M0TJU

VERULAM ARC
Ralph, 01923 265572, g1bsz@aol.com
16 Hands-on equipment test evening

WEY VALLEY ARG
www.weyvalleyarg.org.uk
5 Are big antennas and linears obsolete? by Walter, G3JKV
19 Club night

WHITTON AMATEUR RADIO GROUP
www.warg.info
12 Icom Pro 3 users training with Garo, G0PZA
26 Preparing for CQWPX SSB Contest
27 Weekend event CQWPX SSB Contest Club contest call M2W

WIMBLEDON & DARS
Jim, M0CON, 020 8874 7456, www.gx3wim.org.uk
12 On the air (digimodes)
26 Commercial satellite communications by Peter, G1SHV

10 SOUTH & SOUTH EAST

REGIONAL REP: GAVIN KEEGAN, G6DGK, G6DGK@RSGB.ORG.UK

BREDE STEAM ARS
Steve, 01424 720815, M0NUC@aol.com
2, 6, 9, 16, 23, 30 At the shack

CRAWLEY ARC
John, G3VLH, 01342 714 402
24 Spring surplus equipment sale Visitors welcome

FARNBOROUGH & DRS
Derek, G3OFA, mail@farnboroughradio.org.uk, www.farnboroughradio.org.uk,
10 Imaging technology by Julian, M0XPJ
24 Visit to Martin Lynch & Sons (Chertsey)

HARWELL ARS
Malcolm, G8NRP, 01235 524844, info@g3pia.org.uk
9 6m DX by Colin, M0DDT
23 Shack activity night

HASTINGS E&RC
Gordon, 01424 431 909, gordon@gsweet.fsnet.co.uk www.herc.uk.net
24 ATV Talk and Demo

HORNDEAN & DARC
Stuart, G0FYX, 023 9247 2846, www.hdarc.co.uk
2 Natter night/social evening
23 Police aviation by Dave Boardman

HORSHAM ARC
www.harc.org.uk
4 Used equipment sale
25 Social,The Blue Ship

ITCHEN VALLEY ARC
Charlie, M0WYM, 02380 439560, secretary@ivarc.org.uk
12 AGM
26 Introduction to internet telephony by Geoff, G3ROG

MID-SUSSEX ARS
Peter, G4AKG, 01444 239371
5 Quiz night
12 Radio night
19 The Volks Electric Railway by Ian Gledhill
26 Surplus equipment sale

SOUTHDOWN ARS
John, G3DQY, 01424 424 319
1 History & renovation at Polegate Windmill by John Flude
3 Operating at Hailsham shack

SWINDON & DARC
Den, M0ACM, 07810 317750, www.sdarc.net
4 Construction contest
11, 25 Natter night
18 Code breaking at Bletchley Park by Bob, G0VTA

TROWBRIDGE & DARC
Ian, G0GRI, 01225 864 698, E/W
3 How good is your take off? with Alan, G3XSV
17 Natter night
28 S. Glos. Amateur Radio Rally (Club table)

WATERLOOVILLE ARC
Rich, G4IBW, 02392680852, g4ibw1@ntlworld.com
7 CW night
14, 19 Exam course
28 Club talk

WORTHING & DARC
Roy, G4GPX, 01903 753 893
3 The rise and fall of Don Miller by Bob, G3VXJ
10 Discussion evening
17 Loops and how antennas really work by Mike Underhill
24 Discussion evening

11 SOUTH WEST & CHANNEL ISLANDS

REGIONAL REP: PAM HELLIWELL, G7SME, G7SME@RSGB.ORG.UK

APPLEDORE & DARC
Brian Jewell, M0BRB, 01237 473251
15 AGM

BLACKMOOR VALE ARS
Tony G0GFL, 01258 860741
2 VHF evening in the club shack
9 Talk on D-Star by Alan, M0MYI
16 HF evening in the club shack
23 Clansman military radio by M0PDM
30 Video K5D

CORNISH AMATEUR RADIO CLUB
Steve, G7VOH, 01209 844939, G7VOH@btinternet.com
1 Committee meeting
3 Talk by David, G3NPB
8 Microsoft Excel by Clive, G3OCB

NORTH BRISTOL ARC
Dick, 01454 218362, g0xay@aol.com
5 Archery with Richard, M6RES
12 Operating evening
19 Committee Meeting
26 Radio Literature: What's New? by G0XAY

TAUNTON & DARC
William, G3WNI, 01823 666 234, g3wni@btinternet.com
3 Discussion on WSPR
10, 24 Operating club station
17 TBA
31 Video

THORNBURY & SOUTH GLOUCESTERSHIRE ARC
Tony, G0WMB, 01454 417048, tonytsgarc@sky.com
3 South Gloucestershire amateur radio rally planning meeting
10, 24 On air night
17 Video night
28 South Gloucestershire amateur radio rally

TORBAY ARS
Dave, G6FSP, g6fsp@tars.org.uk
5, 19 Natter night
12 Operating night
26 Presentation night, entry by ticket only

WEST DEVON RC
Jules Cuddy, M1AGY, 01752291588
2 Open visit evening - invitations to other local clubs to attend.
16 Radio repair and valve testing night with Tony Helm

YEOVIL ARC
Steve Crask, G7AHP, steve@g7ahp.co.uk
4 HF propagation by G3MYM
11 My first year as an amateur by M3ZFF
18 Coils and Inductive Coupling by G3MYM
25 Station on air & committee meeting

12 EAST & EAST ANGLIA

REGIONAL REP: PHILLIP BROOKS, G4NZQ, G4NZQ@RSGB.ORG.UK

BITTERN DX GROUP
Linda, G0AJJ, 01692 404154, secretary@bittern-dxers.org.uk
11 Informal meeting
20 BDXG annual club dinner and prize giving
25 Planning for major events and training opportunities

BRAINTREE & DARS
John, M5AJB, 01787 460 947
1 Portable operating by 2E0XRS
15 Bats: the world's most successful mammal by Mr & Mrs Jiggens.

CAMBRIDGE & DARC
Lawrence Micallef, M0LCM, 07941 972724, events@cdarc.co.uk
5 Rally planning and social
7 Cambridge and DARC rally
12 Radio quiz night with Chris, G1PXH
19 Understanding radio specifications by Ludovic, M0GDO
26 Annual general meeting
27 Training course weekend - Foxton

CHELMSFORD ARS
Martyn, G1EFL, 01245 469 008, www.g0mwt.org.uk
2 London Underground modernisation by Mark, M0IEO
9, 16, 23, 30 Club net night

DOVER RC
Brian, G4SAU, g4sau@darc.org.uk
3 Brainstorm evening
10 Spy radio by Ian, G3ROO
17 Natter and operating evening
24 Emergency power for radio communications by Nigel, M0NDE
31 Talk on APRS by M1CMN & M0TMX

FELIXTOWE & DARS
Paul, G4YQC, pjw@btinternet.com
22 AGM

GORLESTON ARS
David, G3OEP, QTHR, 01493 662 323
27 Lunch time meeting at the Short Blue Hotel, Gorleston

HARWICH ARIG
Kevan 2E0WMG 07766543784 kevan2e0wmg@live.co.uk
10 VHF marine radio by Kevan, 2E0WMG

KING'S LYNN ARC
Ray, G3RSV, ral-g3rsv@supanet.com, www.klarc.org.uk
4, 11, 18, 25 Club night and 2m club net

LOWESTOFT & DISTRICT PYE ARC
Phil, G0JSG, 01502585448, phillip.holden@virgin.net
4, 18, 25 Club night at shack
11 Open planning meeting

