RadCom

RADIO SOCIETY OF GREAT BRITAIN ◆ WORKING FOR THE FUTURE OF AMATEUR RADIO

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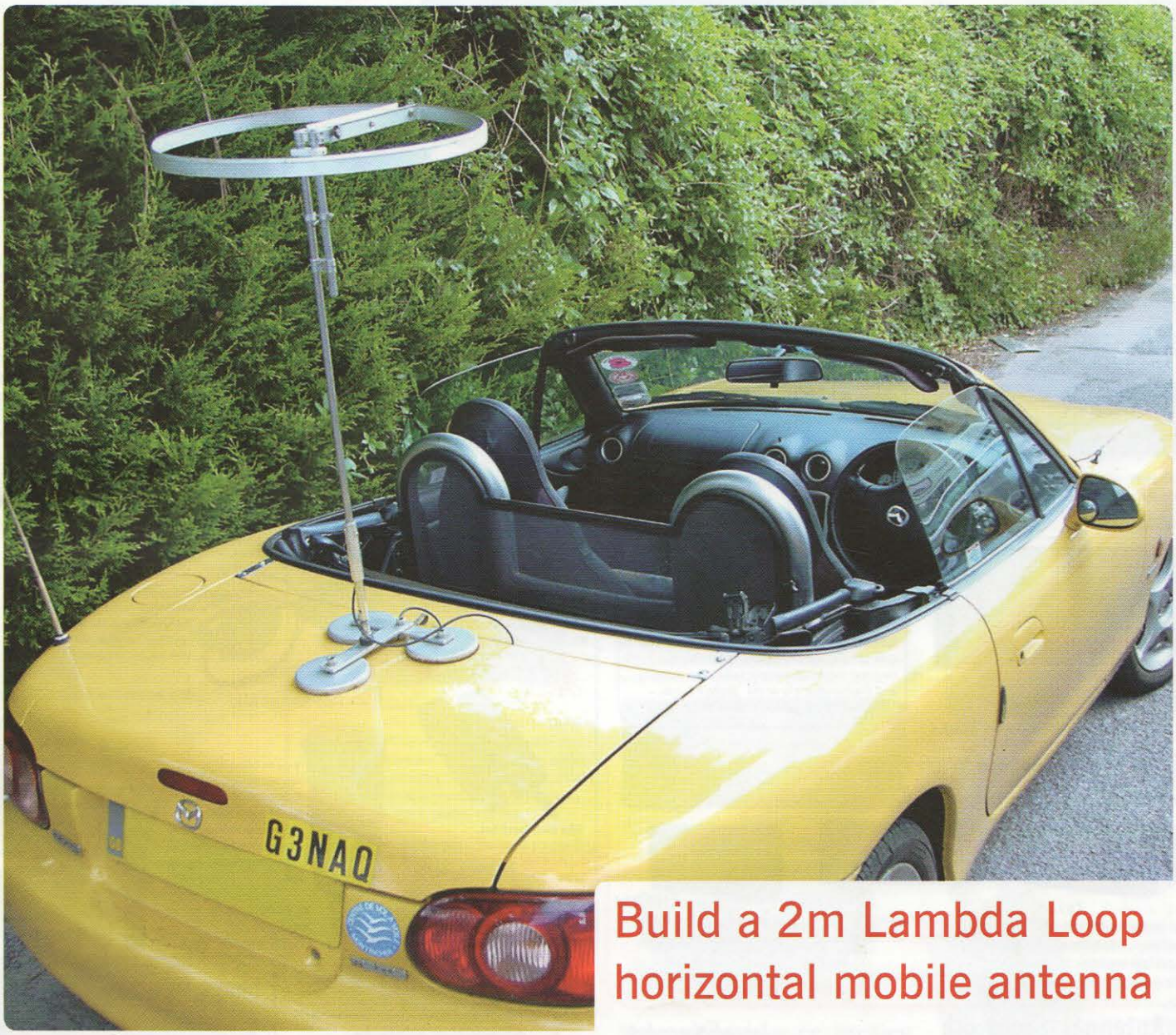

Build a 2m Lambda Loop horizontal mobile antenna

Yaesu FTDX1200

Peter Hart, G3SJX gives his verdict on the FTDX3000's little brother

G100RSGB

Final reports from the year-long activation

IOTA Convention

Celebrate 50 years with style at Windsor in July

WATERS & STANTON

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YAESU
Choice of the World's top DX'ers

FT-DX1200

£1,266d
Includes £83 Yaesu Cash Back

Price Down!

In Stock!

100W HF - 6m Transceiver with Colour LCD Panel
A Great Base Station Transceiver at a Great Price

New Yaesu CashBacks Look for the "Smile." Each CashBack Offer runs until the end of March

Features
* HF - 6m with wideband receive
* 100W Output on All Modes
* Triple conversion receiver
* Three roofing filters 3kHz 6kJz and 15kHz
* Texas Instruments DSP Module
* Full Colour 4.3" TFT Display panel
* Variable bandwidth & IF Shift + IF Notch
* 3-Band EQ Mic. amp. adjustment
* Hi-Speed Auto ATU + 2 Antenna sockets
* Bandscope, Analogue or Bar Metering
* CW & RTTY Display decoding (option)

There's lots more to love about this transceiver, not the least of which is the PRICE

We can offer interest FREE, no deposit terms, on this transceiver.

Yaesu FT-DX1200 - Peter Haart RadCom Review says:

"Particularly crisp, bright and colourful display - - - 8 input bandpass filters - - many features are the same as in the FT-DX3000D - - wide band receive from 30kHz to 56MHz - - blocking performance is very good - - good ergonomics - - informative display - - I could find little to fault - - another good all rounder - - both FT-DX1200 and FT-DX3000D are excellent choices.

FT-DX3000 HF & 6m Transceiver

Peter Haart Reveiw in RadCom:
"There is little I could find fault with."
The new HF generation of base stations from Yaesu/ Built in auto ATU with advanced DSP and superb roofing filters.

Includes £167 Yaesu Cash Back **£,1899 C**

More Exclusive Yaesu Deals from Top UK Yaesu Dealer!

FT-897D HF & 70cmsm 100W

£707 d
Includes £42 Yaesu Cash Back

The FT-897D is a very compact radio, like and FT-817ND on steroids. All modes and all bands in a very compact package

FT-DX5000MP

We have the last few of these great transceivers at an equally great price. Once they are gone they are gone so hurry if you want to pick one up. Regarded by many as the best HF transceiver in the last few years.
Includes £250 Yaesu Cash Back **£4245 d**

FREE HEALTH CHECK

SATURDAY March 8th at HOCKLEY

This is your chance to get your radio checked out for sensitivity, power and other parameters. Maybe even evaluate it for part exchange. It is a service which we are offering FREE and there will be the usual FREE tea and coffee, supplemented with biscuits - no expense spared! We won't be able to carry out any repairs on the day, but it will be good to know how your radio is performing and maybe what it is worth - Make it a date.

ONE DAY ONLY SATURDAY 8th MARCH

HEIL SOUND — The Origin of Great Sounding Signals

It All Starts at The Microphone!
W&S Exclusive Ham & Pro Distributors

ProSet Boom Mic.

The favourite of contesters and DXpeditions

ProSet-3 Heaphones

ProSet-3
If you have never tried a pair of professional headphones, then you are in for a big Surprise. The ProSet 3 has a real "WOW" factor. At last you can hear exactly what is coming out of your receiver. Nothing missing and nothing added. A real investment.
£109.95 c

ProSet Elite Boom Mic Headset
Large dual headphone & boom mic. with HC-6 element and Phase Reversal System. **£179.95 c**

ProSet Elite IC Boom Mic Headset
Icom boom set inc Icom lead **£189.95 c**

ProSet- 6 Boom Mic Headset
Everything that you get with the ProSet Elite other thsn the phase reversal.
£149.95 c

We can supply matching cables for any radio

Fist Mic,

The fist mic is back with an acoustic front vent to reduce noise and echo. Typical Heil quality.
Available from stock **£79.95 c**
Matching Rig leads available

Blue Tooth Set

HBA Blue Tooth Set.
Allows you to dispense with your mucrophone lead and wander all round the room if needed! For use with PR-781 mics. or other "PR" series microphones. A great idea. **£109.95 c**

Headset Adaptors for boom mics.
These are **AD-1** codes **£18.95 for each radio type**

Pro Series Mic

If you are looking for the very best microphone for ham radio, this is the one. Bob Heil designed this for use with top range transceivers using the same element as is used in the best broadcast mics. Available from stock. **£179.95**

Mic. Adaptors
These have **CC** codes
£35.95 for each radio type

Base Station Mic

HM-12 Base station Mic.

Using the broadcast quality HC-6 insert, this is the ideal base station microphone for the modern transceiver with EQ control. This really is great value and gives you Heil quality at a great price. Call us with details of your radio and we advise on matching lead.
£69.95 c

WATSON — All models fitted with "NF" Noise Remove Function

Power Mite-NF

£69.95c
- Output Voltage Variable: 4.0V - 16V
- Output Current: 22A Continuous, 25A Peak
- Output Voltage Regulation: Less than 1%
- Red Trip Warning LED, Green Power LED

Power Max-45 NF

£119.95c
- Output Voltage Variable: 4.0V - 16V
- Output Curvrent: 40A Continuous, 45A Peak
- Output Voltage Regulation: Less than 1%

Power Max-65 NF

£199.95d
- Output Voltage Variable: 4.0V - 16V
- Output Current: 60A Continuous, 65A Peak
- Output Voltage Regulation: Less than 1%

InnovAntennas from Stock

144MHz	Elements	Boom L.	Gain dB	Price inc VAT
144-LFA-3	3el	0.67	8.67	£59.95c
144-LFA-4	4el	1.17	9.49	£74.95c
144-LFA-5	5el	1.79	11.16	£89.96
144-LFA-6	6el	2.41	11.88	£104.95c
144-LFA-8	8el	3.73	13.32	£164.95c
144-LFA-9	9el	4.40	14.06	£194.95c
144-LFA-12	12el	7.13	15.80	£269.95c
$32MHz				
432-LFA-SQ	10el	1.76	14.5	£92.95c
432-LFA-SQ	12el	2.32	15.22	£99.95c
432-LFA-SQ	16el	3.46	15.92	£139.95c
432-LFA-LN	18el	4.27	18.1	£174.95c
432-LFA-SQ	22el	5.51	19.06	£215.95

bhi — Noise reduction products

DeskTop

NEW

- High Quality Desk Speaker
- 4" Bass % 1" Tweeter
- 10W output
- bhi DSP Noise cancelling unit
- Side DSP controls
- Accepts stereo or mono input
- Feed with line or speaker levels
- Requires 12v - lead included
- Hear the difference

Maybe you are not realising the full potential of your receiver? This DeskTop unit is a great station addition. **£179.95 c**

NEX-10-2 mk II

- Noise Cancelling speaker
- 9 - 35dB reduction
- 8 levels of processing
- Bypass switch
- Easy connects to any receiver
- No need to open up receiver
- 12v DC operation

A great asset to any receiver or transceiver. Hear the signal and not the noise! Makes copy so much easier. **£99.95b**

YAESU

FT-817ND All Mode 5W HF - 70cms Transceiver

Here's a great combination offer for those who want to go portable with a complete station including matching auto ATU and case for the transceiver. All battery operated and capable of feeding even a long wire. Comprises FT-817ND, Case and Elecraft T1-A auto ATU.

Complete Package **£699 c**

YAESU

FTM-400DE

NEW

The New Dual Bander 2m & 70cms 50W Digital / FM

High visibility colour screen with bandscope, altitude and navigational screens. Enjoy both digital and FM. Available now! **£569.95c**

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

blog.wsplc.com

Free Extras

IC-R6

This scanner covers 100kHz-1309MHz. Receives FM WFM & AM and comes with AC charge and NiMH batteries £179.95c

PLUS £50 of FREE Accessories

ICOM Cap	worth £19.95
ICOM Mug	worth £7.95
WAT-999 Earpiece	worth £9.95
WSC-3 Belt case	worth £12.95

VX-8GE

2m/70cm Handy **Save £60**

The VX-8GE APRS/GPS provides an economical opportunity to obtain a handheld dedicated to APRS on 144 & 430 MHz. This model allows users to acquire a VX-8 series radio without having to pay for many of the VX-8DE features that may not be of value for their active APRS operation

Was ~~£349.95~~ Now £289.95c

Turn Your Old Gear Into Cash or New Gear

WANTED
DEAD OR ALIVE!

We will accept any ham radio equipment in part exchange, wwwn non-working items in many cases.

Just a Phone Call Away!
01702 203553
email: sales@wsple.com

Part Exchange
Use your old gear as part payment.
No Deposit Interest Free
Use your old gear to to reduce monthly payments.
Cash Back
Use your old gear in the Yaesu CashBack Offers

The NEW OM Power 2000 Amplifier

- HF - 6m 2kW SSB CW (1.5kW on 6m) 1.5kW RTTY
- Self Contaoned Desk Top Operation
- 40 - 60W Drive to FU-728F ceramic tetrode
- Full QSK with silent vacuum relay
- Automatic Protection - LED Dosplay
- 3-way antenna switchig
- 390mm x 195mm x 370mm (w x h x d)
- Weight 24kgs 220 - 240v AC input

OM Power are recogniesed as one of the worlds leading manufacturers of high power amplifers. This one reaches a new level of perfprmance and operation. Available now. **£3,999d**

WATSON
End Fed Half Waves

NEW

We are pleased to introduce the new Watson range of End Fed Half-Wave Antennas. An easy way, and most convenient antenna system for both home and portable application. These are purpose built single band resonant antennas for optimum performance.

WREF-10	10m (5m long) halfwave SO-239	**£62.95c**
WRED-12	12m (6m long) halfwave SO-239	**£64.95c**
WREF-15	15M (7m long) halfwave SO-239	**£66.95c**
WREF-17	17M (8m long) halfwave SO-239	**£66.95c**
WREF-20	20M (10m long) halfwave SO-239	**£69.95c**
WREF-30	30M (15m long) halfwave SO-239	**£73.95c**
WREF-40	40M (20m long) halfwave SO-239	**£86.95c**
WREF-60*	60M (30m long) halfwave S)239	**£134.95c**
WREF-80*	80M (40m long) halfwave SO-239	**£151.95c**

*These antennas are suppled with coax choke for optimum matching.

Half Wave End Fed Antenna SO-239 Feed and Kevlar core element. 150W

KENWOOD
TS-990S HF Flag Ship - In Stock!
£5999.95

200W of high quality power output with a quite amazing receiver. If you are looking fir a top range transceiver, then this is the way to go. It is our current best seller in this price range with great **Part Exchange** deals. Phone!

FT-450D
HF-6m-100W

Price Down!

One of the most popular HF transceivers with built in ATU at a new incredible price. Don't miss out! **£669 with Cash Back!**

Handheld Transceivers

YAESU
FT-252 2m Handy
£79.95
Genuine Yaesu
Genuine Quality!

- 144-146MHz
- Rx 139-174MHz
- Loud 800mW Audio
- Tx 5W, 2W and 500mW
- CTCSS & DCS Tx & Rx
- 9 DTMF Auto Dial Memories
- 1Ah Li-ion Battery & Charger

VX-3E	2m / 70cm Handy Wideband receive	**£129.95c**
VX-6E	2m/70cms handy, Wideband Receive	**£179.95c**
VX-7R	Triple band handy silver/black	***£299.95c***
VX-8DE	6/2m/70cm Upgraded APRS	**£369.95c**
IC-E80D	2m/70cm D-Star GPS ready	£329.95c
IC-E92D	2m/70cm + D-Star	**£387.95c**
TH-F7E	2m/70cm + wide receive inc. SSB	**£236.95c**
TH-D72E	2m/70cm GPS & TNC + SiRF	**£426.95c**
TG-UV2	2m/70cm with CTCSS DCS	**£84.95d**
KG-UV6D	2m/ 70cm 5W/4W SMA	**£94.95d**

NEW

ICOM
ID-51E 2m/70cm

- *Dual Bander*
- *Rx. two simultaneously*
- *D-STAR DV*
- *Integrated PS*
- *AM/FM Broadcast Rx.*
- *Submersible Construction*
- *Voice Memory recorder*
- *MicroSD Card Slot*
- *1304 Memory Channels*
- *Rapid Charge DC Power Jack*

TS-590s 160-6m Transceiver

Kenwood has won the admiration of the radio press and hams all over the world. It is probably one of the best transceivers that Kenwood have ever produced. The best dynamic range in its class, digital IF, narrow roofing filters and auto ATU. Also FREE PC control program that can be downloaded. Exceptional value.

IN STOCK £PHONE FOR DEAL

IC-9100 HF - UHF Transceiver

The Icom IC-9100 is ideal for the operator who is looking for a complete high performance radio that covers HF - UHF in one box. It offers 100 Watts output on all bands up to 2m, whilst on 70cms you get a healthy 75 Watts. An internal auto ATU is included which covers HF plus 50MHz. IN STOCK £2899.95 D

KENWOOD TS-2000 160-23cm *

A base station that does everything. All modes, 160-2m 100W, 70cms 50W and 23cm (option) 10W. This fine radio has stood the test of time. **£1549.95c**

ICOM ICOM IC-9100 160m - 23cn*

The latest all mode DC to light radio from ICOM. 160-2m 100W, 70cms 75W and 23cm (option) 10W. **£2899**

IC-7600 HF Transceiver HF - 6m

Dual DSP and three roofing filters. 3 , 6 & 15kHz
Double conversion superhet - super image rejection
Display 5.8" with ultra wide viewing angle.
Real time spectrum scope - USB for flash card or keyboard. 104dB dynamic range for great receiver performance
IN STOCK £3299.95 D

ICOM IC-7100 HF - 7-cm £1249.95c

Includes 4m

- HF, 6m, 2m, 70cm Multi-band, All-mode
- DSTAR DV Mode • Intuitive Touch Screen Display
- Easy-to-see, Easy-to-use Slant Top Controller
- Built-In SD Card Slot & USB • Built-In Speaker
- Dual DSP deliver great processing performance
- Built-in RTTY demodulator and decoder
- Voice recording and playback functions
- Optional RS-BA1 IP remote control software

AR-8600MKII Base/Portable

This base or portable station receiver covers 530kHz - 3GHz. All modes AM FM FMW & SSB with standard rotary tuning. The ideal general coverage station receiver. Every Ham radio station needs a means of monitoring the signal that is being transmitted. We think that this is the one. **£699.95**

NEW

FG-01 MkII Antenna Analyser

The new FG-101 antenna analyser that covers up to 72MHz with larger screen and will include a matching AC charger and PSU. This highly portable unit features dual impedance and VSWR traces with colour screen. **£239 b**

Fast Antenna Adjustments

CHECK OUT OUR NEW WEB SITE

Mobiles

TM-281E

Latest 2m FM 65W mobile. Superbly built **£169.95 D**

FT-8800E

Dualband Mobile 50W / 30W Great Value **£284.95 D**

FT-2900E

75 Watt 2m 3W Audio, CTCSS, DTMF mic & "WIRES" internet. **£142.95 D**

FT-7900E

2m/70cms mobile 50/40W CTCSS, DTMF, internet, wide Rx **£219.95 D**

FT-8900R

Quad band 10/6/2m/70cm FM 50W (70cm 35W) **£329.95 D**

FTM-10E

2m/70cms Blue Tooth & built-in mic. **£324.95 D**

ID-E880

50 Watt Dual band 2m/70cm with D-Star and airband receive. **£439.95 D**

TM-D710E

50 Watts 2m/70cms with APRS **£445.95 D**

FTM-350AE

2m/70cm Mobile Bluetooth GPS APRS **£399.95 D**

TM-V71E

2m/70cm Mobile with Echo Link ~~£299.95~~ **£259 D**

Add A Quality Dash-Board Speaker!

SP-160

* 8 Ohms * Power rating 1.5W * 3m of lead with 3.5mm jack * Size 97 x 67 x 27mm * Weight **£9.95b**

SP-180A

6W Amplified Speaker 6W * Gain and on/off control * 12V DC cigar plug, bracket, audio lead with3.5mm plug. **£20.95b**

HF - UHF Compacts - One Box! GREAT PRICES

YAESU

FT-897D base or portable. This 1.8 - 440MHz transceiver is great value. 1.8 - 50MHz 100W 2m 50W 70cm 20W. **£749.95d**

FT-857D The great value mobile or base HF-6m 100W, 2m 50W 70cm 20W. **£679.95d**

WATSON HF-VHF Mobile Whips

MultiRanger 9 £49.95c

- 80 - 2m non WARC
- Impedance: 50 Ohms
- Power Capacity: 120 Watts
- Connector: (PL-259)
- Length: 1.9m Max

MultiRanger 2000 £69.95c

This antenna is the same as the MultiRanger 9 but adds the WARC bands of 30m, 17m and 12m, 200Watts

HF on a BUDGET!

PART EXCHANGE

We offer great Part Exchange deals on your old used gear. Even if it is dead, it has some value. So turn that old gear into cash now. Phone today.

IC-718 SSB CW 100W from 160m-10m. You won't find a more cost effective HF radio! **£594.95d**

ICOM

ICOM

IC-7200 this 100 Watt radio covers 160m-6m and includes digital IF filters. **£839.95d**

KENWOOD

TS-480SAT A very HF popular transceiver giving 100 Watts from 160 - 6m and includes auto ATU. **£779.95d**

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

WATERS & STANTON

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Phone: (+44) 0845 5050128
FAX: (+44) 01592 610451
Email: jayceecoms@aol.com
Opening: Tuesday - Saturday 9.15am - 5pm

Web: www.wsplc.com
Blog: blog.wsplc.com

VISA MasterCard PayPal

MFJ

MFJ-269 HF-UHF Antenna Analyser

Isn't it time that you made antenna adjustments more quickly and more accurately? That's exactly what this analyser does. Improve your antenna performance and have full data information displayed.

* Freq Coverage 1.8-170, 415-450MHz
* Frequency Counter * LCD readout
* SWR & impedance or SWR Bargraph
* Coaxial loss meter * VSWR Meter
* Signal Generator * Freq Counter)

£399.95

MFJ-259B HF-VHF Antenna Analyser

* Frequency Coverage 1.8-170MHz
* Frequency Counter * LCD readout
* SWR & impedance or SWR Bargraph
* VSWR Meter * Signal Generator
* Frequency Counter

£299.95

MFJ-422D Bencher Keyer

Best of all CW worlds -- a deluxe MFJ/Curtis keyer in a compact package that fits right on the Bencher iambic paddle! Buy the combination or just the keyer for your Bencher or MFJ iambic paddles.

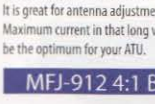
£199.95

MFJ-854 HF RF Current Meter

This handheld device enables RF currents from 1mA up to 3 Amps to be measured. It is great for antenna adjustments. Maximum current in that long wire MUST be the optimum for your ATU.

MFJ-912 4:1 Balanced Line Balun

The famous W9INN 4:1 1.5kW balun is for feeding ladder line via coax cable. Two large insulators for ladder line and SO-239 for coax. loss.



£76.95

MFJ-945E 300W 1.8-50MHz Coax

The small 8W x 2H x 6D inch black aluminum cabinet uses little room. The Cross-Needle meter shows SWR, forward and reflected power -- at a glance

£139.95

MFJ-971 1.8-30MHz Portable ATU

The MFJ-971 is ideal for portable work and as well as dual ranges of 30W and 300W, it is possible by changing an internal jumper to convert to QRP 6W or 30W FSD. Wire, coax or balanced.