NORFOLK ARC
Chris Danby, G0DWV, 01603 419204, cmdanby@btinternet.com
3 Wing Commander Ken Wallis, Little Nellie and 007
10 Informal, construction and workshop evening
17 2m and microwaves by G4DDK
24 Informal, construction, workshop and Bright Sparks evening
31 Square Bashing on Es by G3YLA

PETERBOROUGH & DARC
David Howlett, M0VTG, padarc@tesco.net
24 Supersonics, RF harmonics, digital electronics and teddy bears: a near space adventure by Ed Moore

SOUTH ESSEX ARS
Norman, M0FZW, 01268 692776, secretary@southessex-ars.co.uk
10 Marine and offshore radio by G4UVJ

13 EAST MIDLANDS

REGIONAL REP: JIM STEVENSON, G0EJQ, G0EJQ@RSGB.ORG.UK

EAGLE RG
Terry, G0SWS, 01507 478590
9 Local D-Star facilities by Rob, M0AOV

FRISKNEY AND EAST LINCOLNSHIRE COMMUNICATIONS CLUB
Chris M0MFP, 01507 442240
2 Data modes by 2E0BDS

HINKLEY ARS
John, M0JAV, m0jav@lowgables.co.uk, 07836 731544
3 Social Evening
10 Antenna Workshop: HF doublet ZS6BKW by John Rogers, M0JAV
17 On the air
24 Antennas: my view by Steve, G4XCK
31 Junk sale

LINCOLN SHORT-WAVE CLUB
Pam Rose, G4STO, 01427 788356, pamelagrose@tiscali.co.uk
3, 17 Shack activity and natter night
10 G5FZ on air

LOUGHBOROUGH & DARC
Chris, G1ETZ, 01509 504 319
2 Annual Dinner The Griffin Inn
9 ZN414 project judging
16 DF future & equipment
23 Early radar by George, G4EUF
30 Practical evening

SOUTH NOTTS ARC
Terry, M0RIA, www.radioclubs.net/snarc
2 2m Contest
3 Component theory - resistors
17 On air and Morse
21 Weekend event: Science and Engineering Week, GB2GG
24 Open forum (members only)
31 Homebrew no. 1 reworked,

SPALDING & DARS
Graham Boor G8NWC, 07947 76448, secretary@sdars.org.uk, www.sdars.org.uk
2 144 UKAC
19 DVD night

WELLAND VALLEY ARS
Peter D Rivers, G4XEX, QTHR, 01858 432105, g4xex@fsmail.net
15 10GHz demo and experiment night

HF F-Layer, Propagation Predictions for March 2010

Compiled by Gwyn Williams, G4FKH

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe								
Moscow	86......7778	463....68876	..64456886..	...777887...	...78998....	....677.....	.....	.....
*** Asia								
Yakutsk	.........4..	6765	..53.44.....	...663......	.....	.....	.....	.....
Tokyo	.........33..	.......6762.	.....	.....	.....	.....	.....	.....
Singapore	........111.	78752	.......55...	.......4....	......54....	.....	.....	.....
Hyderabad	.....	4333	.......354..	.......4....	......3.....	.....	.....	.....
Tel Aviv	99......8999	876....79998	..6....786..	...645677...	...44566....	.....	.....	.....
*** Oceania								
Wellington	.....	.......25...	......235...	.....	.....	.....	.....	.....
Well (ZL) (LP)	.....	..7.........	568......754	5.7......863	.....	.....	.....	.....
Perth	.....	.......5765.	......2675..	......344...	.....	.....	.....	.....
Sydney	.....	......4775..	......777...	.....3663...	.....	.....	.....	.....
Melbourne (LP)	...5.....	.279.....	56698.....	...984....4.	....7.....	.....	.....	.....
Honolulu	.....	...5.....	...43.....	.....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....7...	.....	.....	.....	.....
W. Samoa	.....	...3.....	...4666.....	....466.....	.....56.....	.....	.....	.....
*** Africa								
Mauritius	2.....212	6......27776	3......78754	.......773..	.......75...	.......5....	.....	.....
Johanesburg	.....	.2.....443	56......9988	.......7984.	.......56...	.......44...	.....	.....
Ibadan	22.....111	772.....2667	776.....6767	..43...377..	...6545776..	...766678...	.....6665...	.....
Nairobi	.....	52......3344	6.......5566	.......466..	......366...	...4..564...	.....	.....
Canary Isles	777......777	888.....5878	8786...57887	...46567784.	....478847..	.....888.5..	.....555....	.....
*** S. America								
Buenos Aires	.....	22.....	43.5......53	.....3..	.....	.....	.....	.....
Rio de Janeiro	.....	332.....32	543......874	.....7..	.....	.....	.....	.....
Lima	.....	2..2.....	3..6......53	.....	.....	.....	.....	.....
Caracas	1.....	333.....23	52.7.....376	....6....73.	.....	.....	.....	.....
*** N. America								
Guatemala	.....	...1.....	...5.....	.....	.....	.....	.....	.....
New Orleans	332.....	6663.....6	.....4.	.....3...4..	.....	.....	.....	.....
Washington	445.....3	7765......37	363	.....3.346..	.....45...	.....	.....	.....
Quebec	677.....26	5.....476	.....37..	.....53563..	.....	.....	.....	.....
Anchorage	.....	4.5.....	.....344..	.....	.....	.....	.....	.....
Vancouver	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco	.....	.....	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....	.....5....	.....5....	.....	.....

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 March, April and May are respectively (SIDC classical method – Waldmeier's standard) 4, 4, 4 and (combined method) 23, 27, 30. The provisional mean sunspot number for January was 13.1. The daily maximum / minimum numbers were 26 on 23 and 24 and 0 on 6, 7 & 19 January 2010.

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ALINCO DR112E 2m FM MOBILE transceiver. 5/45W output. Wide range receiver. Microphone, mounting hardware, DC cable, user and workshop manuals. See www.Alinco.com/archives for full specification. £50 ono. View/collect or plus £7 carriage. PJ Ball, G3HQT, 01489 570735 (Warsash, Southampton).

ALPHA DELTA DX-EE 40-20-15-10m dipole £75.00. Garex 4m handheld Flexiwhip 50cm BNC £11.00. Moonraker Supergainer 2m/70cm SMA 40cm £11.00 - all as new. Powersonic SLAB 12V 7.0Ah (2 available) £10.00 each. Ansmann ALCT 6-24/1 charger £15.00, never used. Free P&P. Richard, G1JTD, 07836 554841 (Skipton).

BALANCED SUPERTUNER ATU with built in SWR/power meter, by Linear Amp UK. Tunes 20-2000Ω from 160-10m, up to 1.5kW CW. Just the job for linears / balanced feeders. Very well made, condx as new, still in box. £250, buyer collects. Gerald, G3LEO, 01845 567519 (N Yorks).

COMPACT LOOP ANTENNA, home built, suitable for indoor or portable use, covering 13 to 30MHz with remote tune PSU. £75 ono, prefer buyer inspects and collects. Brian, G4UTM, 01823 412238 (Taunton).

YAESU FT-102 main HF WARC rig, FC-102 ATU (1200W), SP-102 Speaker. Costs £225, £150, £100 respectively. Good working order, all matching units, can be seen working / tested. Andy, G0JLX, QTHR, 07768 282880 (Winchester).

CREED MODEL 7B TELEPRINTER, series governed motor, free to good home, will need to be collected. Paul, G4SDU, 01939 260409 (Shrewsbury).

GREAT NORTHERN TELEGRAPH Bakelite Morse key £10 + £5 P&P. David, G3ZPA, 01908 501310, Milton Keynes.

HOLIDAY WITH YOUR AERIALS. Self-catering, smoke-free studio cottage near the middle of a long 3-acre garden. Sleeps 2. Peaceful, electrically quiet rural area; non-amateur owner is happy for you to string up temporary aerials. Under £200/week, less in low season. Diana, 01308 485301 (W Dorset).