£119.95

MFJ-941E 1.8-30MHz 300W ATU

Here is amazing value. A cross needle meter, antenna selector switch, and the ability to match wire, coax and balanced feed. This makes a great base station tuner capable of up to 300W and has internal 4:1 balun. 12v illumination

£164.95

MFJ-949E 300W HF ATU + Load

More Hams use the MFJ-949E ATU than any other model. Match any antenna. Wires, coax, balanced, plus 8-way antenna switch Large 3" cross needle and internal dummy load.

£199.95

MFJ-993B Auto ATU

One of our most popular auto antenna tuners that will match wire, balanced line and coax feeders. It not only tunes your antenna but also gives you a digital display showing characteristics of the matching.

- Automatically tunes unbalanced/balanced antennas
- 1.8-30 MHz with 4:1 current balun for balanced line
- .Now with 20,000 memories
- Antenna Switch and Efficient L-network design
- .Select 300 Watts (6-1600 Ω) or 150 Watts (6-3200 Ω)
- Digital SWR/Wattmeter Audio SWR meter
- Backlit LCD - Remote control port .- Radio interface £279.95

MFJ-16010 200W Wire Tuner

The MFJ-16010 is a variable L-network random wire antenna tuner designed to match the low output impedance of your transmitter to the high impedance of a random wire. Covers 3.5 - 30MHz.

£65.95

MFJ-901B

The MFJ-901B is MFJs small and most affordable 200 Watt PEP Versa Tuner. Its designed to match virtually any transmitter (up to 200 Watts and can match coax and end fed antennas. £104.95

MFJ-986 1.5kW 1.8-30MHz ATU

Differential-T Tuner uses a differential capacitor making tuning easier. Broadband coverage ends constant re-tuning. A rugged roller inductor atu that handles 1500 Watts PEP SSB power and covers 1.8 - 30 MHz continuously.

£359.95

MFJ-989D 1.5kW ATU

New and improved! The world's most popular legal limit antenna tuner just got better -- with no increase in price! You get better efficiency, lower losses, and a new true peak-reading meter. Easily handles full 1500 Watts SSB/CW, 1.8 to 30 MHz.

£399.95

MFJ-962D 1.6kW ATU

The compact MFJ-962D handles 1500 Watts PEP SSB amplifier input power (800 Watts PEP SSB amplifier output power). Its perfect for Ameritrons best selling 800 Watt AL-811H or 600 Watt AL-811 amplifiers!

£299.95

Tiny Tuner MFJ-902B

Tiny 4 1/2 x 2 1/4 x 3 inch tuner handles full 150 Watts! Covers 80-6 Meters, has tuner bypass switch, tunes nearly anything! Wire or coax.

£104.95

MFJ-267 1.5kW Power Meter & Load

1.5 kW Dry Dummy Load has built-in precision, true peak-reading SWR/Wattmeter switchable to external antenna! Up to 650MHz £169.95

MFJ-250X 2kW Dummy Load

The MFJ-250X VersaLoad KW Wet Dummy Load lets you tune up fast! You can run 1KW CW or 2 KW PEP for 10 minutes. Or run ½ KW CW or 1 KW PEP for 20 minutes. Requires oil £59.95

MFJ-260C 300W Dummy Load

Every station should have a dummy load for testing and adjustment purposes. This one is our top seller and is available with SO-239 (C) or N (N) type sockets. It will handle up to 300W of power. £45.95

MFJ-914 Auro Tuner Extender

£89.95

How often do you find that your internal auto ATU will not match your antenna? It's a common problem, particularly with the ever popular GSRV tuner. Most internal ATUs (other than Elecraft) struggle when the match demands are complex. This little device sits between your antenna and the transceiver. Simply select one of the positions on the front panel and enjoy a perfect match from your internal ATU.

MFJ-441 Economical Keyer

SlimLine Econo Keyer. Just 1.25 inches tall. has volatile 89 character MessageMemory. Front panel speed/volume controls. 4x1.75x3.25 inches.

£89.95

MFJ-434 Voicel Keyer

This voice keyer allows you to record and send up to 5 messages with a total time of 75 seconds. You can also set up an auto repeat mode. Great for CQ and contesting.

£204.95

MFJ-925 for IC-7000 & FT-857

MFJ-925 IntelliTuner™ specifically complements todays compact HF transceivers, such as the IC-706MKIIG, IC-7000, FT-857D, DX-70TH and TS-50S. Operates from 2 - 200W £174.95

MFJ-991B 300W Auto ATU

First dual power level Tuner -- Select 300 Watt SSB/CW and match 6-1600 Ohm antennas Or select 150 Watt SSB/CW and match extra wide-range 6-3200 Ohms. New 10,000 VirtualAntennaTM Memories. Like MFJ-993B, less digital SWR/Wattmeter/ LCD display, audio SWR meter/ audio feedback, antenna switch or 4:1 current balun. £214.95

MFJ-998RT 1.5kW 1.8 - 30MHz

Weather-tight ABS plastic cabinet top with a stainless steel bottom. Send DC/RF down the coaxial line. Has MFJ's InstantRecall to see if that requency has been used before. If so, tuning is instantaneous. Measures 13 3/4W x 6 3/4H x 17 1/2D inches. It's the true fit and forget Auto ATU for those using linear amplifiers.

£799.95

MFJ-994BRT 600W Remote ATY

As you're ragchewing, contesting or DXing, your MFJ IntelliTuner is learning! to operate in milliseconds! We've made this tuner to suit the UK market, so that those with linear amplifiers can enjoy the benefit of auto ATU. Includes coax DC feed.

£449.95

MFJ-926B 200W Remote ATY

MFJ-926B Automatic Antenna Tuner covers the entire HF band and will match a random wire or coax-fed antenna 1.8 - 30 MHz at a full 200 Watts SSB/CW. Matches impedances 6-1600 Ohms (SWR up to 32:1).

£299.95

MFJ-993RT 300W Remote ATU

The Remote IntelliTuner is mounted in a durable hard plastic case. Covers 1.8 to 30 MHz, has heavy duty 16 Amp / 1000 Volt relays and a highly efficient L-network. It also includes the MFJ-4117 BiasTee Power Injector to send DC/RF down your coax.

£329.95

MFJ-927 200WRemote Auto ATU

Weather protected remote auto tuner for coax/ wire ant., includes MFJ-4116 Power Injector. Most MFJ-929 features, no LCD/buttons. This is a low cost ATU that will get you on all HF bands using just a single wire.

£259.95

MFJ-402 Nano Size Paddle Key

It's a nano-size 2" x 3" x 1" and weighs just 3 ½ ounces! Speed adjusts 5-65 WPM, weight 25-75%, has iambic mode A or B, normal or "bug" mode and reverse.

£72.95

MFJ-385B Base Station Speaker

The new MFJ base station monitor is designed to give the very best and articulate audio from your receiver or transceiver. You won't realise how restricted your internal speaker is until you plug this great unit into your radio. It improves intelligibility and is a great asset to any station. Size is 5 1/4Wx6 3/4Hx6 1/2D inches.

£44.95

MFJ-451X Keyboard CW Keyer

£105.95

Get a great idea. This little module is ready to interface between your transceiver and a PC keyboard. It then allows tou to directly send CW via the keyboard and also includes a type ahead buffer and built in CW trainer. Any PC keyboard with the 5-pin Din connector will work.

MFJ-442 Complete Keyer

This is a complete ianbic keyer with built in sidetone monitor. It features the electronic CW generator and the iambic keyer paddle. It operates A and B modes and even has a built-in message facility. Just plug it into any radio with a CW socket and you are ready to go.

£199.95

MFJ-447 Deluxe Keyer

This is one of our most popular keyers. MFJ-447 SlimLine Deluxe iambic style keyer front panel speed, weight, tone, volume controls and message, semi-auto, tune, power buttons.

£102.95

MFJ-336T Triple Mag Mount

The quickest and neatest way to mount many HF antennas is with a magnetic mount. This one is fitted with a 3/8" thread that matches many HF mobile whips including the Hustler range. It makes a very firm, safe and efficient way to mount your mobile whip.

MFJ-929 Fast Compact Auro ATU

200W handling matches any antenna with near perfect VSWR. Get the best from your antenna!

£214.95

MFJ-998 1.5kW Auto ATU

*Full 1500 watts SSB/CW *Digital & Analog SWR/WattMeter *Ultra-fast, Safe Automatic Tuning *Wide Tuning Range (12-1600 Ohms from 1.8 to 30 MHz) *Built-in Antenna Switch for two coax/long wire *Automatic Bypass protects your amplifier *Field Upgradeable Software *Very Compact!

£659.95

MFJ-901B HF ATU

£104.95

One of our most popular antenna tuners and offered at a very attractive price. It covers 1.8 - 30MHz and handles 200W. It is very versatile and handles end fed wires, balanced feeder and coax fed systems.

MFJ-704 Low Pass Filter

This filter is the sure way to suppress unwanted and unwelcome harmonics. It cuts off above 40MHz and can handle up to 400W.

£67.95

MFJ-928 Budget HF Auto ATU

Here's a great budget auto ATU that will handle up to 200W. Designed for coax feeder, it is a great way to add an auto ATU to your base station.

£203.95

MFJ-4416B Battery Booster

This Super Battery Booster eliminates low voltage problems by boosting input voltages as low as 9 volts up to the desired 13.8 volts at up to 25 amps peak with a typical efficiency of close to 90%. Designed for car use direct from battery or the cigar socket.

£148.95

MFJ-4117 Bias T Voltage Feed

This unit is a great way to pass a 12v DC source down a coax kine. It is fitted with SO-239 sockets and operates up to 60MHz. You need two units - one at each end of the line.

£88.95

MFJ-1118 DC Distribution Board

£88.95

Has two pairs of super 30A 5-way binding posts.. Fused and RF bypassed. Handles 35 Amps total. Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total.

ORDER NOW!
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Carriage Charges: A-£4, B-£5, C-£8.50, D-£11

Contents

RadCom

THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

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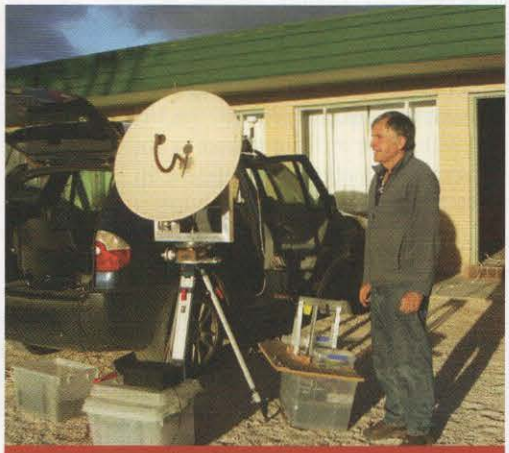
Layout and design by Kevin Williams. Original concept by Imotea Creative Mediadesign

The online *RadCom* is at www.rsgb.org/radcom/

News and Reports

Reviews

Features



10GHz portable operation – P66

Cover image: The Lambda Loop horizontally polarised 2m mobile antenna by G3NAQ.

Technical Features

A breather from the Commonwealth Contest – P72

Regulars

Centenary Awards

The Centenary Award and Centenary Challenge were created to stimulate operating throughout the Centenary year and introduce amateurs to some of the RSGB operating awards.

Particular congratulations go to the winners of the special Commemorative Plaques that will awarded, at the AGM, to those who achieved the highest overall scores in the Centenary Award submitted by 2359UTC on 31 January 2014. They were Peter Hart, G3SJX, the overall winner of the UK category and Fabrizio Zanarotti, IZ2KXC who was the overall winner of the overseas category.

In the Centenary Challenge, for working Gx100RSGB from a variety of Regions and on different bands, the winners and runners up were:

Combined HF & VHF Challenge
Full Licensee Winner: G4ENZ
Full Licensee Runner-up: G3SJX
Intermediate Winner: 2E0XYX
Intermediate Runner-up: 2E0SBW
Foundation Winner: M6KMB
Foundation Runner-up: M6KVJ

VHF Challenge
Full Licensee Winner: G8BUN
Full Licensee Runner-up: G8FMC
Intermediate Winner: 2E0JWJ
Intermediate Runner-up: 2E0SQL
Foundation Winner: M6KMB
Foundation Runner-up: M6OXO

HF Challenge
Full Licensee Winner: G3LQZ
Full Licensee Runner-up: G3OAG
Intermediate Winner: 2E0XYX
Intermediate Runner-up: 2E0SBW
Foundation Winner: M6KMB
Foundation Runner-up: M6KVJ
Overseas Winner: IZ2KXC
Overseas Runner-up: OZ6GH

Special commendation also goes to VP8NO (Falkland Is) for working 60 different regions/band slots; K8ED for working 51 different region/band slots & JA2JNA for working 40 different region/band slots.

Youngsters on the air 2014

The RSGB Board has given its approval for the Society to send a team to the IARU Youngsters on the Air (YOTA) event in July. The event is held every year in a Region 1 country and brings together young radio amateurs from 15 member societies. This year it is hosted by the Finnish Radio Amateur League. Previous events have included workshops on antenna building, satellites, ARDF and robots as well as some on-air sessions and cultural visits. More details about YOTA at www.ham-yota.eu/.

All RSGB members within the age range stipulated by the event organisers (15-25) have been sent a personal invitation to apply for a place on the UK team. The applications deadline is 14 February and the team will be selected by a panel made up from the RSGB Board members.

Funds have been secured such that this will be an expenses paid trip for four young members and a Team Leader.

Could you be the Team Leader? The Society is looking for someone to lead the UK team. That person may be over 25 but will preferably be a young teacher or other type of experienced youth leader. If you think you could fulfil that role, please contact the Chair of the Training & Education Committee via tec.chair@rsgb.org.uk.

Depending on the level of interest, the Training & Education Committee may set up a one-day, or weekend event in the UK to link up with those in Finland and to do more for younger amateurs. Depending on its success this could become an annual event.

Apologies

Unfortunately, due to a technical issue at Danby Advertising there was a duplication of an advert page from Waters and Stanton in the February edition. Danby Advertising would like to apologise to Waters & Stanton and readers. We are working with Danby Advertising to prevent this from happening in the future

CC Newsletter

The latest Contest Committee newsletter has details of a new VHF Shield. Harwell ARS has generously agreed to donate a shield in memory of the late Bryn Llewellyn, G4DEZ, who was one of their members. A few details remain to be resolved, but it has been agreed that it will be awarded to the leading single operator in the UK Activity Contest series.

You can subscribe to the newsletter by going to www.rsgbcc.org/hf/.

CONGRATULATIONS

To the following Members whom our records show as having reached 50 or 60 years' continuous Membership of the RSGB.

50 years

Mr D J Butler	G4ASR
Mr G Ferguson	RS26003
Mr N R Goddard	G3UXR
Mr P D Lee	G3SPL
E D Moustakas	SV1AN
Mr S Revell	G3PMJ
Mr I Trusson	G3RVM
Mr P R Smith	G3WPB
Mr D R Stimson	G3THC
Mr I Walker	G3RJF

60 years

Mr J A Hardcastle	G3JIR
Mr F G Whatley	G3JOT
Mr R M Woodman	G3JYLW

Honour Roll

Apologies to Tom Sorbie, GM3MXN who has been a Member since 1958 and Eric Bettles, G3KXE who has been a Member since 1948. Their names failed to appear in the Honour Roll due to a technical error in the Membership database.

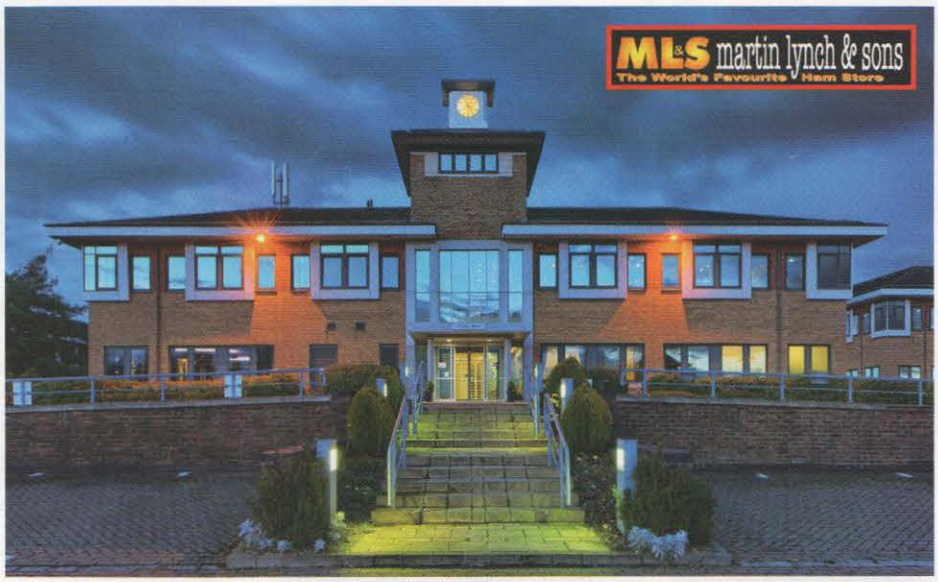
A New Venue for the RSGB Convention

Those of you who have attended the last few Conventions at Horwood House will know that we have outgrown the location. After some searching we have identified a new location. The 2014 RSGB Convention will be held at Kents Hill Conference Centre in Milton Keynes (see www.kentshillpark.com). The event will run from 10 – 12 October.

The new location has much more space for lectures, more bedrooms, a larger dining area and various other positive attributes. The five lecture rooms that we have identified have capacities of between 100 and 300, which is more than sufficient for the attendance that we anticipate. There are 330 bedrooms, parking for 800 cars and the Dinner can accommodate up to 330 people.

After a number of successful years, Dave Wilson, M0OBW has stood down as organiser and, as Chairman of the RSGB, I have taken on some of the responsibilities with Graham Coomber, G0NBI, the RSGB General Manager, and a number of others.

We have been in contact with a number of Special Interest Groups to ensure that we are able to offer a broad spectrum of attractive talks at the event. For example, we are delighted that the Contest University is being re-introduced. Mark Haynes, M0DXR, will be leading this stream that will cover many aspects of contesting. It will be attractive to operators across wide parts of the spectrum and, indeed, some of the talks, such as one on antennas, will likely include material suitable for non-contesters too.



The new venue, Kent's Hill Conference Centre, will give delegates more space and better facilities.

We are also delighted to confirm that Brian Justin, WA1ZMS, has agreed to attend. Brian is known to many people as he is active from VLF right through into the millimetre wave frequencies where he holds a number of distance records. He is also a collector of vintage wireless equipment as well as being a key player in activating both 4m and 2m transatlantic beacons. He is a very popular speaker at various amateur radio events in the USA.

Please put this date in your diary and if you have any suggestions or offers of talks then please e-mail convention@rsgb.org.uk. As the programme becomes clearer we will update the website so keep logging on. See you in October!

Graham Murchie, G4FSG
RSGB Chairman

CONVENTION BOOKINGS OPEN NOW AT www.rsgbevents.co.uk

Licence revalidation

As you will know, all radio amateurs are required to revalidate their licence at least every five years. The process to do this requires every licence holder to contact Ofcom to confirm or update the details on the licence database. This process has been underway for some time and to date some 52% of licences have been successfully revalidated.

The quickest way to revalidate is online via the Ofcom website www.ofcom.org.uk or by e-mail to amateur.validations@ofcom.org.uk. This can be done at any time. If individuals need assistance in the process, Ofcom staff are available to help on the telephone but their limited availability means that the workload needs to be staggered to avoid undue delays. There will thus need to be a phased approach during the coming months and Ofcom have asked for our assistance.

It is proposed to hold a series of consecutive 'regional campaigns' to make as many licensees as possible aware of the need to revalidate.

We will be publishing details on the website, in *RadCom* and supplementing these with weekly reminders in the regional sections of the GB2RS News. Please note: although amateur radio licences are now classed as 'lifetime', revalidation is compulsory.

Ofcom have advised that any licences that remain unvalidated by a yet to be agreed date will be considered as lapsed. After this time, licences will need to be renewed and a fee of £20 will be charged.

2.3 / 3.4GHz Bands

Ofcom has just published the inputs to the recent consultation on the 2.3/3.4GHz bands at http://stakeholders.ofcom.org.uk/consultations/2.3-3.4-ghz/. The right-hand menu for 'show responses' is the place to go to read all comments, including the one from the RSGB.

Award

The RSGB Board would like to congratulate Carl Luetzelschwab, K9LA, a Corresponding Member of the RSGB's Propagation Studies Committee, who has been named the winner of the Bill Orr, W6SAI, Technical Writing Award for 2013. His article, The Sun and the Ionosphere, appeared in the March 2013 issue of *QST*.

Carl, who frequently writes on solar and propagation phenomena and trends, is the Propagation columnist for the *National Contest Journal*, and a frequent visitor and speaker at the RSGB Convention.

Solar PV Panels

Have you, or has your neighbour, installed Solar PV Panels? If so, we would like to hear from you.

We are trying to build a clearer picture of the circumstances in which these installations cause a significant rise in the noise levels on the amateur bands. If you, or a neighbour, have installed Solar PV, please let us know whether you have noticed an increase in noise level. We would like to know, if possible:

When the Solar PV was installed and the power of the installation in kW

Make and model number of the inverter, if known (that's the main electronics associated with the installation, normally fitted in the loft) and whether it has optimisers fitted (these may be fitted behind individual panels or built in to panels). If optimisers are fitted, how many are there and what are the make and model number (if known)? This information should be itemised on the invoice for the installation, or can be taken from the manufacturer's make/model information on the equipment label (in the case of the inverter).

Have Solar PV panels appeared near you? (Photo © Túrelio / Wikimedia Commons CC-SA3.0-DL).

Whether there is any increase in noise and if so how much, and on what bands.

Please remember that a return saying 'no increase in noise' is just as important as one reporting a noise problem.

The information you supply will help the Society build a clearer picture of the pattern of interference and inform its policy in this area.

Please e-mail this information to solarpv@rsgb.org.uk.

IARU Contest 2014 GR2HQ – Can you help your Society?

Over the years, RSGB members have been prominent players in the IARU Contest – operating stations for the RSGB in the HQ section of the contest.

For 2014 we are looking to expand the stations and operators forming part of the GR2HQ team. If you have an interest in helping out, please let us know on which *single* band you regard your station as internationally competitive. To be part of the contest, you could either operate as a 'spotter' station on your chosen band, host one or two other operators to form a team for a band / mode station from your QTH, or volunteer as an operator at one of the stations nearby to you.

This is a highly competitive event, and some pre-work would be needed prior to July 2014 – particularly in terms of joining the software network for logging and inter-station communication and perhaps additional antennas.

This is a serious event, with plenty of technical and operating challenges but it's great fun. If you would like to join the UK team, please let Don Beattie, G3BJ know via e-mail to don.beattie@rsgb.org.uk as quickly as possible, or contact him if you would like additional information about what is involved.

Communications Officer (Part time)

The Society is looking for a Communications Officer to improve communication within the Society, and between the Society and those external bodies and individuals with whom it interacts, including the general public. The successful candidate will manage our total communications package (both in traditional and electronic forms) to ensure that it is integrated and meets the needs of our Members and others with whom we communicate.

Duties will include developing a Communications Strategy and implementation plans, and integrating the various methods and media that the Society uses to communicate with its staff, volunteers, Affiliated Clubs and Members. Other tasks will be to provide regular briefing material for the Regional teams to disseminate to clubs and other parties and the production of briefing material for, national and local media when required.

This is a paid part time role and salary will be dependent upon experience. For a complete job description, please e-mail the RSGB General Manager, Graham Coomber, G0NBI, via graham.coomber@rsgb.org.uk.

RSGB 2014 AGM

The AGM will be held at the Renaissance Hotel, Blackfriars Street, Manchester M3 2EQ at 12 noon on 12 April. The venue is within easy reach of the Manchester mainline train stations and there is also nearby car parking.

Sign up a friend

The RSGB Board has developed a new initiative where Members can sign up a friend and you will both receive £10 of RSGB book vouchers. This is your chance to help ensure a strong Society to represent amateur radio both in the UK and around the world.

You can sign up anyone who hasn't been a Member in the last 12 months. New people are equally welcome and you don't have to be a licenced amateur to be an RSGB Member.

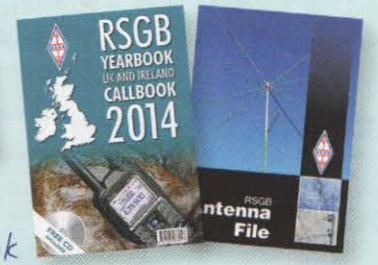
RSGB clubs can also recruit new RSGB Members and they will receive £10 cash towards club funds for every Member recruited.

Full details of this offer are on pages 9 and 10 of this edition of *RadCom*.

Sign Up A FRIEND

AND RECEIVE £10 WORTH OF BOOK VOUCHERS EACH

Some of the Great Benefits!



Book Discounts

RadCom

QSL Bureau

Hobby Protection

The RSGB is asking its Members to help the Society by recruiting new Members. As a special incentive to do so we will give **both you and the new Member £10 of RSGB book vouchers!** This is your chance to help ensure a strong Society to represent amateur radio in the UK and around the world.

This offer is available to anyone who hasn't been a Member in the last 12 months, so could be the ideal chance to sign up someone who was a Member previously. New people are equally welcome and they don't have to be licensed to be a Member. There is even a special offer if you can sign the new Member up to direct debit (detailed overleaf).

Being a Member of the RSGB has some great benefits including *RadCom* each month, QSL bureau, Members discounts and much more. **Simply sign up overleaf to get the ball rolling.**

DONT FORGET

RSGB Clubs £10 Cash!

RSGB affiliated clubs can also help recruiting new RSGB Members and they get £10 cash towards club funds for each Member recruited. And of course the new Member still gets their vouchers

Please note this becomes payable once the Member has paid over £10 to the RSGB. Individuals can only join this way once and again those who have been Members in the last 12 months aren't eligible. This offer is not available to any individual only RSGB affiliated clubs.

Note: The scheme does not apply to anyone who has been an RSGB member in the last 12 months or anyone eligible for a free RSGB subscription. The RSGB reserves the right to vary this offer or withdraw it at any time without notice.

Sign Up Today!

Not only can you sign up and get £10 of book vouchers each, you can take advantage of the special rates available for joining the RSGB and paying by direct debit. If you pay by direct debit, not only do **you save £4.00** on the regular fee, we will give the new Member a three month trial membership of the Society free of charge. Direct debit payers also get the ability to pay monthly or quarterly at no extra charge. **Direct Debit is the smart choice sign up today.**

Being part of the RSGB is more than *RadCom* each month and even though we send all our Members the biggest and best amateur radio magazine in the UK every month, there is much more to being an RSGB member. The RSGB provides membership benefits such as the QSL bureau, discounts on amateur radio books, special Members' only offers on equipment, email newsletters, contests, awards and whole lot more. Being a Member of the RSGB not only keeps you up to date with what is happening in amateur radio but it is run by amateurs for you. The RSGB looks out for the interests of all radio amateurs and plays a major role negotiating with governmental bodies both in the UK and worldwide. We also have a RSGB Regional Team that operates locally helping amateurs across the country.

Sign up online or over the phone.
If you want to pay by Direct Debit simply give us a call on **01234 832700** (during office hours) and there is no paperwork to complete, we will do it all for you. Alternatively if are paying by card you can sign up online 24 hours a day at **www.rsgb.org/vouchers**

Great benefits!

- ✔ RadCom
- ✔ QSL Bureau
- ✔ Book discounts
- ✔ RSGB Regional Team help
- ✔ Protection of your Hobby
- ✔ Members' Offers
- ✔ Email Newsletters
- ✔ RSGB Contests
- ✔ RSGB Awards
- ✔ Planning advice
- ✔ EMC advice
- ✔ Members' Ads
- ✔ IOTA

With a free membership on offer what do you have to lose?

Join us today!

Payment using the form

Direct Debit – the easy option (£47.00 p.a.)
Simply fill is section 1 below and 2 - the blue section. Return this to us and we will do the rest

Card, cheque (£51.00 p.a.)
Simply fill is section 1 below and 2a - the yellow section. Return this to us with your payment and we will do the rest

Note:
If you choose to pay by Direct Debit you may decide not to continue your membership, if so you can cancel prior to your start date and owe us nothing. All that we ask is that you let us know in writing 14 days before your first payment becomes due and we will cancel your membership.

If you are a licensed amateur under 21
For those under 21 and a licensed amateur membership of the RSGB is free. If you would like to sign up a young person simply fill in section 1 below and return this with a proof of age and details of their licence. No vouchers are sent with free memberships.

Voucher Offer
Please fill in section **1** and either **2** or **2a**
(under 21's section 1 only)

1. Personal details

PLEASE PRINT ALL

Callsign Last Name
First Name Initials
Address
Postcode Date of Birth / /
Tel No
Email

1a. Family membership

People living at one address can jcin for a joint fee of £60.00 (£56.00 on DD)

First Name
Last Name
Callsign Date of Birth / /
First Name
Last Name
Callsign Date of Birth / /

or 2a. Payment alternatives

12 month subscription

☐ I enclose a cheque for the sum of £51 only
☐ I enclose a cheque for the sum of £60 only for family membership
Please make cheques (in £ sterling only) payable to the "Radio Society of Great Britain".
☐ Please debit my: VISA / Mastercard / Delta / Switch
Credit Card Details: Card No

Card Expiry M M Y Y Valid from M M Y Y ISSUE No (Switch etc)

Signature Date

Existing Member/Club Details

Callsign
Name Post Code
NB Must be an RSGB Member

2. Direct debit instructions

three months FREE then from only £3.91 a month

Instruction to your Bank or Building Society to Pay Direct Debit
Annually ☐ Quarterly ☐ Monthly ☐ (please tick)
Service User Identification No 9 4 1 3 0 2
1. Name & Full postal address of your Bank or Building Society Branch
To: The Manager
Bank or Building Society Name
Address
Post Code
2. Name(s) of account holders(s)
3. Branch Sort Code
(from the top right hand corner of your cheque)
4. Bank or Building Society Account number
5. Instruction to your Bank or Building Society
Please pay the Radio Society of Great Britain Direct Debits from the account detailed on this instruction subject to the safeguards assured by The Direct Debit Guarantee.

DIRECT Debit

Signature Date

☐ I have completed the Direct Debit Mandate above and claim 3 months FREE membership

NB: the three months free offer is only available to those who have not been RSGB members in the last 12 months

FOR SOCIETY USE ONLY	RSGB Direct Debit Ref No.

Please complete this form and send it to: RSGB, 3 Abbey Court Fraser Road, Priory Business Park, Bedford MK44 3WH

PLEASE RETAIN

DIRECT Debit Guarantee

- This Guarantee is offered by all banks and building societies that accept instructions to pay Direct Debits
- If there are any changes to the amount, date or frequency of your Direct Debit Radio Society of Great Britain will notify you 7 working days in advance of your account being debited or as otherwise agreed. If you request Radio Society of Great Britain to collect a payment, confirmation of the amount and date will be given to you at the time of the request
- If an error is made in the payment of your Direct Debit, by Radio Society of Great Britain or your bank or building society you are entitled to a full and immediate refund of the amount paid from your bank or building society – If you receive a refund you are not entitled to, you must pay it back when Radio Society of Great Britain asks you to
- You can cancel a Direct Debit at any time by simply contacting your bank or building society. Written confirmation may be required. Please also notify us.

QSL Matters

Recently, opening a box of around 6,500 correctly sized cards (140mm x 90mm) from an EU country neatly stacked, we found 12 larger cards. All had some damage. Oversize or overweight cards are a constant and growing issue. If you are still sending large cards, please think about the state your card may end up in.

GB STATIONS. Don't forget to include a copy of the NoV (Notice of Variation) with each package to help us trace who held what call, when and to verify membership. Although NoVs are issued to an individual they are often operated by a club. Knowing the NoV holder and the club operating the special event station, where applicable, is very helpful and speeds up the processing of QSL cards.

NEW MANAGERS. GW and MW/2W. With the recent retirement of Lloyd, 2W0LLT, we have been fortunate to find two volunteers to take on this demanding role. John Lewis, GW0RAD is the new manager for all GW callsigns. Simon Smith, MW0TBI is handling all MW and 2W callsigns. Thanks go to Lloyd for all his effort in the past serving his fellow amateurs and to John and Simon for taking on these new roles. Details of both sub-managers are available on the RSGB main website, by searching from the *Operating* dropdown menu.

VOLUNTEERS WANTED. M0M-Z. This month we are really sorry to lose Wayne, M0WAY, who is stepping down after 5 years serving Members in this active sub-group. Wayne has provided superb service to many through his helpful, proactive approach. M0M-Z has one of the highest Member collection rates of any group, thank you Wayne – you will be missed! **G3M-P.** The bureau has cards and envelopes for this group and is now urgently seeking a new volunteer with time to handle approximately 15-20,000 cards per year.

Special Prefix Sub Manager. Since 2011, all cards for UK wide special prefixes – R, Q, O, V - have been handled by Martin, G0VXC and Jo, RS209897, both of whom are now stepping down. They have created a system for tracking and posting the cards that has proved to be invaluable and would like to thank them for this effort.

We now need several volunteers to build on what Wayne, Martin & Jo have started. We urgently need volunteers with commitment, time, space and some basic spreadsheet skills to sort and send up to 50,000+ cards a year. If any of the above groups are of interest to you, please e-mail the bureau qsl@rsgb.org.uk.

WWI Commemoration

2014 sees the start of four years of commemoration around the world marking World War 1. The RSGB will be taking part in a number of events as well as assisting with information and advice to a number of exhibitions. In the August *RadCom* we will be looking at how some of the Membership served their country and expanded their wireless knowledge during that period. Let us know if your club is doing anything with groups or individuals to mark this event.

You may be interested to know that, in the USA, the National World War I Museum at Liberty Memorial will put an amateur radio event station, WW1USA, on the air periodically over the next 4 years on dates of significance to the war – 28 June marking the assassination of Archduke Ferdinand, 3 August Declaration of war, 5 September Miracle of the Marne and so on.

Don't forget that we have a club talk on the service given by radio amateurs that includes several amateurs that served during WW1. Details for the download can be obtained from elaine.richards@rsgb.org.uk.

WELCOME

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

Mr P Herron, 2E0CVZ
Mr P Gavin, 2E0PTG
Miss S McCartan, 2I0SSW
Mr S Young, 2M0SRY
Mr D Griffiths ,2W0AFA
Mr V Oliveira, CT5JPP
REF 31, F5KSE
Mr G Bergeret, F5TUN
Mr J Groves, G1AUN
Mr J Mason, G1EFI
Mr A V H Swatman, G1XMF
Thurrock Acorns ARC, G4HKO
Mr J Smith, G6NJE
Mr A Malloy, G7TSX
Mr M Clarke, G8FHI
Mr P London, G8UHH
Mr N Andrews, K9GVM
Mr T Bultman, KB2LEB
Mr S Edgecombe, KJ6ZTK
Mr D P Bailey, M0DSY
Mr K Enright, M0DZM
Mr I Ivanov, M0YGM
Mr D Rogers, M3MQR
Mr D Lillywhite, M6DLE
Mr C Tompkins, M6DLV
Mr L A Edmonds, M6DYT
Mr J Hanlon, M6DZM
Mr A Parker, M6GDP
Mr H Lillywhite, M6HTL
Mr H Chawdhry, M6HXC
Miss A Instone, M6IAQ
Mr W Dover, M6KIK
Mr M L Dixon, M6MLD
Mr N Dagger, M6NPD
Mr A D Power, M6RET
Miss R Landragin, M6SOO
Mr M Sadler, M6SPF
Mr J White, M6SSH
Miss A Thomas, M6TDZ
Miss T S B Blackburn, M6TSB
Mr A Hartstone, M6WXA
Mr G Boam, M6YAD
Mr M Palmer, M6ZBB
Mr A McGarvey, MI0TXM
Mr J O'hara, MI3JUS
Mr J M C McMorland,MM0GUE
Mr A Connell, MM6EBD
Mr A Boyce, MM6ZDR
Mr R Harlow, MW0REH
Mr T A Davies, MW3BGP
Mr S Nelson, MW6SPN
Mr R Nobis, N7RJN
Mr D S Nielson, OZ5DM
Mr B Jensen, OZ9QI
Mr J J Zijp, PA3DCU
Mr A J Niewold, PD0RFC
Mr A Tapster, RS214934
Mr P Wade, RS214963
Mr D Ashby, RS215170
Mr M Bruce, RS215198
Rev T Lee, RS215201
Mr P Singleton, RS215248
Mr D Abbott, RS215250
Mr N Evans, RS215285
Mr A Whitton, RS215288
Mr J E Mason, RS215294
Mr P C Monteith, RS215298
Dr N Linke, RS215312
Mr A Shepherd, RS215318
Mr D H Ness, RS215320
Mr A Usher, RS215327
Mr J Clark, RS215336
Mr P Fisher, RS215341
Mr P Owen, RS215364
Skovde ARC, SK6EI
Mr B Johansson, SM7FCG
Mr T O'Donnell, VK2QW
Mr R Payne, VK2UFO
Mr I Delves, VK3IAN

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

Dr A G W Norden, 2E0LFT
Mr A Sulieman, 2E0PUW
Mr D R Moore, G0FZH
Mr A S Orton, G0GQI
Mr P W Sobye, G0PNM
Mr M Nicolaou, G0WWW
Mr D C Padfield, G1AJQ
Mr J Yale, G3ZTY
Mr D B Andrews, G4EZZ
Mr P R Jones, G4GNK
Mr S E G Porter, G4NHP
Mr D Wilson, G4OLL
Mr J R Gibbs, G4UQR
Sheffield & Rotherham RAYNET, G6AEN
Mr R J Hanrahan, G6BJQ
Mr J W Tyerman, G7EJH
Mr B S McIntyre, G7KBE
Mr S C W Guscin, G7ONG
Mr P Young, G7SQC
Mr S Furminger, G7TYH
Mr S N Davis, G7WKX
Mr S G Carter, G8EPA
Mr R J Anderson, GM0SCW
Mr R S Bannerman, GM4LUD
Mr C D S Rodgers, GM4NNC
Mr A R J Powell, IZ4LXP
Mr D Brower, K4PZT
Mr H C Seldon, M0BWN
Mr S Pantony, M0HUD
Mr R Phillips, M0PHE
Mr A Ravary, M0RAV
Mr J A Meredith, M3BTJ
Mr A Milne, M3DKK
Mr D J Bown, M3JOS
Mr G Allen, M3KKN
Mr C W Teo, M3TEO
Mr S G Phillips, VK3JY
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Peter Hart review RadCom February 2014
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- Roofing Filters (3/6/15 kHz)
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A built-in 4.3-in TFT wide full colour High Resolution Display with loads of information provides superior operability and visibility for the FTDX1200 owner.

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Yaesu FTDX1200

HF & 50MHz transceiver

FTDX1200 front view. The resemblance to the FTDX3000 is very strong.

INTRODUCTION. During 2013 Yaesu replaced its mid-range HF transceivers with two new models, the FTDX3000 as the more up-market of the two and the FTDX1200 aimed more towards the economy price bracket. The FTDX3000 was reviewed in the January 2014 *RadCom* and now follows my review of the FTDX1200. In many respects the radios are very similar, particularly with regard to the user ergonomics and the functions and features implemented by DSP. To avoid duplication, I will concentrate on the differences and an overview of the functions and refer the reader to the January review for a more detailed description of the common features.

BASIC FUNCTIONS. The FTDX1200 is a mid-sized 13.8V operated radio containing a single receiver and 100W transmitter. It is the same size and has the same styling as the FTDX3000, measuring 365mm(w) x 115mm(h) x 312mm(d) and is a similar weight, 9.5kg. As with the FTDX3000, the receiver tunes continuously from 30kHz to 56MHz and the transmitter is enabled only within the amateur allocations. Individual buttons select bands and modes are selected by a single scrolling button. All the usual voice and data modes are provided and all related functions for tuning and mode selection, comprehensive memory storage and scanning functions are the same as for the FTDX3000. Contrary to what I stated in that review, memories can be labelled up to 18 characters in length, making identification and selection very straightforward.

Operation of the radio and use of the front panel controls is subtly different from the normal style of the Yaesu user interface. With fewer individual physical controls allowing better visibility and less cramped layout, the display is central to how the radio is used. Frequently accessed functions have dedicated buttons along one side of the display, with settings shown in a pseudo block signal flow format. These buttons are illuminated in the FTDX3000 but not in the FTDX1200. Other functions use on-display buttons that are accessed and selected by four navigation keys. IF filtering functions of width, shift, contour and notch have dedicated rotary controls with separate graphical portrayals of their filtering function on the display and the numerical value held for three seconds after the function has been adjusted. The display also shows a multifunction meter in analogue or bargraph formats, spectrum display for the scope function and, when the FFT option is fitted, readouts for the RTTY, PSK and CW decoders. All controls to the left side of the tuning knob are common to both radios. Those to the right are also similar but with some small differences in positioning.

Other functions – some 196 items – are accessed via the menu system and common to both radios. These are fairly easy to scroll via the navigation keys, with each function well described in plain language on the display. Some functions that normally have dedicated controls have been relegated to the menu system to simplify control layout. A front panel pushbutton labelled CS (Custom Selection) provides a one-touch access to any specific menu item such as for transmit power or CW break-in drop back delay. Although I stated in the FTDX3000 review that transmit power can only be adjusted via the menu, this is only true for SSB voice and SSB generated data modes as used with an AFSK audio derived transmit source. On modes using a carrier such as CW, FM, FSK RTTY and AM a front panel CAR control adjusts power over the range 5 to 100W.

The 4.3-inch main display is common to both radios although the layout is slightly different and uses full colour TFT LCD technology. This is particularly crisp, bright and colourful, with an excellent viewing angle. The second display is not used in the FTDX1200 and is replaced by indicators showing VFO status.

A standard 8-pin microphone socket is located on the front panel and an MH-31 hand microphone is provided with the unit. The rear panel connectors are a slightly reduced set compared with the FTDX3000. There are two antenna sockets that can be freely assigned according to band or one can be used for a receive-only antenna. There are key jacks on both the front and rear panels and these may be configured independently for various internal or external keying options. Mini-DIN connectors provide dedicated interfaces to a linear amplifier, controller or soundcard for data modes, external auto ATU and Yaesu rotator control. The Yaesu μ-tune front-end filters are supported but not the DMU (data management unit) accessory. Low-level receiver audio output is provided, as is a separate PTT jack. The FH-2 keypad may be connected to access contest messages on CW, SSB and data modes and to provide an alternative method of tuning the VFO.

There is no IF output for spectrum monitoring, RF output for transverters or dedicated receive-only antenna input. However, it is possible to use one of the μ-tune RF connectors as a separate receive-only input if the μ-tune filters are not fitted. The traditional 9-pin D connector CAT interface allows PC serial port control but there is no USB interface. However the SCU-17 external accessory provides a USB interface for CAT control with audio codec and PTT for data modes. The SCU-17 can also be used with many other earlier Yaesu models. Drivers and software for this unit are downloadable from the Yaesu website. The radio firmware can be updated either via the CAT interface or through the SCU-17. The usual comprehensive Yaesu manual is included and a set of circuit diagrams. Information on programming aspects for computer control is available in a separate manual downloadable from the Yaesu website.

RADIO DESIGN AND ARCHITECTURE. The principal difference between the FTDX3000 and the FTDX1200 lies in the receiver. Whereas the FTDX3000 uses a down-conversion architecture, the FTDX1200 is an up-conversion triple superhet with a first IF of 40.455MHz, a second IF of 455kHz and a final IF of 30kHz (24kHz on AM and FM) feeding directly the DSP for all further signal processing. There are three roofing filters at the first IF, with bandwidths of 3kHz, 6kHz or 15kHz selected automatically according to channel bandwidth or manually. A 32-bit DSP clocked at 300MHz is used to provide

March 2014 • RadCom

Peter Hart, G3SJX • e-mail: peter@g3sjx.freeserve.co.uk

The FTDX1200 rear panel.

all IF channel filtering, demodulation, noise reduction, audio processing and AGC functions and is the same unit used in the FTDX3000 and FTDX5000 radios. The transmit signal uses the same frequency conversion scheme in reverse, culminating in the same 100W PA and filters as used in the FTDX3000.

The receiver front end has two switchable bipolar RF preamplifiers for nominally 10dB or 20dB gain, plus three levels of input attenuation. There are 8 input bandpass filters covering the total frequency range of the receiver and a quad arrangement of FETs for the first mixer. The frequency synthesiser uses a PLL/DDS combination with four VCOs at VHF to cover the tuning range and a divider to provide the first local oscillator signal. A 0.5ppm TCXO reference ensures excellent frequency accuracy and stability.

Construction is identical to the FTDX3000. Extendable front feet tilt the front panel to improve operating ease and a carrying handle is fitted to the side. A reasonably sized 9cm speaker fits in the case top. An internal fan cools the unit and only operates when the temperature rises. The speed increases with temperature but is very quiet in operation.

FEATURES AND FUNCTIONS. Many of the features and functions of the radio are implemented in DSP and these are the same as are incorporated into the FTDX3000. This includes all the channel filtering functions, width, shift and contour, the IF and audio notches, noise reduction, AGC and all the audio filtering functions. A similar IF noise blanker is also fitted.

The transmit functions are also the same, including an auto ATU covering bands to 50MHz, highly configurable audio filtering, VOX, speech processor, a comprehensive CW message keyer and full facilities for FM repeater operation.

A spectrum scope display is also included. Unlike the FTDX3000 that uses a separate signal path, the FTDX1200 uses the receiver to make the scan and mutes the audio for 0.3 to 1s whilst this is being done. Only single scans are provided and an auto mode enables a scan whilst tuning or at periodic intervals. In FIX mode it will scan between two fixed points, separately programmable for each band. In CENTRE mode it will scan either side of the receive frequency with a range from 20kHz to 1MHz. Receive and transmit frequencies are shown as markers on the display and up to ten scans can be memorised. The amplitude displayed range is 80dB but this is crammed into just 1cm height of the display. A full screen mode can also be selected but the display then shows no other information.

If the optional FFT-1 board is fitted then data decoders for CW, RTTY and PSK are also provided. This board also provides the audio spectrum function and auto tuning for CW modes. These functions have the same features and operate in a similar way to those in the FTDX3000.