HUSTLER 6-BTV HF vertical antenna £150. MFJ 948 300W Versa Tuner £100. Carriage extra. Both as new condx with original packaging. Gordon, G7MHQ, 01484 329886 (Huddersfield).

HUSTLER 6-BTV vertical £160, Kent twin paddle key £50, ZX 6m 3 ele Yagi £60, 2m 7 ele ZL Special £45, 2m/70cm collinear vertical £30, G2DYM 80-10 trap dipole £80, G5RV £15, all plus post. G3OHC, 01757 705869, G3OHC@uksmg.net (not QTHR, Selby).

IBM600X LAPTOP 650MHz, 256MB, 40GB-HDD, new battery, docking station, PSU, CDROM, CDWriter, DVDROM in good working order and in pristine condition (scruffy lid outside); £120 the lot. Prefer collection or postage extra. Nigel Pritchard, G8AYM, 01296 432144, nigel-pritchard@o2.co.uk (Aylesbury).

ICOM IC7000 HF/VHF/UHF all mode transceiver, HM151 mic, manual, mobile bracket cable, model covers UK and US allocations, original packaging. £500 plus shipping. Bob Whelan, G3PJT, 01223 263137, g3pjt@btinternet.com (Cambridge).

KENWOOD TS870 complete with auto tuner, boxed, manual very good condition. £525 ono. Prefer buyer collect and inspect or carriage extra. Mike, M0AZE, 0121 308 6015, michaelsurplice@btinternet.com (Sutton Coldfield).

KENWOOD TS870 HF TRANSCEIVER with matching TS52 power supply. Both boxed with manuals £700. No split. Buyer collects or pays postage. Patrick Cassidy, M0DDI, 01253 822646, Thornton-Cleveleys.

MFJ-418 MORSE TRAINER. Very little used, complete with manual. £30 plus P&P. Chris, M0PSK, 0151 9241525, chrism0psk@gmail.com.

OFFERS INVITED for the following, suggested prices in brackets. TS530 (£300), FT221R with muTek & Digi readout (£200), TS930S + CW filter + SP930 (£300), TS940S (£350). All with manuals. Prospective buyers MUST inspect and collect. A D Hitchcock, G3ESB, 01332 735 896, joalan@ntlworld.com (Spondon nr Derby).

PIRATE RADIO 1960s 1970s. Sounds, pics of Caroline, London, 270, Scotland, City, 208, Manx Radio, RNI. Transferred from tapes. Real memories of the Offshore stations in jewel case. From 99p. Dave, G8ZRE, QTHR, 01244 316673, g8zre@hotmail.com (Chester).

RACAL RA17L RX £85, Racal MA197 preselector £80, Eddystone 840C Rx £85. R Young, 01637 875848, rcry100@yahoo.com.

RADIOVISION 'HAMBANDER' RX, good condx, working order, £100. Heathkit RA1 Rx, average condition, working order, £40. Rees-Mace CAT, Naval receiver, good condition, working order, £120. Trio 599 Tx & Rx twins, good condition, working order, £140. Heathkit GDO with all coils, £40. David, G0SKE, 07704 111701 (Bungay, Suffolk).

SELECTION OF VALVES – all new and boxed. Zaeric: 1 x KT66, GEC: 3 x KT66, Marconi: 2 x KT66, Mazda: 1 x PL509, 1 x ECC83, Mullard: 1 x PL509, 4 x GZ34, 2 x ECF80, 5 x ECC83, 4 x EF86. Prefer sell as lot but would split if required. Best offer secures. Mike, 01926 858178 (Kenilworth, Warwickshire).

TRIO 9R-59DS, in GWO, £35. Codar PR30 preselector, £10, Codar RQ10 'Q' multiplier, £10. Prefer buyer inspect and collect. Les Arnold, G8AHE, 0121 458 2406 (Birmingham).

TS-120V, CW FILTER, PS-20, VFO-120, AT-120, SP-120, QRP classic £235. Eddystone 840C, original box, correct mains lead, manual, £120. Eddystone 740, scruffy, working, £35. Marconi Marine Kestrel III, Falcon II xcvrs, big, untested, collect only please, Richard, GM0OGN, 01789 293375 (Stratford-Upon-Avon).

YAESU FL2000B TX (no PA valves) with manual £45, Heathkit SB-401 Tx with manual £45. Heathkit Daystrom 50W speaker units £15 pair. Box of microwave bits, coaxial switch, step attenuator, LNAs, N type connectors etc, £10. Attaché tool case including solder gun and many tools £10. Bruno, G4FZG, QTHR, 01242 216915 (Cheltenham).

YAESU FP1000M xcvr in original box with matching mic MH-31B8. Condition as new - only used on RX. Cost £1700 - realistic offer required. Inspect and collect. Douglas, M0BGG, 01440 9613970 (Suffolk).

YAESU FT 1000 classic HF xcvr, 200W. Hand mic MH-31, manual, FIF-232C CAT system. Excellent condition. Non smoker operator. £1100 + carriage or collect. Kenneth Gray, MM0AWJ, 01592 757831, mm0awj@btinternet.com (Glenrothes).

YAESU FT 847 Genuine UK (C2) 4m version. Very good condition. Complete with box, power lead, mic and manual. £735 Prefer buyer to collect. John, G0JJL, 07811 643114, vhf-dx@radiouk.com (Preston, Lancashire).

YAESU FT-101Z HF xcvr £150. Yaesu FT dx 401 HF xcvr £100. Yaesu FC-301 ATU £65. Welz AC-38M ATU £30. BC221 + PSU £20. Heathkit GD-1U grid dip meter £10. Rupert, G4XRV, 01494 758361, rupert@g4xrv.fsnet.co.uk (Chesham, Bucks).

YAESU FT-736R. 50, 144 & 432MHz. All mode. Mint condition, boxed, manual & mic. £500 ono + p&p. Details Niall, G0VOK, 07841 210589 (Northwich).

WANTED

CIRCUIT DIAGRAM and any other information on the TW Communicator, 2m or 4m version. Bruce, G3WCE, 01692 538794, g3wce@grimblepoos.co.uk (North Walsham).

COLLINS AUTO ANTENNA TUNER 180 L-3 (or L-2) ex-airborne unit for project. Any condition considered but must have the main inductor mechanism. Ken, M0KNT, 01483 563863, Guildford, email kennethgray@btinternet.com.

SILENT KEYS

We regret to record the passing of the following members:

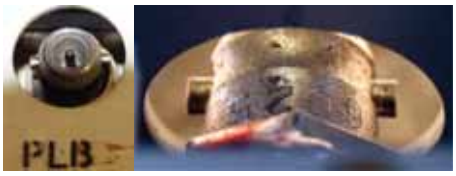
Mr NAS Fitch, G3FPK	29/1/2010
Mr D Ingram, K4TWJ	20/1/2010
Mr W Felton, G3XZF	7/1/2010
Mr RK Taylor, G4KTI	11/1/2010
Mr A Mallinder, G3JUY	4/1/2010
Mr JE Foster, G7NCF	26/12/2009
Mr KR Robertson, G8LSE	23/12/2009
Mr D Mather, GM3KAM	16/12/2009
Mr MJD Watts, G4JZO	13/12/2009
Mr JC Bain, GM3KAI	10/12/2009
Mr RE Pedley, G0LWF	6/12/2009
Mr MA Chatfield, G0TTK	12/2009
Mr RF Saunders, G3CVW	12/2009
Mr AG Edwards, G7KXU	13/11/2009
Mr R Tiller, G7JTY	10/2009
Mr JG Assenheim, G4BOK	25/9/2009
Mr RP Isaac, G7HBI	10/8/2009
Mr DV Cox, G0RRJ	3/2008
Mr DW Aitken, M3DOS	
Mr B Mercer, G3KLL	
Capt I Morris, GD3CKO	

COLLINS: 75A-4, KWS-1, 270G, 51J-4, 32S-3, 75S-3 ETC. All items for own use and a good home will be provided. Will collect and pay cash. Steve, G3YFG, 01254 822222 or 07793 665000, g3yfg@btconnect.com (Clitheroe).

HF LINEAR, your faulty HF linear or unfinished homebrew HF linear or parts to build big HF linear. Iain, G4DPF, 07836 703604, Buckden, Cambs, email iain@g4dpf.co.uk.

MASTS FOR NEW QTH. Trailer or ground-mounted, lattice or tubular, winch, pneumatic, WHY? John, G3XHZ. 01799 528729, annandjohnfarrer@gmail.com (Saffron Walden).

PLEASE HELP ME IDENTIFY the RF input connector on an STC 75MHz aeronautical ILS marker receiver type SR45A. Where can I obtain the matching plug? The socket is marked 6025. Godfrey, G4GLM, 0208 958 5113, 63 The Drive, Edgware, Middlesex, HA8 8PS, e-mail cgmm2@btinternet.com.



PLUMBICON SSTV CAMERA, need not have tube. Must be cheap! B H Twist, G3NFY, 01643 706823, oli.g3nfy@googlemail.com (Minehead).

TRIO/KENWOOD JR599 and TX599 or KENWOOD TS820S or YAESU FT101 - late series - in perfect condx. Karol, G0UNU, g0unu@yahoo.co.uk (Halifax).

RALLIES & EVENTS

Members of the RSGB Regional Teams will be at the rallies this month that are marked with a diamond.

7 MARCH - **BOURNEMOUTH RADIO SOCIETY 21ST ANNUAL SALE** - Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH. CP, OT 09.30, admission £1.50, TS, SIG, C, DF, Junk Sale. Contact John, G0HAT, 07719 700 771 [www.brswebsite.org.uk].

7 MARCH - **EXETER RADIO & ELECTRONICS RALLY** - America Hall, De la Rue Way, Pinhoe, Exeter, EX4 8PW. OT 10.30 [10.15], £2, TS, B&B, C, TI. Contact Pete, G3ZVI, 07714 198374, e-mail g3zvi@yahoo.co.uk.

7 MARCH - **CAMBRIDGE & DISTRICT AMATEUR RADIO CLUB RALLY** - Wood Green Animal Shelter, King's Bush Farm, A1198 London Road, Godmanchester, Cambs PE29 2NH. OT 10:00 (09:45), £3, TI, TS, B&B, LB, C ,DF, SIG, WIN, LEC, FAM, Contact David, M0GUM, 01954 203080, email rally2010@cdarc.co.uk, [www.cdarc.co.uk].

13 MARCH - **DUTCH NATIONAL RADIO FLEA MARKET** - "Autotron", Rosmalen 's-Hertogenbosch, just off A59 motorway]. OT 0900 to 1530. TS, FM, €6. TI PI4SHB, 145.250MHz. Details +31 6 1356 1325, e-mail info@radiovlooienmarkt.nl [www.radiovlooienmarkt.nl].

20 MARCH - LAGAN VALLEY ARS RALLY - The Village Centre, 7 Ballynahinch Road, Hillsborough. OT 11.30, TS, CP, C. Contact Jim, GI0DVU, 02892 662270, e-mail jim.henry@ntlworld.com.

21 MARCH - 25TH WYTHALL RC RADIO AND COMPUTER RALLY - Woodrush Sports Centre, Shawhurst Lane, Hollywood, nr Birmingham B47 5JW on the A435, 2mi from J3 M42. OT 10-3, £1.50, TS, C, B&B, CP, TI S22 (V44). Contact Chris, G0EYO, 07710 412 819, e-mail g0eyo@blueyonder.co.uk. [www.wrcrally.co.uk].

21 MARCH - CALLINGTON AMATEUR RADIO SOCIETY RALLY - Callington Community College, Launceston Road, Callington, Cornwall PL17 7DR. TI, CP, OT 10am, £2.00, TS, B&B, C, DF, WIN. Contact Chris G7UDX, 07973418371, e-mail g7udx@mac.com.

28 MARCH - SOUTH GLOUCESTERSHIRE RALLY - Avon Scouts Activity Centre, Woodhouse Park, Almondsbury, S.Glos. BS32 4LX. I.5 mile from the M4/5 junction. Organised by Thornbury & S. Glos ARC with Avon Scouts ARC. OT 9.30/10.00. traders 7:30, £2, Tables & boots £5 (booking essential). No dogs (except assistance). TS, FM, TI, DF, CP, C, CBS. Contact Peter Cabban, G4OST 01454 612689 or peter.cabban@btinternet.com [www.avonscouts.org.uk/woodhousepark/location.htm].

28 MARCH - SPRING MILITARIA & ELECTRONICS & RADIO AMATEUR HANGAR SALE - Hack Green secret Nuclear Bunker, Nantwich, Cheshire, CW58AP. 10am, £2.50. Contact Rod Siebert, 01270 623353 or e-mail coldwatr@hackgreen.co.uk. [www.hackgreen.co.uk].

11 APRIL - CAMBRIDGESHIRE REPEATER GROUP ANNUAL RALLY - Foxton Village Hall, Hardman Road, Foxton, Cambridge CB22 6RN. TI S22, TS, B&B, C, DF, LEC, OT 10am (7am traders), £2. Contact Laurence, M0LCM, 01223 654880, e-mail rally2010@cambridgerepeaters.net [www.cambridgerepeaters.net].

11 APRIL - NORTHERN AMATEUR RADIO SOCIETIES ASSOCIATION EXHIBITION - Norbreck Castle Exhibition Centre, Blackpool. TI, CP, TS, B&B, SIG, MT, LB, C, DF, RSGB Book Stand. OT 10:45/11:00. Dave, M0OBW, 01270 761 608 or e-mail dwilson@btinternet.com [www.g1gyc.demon.co.uk/narsa].

11 APRIL - LOUGH ERNE AMATEUR RADIO CLUB ANNUAL RALLY - The Share Holiday Village, Lisnaskea, Co. Fermanagh BT92 0EQ N. Ireland. Access from Erne/Shannon Waterway. OT 12 noon, CP, B&B, TS, LB, C, DF. Details Iain 028 66326693, E-mail gibbjgbb@aol.com [www.loughernerradioclub.co.uk].

18 APRIL - WEST LONDON RADIO & ELECTRONICS SHOW (KEMPTON RALLY) - Kempton Park Racecourse, Staines Road East, Sunbury on Thames, Middlesex TW16 5AQ. TI, free CP, OT 9.50/10.00. TS, FM, B&B, SIG, C, DF, WIN, lecture stream. Details Paul, M0CJX, 0845 165 0351, info@radiofairs.co.uk [www.radiofairs.co.uk].

24 APRIL - NEW DATE - 4TH CHESTERFIELD AMATEUR RADIO RALLY - Hasland Village Hall, Eastwood Park, Hasland S41 0AY (M1 j29/30). TI S22 (V44) & GB3EE. OT 10am, TS, C. Details by e-mail to rally@chesterfieldrally.com [www.chesterfieldrally.com].

25 APRIL - ANDOVER RADIO AMATEUR CLUB BOOT SALE - Wildhern Village Hall and Playing field SP11 0JE (North of Andover) just off the A343. TI S22, CP, £1.50, C, DF. Vendors £6 per boot/table, £8 inside the hall. Details Martin, M0MWS, 01980-612070. [www.arac.org.uk].