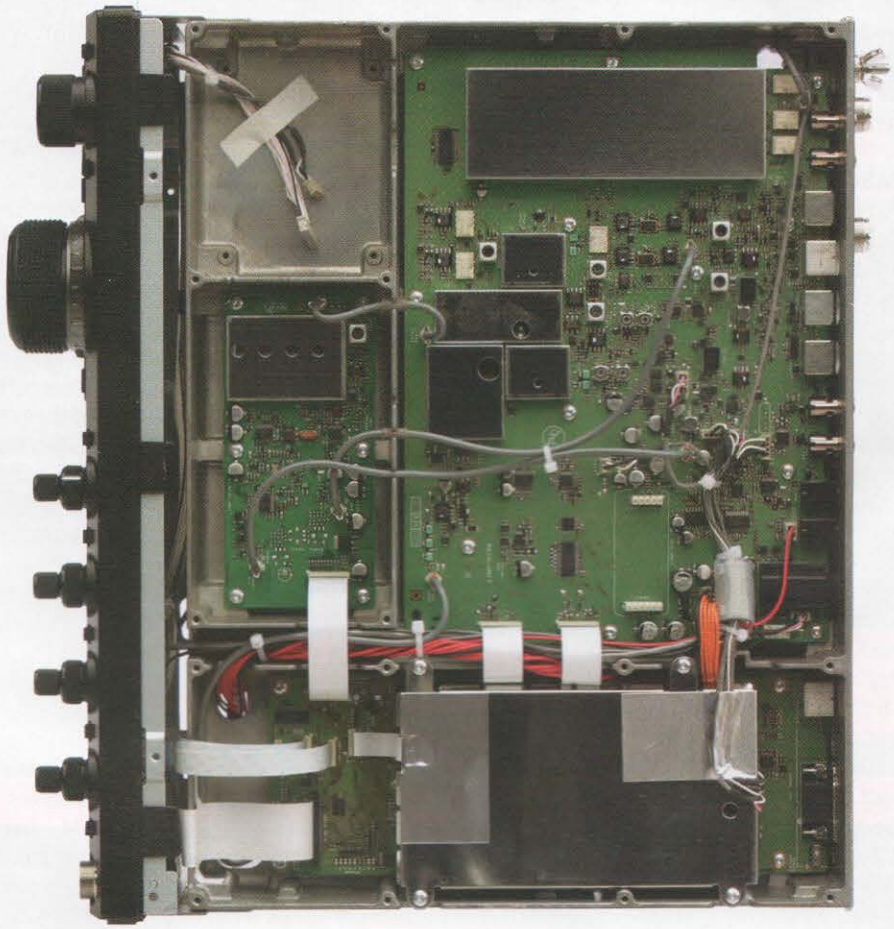
A digital voice memory option, DVS-6, is also available. It installs easily inside the radio. Useful for SSB contest operation, there are five stores, each holding up to 20 seconds of voice messages. The FH-2 remote keypad provides access to these messages. Recording the receiver audio is not provided.

MEASUREMENTS. The full set of measurements is given in the table. The receiver is very sensitive and is flat across the frequency range down to about 500kHz. Below 200kHz sensitivity reduces noticeably and is down by 20dB at 136kHz and 25db at 100kHz. The preamplifiers operate over the whole range. The S-meter calibration closely follows 2.5dB per S-unit and is very linear up to at least S9+50dB. Broadly similar results are achieved on all modes and roofing filters, with FM reading about 10dB higher.

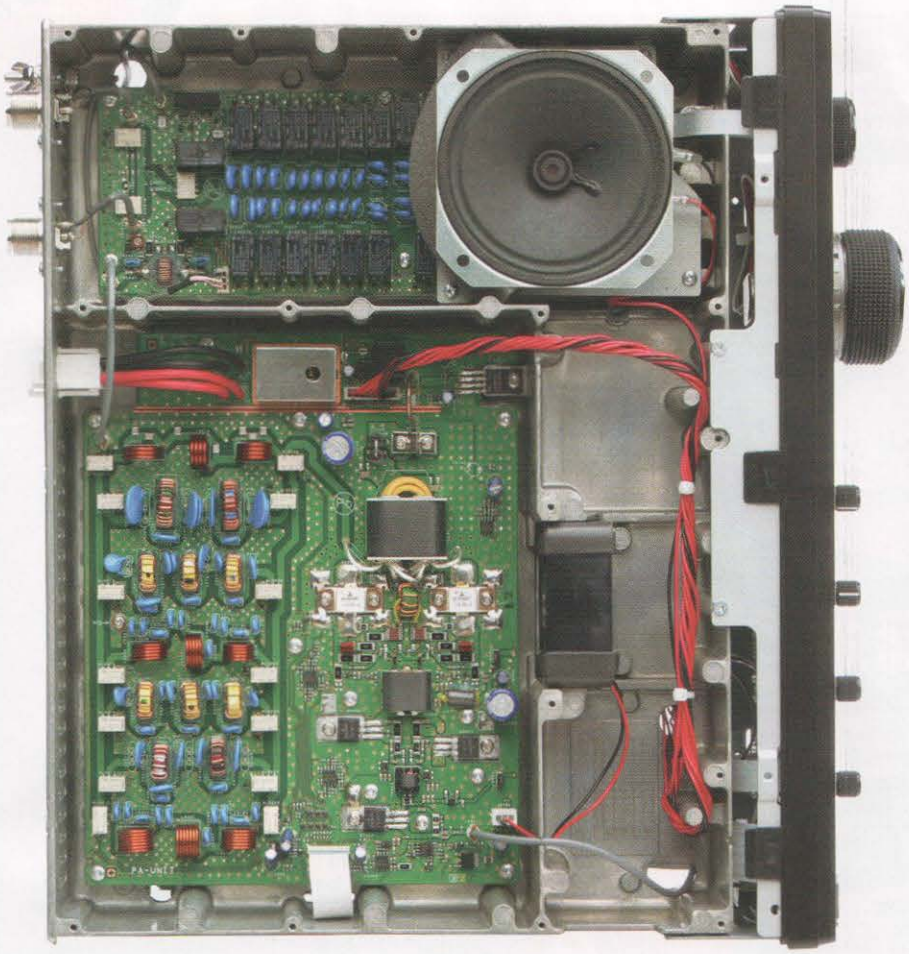
Rejection of IFs and images was around 80 to 100dB on most bands except on 50MHz, where image rejection dropped to 60dB. Other spurious responses due to synthesiser spurs were down around 90dB. The AGC characteristic was very clean, with a fast attack time and no 'hole' as seen in many DSP implementations. The decay time is reasonably close to the menu set figures, or a little less.

The strong signal performance of the front end is generally good for a mid-range radio, holding well at closer spacings down towards the skirts of the roofing filters but then degrading significantly by around 30dB inside the roofing filter bandwidth. When narrow bandwidth high frequency roofing filters were first introduced in up-conversion radios, the expected improvement in close-in performance was often not achieved due to intermodulation within the filter itself. The filters used in the FTDX1200 appear fairly immune to this problem. Blocking due to front end overload appeared very good with reciprocal mixing (RM) noise predominating and preventing measurement. Inband intermodulation and audio distortion figures were very good for signal levels below S9+20dB, reducing at higher levels. Second order and wideband third order products were fairly well suppressed.

The reciprocal mixing figures are typical to good for a mid-range radio, similar to or slightly better than the FTDX3000. The figures



Underneath the bottom cover, showing the main RF and signal processing boards.



Underneath the top covers, showing the transmitter PA, output filter and ATU boards.

are fairly similar across the frequency bands except on 50MHz. On this band figures are some 5 to 20dB worse, particularly in the area of 30 to 100kHz offset. RM noise limited measurement of the IF filters down to about -70dB and the results comparing the different shape characteristics are shown in the table. The difference compared with the FTDX3000 is largely due to the influence of the roofing filter (3kHz), which also introduced a noticeable slope across the passband. On narrow CW bandwidths and inside the roofing filter passband, the ultimate stopband rejection was about 80 to 90dB with ripples. This is often bettered by other DSP implementations.

On transmit, two-tone distortion products were good for a 12V operated power amplifier and harmonics and other spurii were very low. Distortion degraded with overdrive, but not as much as with the FTDX3000. The processor added no extra distortion, surprisingly. CW rise and fall shapes were reasonable with negligible character shortening at 40wpm in both full and semi break-in modes. No first character shortening or overshoot at low powers was observed; a good clean result. AM transmit was clean with low distortion. Transmit/receive switching times are acceptable with adequate sequencing to allow linear switching. The delay is adjustable via the menu.

Close-in transmit noise as phase noise on the signal is similar to the FTDX3000 but further out at greater than 10kHz from the transmit signal, where it is due to amplifier noise, it is up to 12dB better.

The FTDX1200.

ON THE AIR PERFORMANCE. Operating the radio was a pleasure. The controls are well proportioned and laid out, generally easy to use with good ergonomics. The clear, information-packed display is one of the radio's key benefits. However, some functions require display navigation or menu access, which requires multiple button presses, but to be fair these are generally the functions that need less frequent access. The main tuning control is smooth and precise, with a large weighted flywheel knob and optimal tuning rates. The VFO B sub control is very free and is easy to knock, particularly when changing bands or other functions in the same panel area. The main control allows the torque or drag to be adjusted, but the sub control does not. Menu scrolling is easy, but the highlighted line is not particularly clear and would benefit attention in a future software upgrade. It is also necessary to press the SELECT key before and after making changes. This can be forgotten and the new settings are then not stored.

The radio performed very well and I could find little to fault. It coped well with crowded conditions and with weak signals on bands such as 50MHz. The audio quality was good, broadcast AM performance was generally good but there were some spurious beat signals on the lower broadcast and LF bands. At low listening levels there was a slight hiss audible, which was particularly noticeable using sensitive headphones. The filters and notches functioned very well and settings are clearly indicated on the display. I did not experience situations where phase noise was a problem.

Split frequency operation in DX pileups using TXW to search for a transmit frequency and the use of twin VFOs was straightforward and nearly as good as using twin receivers.

On transmit, the audio sounded good and reports were favourable. The CW break-in characteristic was clean, although there was a slight thump on the return back to receive under certain circumstances. Full break-in was fast and it was possible to listen between dots up to about 25wpm.

CONCLUSIONS. The FTDX1200 is another good all-round radio, generally easy to use and with a good overall performance within its price bracket. For mid-range radios the FTDX1200 and FTDX3000 are excellent choices, offering a good trade-off between features and performance. They are currently for sale with special deals and substantial discounts over the list price.

ACKNOWLEDGEMENTS. I would like to express my gratitude to Yaesu UK for the loan of this radio.

Yaesu FTDX1200 Measured Performance

Receiver Measurements

	SENSITIVITY SSB 10dBs+n:n			INPUT FOR S9		
FREQUENCY	IPO	PREAMP 1	PREAMP 2	IPO	PREAMP 1	PREAMP 2
1.8MHz	0.8µV (-109dBm)	0.2µV (-121dBm)	0.11µV (-126dBm)	110µV	28µV	9µV
3.5MHz	0.8µV (-109dBm)	0.2µV (-121dBm)	0.1µV (-127dBm)	110µV	28µV	9µV
7MHz	0.7µV (-110dBm)	0.18µV (-122dBm)	0.09µV (-128dBm)	130µV	32µV	9µV
10MHz	0.56µV (-112dBm)	0.14µV (-124dBm)	0.08µV (-129dBm)	130µV	32µV	9µV
14MHz	0.8µV (-109dBm)	0.2µV (-121dBm)	0.1µV (-127dBm)	110µV	32µV	9µV
18MHz	0.9µV (-108dBm)	0.22µV (-120dBm)	0.1µV (-127dBm)	130µV	32µV	10µV
21MHz	1.0µV (-107dBm)	0.25µV (-119dBm)	0.1µV (-127dBm)	130µV	32µV	9µV
24MHz	1.6µV (-103dBm)	0.4µV (-115dBm)	0.14µV (-124dBm)	130µV	32µV	9µV
28MHz	1.4µV (-104dBm)	0.35µV (-116dBm)	0.13µV (-125dBm)	160µV	40µV	11µV
50MHz	0.9µV (-108dBm)	0.22µV (-120dBm)	0.1µV (-127dBm)	130µV	35µV	10µV

AM sensitivity (28MHz) Preamp1: 2.8µV for 10dBs+n:n at 30% mod depth
FM sensitivity (28MHz) Preamp 1: 0.7µV for 12dB SINAD 3kHz pk deviation
AGC threshold Preamp1: 2µV
100dB above AGC threshold for <1dB audio output increase

AGC attack time: approx 1-2ms
AGC decay time: approx as specified
Max audio at 1% distortion: 2.4W into 4 ohms, 1.7W into 8 ohms
Inband intermodulation products: -60dB at S9+20dB or less

S-READING (7MHz)	PREAMP 1
S1	2.5µV
S3	4.5µV
S5	8µV
S7	16µV
S9	32µV
S9+20	320µV
S9+40	3.2mV
S9+60	32mV

INTERMODULATION (50kHz tone spacing) 2400Hz bandwidth 3kHz roof USB

	IPO		PREAMP 1		PREAMP 2	
Frequency	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
1.8MHz	+27dBm	97dB	+16dBm	98dB	+6dBm	95dB
3.5MHz	+26dBm	97dB	+15dBm	97dB	+3.5dBm	94dB
7MHz	+21dBm	94dB	+8.5dBm	94dB	-2dBm	91dB
14MHz	+29dBm	99dB	+17dBm	99dB	+5dBm	95dB
21MHz	+29.5dBm	98dB	+17.5dBm	98dB	+6.5dBm	96dB
28MHz	+23.5dBm	92dB	+12dBm	92dB	+1dBm	91dB
50MHz	RM noise	RM noise	RM noise	RM noise	RM noise	RM noise

CLOSE-IN INTERMODULATION ON 3.5MHz BAND, 500Hz bandwidth CW IPO

	15kHz ROOFING		6kHz ROOFING		3kHz ROOFING	
Spacing	3rd order intercept	2 tone dyn range	3rd order intercept	2 tone dyn range	3rd order intercept	2 tone dyn range
1kHz	-19.5dBm	71dB	-25.5dBm	67dB	-19dBm	71dB
2kHz	-21dBm	70dB	-18dBm	72dB	+2dBm	85dB
3kHz	-20dBm	71dB	-5dBm	81dB	+24dBm	100dB
5kHz	-7.5dBm	79dB	+25dBm	101dB	+25dBm	101dB
10kHz	+25.5dBm	101dB	+25dBm	101dB	+25dBm	101dB
20kHz	+25.5dBm	101dB	+25.5dBm	101dB	+25dBm	101dB
50kHz	+26dBm	101dB	+26dBm	101dB	+26dBm	101dB

BANDWIDTH/ROOF SET TO	BANDWIDTH -SHARP- -6dB	-60dB
2.4kHz/3kHz roof		
Steep	2156Hz	3109Hz
Medium	2183Hz	3409Hz
Gentle	2202Hz	4068Hz
500Hz/3kHz roof		
Steep	527Hz	692Hz
Medium	544Hz	779Hz
Gentle	574Hz	987Hz

FREQUENCY OFFSET	RECIPROCAL MIXING DYNAMIC RANGE 500Hz BW 7MHz	21MHz	TRANSMIT NOISE 7MHz 100W O/P
1kHz	81dB (-108dBC/Hz)	77dB (-104dBC/Hz)	-101dBC/Hz
2kHz	89dB (-116dBC/Hz)	85dB (-112dBC/Hz)	-108dBC/Hz
3kHz	93dB (-120dBC/Hz)	89dB (-116dBC/Hz)	-111dBC/Hz
5kHz	97dB (-124dBC/Hz)	93dB (-120dBC/Hz)	-114dBC/Hz
10kHz	103dB (-130dBC/Hz)	100dB (-127dBC/Hz)	-124dBC/Hz
15kHz	107dB (-134dBC/Hz)	104dB (-131dBC/Hz)	-126dBC/Hz
20kHz	110dB (-137dBC/Hz)	107dB (-134dBC/Hz)	-128dBC/Hz
30kHz	113dB (-140dBC/Hz)	110dB (-137dBC/Hz)	-129dBC/Hz
50kHz	116dB (-143dBC/Hz)	113dB (-140dBC/Hz)	-130dBC/Hz
100kHz	119dB (-146dBC/Hz)	117dB (-144dBC/Hz)	-130dBC/Hz
200kHz	121dB (-148dBC/Hz)	120dB (-147dBC/Hz)	-130dBC/Hz

Transmitter Measurements

FREQUENCY	CW POWER OUTPUT	HARMONICS	INTERMODULATION PRODUCTS 3rd order	5th order
1.8MHz	103W	-65dB	-33dB	-47dB
3.5MHz	107W	-65dB	-40dB	-42dB
7MHz	104W	<-75dB	-40dB	-40dB
10MHz	106W	<-75dB	-40dB	-40dB
14MHz	105W	<-75dB	-26dB	-40dB
18MHz	106W	-67dB	-42dB	-38dB
21MHz	106W	-70dB	-42dB	-40dB
24MHz	106W	<-75dB	-26dB	-34dB
28MHz	106W	<-75dB	-25dB	-40dB
50MHz	106W	-69dB	-25dB	-38dB

Intermodulation product levels are quoted with respect to PEP.
Microphone input sensitivity: 0.2mV for full output
FM deviation: 2kHz narrow / 5kHz wide
SSB T/R switch speed: mute-Tx 34ms, Tx-mute 3ms, mute-Rx 35ms, Rx-mute 2ms
NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on USB with receiver preamp switched out (IPO), 2.4kHz IF bandwidth and 3kHz roofing filter.

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By Reg Irish G4LUF

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Homebrew

More modules for the LF/MF transceiver project

IF AMPLIFIERS. For last month's tests of the new receiver front end, I used a spare IF/AF unit that was gathering dust in the shack. This arrangement worked well and many local and DX stations were heard on 80m and 160m. There may however be some room for improvement. I have found that typical IF amplifier ICs are relatively noisy. Traditional receiver designs tend to have enough gain at the front end (RF amplifier and first mixer) that the total system noise figure is largely determined by front end performance. More recent designs tend to keep front end gain to a minimum and place most of the receiver gain after the selectivity of the IF filter. This approach usually provides greater strong signal handling and dynamic range.

So how much gain do we need? The combined RF, IF and AF gain of most superhet receivers will be well over 100dB. Turning microvolts of RF into volts at the loudspeaker requires a voltage gain of 1,000,000, or 120dB. Passive stages of the receiver like the RF and IF filters will have a power loss. Passive diode mixers as used for the mixer and product detector in our receiver will also show a conversion loss. A typical system will have excessive gain that is controlled by automatic gain control (AGC) and ultimately by the manual AF gain control.

Some of our previous construction projects have illustrated extreme cases like the crystal set, which has no gain, and direct conversion receivers where the entire receiver gain is at audio frequency.

The following is an approximate guide to the gain distribution of our new receiver: RF filter (LPF) -1dB, RF mixer -6dB, post-mixer amp +20dB, IF filter -5dB, IF amplifiers +60dB, product detector -6dB, AF amplifier and PA +60dB.

-1+ -6+20+ -5+60+ -6+60 = +122dB.

The most commonly used IF amplifier ICs have about 30-45dB of gain, a similar amount of AGC gain control range and noise figure of 8-11dB. Two cascaded stages will meet our requirement for gain of around 60dB. If AGC is applied to both stages, a gain reduction of 60-80dB can be achieved. This should be sufficient to deal with even the strongest signals.

PHOTO 1: Dual gate MOSFET IF amplifier test circuit.

IF amplifiers based on a single discrete transistor or FET will tend to have lower gain and AGC control range per stage. It would probably take three amplifier stages to meet our 60dB requirement. Low noise devices like the dual-gate MOSFET tend to be quieter than a typical IC based IF amplifier. The noise figure of typical devices at HF/VHF is around 1-2dB. With careful attention to input matching, similar performance should be possible at commonly used HF intermediate frequencies.

Some of my most successful IF amplifiers have used a dual gate (DG) MOSFET as the first stage and IC based amplifiers for subsequent stages. This gives the advantage of low noise in the first stage and retains the excellent AGC characteristics of IC based amplifiers in the later stages. As a typical DG MOSFET will have more than 20dB of gain, the noise performance of the entire IF strip will be dominated by the first stage. For cascaded stages, the overall noise factor is: $F = F1 + ((F2-1)/G1) + ((F3-1)/G1G2) + \ldots$ Note that linear units are used so that power ratios are not expressed in dB and noise factor F is used instead of noise figure NF. F=(SNR_in/SNR_out) and NF=10log(F) dB. For the benefit of lazy people like me, Mini-Circuits provides a simple noise figure calculator for cascaded stages [1].

VHF/UHF dual gate MOSFETS like the BF981 will give good performance at HF when matched for input and output impedance of around 2000Ω. I used a simple PI network to match gate 1 of the MOSFET to the 50Ω impedance of the IF filter unit. The network was designed for R1 = 50Ω, R2 = 2000Ω, f = 10MHz and Q = 13. The circuit is shown in **Figure 1**. The circuit of the prototype amplifier is shown in **Figure 2**.

The circuit was built in the usual dead-bug style on a strip of PCB laminate. The 2.88μH inductor L1 is 24 turns of 0.375mm enamelled copper (Maplin YN86T or similar) evenly spaced on a T50-2 (red) powdered iron toroid. T1 is also 24 turns on a T50-2.

For the initial tests, the amplifier was configured for a 50Ω output load. The output coupling winding of T1 is 5 turns of insulated hookup wire. This will be increased to 8 turns later when the MOSFET amplifier is coupled to the second IF amplifier. Gate-2 bias was provided by a simple potentiometer across the 13.8VDC supply. Maximum gain was achieved with 5.5-6V of bias. Decreasing the bias to 0V reduced gain by 15dB.

The amplifier gain was measured using a spectrum analyser with tracking generator. Gain at 10MHz was 27dB. This is not surprising as these devices have well over 20dB of gain at VHF. Feeding the amplifier input from my thermionic noise source saw output noise increase by 3dB for a noise diode current of 2mA. This indicates a noise figure of 3dB, which is just about ideal for our purposes. The assembled prototype amplifier is shown in **Photo 1**. Note that there are a few minor detail differences between the photo and the final version that is shown in the schematics.

There is a good range of IF amplifier chips available. Popular choices are the AD603, MC1350 and TL026. As I have a tube of TL026 devices available and more are readily available at reasonable cost, I have decided to use the TL026CP. These

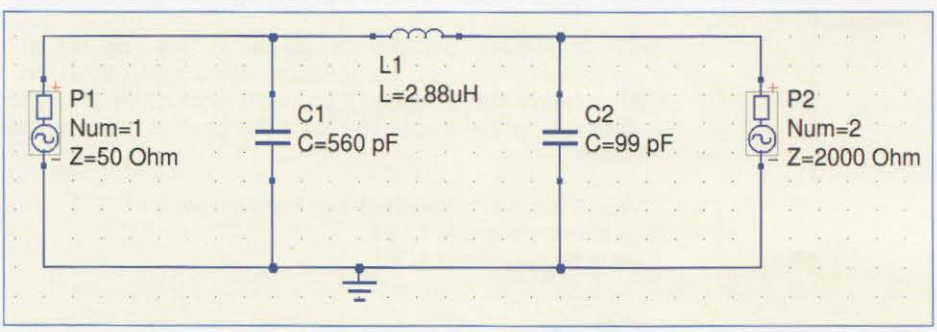
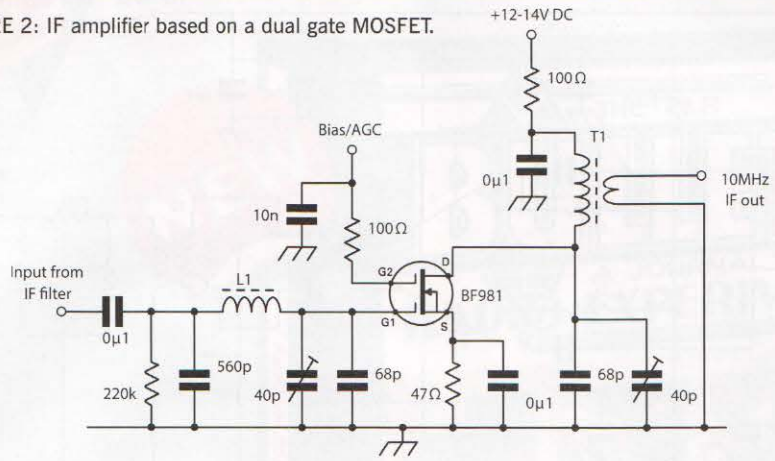


FIGURE 1: Simulation of the MOSFET gate 1 matching network.