25 APRIL - 26TH YEOVIL QRP CONVENTION - Digby Hall, Hound St, Sherborne, Dorset. Digby Hall adjoins the central shopping car parking. TI S22 (V44), CP, OT 09.30. LEC, TS, B&B, C, DF. Robert, 01935 706715, e-mail robert.farey@btinternet.com. [www.yeovil-arc.com].

3 MAY - DARTMOOR RADIO RALLY - Tavistock College, Crowndale Rd, Tavistock, Devon, PL19 8DD. OT 1015/1030. TS, B&B, TI S22 (V44), CP, DF, C, FAM. Details Peter, M1AYI, 01822 860277.

14-16 MAY - DAYTON HAMVENTION®, USA - Hara Arena, Dayton, Ohio, USA. 3 day pass $20/$25 on door. CP, TS, FM, SIG, DF, LEC, C, CBS, WIN [www.hamvention.org].

29 MAY - MID ULSTER AMATEUR RADIO CLUB RALLY AND BOOT SALE - Drumgor Youth Centre, Drumgor Heights, Craigavon, BT65 4AP. OT 11am, CP, TI, B&B. Bobby 2I0ULL on 02838 348 451. [www.muarc].

6 JUNE - RED ROSE QRP FESTIVAL

6 JUNE - SPALDING & DARS ANNUAL RALLY

13 JUNE - EAST SUFFOLK WIRELESS REVIVAL

13 JUNE - 9TH JUNCTION 28 QRP RALLY

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 M A Pyle	G2BLA
60 years	
Mr B J Mitchell	G3HJK
50 years	
Mr NAM Bolton	G3HMV
PW Myers	G3UWT

20 JUNE - NEWBURY RADIO RALLY AND BOOT SALE

25-27 JUNE - HAMTRONIC SHOW, FRIEDRICHSHAFEN

27 JUNE - WEST OF ENGLAND RADIO RALLY

4 JULY - BARFORD NORFOLK RADIO RALLY

18 JULY - HOT IRON QRP DAY

18 JULY - MCMICHAEL RALLY AND BOOT SALE

18 JULY - MACMILLAN [NORTHAMPTON] HAMFEST

1 AUGUST - KING'S LYNN ARC RALLY & CAR BOOT

8 AUGUST - FLIGHT REFUELLING ARS HAMFEST

13 AUGUST - COCKENZIE & PORT SETON ARC17TH ANNUAL MINI-RALLY NIGHT

15 AUGUST - FRISKNEY & EAST LINCOLNSHIRE COMMUNICATIONS CLUB RALLY

30 AUGUST - HUNTINGDONSHIRE ARS BANK HOLIDAY MONDAY RALLY

5 SEPTEMBER - TELFORD HAMFEST

12 SEPTEMBER - TORBAY ANNUAL COMMUNICATIONS FAIR

13-18 SEPTEMBER - THE 15TH WORLD ARDF CHAMPIONSHIPS, CROATIA

18 SEPTEMBER - NEW RALLY - THE FOG ON THE TYNE RALLY

19 SEPTEMBER - NEW DATE - GREAT NORTHERN HAMFEST

1 & 2 OCTOBER - NATIONAL HAMFEST

3 OCTOBER - AUTUMN MILITARIA & ELECTRONICS & RADIO AMATEUR HANGAR SALE

8-10 OCTOBER - RSGB CONVENTION

17 OCTOBER - NEW DATE - HORNSEA AMATEUR RADIO CLUB RALLY

30 & 31 OCTOBER - NORTH WALES RALLY

7 NOVEMBER - WEST LONDON RADIO & ELECTRONICS SHOW (KEMPTON RALLY)

21 NOVEMBER - PLYMOUTH RADIO CLUB RALLY

28 NOVEMBER - BISHOP AUCKLAND RADIO AMATEURS CLUB RALLY

RSGB MEMBERS' ADVERTISEMENTS

RSGB members wishing to place an advertisement may do so free of charge by e-mail, or by post provided the advertisement is accompanied by a payment of £5.00 to cover administration costs.

As an interim concession, this charge is waived for any postal adverts received between 8 January & 1 March 2010.

The following terms and conditions apply to all Members' Advertisements.

1) In order to qualify for free insertion, Members Ads must be submitted by e-mail to memads@rsgb.org.uk. Please ensure you include .uk on the end of the email address.
2) **Your advert must clearly show whether it is For Sale or Wanted and must include your name, callsign or membership number, telephone number and postal town, in that order.**
3) The Ad may not contain more than 40 words, excluding the information in (2), and may be edited for readability at our sole discretion. Longer ads may be accepted if there is a good reason, eg a shack clearance on behalf of a SK member; e-mail us and ask.
4) Not more than one ad per month will be accepted from any member. 'Recurring' ads will not be accepted, but members may re-submit the same advert each month if they wish.
5) E-mailed adverts may optionally include one photograph of the item(s) being offered. Images must be attached as a jpg file, at least 800 pixels wide and of good quality. By submitting any image you warrant that you own the copyright and that you permit the RSGB to use it in any way. We will endeavour to publish photographs with ads as space permits but cannot guarantee to publish any particular photograph.
6) Adverts will be published at the first available opportunity but no guarantee can be given as to when a particular ad will appear.
7) The RSGB believes that it is inappropriate for members trading in radio equipment in any way to place members' ads. We therefore regret we are unable to accept such ads, although we do welcome these in the 'Classified' advertising section of *RadCom*.
8) The RSGB accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange.
9) Members' Ads are accepted and published in good faith.
10) Members' Ads are accepted at the sole discretion of the Editor, whose decision is final.

WARNING

Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement.

The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the money paid.

Members' Ads also appear on the Members-Only website at www.rsgb.org/membersonly/membersads.

This list shows all rallies and events we are aware of as at 1 February 2010. 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.

SPECIAL EVENT STATIONS FOR MARCH 2010

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.

Please note that the QSL Bureau sub-manager for all special event station callsigns (GBxAAA-GBxZZZ) has recently changed and is now Mrs Davina Williams, M0LXT, 20 Neale Close, Wollaston, Northamptonshire, NN29 7UT, e-mail QSLTREK@hotmail.co.uk, web site www.gb-special-event-qsl-status.webs.com. Will organisers of special event stations please ensure that they lodge plenty of envelopes with M0XLT?

Date	Callsign	Phonetics	Location	Bands	Keeper
17/03/2010	GB2SPD	St Patricks Day	Moneymore, NI	LHV27	MI0LPO
07/03/2010	GB4BAR	Brickfields Amateur Radio	Binstead	TLH2	G0VZV
27/03/2010	GB0BS	Boston Scouts	Butterwick, Lincs	TLHV27	G0KYD

CLASSIFIED ADS

Classified advertisements 58p per word (VAT inc.) minimum 14 words £8.12. All classified advertisements must be prepaid. Please write clearly. No responsibility accepted for errors. Latest date for acceptance is 1st of the month prior to publication.

Copy to: Chris Danby G0DWV, Danby Advertising, Fir Trees, Hainford, Norwich, Norfolk, NR10 3LX Tel: 0870 904 7377 Fax: 0870 904 7378 E-mail: adsales@rsgb.org.uk

Payment to: RSGB, 3 Abbey Court, Priory Business Park, Bedford, MK44 3WH

FOR SALE

ISOLATED DATA INTERFACES for PSK31-SSTV-RTTY-CW-FSK-WSJT etc. ALL PREVIOUS MODELS STILL AVAILABLE, See RSGB Reviews SEPT 09 RADCOM. NEW ISOTERM TRAVELLER KIT AVAILABLE. PAYPAL REGISTERED. www.g3liv.co.uk johnny@melvin.com 0191 2843028

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WANTED

Unwanted valve amplifiers, working or not. Known makes only (Kenwood, Yaesu, Drake, Linear Amp, etc), not homebrew. Cash paid. Contact Peter G3ZRS on 01482 862323 or e-mail: g3zrs@hotmail.co.uk

MISCELLANEOUS

CALL IN ON THE UK 'GOOD NEWS' CHRISTIAN NETS! Every Sunday morning at 8am local on 3747kHz, 2pm on 3747 or 7147Khz (propagation) and 144.205 SSB at 3pm sharing Christian fellowship. Go to www.wacral.org for more information or contact G3XNX at 51 Alma Road, Brixham, South Devon, TQ5 8QR, Tel: 01803 854504 or derekg3xnx@talktalk.net

ACCOMMODATION NORTH COAST SCOTLAND. Self catering, B&B, camping. Discounts for licensed amateurs. GM4JYB Tel: 01847 851774. Web: www.dunnethead.iberacal.com Email: briansparks@dunnethead.co.uk

EQUIPMENT

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SNOW NET

Ken, MW0YAC DRM RSGB Region 74

On 21 December 2009, I was unlucky enough to be caught in the most atrocious snow storm you could imagine in and around the Reading and Basingstoke area.

While travelling westbound on the M4 towards my home in South Wales, the traffic came to a dead stop at junction 5. Tuning in to 145.675, the Reading repeater, the voice of Jonathan, M3VJO was heard and he had what we now call the 'Snow Net'. My thanks go out to him and the other controllers on the night as they made a lot of journeys much easier.

In all, Jonathan built up a dossier of hazardous and closed roads and where the biggest jams were and, as far as possible, directed traffic to more accessible routes in and around the area. I feel sure that there are people involved that night who would have been stranded for a lot longer if not for the efforts of these operators.

Jonathan, M3VJO was on air for most of the night, G4JTR, M1ELK and G0TKV helped him out from time to time. In all 30 amateurs were involved: 2E0ZIP, M0HAK, G3YSX/M. M6JPW, G1LKJ/M, G4KWT, G4PZK, M0YAC/M, G0BJW/M, M1KVI/M, M3XPR/M, G0LGG/M, M6HVS, 2E0RPG, M0KZC/M, G4PZK/M, G0JMS/M, M6AMP, G7BXU, G4ZUP/M, G8GOS, G8NXJ, G3WNS, G8DBH, G7DPE and G0DWD.

That's what radio and mobile comms is all about. Keep it up.

RAYNET, TOO MANY COOKS OR NOT ENOUGH?

Wally Sawyer, G7FHN

I read, with interest, the leader article in the February *RadCom* by RSGB General Manager Peter Kirby. In it he does make an interesting point in that it seems to me that RAYNET is not a true national organisation with one voice. I am a member of a RAEN affiliated RAYNET group whilst also being a member of the RSGB and apart from the news broadcasts from each organisation, very little information is sent down to individual groups as far as I can tell.

There are groups in most counties, some like Oxfordshire has two groups and some like Hampshire has four, but the problem is that some groups are affiliated to the RSGB, some to the RAEN while others remain completely independent. With this arrangement, how can the authorities be expected to deal with two separate organisations that, as far as I can see, do not even communicate with each other?

Peter makes a reference to a national audit of capability, a good idea, but as I seem to remember the RSGB tried to do this on its own, when in fact it should have been and still should be done, but as a joint RAEN/RSGB venture. Perhaps it could be carried out by one of the many survey organisations but jointly funded. Only then will it be known what capabilities there are and where they are.

The 'events' lists of many groups is comprehensive and there is no doubt that they are able to offer help to the various fun runs, fairs etc held in their area, but is the level of training in the passage of messages up to any sort of standard? Agreed or understood by our user services? Again, this is one of the issues that should be dealt with on a national level by discussions with the various user services as I have no doubt that different organisations will want messages sent in a format that they have always used and on a form that they have designed. A military user will require input on an F Sigs 266 of the latest revision! This means that the RAYNET operator needs to have the skills to know what forms and procedures are required or have been agreed by different users, who all have different levels of communication training, many will have no understanding of radio nets at all!

But with two national organisations that only represent those groups that are affiliated to them and there are those groups that are independent with no representation at all, one thing is for sure, and that is that things have to change. If RAYNET members, RAEN, RSGB or independent, wish to take part and help in real emergency situations there has to be better coordination and training on a national basis. Somehow the RAEN and the RSGB need to put aside any differences and work together, perhaps by the formation of a joint executive committee to liaise with user services at a national level and this could be chaired by having a chairperson from RAEN one year and from the RSGB in the next year.

It was interesting to listen to the GB2RS news this morning (24 Jan) during which it was said "Following the earthquake in Haiti on 13 January, all radio amateurs are still requested to keep 7045kHz and 3720kHz clear for possible emergency traffic". While in the weekly news from the RAEN on the same day, they had this "Haiti operations - Final Report - IARU have now announced that frequencies previously advised as carrying emergency traffic will return to normal use. Please maintain the normal procedures of; * Listen before transmitting * If you hear any station passing emergency traffic then leave the frequency clear and avoid causing QRM". So which version do I believe? I could note find any reference on the IARU website to confirm the position one way or the other.

As regards information on GB2RS, the script for 24 January was updated on Thursday 21 January on receipt of the latest electronic bulletin from the IARU. Once the script is on public view on Friday of each week it is difficult to keep making changes as you would find different version being read out all over the country depending upon the time that the newsreader received their script. Whilst we always try and have the latest information, there comes a point where the script has to be left alone to allow newsreaders a chance to read it through before going on the air. Any organisation that is sending out an electronic newsletter can make changes right up until the moment of electronic transmission, which is why you may find a difference in information on a subject that was changing daily. Ed.

Name & Address withheld

When I read the leader in the most recent issue of *RadCom*, it was as if you were reading my thoughts. I too was looking out of the window thinking exactly the same as you. I then went on to mull over the What if's…?

Let's go back a bit though. I have been licensed since the early 80s and have been active on and off ever since as I moved around the country for work and personal reasons. Now, as I near retirement, I find not only am I more interested in radio but it is easier to find the answers to questions or look up information on the internet. I also find that I want to get involved more and 'give something back' to this fantastic hobby of ours.

So, I contacted RAYNET and offered my services during November last year. About a week later I received a telephone call and had a conversation with a member of the local group who told me about the 'rewards', costs, insurances, a meeting 'soon' but no set date, etc. However, I didn't get the feeling that much was happening nor that much would be happening and I was a little disappointed that it all seemed to be a little 'flat'.

To set the scene, I live in a remote village in Northumberland where we have suffered severe flooding (three times in four years), lost all gas supplies for nearly a week (due to the floods and builders!), electricity more times than I can remember and most recently snow and ice, the like of which we haven't seen in years. Each catastrophe has cut off the village and valley at times. Bearing in mind that Northumberland is not known for being over supplied with reliable mobile phone coverage (or amateurs for that matter) I envisaged from my lofty and flood free perch half way up the surrounding hill I could provide a good point of contact in times of need.

Obviously, RAYNET have not been contacted and asked for their assistance over the past three months as I would have thought they would have contacted me. I can only assume the country is well equipped enough to deal with whatever emergency is thrown at it or the local group have been active and just lost my details. Whatever the reason I am left wondering, like you, ARE WE REALLY READY?

OFCOM AND PLT

Ray Scrivens, G3LNM

OFCOM's draft Annual Plan for 2010/11, in the section entitled "OFCOM's Approach to Regulation", states the following:

"3.9 Our principal duty to further the interests of citizens and consumers makes it particularly important for us to understand how our decisions affect these groups. As consumers, we participate in the marketplace, acquiring or using goods and services. As citizens, we are concerned not only with our narrow individual interests, but with what is good for society.