FIGURE 2: IF amplifier based on a dual gate MOSFET.



devices were also used in the 40m receiver project (see March/April 2013). The TL026 [2] is a high frequency amplifier with differential inputs and outputs. It is similar to the well-known NE592 video amplifier except that the TL026 has an AGC input.

The TL026 is designed for use with a split positive/negative power supply. It is possible to use these devices with a single ended supply by using a simple voltage divider to provide an 0V reference at half the supply voltage. Input pin voltages are referenced to this half-supply point and not to the negative or positive supply rails.

For detailed information about the TL026, see the device data sheet and our project from March/April last year. **Figure 3** shows the complete IF amplifier unit, which consists of the MOSFET amplifier as the first stage and the TL026 IC as the second IF amp. The first stage is as described previously except that the output coupling winding (T1) has been increased to 8 turns. Any small PVC insulated wire will be suitable for the coupling winding. I used wire stripped from standard 4-core telephone cable. The 8V supply for the TL026 is provided by a 78L08 voltage regulator IC. The pair of 820Ω resistors at the centre of the schematic provide the mid-supply reference. The output balun transformer T2 is 10 turns of 0.375mm enamelled copper, trifilar wound on an FT37-43 ferrite toroid. All capacitors are standard ceramic disc types except for the 40pF miniature trimmers. The value of these is not that critical: 30pF or 60pF trimmers should make a suitable replacement. **Photo 2** shows the first prototype TL026 amplifier. This rather tatty circuit bears many scars from the soldering iron. The circuit stopped working during testing. After some experimenting and a lot of cursing, I decided to rebuild it with a new IC. The problem was eventually traced to a simple wiring fault and the rebuild was completely unnecessary. The 78L08 regulator can be seen at top-centre. At top-left of the photo, there is a small rectangular piece of PCB superglued to the ground foil. This serves as the mid-supply reference.

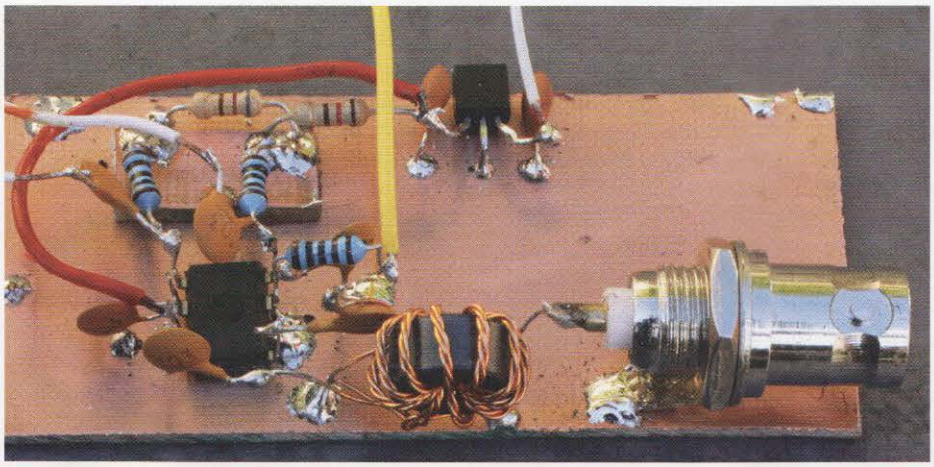


PHOTO 2: The somewhat tatty first prototype TL026 amplifier.

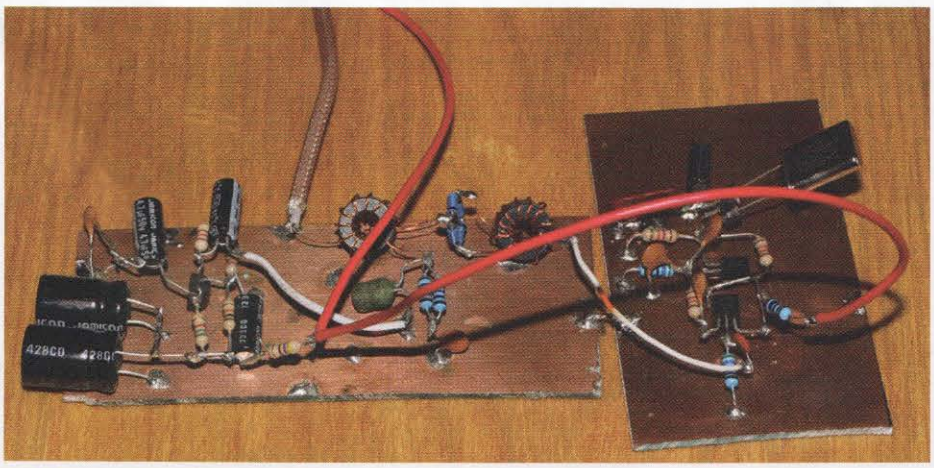


PHOTO 3: Product detector / audio assembly.

As the entire IF unit is designed for interfacing to 50Ω at both ends, it is a simple matter to measure gain using the spectrum analyser. As the minimum output from my tracking generator is -50dBm, it was necessary to place a 20dB attenuator between the generator and the input of the IF amp. Gain at 10MHz was measured at just over 60dB, which is within the expected range and just about ideal for our application. Note that this measurement was made before the 6dB attenuator pad was added to the IF amp output. The noise figure for the entire IF strip was measured at just over 3dB. As the AGC unit has not yet been designed and built, it was necessary to provide bias/gain-control voltages for both IF stages. **Figure 4** shows how the necessary voltages were generated. Maximum gain is achieved with about 5V to the TL026 and 5.5V to the MOSFET. As gain was generally excessive for normal listening, the TL026 was run at reduced gain for the listening tests.

PRODUCT DETECTOR AND LOW-LEVEL AUDIO AMPLIFIER. The product-detector (PD) / AF unit is shown in **Figure 5**. This design was copied with little or no modification from the 40m receiver project (April 2013). A diode double-balanced mixer is used as the PD. Demodulated SSB or CW signals appear as audio at the mixer IF port. A simple diplexer provides a 50Ω termination for IF and carrier insertion oscillator (CIO) / beat frequency oscillator (BFO) signals. The AF signals are amplified by a BC548 transistor amplifier in a common-base configuration.

The balun transformers T1/T2 in the PD are each 10 turns, trifilar wound on FT37-43 ferrite toroids. See last month's issue for

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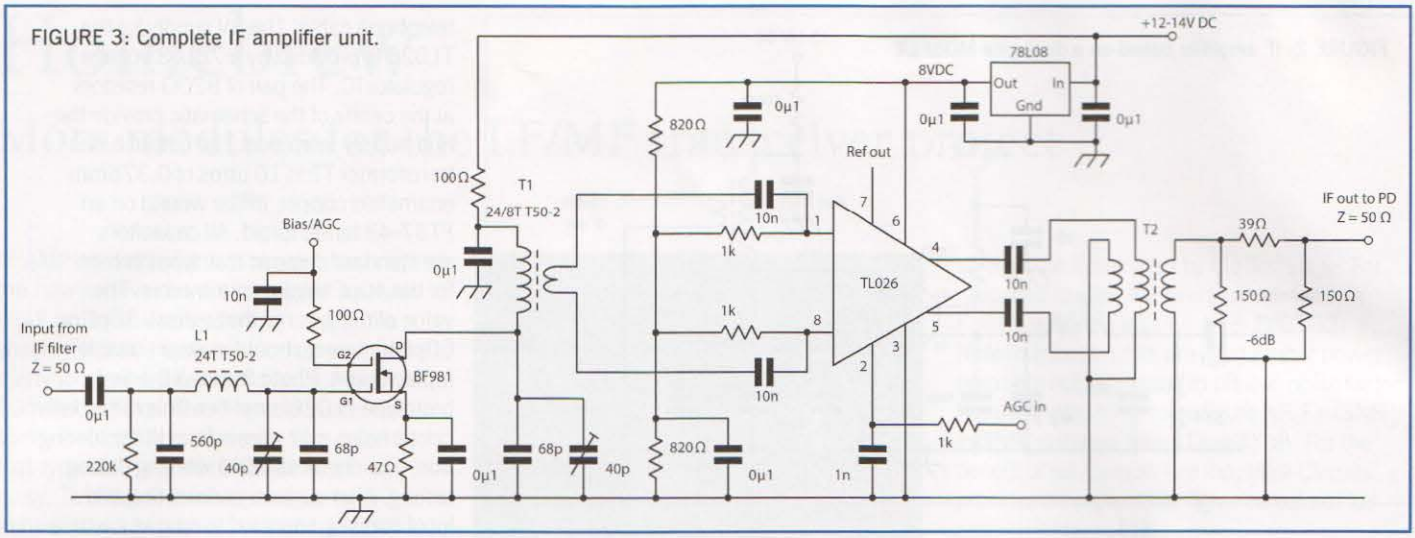
FIGURE 3: Complete IF amplifier unit.



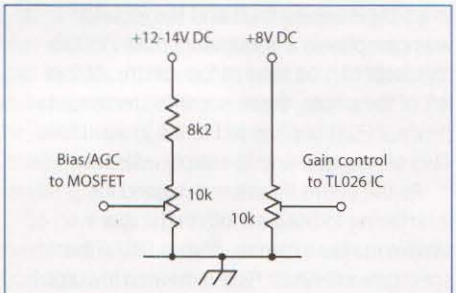


FIGURE 4: Temporary bias/gain control circuit, in lieu of AGC voltages.

detailed information about making this type of transformer. The four diodes are 1N5711 Schottky types that were matched for forward voltage drop using the diode test feature of a digital multimeter. Diode choice is not that critical for this application. Ordinary silicon signal diodes like the 1N4148 or 1N914 would probably perform well in this circuit. The 470µH inductor is a miniature moulded choke. If a suitable choke is not available, you can use 37 turns of enamelled wire on an FT37-43 toroid. The assembled PD/AF unit is shown in **Photo 3**. The IF carrier oscillator will eventually be part of the transmit exciter unit, which has yet to be built. The oscillator at the RHS of Photo 3 is a spare oscillator that was temporarily grafted onto the PD/AF. Regular readers will recognise this as the oscillator I use for testing crystal parameters.

TESTING. The available units were wired together for off-air reception tests. As many of the 50Ω inter-module connections are via BNC sockets, assembling the receiver turned out to be a remarkably quick and easy job. The units are: RF LPF, front end module, local oscillator (provided by my DDS signal generator), SSB IF filter, IF amplifier unit, PD-AF and BFO/CIO as described. The output from the PD/AF was taken to the audio line input of my PC sound card so that I could record and analyse received signals. Always take care when connecting external equipment to your PC. Damage caused by accidental overloading of the audio inputs could be inconvenient if you use a removable sound card and much worse if your PC has onboard audio. The front end, IF and PD-AF modules are shown in **Photo 4**.

My HF doublet was used for the receive tests. As soon as power was applied, I heard some strong and very clear signals from a couple of French stations who just happened to be chatting on the 80m frequency the DDS was tuned to; a very good start indeed! Tuning around the band revealed many SSB and CW stations. After dark, I noticed a familiar sounding one second 'pip' signal in the background on all signals. This turned out to be from the Russian RWM time and frequency standard, which is very close to the IF filter passband at 9.996MHz. The interfering signal was picked up directly by the unscreened IF unit and not via the aerial and RF LPF. Re-positioning the modules provided a temporary cure. This problem should disappear when the units are installed in a screened enclosure.

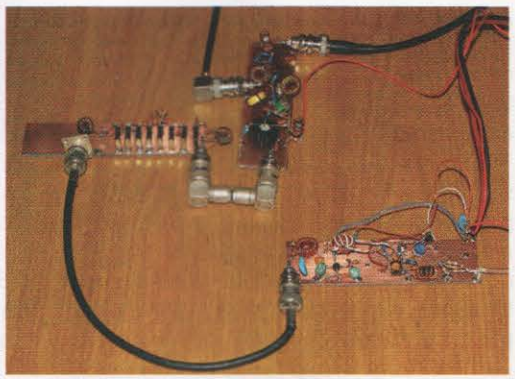


PHOTO 4: Front end, IF and PD-AF modules connected together for testing.

Many local and DX SSB and CW signals were heard on 80m and 160m. Receive performance seems as at least as good as my main HF transceiver, perhaps even better on quiet bands due to the low noise from the IF amplifier section.

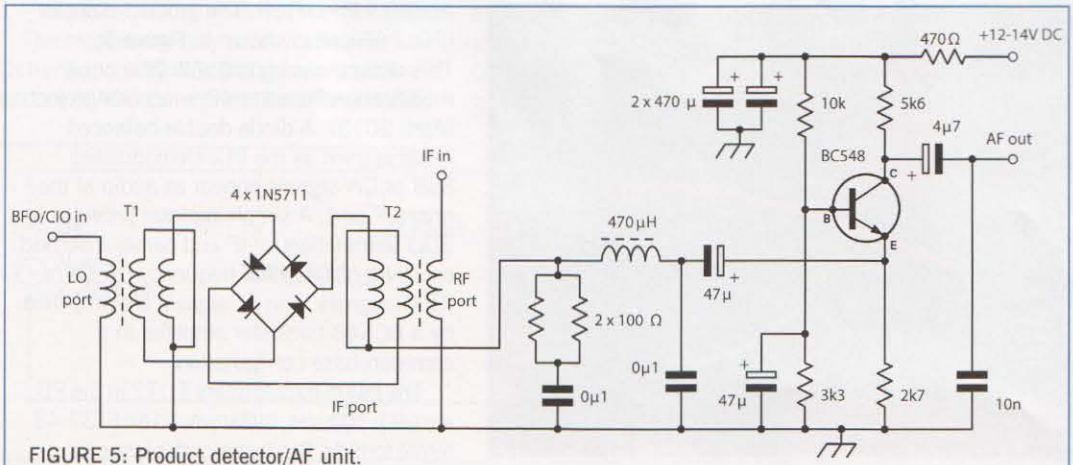


FIGURE 5: Product detector/AF unit.

WEBSEARCH

[1] http://217.34.103.131/applications/mcl_nf_calc.html
[2] Texas Instruments TL026CP datasheet, 1998.

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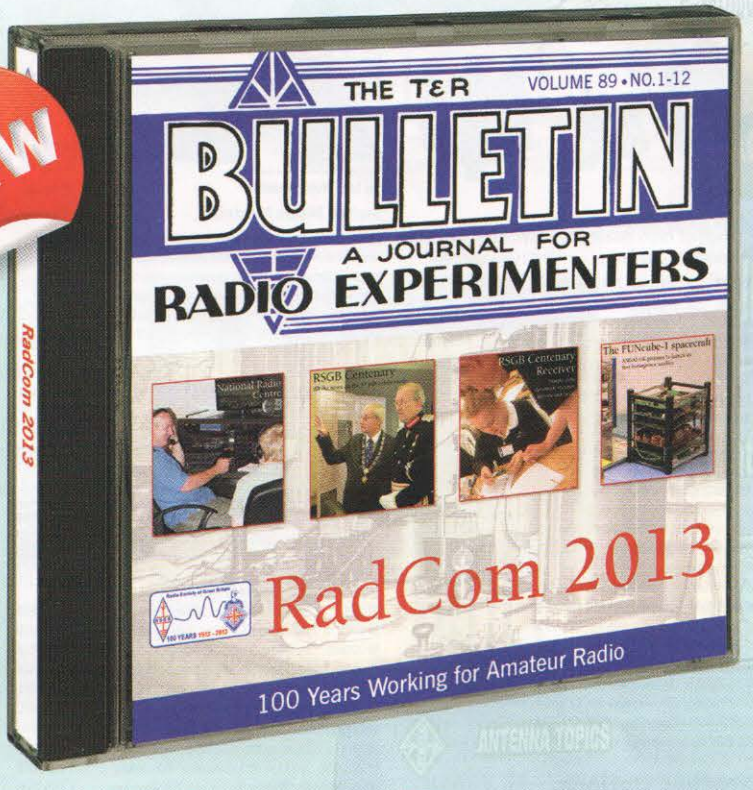

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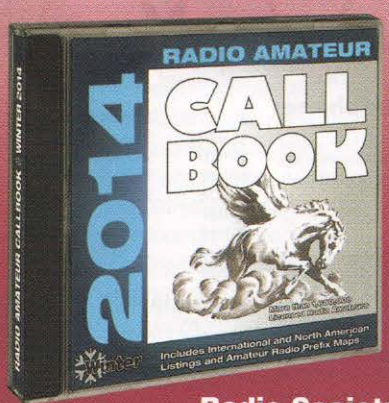

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W-8685 Clock with alarm and inside & wireless outside temperature display **£9.95 A**

Mobile Microphones

Drive Safely - No Holding The Microphone!

Mobile Kit: Adjustable goose neck microphone with PTT change over flick switch

WM-S-FT
Includes Yaesu RJ-11 6 pin modular plug/lead (WYL-6M) **£59.95 C**

WM-S-RW
Choose 1 x free lead WKL-8M/WIL-8M/WYL-8R/WKL-8R/WIL-8R **£59.95 C**

WM-S-IC For Icom
Choose 1 x free lead WIL-8M or WIL-8R **£59.95 C**

WM-S-7000 For Icom IC-7000
Includes free WIL-8M lead **£59.95 C**

WYL-6M	Lead for WM-S to Yaesu modular RJ-11 6 pin plug	£9.95 A
WYL-8M	Lead for WM-S to Yaesu modular RJ-45 8 pin plug	£9.95 A
WKL-8M	Lead for WM-S to Kenwood modular plug	£9.95 A
WIL-8M	Lead for WM-S to Icom modular plug	£9.95 A
WYL-8R	Lead for WM-S to Yaesu 8 pin round plug	£9.95 A
WKL-8R	Lead for WM-S to Kenwood 8 pin round plug	£9.95 A
WIL-8R	Lead for WM-S to Icom 8 pin round plug	£9.95A
WAL-8M	Lead for WM-S to Alinco modular type mic plug RJ-45	£9.95 A

VHF - UHF WHIPS

Vehicle Mount Mobile Whips

W-285	2m 5/8ths whip SO-239 fold-over base	£19.95 B
W-77LS	2m/70cms SO-239 0/2.15dBi gain 0.39m long	£14.95 B
W-770HB	2m/70cms SO-239 3/5.5db gain 1.1m	£19.95 B
W-7900	2m/70cms SO-239 5/7.6db gain 1.5m	£34.95 B
W-627	6m/2m/70cms SO-239 2.15/4.8/7.2dBi 1.62m	£39.95 B
W-8900	10m/6m/2m/70cm 1.32m long	£69.95 C

Integral Micro Magnetic Base Mobile Whips

WSM-270	2m/70cm BNC termination 460mm long	£19.95 B
WSMA-270	2m/70cm SMA termination 460mm long	£19.95 B
WSM-1900	25-1900MHz Receive only. BNC 40cm long	£19.95 B
WSM-225	AVIATOR-2 VHF/UHF airband	£19.95 B
WSM-138	Mobile VHF receive only BNC 138-500MHz 5	£10.95 B

Magnetic Mounts

Triple Magnetic Mount WM-14B

WM-14B	14cm with SO-239 New "Stay-Put" design	£16.95 A
WM-08B	8cm with SO-239 New "Stay-Put" design	£13.95 A
WMM-7	Heavy duty 7 inch SO-239 with cable & PL-259	£19.95 A
WMM-5	Medium 5 inch SO-239 with cable & PL-259	£16.95 A
W-300S	Triple with SO-239 socket and 5m cable with PL-259	£39.95 C
W-300T	Triple with 3/8" socket and 5m cable with PL-259	£39.95 C

Antenna Vehicle Mount Kits

W3-HM W3-RM W3-CK

W-3HM	Hatch/boot universal mount black stainless steel	£16.95 A
W-3RM	Universal rail mount ,stainless, multi angle adjustable	£16.95 A
W-ECH	Cable kit 5m cable SO-239 to PL-259	£13.95 A
W-3CK	Cable kit 5m low loss 5D-FB 30cms PTFE lead	£19.95 A

Cross Needle VSWR Meters

Widely accepted as one of the best ways to read how well your antenna is matched. You can read both forward and reflected values at the same time.

WCN-200 Cross needle VSWR/POWER meter
1.8-200MHz 0.5-30W-300W-3kW **£79.95 C**

WCN-400 Cross needle VSWR/POWER meter
140-525MHz 0.5-30W-300W-600W **£79.95 C**

WCN-600 Cross needle VSWR/POWER meter
1.8-200 & 140-525MHZMHz 30/300/3000W **£99.95 C**

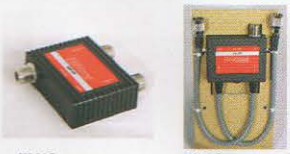
Communications Headphones

HP-100 8 Ohm communications head-phones 3.5mm & 1/4" £19.95 C

Professional Earpieces

WAT-999 Acoustic tube earpiece 3.5mm straight plug curly cable **£9.95 A**
WAT-999K Acoustic tube earpiece 2.5mm right angle plug curly cable **£9.95 A**

High Quality Duplexers



AV-32D AV-32C

AV-35C-NMNM Duplexer
1.6-30 & 49-470MHz N socket to 2 cables PL-259 & N plugs **£54.95 B**

AV-22C-NNNM Duplexer
1.6-150 & 400-460MHz N socket to 2 cables N plugs **£41.95 B**

AV-32C-NMNM Duplexer
1.6-56 & 140-470MHz N socket to 2 cables PL-259 & N plugs **£54.95 B**

Multi Band HF Mobile Whips

If you are looking for a very effective mobile antenna that is also good value, then look no further. This could be exactly what you need. The band changing is carried out using a fly lead with plug, and the base of the antenna is fitted with a 3/8" stud thread. Precise tuning is carried out by a top telescopic whip section.

MULTI-RANGER-9
Mobile whip 80/40/20/15/10/6/2m/70cm/Airband PL-259 base 120 Watts 1.9m long max 1kg **£49.95 C**

MULTI-RANGER-200
Mobile whip 80/40/30/20/17/15/12/10/6/2m PL-259 base 200 Watts 1.9m long max 1kg **£69.95 C**

Single Band Mobile Whips

WHF-160B	160m mobile whip 3/8" thread	£59.95 C
WHF-80B	80m mobile whip 3/8" thread	£24.95 B
WHF-60B	60m mobile whip 3/8" thread	£20.95 B
WHF-40B	40m mobile whip 3/8" thread	£20.95 B
WHF-30B	30m mobile whip 3/8" thread	£20.95 B
WHF-20B	20m mobile whip 3/8" thread	£20.95 B
WHF-17B	17m mobile whip 3/8" thread	£20.95 B
WHF-15B	15m mobile whip 3/8" thread	£20.95 B
WHF-12B	12m mobile whip 3/8" thread	£20.95 B
WHF-11B	11m (CB) mobile whip 3/8" thread	£20.95 B
WHF-10B	10m mobile whip 3/8" thread	£20.95 B
WHF-6B	6m mobile whip 3/8" thread	£19.95 B
WHF-4B	4m mobile whip 3/8" thread	£19.95 B
HFPL-10	10m mobile whip PL-259 base 1.25m long	£29.95 B
HFPL-15 1	5m mobile whip PL-259 base 1.25m long	£29.95 B
HFPL-20	20m mobile whip PL-259 base 1.25m long	£29.95 B
HFPL-40	40m mobile whip PL-259 base 1.25m long	£32.95 B
HFPL-80	80m mobile whip PL-259 base 1.25m long	£32.95 B

Handy Speaker Microphone

A competitive microphone that suits a wide rnage of equipment. Each model has a dedicated ready wired terminated lead.