"3.10 Sometimes the interests of citizens may be at odds with the interests of (at least some) individual consumers."

Surely, what is good for society is that we don't pollute the radio spectrum and this should override the interests of consumers who just want a cheap way of distributing broadband and television around their house.

GOODWILL BETWEEN RADIO AMATEURS

Colin, G3SBI

Although few of us make our own transceivers any more, an important aspect of amateur radio has been to foster international friendship. I think that, by and large, this still exists in that to be a radio amateur is to be a member of a rather special club. However there are some that behave badly.

On Christmas Eve about 20 years ago on 160 metres on CW the behaviour of a GW3 towards a UA3 was the worst I have ever heard.

The GW was the only person on the band and he was calling CQ DX. A UA3 replied but there was no response. The GW called CQ DX again and the UA3 called again. There was a terse reply from the GW 'You are not DX only DX'. The UA3 then sent 'Please just RST for my DXCC'. The GW replied by swearing. The UA3 signed with 'You are a big head'.

I hung around to see what the GW was after and shortly he worked a number of stations in the USA all of whom he had worked before and he then went QRT. Nobody else was on but before going QRT I sent 'a happy Xmas to all operators' and the band exploded with people who wanted to exchange Christmas greetings including the UA3. I told him I had heard his attempted QSO with the GW and that I felt I must apologise to him for the behaviour of my countryman. He replied, 'Thank you Colin. However I am happy to say I have many British friends. It's just that in any hobby there will always be a few bad apples'.

The motto of the story is that when you are on air regardless of the mode in use don't ever believe nobody is listening to you. Half of Europe that night must have heard the bad manners of the GW3.

AGE IS NO BARRIER

Rex Gowing, G3BNP

Congratulations to William A Oliver, MW6KGB passing the Foundation Exam at the age of 74 years - especially so if, at that age, he started from 'scratch', it could not have been easy. For the record, I passed the Foundation Exam back in 2005 when I was knocking 79 years; but I also passed the RAE exam back in early May 1946 (55/1 C&G). My reason for taking the more recent Foundation exam was twofold: (i) to update myself on all the changes in the Licence conditions, particularly present Rules relating to ERM, QRM etc and (ii) to participate in mutual support with my son Colin, also sitting (at opposite ends of the room!) at the same time. Yes, we both passed.

I was one of the many young ones taking their RAE exam back in 1946 and now, I am one of the oldest taking the more modern version of the same thing. Yes, things do change!

RW Griffiths, G7NHB

With reference to the letter from William Oliver, MW6KGB in the February issue of *RadCom*. As an RAE Instructor and now Lead Instructor for the RCE I can tell William that he certainly isn't the oldest. I have records of two older students who passed the RAE.

James Renshaw, G7VDW was born in June 1918 and passed the RAE in May 1995, making him 76 yrs and 11 months old. Basil Beed, M1PDB was born in March 1921 and passed the RAE in May 2001 making him 80 yrs and 2 months old.

I also have records of two students who have passed RCE exams. Phyllis Russel, M3CJQ, born July 1926 passed the Foundation Exam January 2003 aged 76 yrs 6 months. Frank Russel, 2E0AZD , born November 1926 also passed his Foundation Exam in January 2003 at the age of 76 yrs 2 months and his Intermediate Exam in December 2004 when he was 78 yrs 1 month.

I suspect that there is someone who can tell us about many more 'mature' students. Age is certainly no barrier to becoming a radio amateur for the first time.

REDUCING LOCAL NOISE ON 80M

David, G3ZPF

Like many people in the UK my attendance on an 80m Sunday morning net is often marred by a variety of local interference sources. I was recently reminded about http://websdr.ewi.utwente.nl:8901/, which is a software defined radio based in The Netherlands.

I'm actually listening to our 80m net via this link while typing this and even, at 11.30am, the signals are quite readable. Would it be possible for RSGB to organise the establishment of a similar system in a low noise location in the UK?

For anyone with a half-decent internet connection and a cheap laptop/netbook in the shack, it could provide a useful method of getting around local noise issues.

DECIMAL 300

Laurie Bradshaw, G0MRL

The new edition of *RadCom* includes the latest Bandplans and I note that the allocation of 145.300MHz is there yet again. I haven't heard anyone use this frequency for RTTY for many years and suggest it is a total anachronism. The frequency is used only for FM phone and is treated just the same as any other in that part of the band. If there is a need for it, surely it should be in the all modes section of 144MHz. I've spent the last 20 years avoiding 145.300 and yet it is used by all and sundry. The other day, a local club net was on that channel and those operating included committee members and even one instructor. I don't know who could take responsibility for doing something about this, but perhaps a letter in *RadCom* might start the ball rolling.

ANTENNA PROBLEMS

Trevor Beamond, G3VLF

A few weeks ago, my aerial pole came down in a strong wind due to a wooden dowel between two tubes breaking. Examination of one tube showed that it had split as if it had suffered an internal explosion. The split was opposite the tips of an apple tree to which the pole was bound. There was no apparent damage to the tree.

I would be interested if an explanation can be given. I can be contacted via e-mail at trevor.beamond@btinternet.com.

Derek Stanners, G3HEJ

Last week, I lost all my HF antennas, when a snowstorm here caused a major pine-tree branch to snap, dragging down nearby antenna wires and snapping off the top 10 feet of an aluminium-topped 60ft mast. With the 'unmissable' AFS (CW) Contest just three days away, I somehow just had to get up a 'randomish' replacement piece of wire, in order to take part in that 'vital event'!

From the tangled mess of wires, 6in spreaders and varied insulators, I extracted 132ft of covered wire (half of my previous 160m dipole) and pulled it up to and through a redundant, but very handy 60ft high, spare tree-top insulator, already threaded with a long parachute-line loop. So far so good. One wire-end was fed back into the shack (next to the rig) and the other tied off to a bush some 60ft away, making a makeshift halfwave, 60° apex, end-fed Inverted-Vee antenna. My very elderly KW Easy-Match 80-10m ATU was put into the circuit, with one terminal connected to the house central heating copper piping, the other terminal to the incoming antenna's wire end. It tuned up very easily with lots of 'neon glow' at the ATU antenna terminal and I later managed to enjoy a great AFS Contest, on the following Sunday afternoon.

However, for our weekly Farnborough & District ARS 160m Evening Net, I was still stuck for an easy-tune solution to this end-fed ¼ wave wire. The KW ATU is sadly limited to a minimum lowest frequency of 80m. So, it was a case of covers-off and, along with thoughts of perhaps adding parallel capacitance to reach the 160m band, I initially pushed a single medium-long wave 5½ inch antenna ferrite rod into the ATU's lower frequency and open wound, double-coil tuned balun. This most simple addition worked superbly, covering the whole of 160m without any loading problems whatsoever. However, after some minutes of 100 watts key-down testing, the rod became slightly, but not seriously, warm. With enough room inside the coil to allow for up to a five-rod slug of ferrite I did just that and observed a total lack of warming of this enlarged make-shift core. However, for additional safety, I wrapped the five ferrite rods package inside a small plastic bag, to avoid any possibility of coil to rod RF sparking.

For anyone using this particular KW Easy-Match ATU, or other ATU product, either at home and/or perhaps during NFD or similar events this, quick and instantly reversible modification might just provide the solution for their total HF ATU needs.

RESEARCH

Robert Connolly, GI7IVX

The letter from Bob King regarding the VIs on page 93 of the January issue was of great interest to me. I have spent quite a bit of time researching the wartime work my father did as an EWA at Beaumanor and also the wartime role of Gilnahirk just outside Belfast. So far I have found out that Gilnahirk was three separate units on one site, a small Y station, a D/F unit and a mysterious 'Camp Field' that I do not know the role of. Maybe someone reading this may have some idea.