QS-112Y	Spkr/Mic for Alinco/Yaesu/Icom 2-pin	£16.95 A
QS-112Y4S	Spkr/Mic for single plug 4-pole screw	£16.95 A
QS-112Y4	Spkr/Mic for single plug 4-pin	£16.95 A
QS-112K	Spkr/Mic for Kenwood 2-pin	£16.95 A
QS-112W	Spkr/Mic for Wouxun 2-pin	£12.95 A
QS-112E	Spkr/Mic for Elecraft KX3 single 4-pole	£39.95 A
QS-112Q	Spkr/Mic for Quansheng 2-pin	£12.95 A
QS-112GP	Spkr/Mic for Motorola GP-320/340 etc	£20.95 A
QS-112M	Spkr/Mic 2-pin Motorola	£16.95 A

Formula-1LR

Liquid rubber is a handy substance that can be painted onto any surface where a permanent flexible, but waterproof joint is needed. It has been extensively tested for RF use in professional installations. **£5.95 A**

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

IOTA

Celebrating 50 years of IOTA activations

I am delighted to be invited to continue writing the IOTA column within *RadCom*. The program, as we know, is administered by the RSGB, so it's imperative Members are kept up to speed on all things IOTA.

I've been an avid supporter of IOTA for over 25 years now, primarily as a SWL and latterly a licensed listener. One idea for the column is 'Interview the Activator' featuring well-known island activators from around the world. This month, Cezar, VE3LYC has agreed to answer my questions.

Cezar, CE9/VE3LYC on Herschel Island, SA-031.

INTERVIEW THE ACTIVATOR. Cezar Trifu, VE3LYC is a well-known DXer and IOTA activator / chaser from Ontario. He was born and raised in Romania and, in 1992, moved to Canada with his family. He holds many awards and has activated no fewer than five all time new IOTAs, together with activity from some rather rare islands, too.

How was your passion for IOTA born?
Island chasing began as an extension of my interest in the DXCC program, as YO3YC, more than 25 years ago. Looking for a QSO with IOTA expeditions to distant and rare islands seemed quite challenging. Since my operating conditions at the time were very modest, I took advantage of the weekly IOTA network on 20m organised by Gianni, I1HY. Internet wasn't yet available, so the network was the only opportunity to regularly bring chasers and activators together. As far as activation is concerned, I first travelled with Ken, G3OCA in 2007 on an attempt to activate NA-231. A year later we had a memorable trip, operating as VO2A from NA-194 and 205, both on the IOTA Most Wanted list.

You have been to some pretty inhospitable and quite dangerous places, which one sticks out as being so?
I already had 900 IOTAs confirmed by the time of my first activation, and I promised myself to travel only to island groups I never logged before. I have always studied carefully the local conditions in order to develop a reliable expedition plan based on available logistics. However, trips to remote, uninhabited islands, in potentially extreme weather conditions, often carried out with rather modest transportation resources, cannot be completely predicted. From the damaged engine and almost boat sinking during the trip to Gilmore Is (VY0O, NA-230) to the few days spent alone in Arctic winter on East Pen Is (VY0V, NA-231) without water, heat, and gas, and from the incredible weather opening and majestic fauna on Gonzalo Is (CE9/, SA-097) to the accidents, loss of gear, and the battle with sea lions for high ground on Escondida Is (LU6W, SA-096), the adrenalin rush was part of the adventure.

Having activated new and rare islands in the past, is there *one* abiding island or group that you think unlikely ever to be activated, but you'd like the opportunity?
I believe that any island group can and will eventually be activated; it is just a matter of time and resources. I would like very much to be part of a team that puts on the air one of the un-activated Antarctic IOTA groups. One of the major difficulties is the unpredictability of the weather that can prevent sailing to high southern latitudes or landing anywhere. Shag Rocks, for example, has been on my mind for some time. As if weather conditions and the shape of the rocks wouldn't be challenging enough, obtaining a landing and operating permit from the Government of South Georgia and South Sandwich appears extremely difficult, to say the least.

Since 'Murphy' seems to keep an 'affectionate' eye on you, how does your family react when you announce plans?
Lucy has generally learned of various problems from internet posts, later detailed with my storytelling. She was definitely concerned. In any case, this all changed during the trip to East Pen Is (VY0V, NA-231). After spending a couple of days alone on the island, without any concrete feedback as to when I could be picked up, I asked several hams to contact her and let her know of my situation. Thus, she became a direct participant to the expedition, working behind the scene to ensure that a timely rescue mission was mounted. She knows only too well my passion for radio and adventure.

If you had to choose between operating from a rare / new IOTA group and a Most Wanted DXCC but-not-so-rare-IOTA (eg BS7H), which would you choose?
The rare/new IOTA group! There is only one DXCC-IOTA I still need: Navassa Is, which is not a Most Wanted IOTA and while I would like to operate from Scarborough Reef, it is not a Most Wanted IOTA. I think that I am more suitable for small team operations that requires participants to be not only skilled, but physically and psychologically fit, highly driven, and able to cope with hazards and the unexpected.

Where do you see the IOTA Programe within the next five to ten years?
Based on the size of the pile-ups, there are perhaps as many as 20,000 hams infrequently chasing IOTA, with only a small fraction part of the membership. As the program ushers into a new phase, its development must address some key factors, such as simplicity, promotion and financial means. While I personally continue to love paper QSL cards, advantage should be taken by technological advancements to implement a paperless credit system, which will simplify applications and upgrades. Promotion should be focused on actively establishing an IOTA section at every hamvention, stimulate the publication of articles in magazines, and creating support groups at the regional or continental level.

Do you have any future IOTA plans you could reveal to *RadCom* readers?
Over the last 12 months I have been working on several potential projects to very remote and logistically demanding locations. So far, any of my future plans look more like sketches or a wish list.

50TH ANNIVERSARY CONVENTION. The IOTA 50th anniversary convention takes place during the weekend of 4 to 6 July. This promises to be a very special occasion held at Beaumont House, Windsor. Full information can be viewed at http://rsgb.org/main/radio-sport/rsgb-iota-50th-anniversary-convention/ and tickets are available at www.rsgbevents.org/.

NEWS. SA-018 Guafo Is: Members of the Radio Club Provincial Lanquihue will be on the air as 3G7PM from 23 to 28 February. NA-189 Cocinas Is: operators will be active as XF1T between 14 and 17 March using HF, CW and SSB. QSL via IT9EJW and *Club Log*. OC-016 Beqa Is: Jeff, K0UU will be active as 3D2FJ between 23 and 31 March. Activity will be 'holiday style' from 10 to 80m using CW. QSL via home call, Logbook of The World or direct. OC-219: YF1AR, YB2TET and YB3MM plan activity from the rare Wangiwangi Island OC-219 between 26 March and 2 April.

March 2014 • RadCom

John Lemay, G4ZTR • e-mail: john@g4ztr.co.uk & John Regnault, G4SWX • e-mail: john.regnault@btinternet.com

An Introduction to Moonbounce

Part 2: The practical side

RECAP. In the first part of this article we mentioned that there are many stations that now operate EME on 144MHz with as little as a single 2-wavelength long Yagi antenna and 100W. This brings moonbounce communications – at least with other, larger stations – within the capability of hundreds of small stations within the UK. Although it might seem daunting, EME can be done with fairly 'standard' VHF SSB station capability. In this second and final part we cover some of the operating issues to assist those who would like to give EME a try.

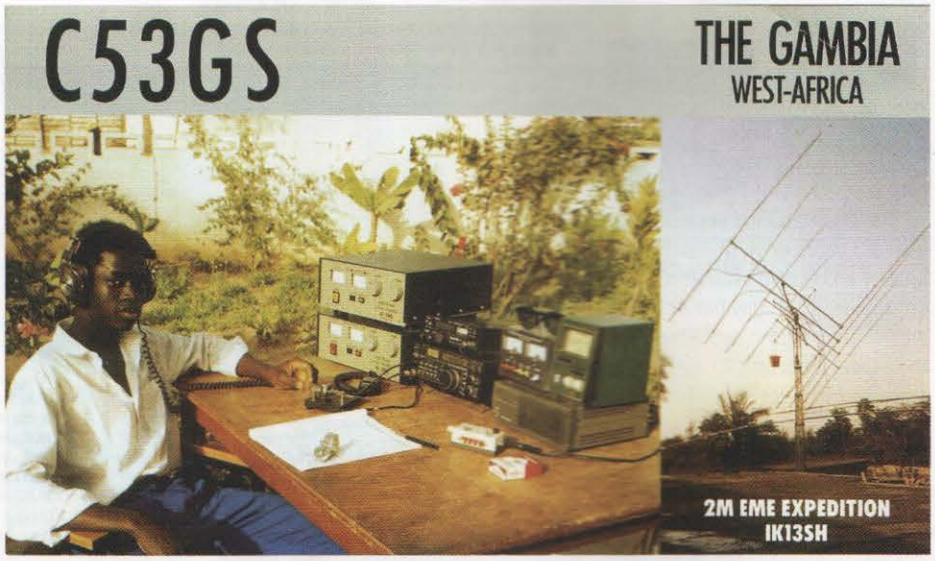


PHOTO 4: QSL card from C53GS confirming the first 144MHz QSO between The Gambia and England.

SETTING UP *WSJT*. The newcomer to EME will almost undoubtedly begin with JT65B from the *WSJT* software suite because of its superior sensitivity over CW and SSB. *WSJT* can be downloaded from K1JT's web pages. The software is free. In the following paragraphs we'll take a quick look at receiver settings, transmitter adjustments, and an easy way to check your receiver.

In order to use *WSJT*, a computer with a sound card and a simple interface are connected to the audio output and the microphone input or 'line' input of a SSB radio transceiver. High-end computing equipment is certainly not needed although decoding speed is dependent upon computer processing power. There are commercial interfaces available but a simple homebrew interface with readily available components is described on the website of Paul Whatton, G4DCV [13]. The interface is required in order to set transmit and receive levels more easily than the somewhat clumsy Windows sliders and, importantly, to provide isolation between computer and radio.

A recommended starting point for the basic settings for EME using *WSJT* is: Setup: Monitor ON at startup, Mode: JT65B, Decode: JT65: Normal deep search, Sync -1, Tol 400. There is a lot more information about getting started on JT65 on the web pages of Gabriel Sampol, EA6VQ [14].

On receive, *WSJT* employs a level control, available as a pull-down menu called 'Rx volume control'. The slider on this control should be set so that when monitoring a quiet part of the band, the Rx Noise icon indicates around 0dB. If the received levels are far adrift from 0dB you can try experimenting with either the PC line volume or microphone volume selection boxes.

At the lower left of the main *WSJT* screen you will see two numbers, which are nominally 1.0000. These numbers indicate whether the input and output rates of your soundcard are close to the required 11025Hz. If your numbers are outside the range 0.9995 to 1.0005, you should use the pull-down menu in Setup, Options to enter the Rate In and Rate Out. It is normal to see these numbers vary a little during signal processing.

For most UK stations, a check of JT65 reception can be made without EME signals, because the GB3VHF and GB3NGI beacons transmit periods of JT65B [15]. If you are not normally able to hear these beacons, try it anyway and you might get a nice surprise about the effectiveness of this mode at very low signal levels. For GB3VHF, tune your receiver to exactly 144.4285 in USB mode. Note that this is 1500Hz offset from the sync tone rather than the 1270Hz normally used in EME communications [16]. Set the waterfall in *SpecJT* to display a speed of 2 to 5 with a vertical scroll and you should see a trace from the beacon, which sends consecutive periods of carrier, CW identification and JT65B identification. If all is well, *WSJT* will decode the beacon as GB3VHF JO01EH. Be patient because the *WSJT* software will not decode the CW or continuous carrier. You will also see some figures to the left of the decoded callsign, including a column headed DF. This is the difference between the frequency of the received signal and your transceiver's calibration. If your transceiver frequency display is accurate, DF will be a small figure, and this represents the frequency error in hertz. If *WSJT* reports DF as -150Hz, you will need to adjust your receiver 150Hz lower to tune the signal spot on. In reality, don't get too concerned if you see DF up to ±200Hz, as JT65 can accommodate errors of several hundred Hz, but some of this tolerance will be used up in the mutual Doppler shift between yourself and the other station. If there is the facility to calibrate the transceiver or transverter this can be done by simply retuning until DF becomes close to zero (see **Figures 2** and **3**).

A final check to make while observing the beacon is the value of DT displayed on the screen. DT represents the difference in time between your computer's clock and standard time and, as with the beacon, it should be 0 seconds. Again, don't be concerned if DT is up to ±1 second. If the reading is greater you should first try to re-synchronise your computer's clock using one of the many internet time sources. If you find that this doesn't work or your computer clock is drifting you will need to install *Dimension 4* [17] or similar timekeeping software to keep this under control. Note that *Dimension 4* works well with Windows XP but is problematic with more recent Microsoft operating systems. For Windows 7 and 8 the recommended timekeeping software is *Meinberg NTP* [18].

Users who have advanced past a single small Yagi antenna have a simple and effective way to test their equipment, by using the sun as a noise source. The antenna array is pointed at the sun, and then pointed at a quiet area of the sky. This will show a difference of several dB, and using VK3UM's software and reference to the current solar indices, a check can be made to see if the system is as effective as theory would suggest.

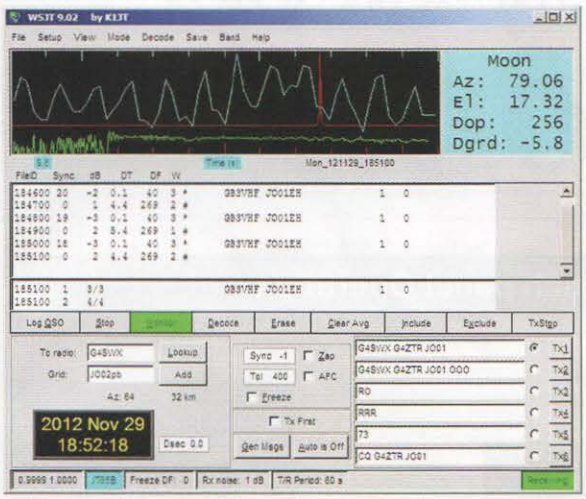


FIGURE 2: Receiving the JT65B GB3VHF beacon signal using *WSJT* software.

It is vital that there is no AGC action in the receiver during this test. The only way to be sure there is no AGC action is to turn it off; just trying to keep the signal levels below the AGC threshold is a notorious cause of misleading results. It's a shame that a few well known transceivers such as the FT-847 have no means of turning off the AGC. This doesn't make the FT-847 completely unsuitable, but be cautious about your results.

RECEIVING EME JT65 SIGNALS. Once you are happy with the setup of the *WSJT* software and your transceiver you are ready to listen for some EME signals. On 2m, most JT65B activity takes place between 144.100 and 144.150MHz. Although you might be able to detect a few stations without a masthead preamplifier, having one now becomes pretty essential.

The *WSJT* screen tells you where the moon is, so no additional astronomical information is needed. Pointing at the moon with a single 3-wavelength Yagi, you should expect to see (but perhaps not hear) a number of the larger stations. With 100W or more of RF at your antenna you should be able to work most of the stations you can see on the *SpecJT* waterfall display. These will be the guys running four or more long Yagis and 1kW, of which there are many, but remember that they will not all be on the band at any one time.

PROBLEM SOLVING. If you know a big station is active but the *WSJT* software is not decoding any information, what might be wrong? You should see a vertical trace on the *SpecJT* window beginning just after the start of a minute and finishing about fifty seconds later. If you do not the *WSJT* software is not being presented with a signal that can be decoded. If you can see a faint vertical trace, the signal might just be too weak and the *WSJT* decoder fails to work its magic. Be patient and remember all the earlier propagation discussion; it may be that after 20 or 30 minutes your wanted station will appear out of the noise. You may have QRN which can take many forms, such as wideband noise, birdies, pulse type interference etc. It is also possible that the combination of frequency error at each end of the path plus or minus Doppler shift may have removed the station outside the search range of JT65. On 2m this range is ±400Hz using the settings recommended earlier, so excessive Doppler shift is not a likely scenario, but on the higher frequency bands you will need to take active steps to compensate for Doppler using RIT or split frequency operation.

On the *WSJT* screen, you will see a column headed "dB", next to DT. The information presented here is the signal strength, normalised to SSB bandwidth (2.5kHz). You might receive a 'big gun' at -10dB for example and at this level you can expect a perfect decode on every occasion. Much weaker signals, around -26dB, will usually but not always decode, and at signal levels of -28dB you should not be concerned if a decode does not occur for several periods. Decodes at -30dB are quite uncommon.

Don't forget too that you should make a visual check on your rotator setting. This might take a while in the UK but eventually you will get the opportunity to make a sighting along the boom of your antenna to the moon. Your reference should be true north, not grid north or magnetic north. The difference between true north and magnetic north is less than 1 degree for locations in the south east of the UK, but around 3 degrees for the West Country and Ireland. Your visual check should be made at different points of the compass because it is quite possible to be aligned correctly at moonrise but to find an error at moonset. Time your observations accurately and don't hang around, because the moon moves across the sky at about 1 degree every four minutes.

We said earlier that Doppler shift is not likely to be a problem on 2m. However, it represents an increasing challenge on the higher bands, as **Table 3** shows. These are the maximum expected values and, to add to the fun, the value of Doppler will change during your QSO.

TRANSMITTING JT65. It's important to get the transmit side of the station set up correctly to avoid either insufficient or excess drive. To start; speech processors and any transmit equalisation filters should be switched off. Control for the transmit level is available from a pull down menu in the *SpecJT* screen and is called 'Tx Volume control'. This should be adjusted so that your transmitter indicates a small amount of ALC and no more. You should check that the ALC level is consistent for the range of tones used by JT65. This will lead to a constant reading on the power output meter. If your transceiver has an audio data or line input connection on the rear panel (such as the FT-847 or TS-2000) this can be more convenient than disturbing the microphone connector – but note that some transceivers also require the microphone to be unplugged to avoid transmitting two modes at the same time!

The transmit and receive periods of JT65 are nominally 1 minute each. In fact, with some decoding time allowed for, plus a delay for relay changeover, the transmit period is around 47 seconds. JT65 modulation is based upon frequency shift keying that drives your amplifier to full power – and places quite a strain on it. Some people have found this out the hard way. When it comes to amplifier ratings you should treat JT65 as a near continuous transmission. There are some excellent solid state amplifiers available and these are of particular value for expeditions where every kg saved is of help. For many people, valve amplifiers are very effective and still remain the norm in 2012.

If the amplifier or power supply show signs of overheating or stress from the JT65 duty cycle, we suggest that you reduce power to a more comfortable level that can be sustained for long periods of operating. In the longer term, consider upgrading your equipment.

EME *WSJT* PROCEDURE. The *WSJT* handbook contains all you need to know about operating procedures on JT65B (although it is quite concise) and the software contains examples of recorded QSOs to practice decoding. Message protocol is quite straightforward. To quote from the notes:

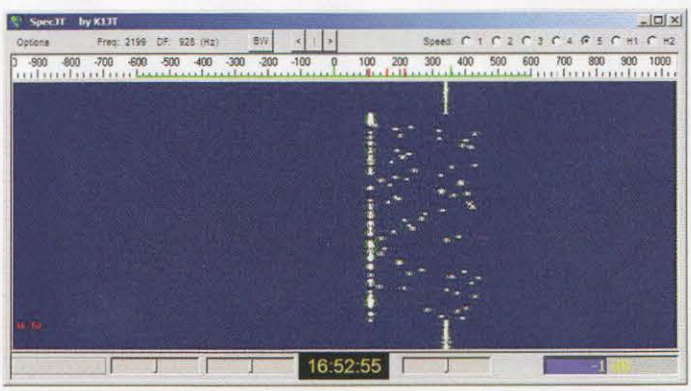


FIGURE 3: Spectral display of JT65B modulation from the GB3VHF beacon.

Exciting New C4FM/FM Digital Mobile Transceiver

C4FM 144/430 MHz DUAL BAND 50 W DIGITAL/FM TRANSCEIVER

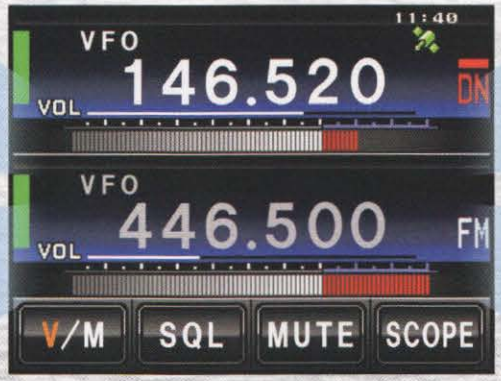
FTM-400DE

Advanced visibility and operability with full color touch panel Operation

Band Scope Screen

Altitude Screen

3.5-inch full color touch panel operation



The icon symbols, multi-function key display and pop-up messages are all displayed in high-resolution color thanks to the full-color, high luminance TFT liquid crystal screen.

Smart Navigation Screen

Frequency Direct Input Screen

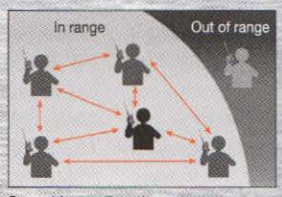
Smart Navigation Screen

- Real-time navigation function enables Location checking at any time.
- Backtrack function that starts navigation facing a registered point.

C4FM Digital Clear Voice
Clear and Crisp Voice Technology

Digital Group Monitor (GM) Function

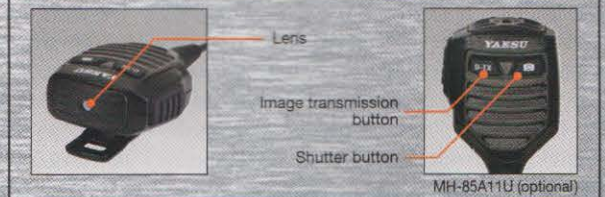
- Automatically checks whether members registered to a group are within the communication range.



Group Monitor Function

Snapshot Function (Image Data Transmission)

- Image data can be displayed on the screen.
- Image data can be sent easily to other C4FM FDMA digital transceivers.



MH-85A11U (optional)

YAESU
The radio

YAESU UK Ltd
Unit 12 Sun Valley Business Park, Winnall Close
Winchester, Hampshire SO23 0LB

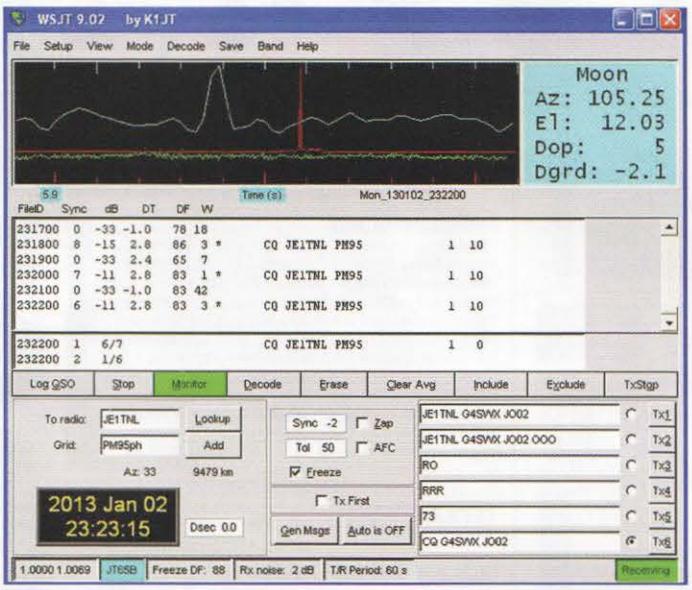


FIGURE 4: *WSJT* display of JE1TNL calling CQ via EME using JT65B.

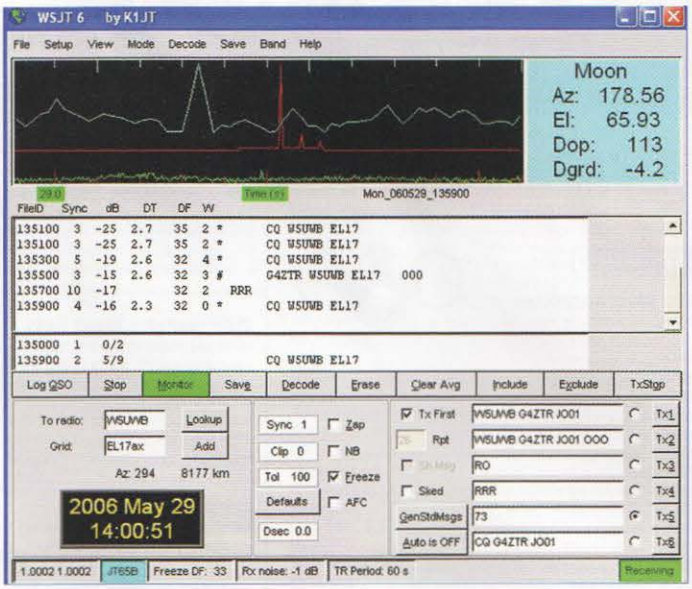


FIGURE 5: A typical JT65B EME QSO. W5UWB calling CQ and then working G4ZTR.

If you have received

- less than both calls, send both calls and your grid locator
- both calls send both calls, your grid locator and OOO
- both calls and OOO, send RO
- RO, send RRR.

RRR means the QSO is complete. It is conventional to send 73 to signify that you have received the RRR, but can be omitted for brevity if activity is high, such as in a contest.

Let's emphasise the second point: on EME, *do not send the report until you have successfully received both calls* – this differs from meteor scatter procedure.

If this sounds a bit complex to remember, don't worry because the program contains templates for these messages and they follow the logical sequence of a QSO. Unless signals are strong it is quite normal, and absolutely correct, to keep sending the same message for a number of periods until you have the received appropriate information from your QSO partner to enable you to move on to the next message.

Your QSO attempt might fail – it happens. It's far better to accept that a QSO has failed than to claim a QSO that wasn't completed. There are no hard and fast rules about how long your attempt might last, but generally people try for three or four periods of one message. If your QSO partner is willing, carry on: patience might be rewarded. One bad habit to avoid is giving a running commentary on the internet chat channel – the QSO attempt must always stand or fall by the information that you manage to exchange via the Moon.

In general if your station is on the smaller side, it is easier to work your first few stations by tuning around and responding to CQ calls. However once you have made a start and 'gained your spurs', calling CQ can yield you quite a few contacts from others looking for new 'initial' EME contacts. This is where online chat and internet reporting (discussed later) can be really helpful for setting up skeds. It takes approximately 2.7 seconds for your signal to travel to the moon and back and this means that an EME signal will indicate a DT of around 2.7 (remember that we said earlier DT=0 for a local beacon). The differential can be useful in deciding whether a signal from, say, Germany is being received by the direct path or via EME.

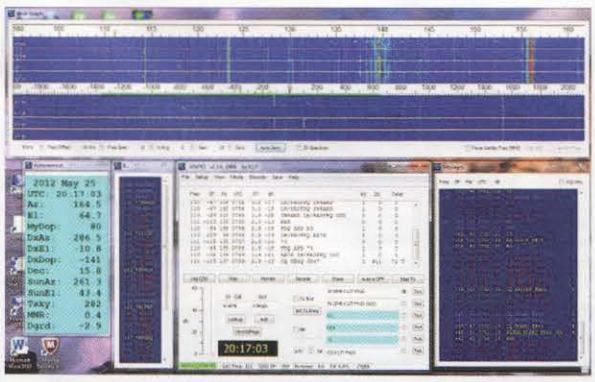


FIGURE 6: *MAP65* software from K1JT in operation. This includes a 60+kHz wideband waterfall display at the top and a QSO dialogue box in the middle at the bottom. It displays decodes of other QSOs in progress in addition to the one being made by the operator.

EME CW PROCEDURE.

Because of the exceptionally low signal levels and frequent fading EME QSOs normally only consist of the basic minimum necessary for a complete QSO. For a QSO to be complete, both parties must have exchanged callsigns, reports and an acknowledgement that the report was received.

For reports, 144MHz EME operators use a single letter, O, to signify that both callsigns have been received in full. On higher bands the reporting system takes more account of signal levels. For full details see [19], which applies to all of the higher bands. Conditions are so variable that even when signals are stronger and an exchange of RST is appropriate most good operators still transmit O & RO reports to secure the QSO before sending a conventional report.

KEYERS. Although a few stations still prefer to use a straight key, the majority of CW EME operation is made using some form of memory keyer. There is no doubt that precise, well-formed characters and regular rhythm can help improve readability at very low signal strengths. A steady 12 to 15WPM seems to suit most operators on 144MHz. Quicker speeds often result in dots getting lost in fast fades. However the libration fading rates are three times faster on 432MHz and three time faster still on 1296MHz so the optimum techniques are different for each band. If you are in QSO with an experienced operator, try to match their speed and style of sending, which they will be using from experience. Information is usually sent without punctuation (W5UN G4ZTR rather than W5UN DE G4ZTR) and regularly repeated for the duration of a transmit period, which makes keyer programming an easy job.

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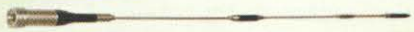

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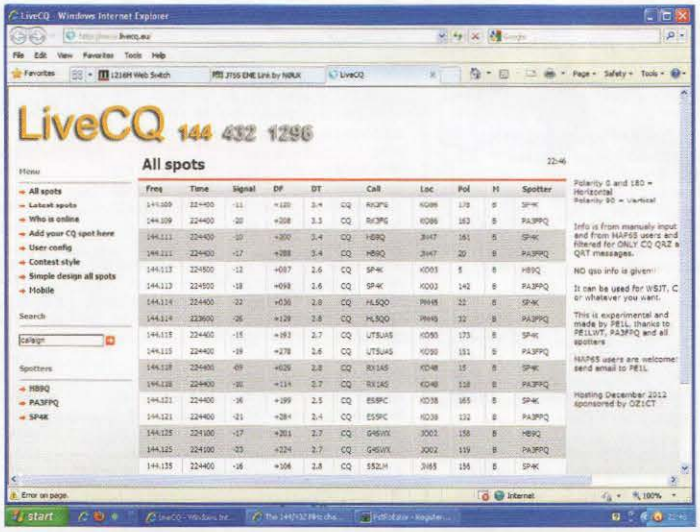

FIGURE 7: Live CQ EME reporting web site with 9 stations calling CQ.

filter is almost essential, with 300-500Hz bandwidth being commonly used. Filters that are too narrow or peaky can result in undesirable ringing, which can soon lead to listening fatigue. In addition to a good IF filter, most operators use an external audio filter, usually tuneable and often with variable bandwidth. As computer technology has advanced so have DSP audio filters, and as they have improved the majority of operators have changed from using more traditional analogue audio peak filters.

When calculating EME station performance an audio filter bandwidth of 100Hz is often assumed for CW. However, with a repeating EME message a good operator may be able to better this by 3dB or more by taking advantage of libration peaks, implying an effective bandwidth of 50Hz or less; when using software, feel free to adjust the reference bandwidth to reflect your own CW capabilities. A part of the receiver which is very often forgotten, but very important for EME operation is the operator interface, the headphones. As you will be dealing with weak and noisy signals for long periods of time the issues here are comfort and keeping out background noise. Whilst there are many 'communications' types on sale, many of the hi-fi types can often offer superior performance at lower cost.

SOFTWARE DEFINED RECEIVERS. Even with basic soundcard based software defined radio (SDR) radio receivers it has become possible to view and demodulate signals over significant sections of the amateur bands. One of the programs developed by Joe Taylor interfaces with a SDR receiver and decodes all JT65 signals across a maximum of 96kHz bandwidth. This software can be used with dual polarisation antenna feeds and receivers to determine the polarisation angle of the received signal. This gives the user the advantage of being able to see all of the stations received at one time. It is feeds from stations running such software that support the Live CQ website, which is a worldwide reporting system for stations calling CQ via EME. Remember that about half the world's surface will be able to see the moon and hear the same EME signals at any given time, so a worldwide reporting system is of genuine value. However, because of the difficulties that polarisation shifts cause between users in different parts of the world, Joe Taylor began work in 2006 on software that would enable the user to see a panoramic display of signals within a 90kHz bandwidth, indicate the received polarisation and decode multiple digital signals simultaneously within that bandwidth. This requires the use of antennas in more than one polarisation, separate feedlines and preamplifiers and a dual channel receiver. The program is currently called *MAP65*, version 2. The detail is outside the scope of this article and the reader is referred to an excellent paper by Joe in the EME2012 Proceedings **[20]**.

ONLINE CHAT AND SIGNAL REPORTING. A question often asked is how you decide where to call CQ, or to listen for others. There is no 'calling frequency' and no "up ten" after establishing contact. Although you might have been watching or listening on a frequency for some time as most EME signals are so weak you might not hear them, how do you decide where to call CQ, or to listen for others? It is usually best for the first few QSOs to call one of the larger stations. However, after proving that your station is capable of EME QSOs, it is sometimes easier to call CQ as there will be many stations looking for new EME 'initial' contacts.

Fortunately, the internet contains several useful sources of real-time information. Live CQ is a web page where automated EME receivers report their reception of CQ and QRZ calls **[21]**. The reception is based on SDR techniques and reported data includes the frequency, relative signal strength and received polarisation as well as the callsign. Once you have seen some activity on Live CQ you have a choice of replying to a CQ call, or finding a clear frequency in between. Another excellent source of information is the NOUK web pages **[22]**, a live chat room for EMEers to set up contact schedules, discuss equipment, or observe activity. While having a live chat, you must be careful to exchange the necessary information to complete a QSO exclusively on the radio, as already mentioned. Usually it's best to keep quiet on the chat during a QSO; there is plenty of opportunity to exchange congratulations or commiserations later. For 6m EME in particular, there is a page for EME/JT65/CW on the well-known ON4KST chat site **[23]**.

THE FINAL COURTESY. EME operators still keep up one of the nicest traditions of amateur radio, that of QSLing directly – because every EME QSO really is something special. In addition to the QSL card, most people include a picture of their antenna system and occasionally other pictures of their station. Up-to-date directories of all stations active on EME are available on a number of internet websites **[24]**.

So, if you are ready for one of amateur radio's ultimate challenges, come and join us 'lunatics'. If you have a good station for terrestrial VHF/UHF DX, then you are already half way there. As you can see from this article, it won't be easy, but the reward is that every EME QSO will be something to remember.

WEBSEARCH

[13] Home built PC soundcard interface: www.g4dcv.co.uk/radio/interface.html
[14] EA6VQ setting up *WSJT*: www.dxmaps.com/wsjtsetup.html
[15] GB3VHF: www.gb3vhf.co.uk/GB3VHFReceiving.html
[16] Data, Andy Talbot, G4JNT, *RadCom* Dec 2012
[17] Dimension 4: www.thinkman.com/dimension4/
[18 Meingerg NTP software: www.meinbergglobal.com/english/sw/ntp.htm
[19] EME operating Guide for 432MHz and Above: www.dl4eby.de/EME_Operating_Procedures.pdf
[20] EME 2012 Conference papers, RSGB, ISBN 9781 9050 8683 2, www.rsgbshop.org/cgi-bin/sh000010.pl?REFPAGE=http%3a%2f%2fwww%2ersgbshop%2eorg%2facatalog%2fOnline_Catalogue_What_s_New_26%2ehtml&WD=papers%20conference%20eme%202012&PN=Online_Catalogue_Space___Satellites_15%2ehtml%23a1319#a1319
[21] Live CQ: www.livecq.eu/
[22] NOUK: www.chris.org/cgi-bin/jt65emeA
[23] ON4KST Chat: www.on4kst.org
[24] EME Directory: www.pa0ply.nl/directory.htm

TABLE 3: Maximum Doppler shift on various bands.

Frequency	Maximum Doppler shift (can be up or down)
50MHz	110Hz
144MHz	330Hz
432MHz	1kHz
1296MHz	3kHz
2320MHz	5.35kHz
3456MHz	8kHz
5760MHz	12kHz
10GHz	24kHz

ATV

News from UK and Europe

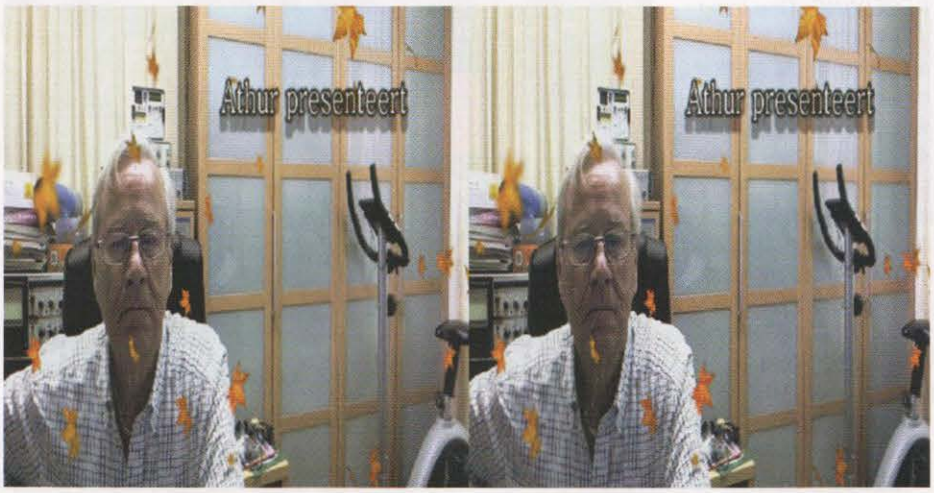

PHOTO 1: ON4FIN transmitting 3D HDTV through ON0SNW.

NEWS. I am sometimes asked why I only talk about the RF communication side of ATV and not about the studio side. The answer is that I report what people are doing. Most of the experimental ATV activities relate to transmission and reception. It is possible to by a decent CCTV camera for £30 and a vision/audio mixer for less than £100 so there is little incentive for us to make these products at home. However, on the transmission side, there is much scope for home construction, either by designing your own products, assembling kits or building equipment from published articles. I am very interested in the studio side of our hobby and I would be pleased to receive any news on this subject.

NORTH WALES. John, GW3JGA reports that the GB3TM repeater in Anglesey will have a new 70cm receiver fitted as soon as the weather improves. This is to improve the DVB-S reception.

CORNWALL. Keith, G0KTD in St Austell and Paul, G6MNJ of Mevagissey have been exchanging pictures on 70cm using very low power over a 5 mile range. Paul has also been trying to get a digital signal to G3MCD in Bodmin but with no luck. With some antenna improvements Paul is confident that they will succeed over this hilly path.

They are also working on adding a 70cm DVB-S receiver to the GB3NQ repeater near St Austell and are just waiting for better weather to put up the antenna.

LANCASHIRE. Darren, G7LWT reports that the new Winter Hill TV Club, M0WTV is now up and running with digital ATV on 70 and 23cm, using an Antennair Quadrant DVB-S transmitter with two video channels over the multiplex. This new club station is located 850 feet ASL on Winter Hill, near Bolton, Lancs. The station is continuously attended by G3SMU and G7GFK, with talkback on 144.750MHz. Talkback can also be accommodated on 70cm.

Digital transmissions from M0WTV are currently running low power, ~1W, but signals have been received across the North West and as far South as Shropshire. Work is in hand to increase the power on both bands.

Analogue ATV is also available on 23cm using a 150W transmitter and soon club members will enjoy the facility to remotely control the club station. For further information about the Winter Hill TV Club, please contact G7LWT or G3SMU via e-mail or on 144.750MHz, the ATV talkback channel.

BOURNEMOUTH. The newly licensed GB3SQ repeater is working well, transmitting in the 23cm band. Recently Dave, G8AJN has been transmitting 3D pictures in 4:3 aspect ratio using red/green filtering for the left and right channels. A 3D monochrome picture can be seen on a normal colour monitor when wearing glasses with red and green eye pieces. See [1] and [2].

COUNTY DURHAM. GB3KM is the first of the repeaters recently licensed to transmit DATV on the 9cm (3.4GHz) band to become operational. It is also the first UK repeater to use this band. With the diminishing availability of the 13cm band, 9cm may well be a good alternative. You can monitor their results at [2] and [3].

BELGIUM AND HDTV. Most TV repeaters simply transmit regular 625 or 525 line television in 4:3 aspect ratio using analogue or digital modulation. Today's broadcasters use high definition transmission in widescreen format. It is very refreshing to see that the ON0SNW repeater near Antwerp is first in Europe to be able to relay HDTV and 3D HDTV. This is also the first repeater to use a multichannel multiplexed transmission, allowing 16 transmission channels on the 10.330GHz output. A single HD output is also transmitted in the 23cm band. **Photo 1** shows ON4FIN transmitting 3D HDTV through the repeater. With this type of 3D transmission the left and right images are transmitted side by side and, by feeding the received signal into a 3D television and wearing the appropriate glasses, a full 3D picture can be seen. You can watch the output of the repeater, in low resolution, on the BATC streaming network [2]. Thanks to Guy, ON4BHM for this report.

GERMANY. The DB0KO repeater near Cologne has more recently reported the ability to relay 3D HD transmissions also. More details of this are shown in [4], as reported by Klaus, DL4KCK.

DATV EXPRESS. This is a digital transmitter designed by an international group of amateurs and suitable for home construction. The advantage of this design is that it will allow for DVB-T, DVB-S and other types of modulation to be used. Charles, G4GUO, who is writing much of the software reports: "We have now shipped the first few DATV-Express boards to developers. I have just finished testing the DVB-T software, which allows the output to be received on a normal digital domestic television. After the software tests are complete we will start selling the parts. The hardware is looking really good, the issues are purely software ones." [5].

NEWS REPORTS. Please send any news and information for publication to my e-mail address at the top of the page.

WEBSEARCH

[1] www.gb3sq.com/
[2] www.batc.tv
[3] www.m0dts.co.uk/gb3km/
[4] www.db0ko.de
[5] www.datv-express.com

March 2014 • RadCom
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Getting started in LF

Amateur allocations below 500kHz

Once upon a time 80m and 160m used to be known as 'the LF bands' but these days we have a *real* low frequency band, 136kHz, and a new medium frequency (MF) band on 472kHz.

Propagation on these low bands is mostly ground wave during the day, with a large increase in range at night. The Atlantic is regularly crossed on both bands in the small hours. Daytime range on 136kHz is about 500 miles and on 472kHz it's a little less. Fading (QSB) patterns are different, with 136kHz tending to have much slower fading than 472kHz.

135.7kHz – 137.8kHz has been with us since 1998 and, now that it's an international allocation, all UK licence holders – including Foundation and Intermediate – can use it. Check your up-to-date licence: it'll be there!

472-479kHz is the new kid on the block, now available to Full licence holders upon issue of a Notice of Variation. This is easy to obtain. Just go to the RSGB website, choose the 'Operating' tab, select 'Licencing & NoVs' and fill in the form for 472-479kHz. The NoV will be e-mailed to you by return.

So there's no problem with permission to operate on these 'long wave' bands, if the idea interests you I shall try and give you some pointers as to how to get going on LF.

The first hurdle to overcome is the fact that you can't just go out and buy some equipment, plug it in, and get on the air. Whether it be a kit or something you've dreamed up yourself, you are going to have to do quite a bit of homebrewing to get going on LF. That, if you are handy with a soldering iron, is a large part of the fun.

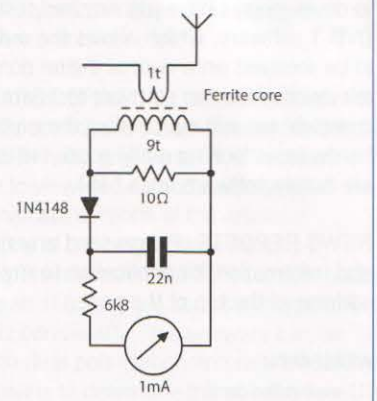

FIGURE 1. Current meter circuit. Aerial lead passes through centre of toroid and forms the 1t primary. Adjust the 6k8 resistor to calibrate

RECEIVING. One thing you won't have to build is a receiver. Most general coverage transceivers will receive on 136 and 472kHz but they may suffer from low sensitivity and be subject to broadcast breakthrough. You will probably need a preamplifier (**Photo 1**) and you will certainly need some filtering to prevent your receiver being swamped by strong stations on the nearby long and medium wave bands.

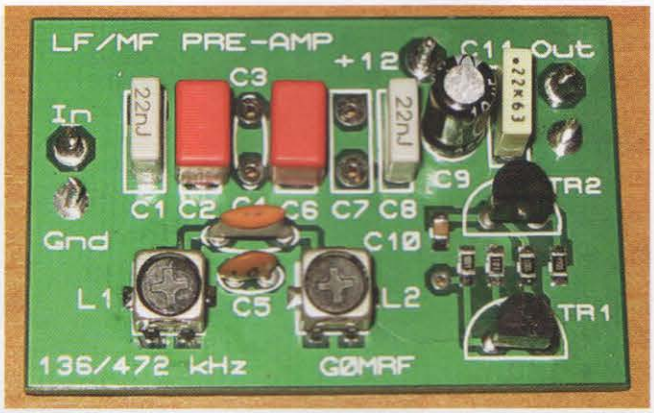

PHOTO 1: The GOMRF preamp that can be configured for either band.

If you just want to have a listen on LF, connect a series inductance between a long wire aerial and the receiver input. Try a ferrite rod salvaged from an old transistor radio (**Photo 2**). The long wave winding works for 136 and the medium wave one for 472kHz. Move the rod in and out of the coil until signals peak up. It's sometimes difficult to know whether you are peaking the right frequency; there could be an intermodulation product getting stronger as you adjust the coil. There are some utility transmitters near the bands that you can use to check that you are tuned properly. On 138.83kHz, just outside the top of the 136kHz band, sits a German data transmitter that sends a steady carrier interrupted every few seconds by a burst of data, a low burbling sound. In the UK this is quite a strong signal and, if everything is perfect, it should read S9+ on the S-meter.

Near the 472kHz band are some aircraft non-directional beacons (NDB). If you search the internet for 'list of UK NDBs' you will be able to find one near your QTH. My local one is BHX at Birmingham airport on 406kHz and it makes a useful reference, even if it is a little way away from the desired frequency.

Having tried things out with a simple setup you'll probably find reception is somewhat noisy. Once you have the main station aerial tuned up for transmit you may find that there's even more noise, but at least it'll be on the right band. The transmit aerial will obviously receive quite well but you'll be very lucky if it's nice and quiet. Most operators find that a separate receive aerial, such as a loop, is a useful addition to the station.

A small receiving loop can be sited at the farthest point from any source of interference and can be orientated to null out particularly troublesome noises. You can even mount one on a rotator. Larger loops such as the popular K9AY type work well but need more space, especially when scaled up for better LF performance.

Commercial broadband loops such as the Wellbrook perform well on LF but it's quite easy to make a tuned loop for one band only. A one metre square frame with about 30 turns of wire should be OK for 136kHz (**Photo 3**). For 472kHz you will only need about 10 turns. A single turn coupling loop should be connected to a coax feed back to the shack. You will need a preamplifier with a small receiving loop like this.