A good friend of mine in Belfast, George Busby, who has been researching Gilnahirk for the last few years, has been invited to speak at Bletchley Park in April at the reunion of former RSS and SCU members.

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A430S15R	15el 70cm 14.8dbi 2.25m L	£65.95 D
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SS144	Stack transformer 2-way 2m	£81.95 C
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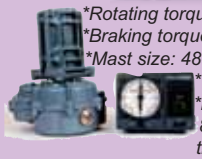
Create
Rotators

RC5-1 Medium Duty Rotator



Rotating torque: 6kg/m *Braking torque: 80kg/m *Mast size: 48-63mm *Vertical load 400kg *Horizontal load 800kg *Rotation speed: 60-150sec/50Hz *Power requirement: 230V AC 80VA *Weight: 5kg *Cable: 7-core cable (not supplied) *Requires MC-2 lower mast clamp if mounting on pole* **£499.95 D

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Same as above but with preset control.

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bhi
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RU-20	70cms 0.8-3 / 15-20W	£169.95 C
RU-45	70cms 3-15 / 45W	£219.95 C
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QRP-20C	20m 1W VXCO Tx +case	£39.95 C
QRP-40C	40m 1W VXCO Tx +case	£39.95 C
QAMP-20C	20m 20W linear +case	£49.95 C
QAMP-40C	40m 20W linear +case	£49.95 C
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SS-70C	Speech scrambler	£39.95 C

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Base loaded telescopic whips that plug into your FT-817 and give you total HF portability. Add a wire radial for really great performance!

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AT-17	17m single band whip	**£19.95 A**
AT-20	20m single band whip	**£19.95 A**
AT-30	30m single band whip	**£19.95 A**
AT-40	40m single band whip	**£21.95 A**
AT-80	80m single band whip	**£21.95 C**

Tigertronics
SignaLink Interfaces

Tigertronics Signalink Sound Card Interfaces do not require the use of a com port to trigger PTT on the rig. SignaLink have internal links which make them compatible with most of the rigs on the market. Radio lead is supplied, state which when ordering. Extra mic leads are available.

SL-USB-4R	4-Pin Round	**£89.95 C**
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SR-20-Lite	20m receiver	**£15.95 A**
SR-30_Lite	30m receiver	**£15.95 A**

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£239.95 C

SB-SP-2000	2m mast pre-amp	**£239.95 C**
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SB-SP-23	23cms mast pre-amp	**£334.95 C**
SB-SP-13B	13cms mast pre-amp	**£299.95 C**
DCW-2004	Sequential controlker	**£99.95 C**
DCW-SHF	Sequential cont. 23/13cms	**£109.95 C**
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RM-17	17m	120-150kHz	**£26.95 C**
RM-20	20m	80-100kHz	**£26.95 C**
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RM-35	40-30m	7-10MHz	**£29.95 C**
RM-40	40m	40-50kHz	**£29.95 C**
RM-50	60-40m	5-7MHz	**£29.95 C**
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The small space answer!

** HF 2 - 30MHz Vertical*
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AL-811HXCE £999.95 D

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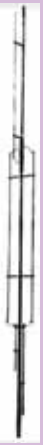

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CX-SW2PL **£26.95 C**
DC - 1GHz 2-way coax switch 2kW 3x SO-239 Connectors.

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VAT may have increased but many of our prices haven't!

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MyDEL CG-3000

With 200W and 200 memory channels.

- Tunable frequency: 1.8 - 30 Mhz with long wire antenna from 8 meters
- Input impendence: 50 ohms
- Input power: 10 - 200W PEP
- SWR: <2:1
- Power supply voltage: 12V +/- 10%
- Current consumption: <0.8A
- Auto tuning time: Approx. 2 seconds (first time tuning)
  Less than 1 second (return to memory frequency)
- Memory channels: 200
- Weight: 1.8 KG
- Size: 310 x 240 x 72mm (L - W - H)

NEW! Remote control for the CG-3000 and CG-5000. £39.95

ML&S: £289.95

CG-3000 shown with optional remote switch.

As reviewed by Steve White in Radcom
"A real bargain when compared to its obvious USA competitor" "Well built & performs impressively"
Steve White, Radcom November.

CG-5000MkII

At last! 600W PEP High Speed Remote Tuner from MyDEL

Specifications:

- Tuneable frequency:
  1.8 - 30Mhz with long wire antenna from 8 meters
- Input impendence: 45-55 ohms
- Input power: 10 - 600W PEP
- SWR: <2:1
- Power supply voltage: DC 13.8V
- Current consumption: <1.5A
- Memory channels: 800
- Auto tuning time: 0.5-6 seconds (first time tuning), less than 0.2 second (return to memory frequency)
- Weight: 3 Kg.
- Size: 385mm x 280mm x 110mm (L - W - H)

ML&S: £559.95

Palstar

Full range of Palstar now in stock

New!
Palstar AT-2KD. Replaces the AT-1KP & AT-1500DT. 160-6M 2kW. ML&S: £419.95

New!
Palstar Commander HF-2500 1.5kW Amplifier

Palstar are pleased to announce a new range of HF Linear Amplifiers built to the highest standard. We have started with the "Commander HF-2500" which is available from stock.
The 2m & 6m versions will be available during early 2010.
ML&S: £3499.95

AT-500 600W PEP Antenna Tuner	**Special Price £349.95**
AT-Auto Automatic 1500 Watt ATU	**£1099.95**
AT-1500DT 1500W Differential Antenna Tuner	**£449.95**
NEW AT-2KD The AT-1500DT and the AT-1KP have been combined into a new 2Kw Tuner	**£419.95**
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BT-1500A Balanced Antenna Tuner	**£599.95**
PM-2000AM Power/SWR Meter	**£149.95**

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DL-1500 (1.5KW)	**£109.95**
DL-2K (2kW)	**£229.95**
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Palstar R30A Receiver

Palstar R30A, fitted Collins filters for SSB & AM	**£549.95**
MW550P Active preselector & ATU for AM & 160M reception	**£259.95**
SP30 Matching Desk Speaker	**£69.95**

PALSTAR AT-500 600 Watt PEP Antenna Tuner

Covering 160 to 6 Meters, the AT-500 features a differential tuning capacitor with 2 stators and 1 rotor, a precision ceramic body roller inductor, and a 4:1 ferrite current balun for balanced line feeds.

The AT-500 utilises only 2 controls to operate for tuning, providing maximum ease of use in a manual tuner. A small-sized roller inductor operates all the way up to 6 Meters, while a relay-switched add-on inductor allows 160 Meter operation. The AT-500 also features Pastar's active Peak and Peak Hold dual cross-needle metering, chem-film treated aluminum metalwork and durable powder coated finish on the front panel and top cover. You'll have a tuner that will grace your shack for years to come.

ML&S PRICE: £349.95

PALSTAR AT-2KP 2000 Watt PEP Antenna Tuner

A newly-designed, smaller roller inductor allows the AT2K to tune 6 Meters, while a relay-switched toroid adds the extra inductance needed for 160 Meter coverage. Newly designed capacitors feature lower minimum capacitance for improved high band performance, while maximum capacitance has been increased to 400pF for better low band performance. In addition, the Peak/Peak Hold metering from the PM2000 has been incorporated into the AT2K.

ML&S PRICE: £419.95

PALSTAR BT-1500A Balanced Antenna Tuner

The BT1500A is a dual-roller balanced L antenna tuner that fills the void for a matching network up to 1500 watts pep for balanced line antennas. For ease of use the BT1500 utilises only 2 controls to operate for tuning with two direct-coupled precision ceramic roller inductors.

ML&S PRICE: £599.95

E&EO

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