With all receive aerials it is advisable to try and prevent noise currents from flowing along the feeder back into the loop. Earth the feeder near the loop and break the noise path back from the shack with a 1:1 transformer or by winding the coax several times through a high permeability toroid.

TRANSMIT AERIALS. The UK power limits for the LF and MF bands are specified as 1W ERP (effective radiated power) for 136kHz and 5W EIRP (equivalent isotropically radiated power) in the case of 472kHz. Whatever the complicated mathematics involved with arriving at these figures may be, a few watts doesn't sound like very much power. However, when you consider that the aerial efficiency of a pretty good Top Band aerial is only about 0.1% on 136kHz, or a couple of percent on 472kHz, you realise that achieving that ERP limit won't be very easy.

In most cases you will need a transmitter of about 1kW to achieve 1W ERP on 136kHz and a few hundred watts to achieve 5W EIRP on 472kHz. Obviously this depends upon the efficiency of the aerial.

The golden rule for LF aerials is: get as much wire as you can as high as you can. In addition to this, the aerial needs to be very well insulated and clear of trees or buildings. A high aerial with a fair amount of top capacitance, like a classic 'T' aerial or inverted L will work well. These are generally known as Marconi aerials.

Some keen LF operators put up special LF aerials with multiple top wires but good results can be obtained by merely strapping the feeders of a 160m or 80m dipole or G5RV and loading it up against ground. The point about insulation is important though: any amateur aerial for LF will be very small in terms of wavelength and this means that, like a mobile whip on Top Band, the whole system needs to be very high Q to work properly. Any leakage through a lossy structure like a tree branch or a damp roof will lower the Q and the aerial won't work very well. With high power the voltage on the aerial wire will be very high, tens of kilovolts, so any lossy point might cause arcing and damage or fire.

Thanks to the efforts of Jim, M0BMU, we can use a quick method of estimating the ERP of an LF station using a Marconi type aerial. All we need to know is the 'effective height' of the aerial (Heff) and the aerial current at the base of the vertical part. We then apply the appropriate formula that Jim has derived to take account of the relative 'gain' of a short Marconi type aerial and the ERP/EIRP specification differences.

For 137kHz:

ERP = 0.000604 x Iant^2 x Heff^2

For 475kHz: EIRP = 0.0119 x Iant^2 x Heff^2.

The effective height of a classic horizontal topped T or L aerial is the height of the top section in metres. For an aerial with sloping top wires take the average height of the top wires as Heff. For a pure vertical use a value of half the height. So for a flat-top T aerial 10m high and an aerial current of 3A on 136kHz, that works out as about half a watt ERP.

PHOTO 2: A ferrite rod coil can be used to tune a receive aerial.

The same aerial on 472kHz would need about 2A to achieve almost 5W EIRP.

So how do we persuade two or three amps of aerial current to flow into our short LF aerial, and how do we measure it?

Because of the high voltage present on an LF aerial at high power, it would be difficult to use a conventional L-match or other ATU design with a capacitor. The easy way to do it is to place a large inductor in series with the aerial and adjust the value to bring it to resonance on the desired frequency. Rough tuning can be done with taps but fine tuning – and it needs to be *very* fine as the aerial resonance will be sharp – is usually done with a variometer (**Photo 4**). This sounds exotic but it's very easy to make.

First wind a large coil on a kitchen bin or similar large plastic former. For 136kHz you will need around 3mH and for 472kHz it'll probably be about 300μH; an inductance meter will be very useful here. At the top end of the coil make a tapping point every ten turns or so. Next, wind a smaller coil on a former that will easily rotate inside the main coil and wire it in series with the main coil. This extra inductance will either add to, or subtract from the main inductance as it rotates inside it, giving a finely variable inductance.

The feed impedance into the aerial with the coil in series will probably be somewhere near 50Ω due to all the losses in the system but a matching transformer may be required to get it perfect (**Photo 5**).

To measure the current you will either need to find a thermocouple ammeter at a junk sale, or make yourself a current meter. A simple design is shown in **Figure 1** & **Photo 6**. The current meter should be calibrated by placing it in series with a 50Ω dummy load fed by a transceiver operating on 160m. With 100W carrier the meter should be set to read 1.4A. If you do find an old thermocouple meter it's always worth checking it in this way before you believe what it says, as some of them are over 60 years old and well out of calibration!

It is also possible to use a large single turn loop as an LF transmitting aerial. The RF current flowing round the loop should be tens of amps so it needs to be made of thick wire and the tuning capacitors have to be rated appropriately. This configuration is very effective where ground conductivity is poor or where the aerial is surrounded by trees or other lossy structures. In fact the loop, often made of coax, can be strung through trees without problems.

I used a tree-supported rectangular loop of coax in Scotland on 136kHz and worked into Switzerland and Finland on it. The 'vertical' sides were about 50ft and the top and bottom runs about 100ft, with the bottom run being 6ft off the ground. The loop required a 12nF tuning capacitor that I made up with a series/parallel combination of 99 1nF polypropylene capacitors plus a vacuum variable for fine tuning. I found that a loop current of over 30A was achievable, although the capacitors did get warm and the tuning drifted slightly! The coupling transformer was wound on three large ferrite cores, see **Figure 2** and **Photo 7**.

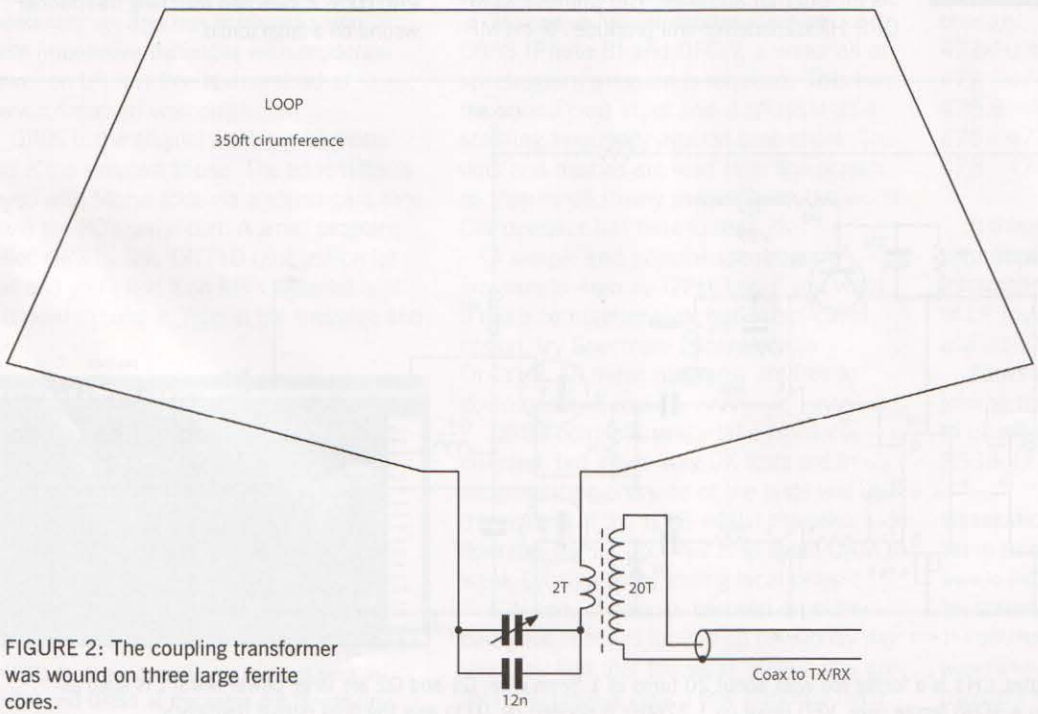

FIGURE 2: The coupling transformer was wound on three large ferrite cores.

March 2014 • RadCom
Dave Pick, G3YXM • e-mail: daveyxm@gmail.com

TRANSMITTERS. There are two types of transmitter used on LF/MF. One is a switch mode type, either Class D or Class E, and the other is a conventional linear type. The choice depends upon power level required and modes of interest. Switch mode transmitters have efficiencies of 80% or so, allowing high power units to be constructed in a small space as they need a smaller PSU and heatsink. Linear power amplifiers, having an efficiency of 60% or less, will need to be much larger for the same output.

There are many designs for Class D or E transmitters on the internet and it is possible to produce about 200W from a desktop design that will run from a normal 25A shack power supply, see **Figure 3**. Power MOSFETs are readily available and cheap and the bigger ones are capable of producing large amounts of power on LF and MF.

If you are going to make your own transmitter you will need a very stable drive source. A DDS is ideal. There are many kits such as the Multi-Rock II by GW4GTE that will do the job.

Many modes in use on the LF bands

PHOTO 4: A homebrew variometer.

PHOTO 3: Tuned loop for 136kHz in action on a Guernsey beach.

don't require a linear PA. CW, QRSS, and *Opera* are all just keyed carrier modes. Some sound card generated modes like *WSPR*, which is FSK, can be amplified with such a PA but you would have to arrange the up-conversion. G0UPL's Ultimate QRSS kit will produce many modes, including *WSPR*, on any frequency up to 40MHz by use of its own inbuilt DDS. Use of phase-shift modes like PSK08 with a non-linear PA will make for a wide transmission so it isn't recommended. (*Some practical circuits for 472kHz were published in the January* RadCom – *Ed.*)

A few high-end transceivers now produce a 136kHz RF output at low level for amplification and some older transceivers such as the IC-706 can be persuaded to transmit on LF and MF but the output is very low and distorted. Great care should be taken not to damage the PA by overdriving it; tap off the RF at low level and take it via an external amplifier. The Chinese X1M QRP HF transceiver will produce RF on MF (and probably LF) but has no filtering for the bands so will need modifying.

A better choice may be a transverter if you wish to run sound card modes like *WSPR*, PSK and *Wolf*. G3XBM has published a simple design on his web site and the German company ID Elektronik produces a ready built 472kHz transverter that can be modified for 136kHz.

OPERATING. The first mode widely used on LF was ordinary CW, sent quite slowly due to the weak signals and, in my case, an inability to go any faster! These days there is some CW on the lower part of the 472kHz band but very little on the 136kHz band. The most popular modes are QRSS, a very slow Morse read from a computer screen, *WSPR* and other new modes such as *Opera* and *Wolf*. The advantage of the new modes is that they are specifically designed for weak signal conditions and are capable of passing information at levels far too weak to be heard by ear. They require the use of a computer with the sound card connected to the transmitter and receiver, just like PSK31.

The mode most likely to produce quick results is *WSPR*. Although not initially

PHOTO 5: A switched matching transformer wound on a large toroid.

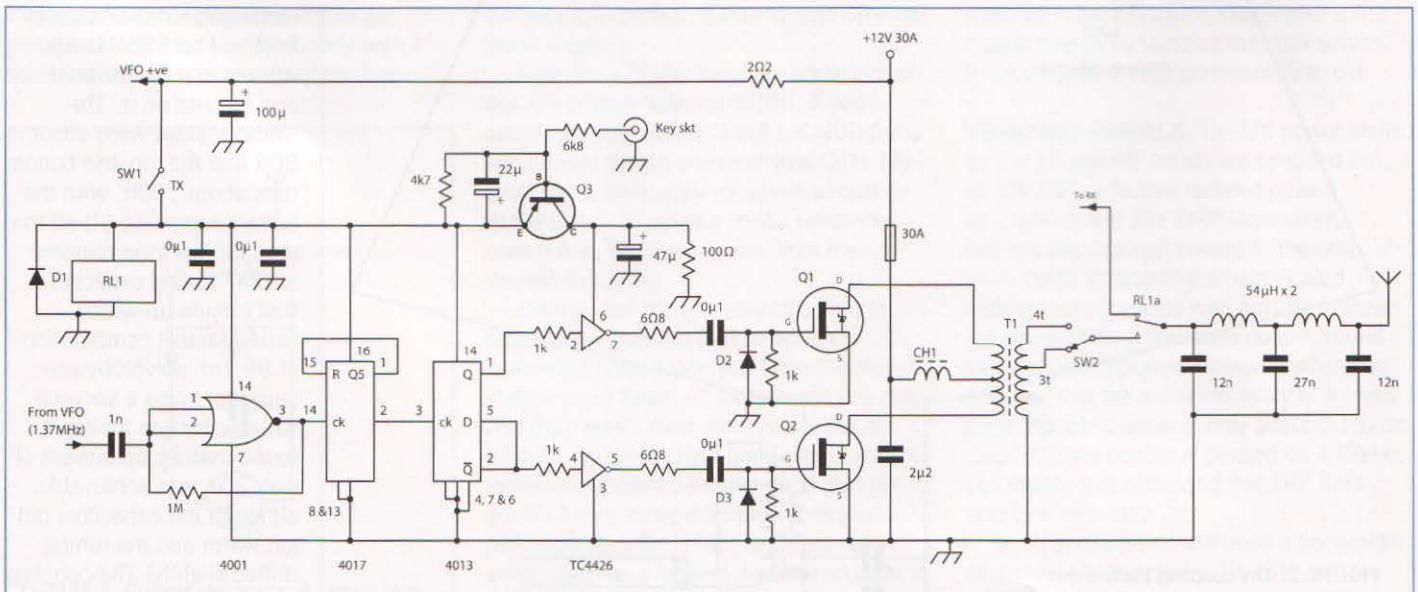

FIGURE 3: Simple class D transmitter. CH1 is a ferrite rod with about 20 turns of 1.5mm wire, Q1 and Q2 are large power MOSFETs such as STW120NF10 and T1 is wound on a 3C90 ferrite core. VFO input on 1.37MHz is divided by 10 to give the final output frequency.

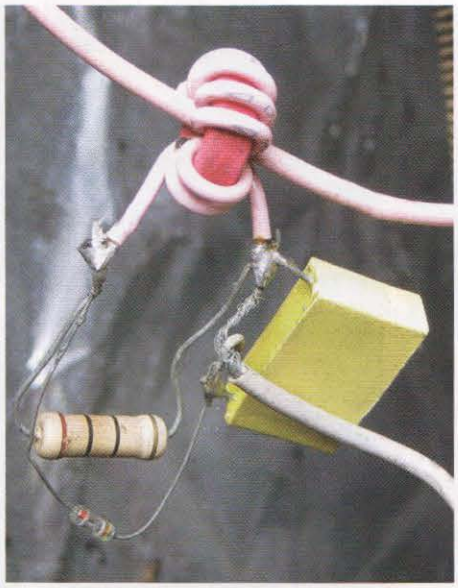

PHOTO 6: The current meter detector in situ on the aerial downlead.

PHOTO 7: Transmitting loop tuning and coupling box.

designed for LF, it is proving very popular and a quick look at the wsprnet.org website will reveal just how many stations are active at any particular time. There are spot databases for both LF and MF bands. The *WSPR* tones are nominally 1500Hz and the Rx (and Tx) should be set to USB on either 136.000kHz or 474.200kHz giving actual transmission frequencies of 137.500kHz or 475.700kHz. *WSPR* is designed as a beacon mode, where each station transmits for a couple of minutes then switches to receive and reports reception of any signals to the website. It cannot be used as a QSO mode. If you want to actually work somebody you'll have to use something else.

Opera is a similar idea, optimised for LF. It uses an on/off carrier so is fine for use with Class D transmitters, has various speed settings and has achieved some quite impressive distances with moderate power on LF. It is free to download at www.rosmodem.wordpress.com

QRSS is the original weak signal mode and is the simplest to use. The transmitter is keyed with Morse code via a sound-card tone or via the PC's serial port. A small program called *QRS* by Rik, ON7YD (just search for that and you'll find it on Rik's website) is all you need to send it. Type in the message and the PC will key it, very slowly. For European contacts the Morse is sent with a dot length of either 3 or 10 seconds. For transatlantic DX 60 or even 120 second dots are used – that makes a dash 6 minutes long if conventional 3:1 ratio is used, so many use a 2:1 dash to dot ratio.

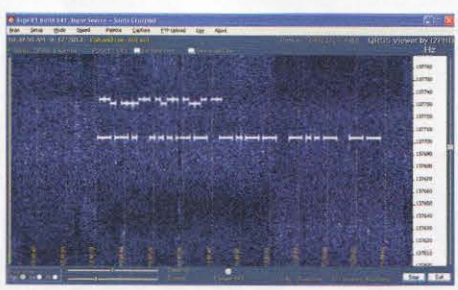

PHOTO 8: Argo showing my callsign sent in DFCW and QRSS at the same dot length. In DFCW the dashes are higher in frequency.

The *QRS* program will also send 'DFCW'. In this mode the dots and dashes are sent on two different frequencies so that they don't need to be different lengths to identify them. With no long dashes to wait for, the message is sent more quickly. The frequency shift information is sent from the serial port together with the keying line. You will need to make up an interface with a couple of optocouplers or transistors. Interfacing information is included in the program under 'Help'.

To receive 'visual' modes such as QRSS (**Photo 8**) and DFCW, a waterfall or spectrogram program is required. This takes the sound card input and displays it as a scrolling frequency against time chart. The dots and dashes are read from the screen as they scroll slowly across; even the worst CW operator has time to read it!

A simple and popular spectrogram program is *Argo* by I2PHD or, if you want a more comprehensive, but complicated option, try *Spectrum Laboratory* by DL4YHF. All these programs are free to download and use.

QRSS contact usually take place co-channel, but if two way DX tests are in progress then one side of the tests will use the bottom of the band whilst the other side operates higher up. This is to avoid QRM to weak DX signals by strong local ones.

CW can, of course, be used on either band but space is limited so on a busy day you may find that the weak station you are trying to copy is only a few hundred hertz away from a strong local signal. A receiver with narrow crystal filters is an advantage here. Many DSP radios have the filtering outside the AGC loop, which means that, although you can't hear the strong adjacent signal, it still de-senses the receiver. Using a receiver with good filters it's amazing how many CW signals you can pack into one kilohertz!

There are advisory band plans for both bands, generated by band users. They are not mandatory but it is important to know where to look for those weak signals. This is the generally accepted 136kHz band plan:

135.7 - 136.2 Tests and transatlantic beacons
136.0 - 137.0 CW
137.0 - 137.6 digital modes
137.6 - 137.8 QRSS centred on 137.7
This is the rather tentative and subject to change.

472kHz band plan:
472 - 475 CW
475.6 - 475.8 *WSPR*
476 - 477 QRSS (also on 478.9)
478 - 479 other digital modes

If this short introduction has whetted your appetite, then much more detailed information can be found in the new edition of *LF Today* by Mike Dennison, G3XDV, available from the RSGB book shop.

News about activity is available by joining the RSGB LF Group on Yahoo. Go to uk.groups.yahoo.com and search for RSGB_LF_group.

WEBSEARCH

The ID Elektronik transverter can be found at www.id-elektronik.de/en/index.htm
The G0MRF preamp can be ordered from www.g0mrf.com/
The G0UPL ultimate QRSS kit can be found at www.hanssummers.com/ultimate2
GW4GTE's Mulitrock II DDS kit is available at www.s9plus.com/

March 2014 • RadCom
Peter Dodd, G3LDO • e-mail: g3ldo@o2.co.uk

Antennas

Fitting PL-259 plugs – yet again

COMMONLY USED. Fitting PL-259 plugs to coax is important – we all use these connectors, not only to terminate cables to antenna feeders but for interconnections around the shack, such as a transceiver to a linear and/or an SWR meter to an antenna installation. The subject of fitting these plugs has been discussed at length in the In Practice column by Ian White, GM3SEK and also in this column over the years but it would appear many Members have not seen all this material. So, this month, spurred on by e-mails from readers, I will address the subject again.

SOLDERED CONNECTIONS. The recommended method described mostly in literature is to use solder to fix the braid and the centre conductor to the plug. Components making up a soldered braid PL-259 are shown in **Photo 1** while the preparation of the coax and assembly is illustrated in **Figure 1**.

However, quite a lot of heat is required to make the braid connection properly. As GM3SEK noted in **[1]**, "When the original PL-259 was designed, more than half a century ago, this was not an issue because every engineer was sure to have the right tool for the job: a traditional soldering iron with a huge pointed copper bit that could store large amounts of heat and deliver it very quickly to the exact spot. Today's amateurs try to solder PL-259s using irons that are under-sized and under-powered... and that's where the trouble begins.

"A bad soldered joint between the braid and the connector body will allow the outside of the coax to become 'live' to RF, causing mysterious problems of high SWR, RF in the shack and other forms of RF interference. Such problems can be hard to trace because the plug still *looks* perfectly innocent. Don't be fooled – badly soldered PL-259s are one of the most common faults in amateur radio stations.

"What we're aiming for is **Figure 2(a)**, where the full depth of the solder hole in the plug body has reached a high enough temperature to melt solder, creating a solidly bonded plug of metal. In **Figure 2(b)**, the solder has melted only to the braid. The sides of the hole never became hot enough to melt solder, so this is a 'cold' joint to the connector body. Normal wear and tear – a bit of twisting, a damp atmosphere – can lead to intermittent contact and eventual failure. If you have a slightly larger iron, or more patience, you might manage something like **Figure 2(c)**. From the outside, this may look like a good joint to the connector body, but only the outer rim of the hole became hot enough to melt solder. Inside the hole it's still a cold joint like Figure 2(b), so when that thin ring of solder breaks, the joint will follow the same path to failure.

PHOTO 1: PL-259 coax plug components. Centre: plug body for RG213-type cable. Top: reducer for RG58-type cable. Left: screw coupler. On the right is a quick-fit (push-on) PL259 adapter, very useful when experimenting with antennas. Similar temporary push-on connectors are available for a variety of other plug types including SMA.

"Very few ordinary soldering irons can manage a PL-259. Most tend to fall 100-150°C short of heating the region around the hole up to the correct soldering temperature, because they cannot pump the heat in quickly enough. As a result, a large majority of joints are failures in waiting. A '100W' quick-heat solder gun isn't up to the job, because most of the heat is not released at the tip itself and the tip also has very little mass of copper to store any heat". GM3SEK describes a simple alternative to using a high wattage soldering iron and that is to preheat the connector body with a hot air gun (this must be done with care). Then put the gun aside and continue with your normal 25-45W soldering iron.

ALTERNATIVE METHOD. Faced with these soldering difficulties, many people just screw the cable into the plug body and solder only the inner conductor. GM3SEK notes that he has used this approach, especially outdoors where heavy-duty soldering is even more difficult and inconvenient... but a few years later, every single one of those bodged connections has failed.

On the other hand I have used this 'bodged' method to fix PL-259 plugs to RG213 cable for years. The method used was also described recently by G8JVM (among others) in Antennas in which he said "you don't need to solder the braid to the body of the plug. Strip as normal but carefully fold the braid back over the outer PVC covering for the length of the connector as shown in **Photo 2**. It's best also to use an extra long inner. Don't cut it to length first. Locate the inner conductor, then screw the cable into the connector clockwise. You may need to hold the PL-259 with large pliers when it's in as far as it goes solder and trim the inner conductor and, if need be, trim off any whiskers of the braid that are sticking out of the cable end of the plug. This makes a better connection of the plug as all the braid is in contact with the inner casing of the plug. This also works with Pope H-100 type cable where the braid has been replaced with copper foil."

As I mentioned earlier I use this method for RG213/PL-259 connections. It is important that the coax is a tight fit into the PL-259 body. The diameter of the larger coax is ostensibly 11.5mm but this value can be nominal. With some coax types it may be necessary to add some insulating tape between the coax outer sheath and the braid to ensure a tight fit, as shown in Photo 2.

For outdoor connections I smear the inside of plug with grease before fitting the coupling ring and this keeps out all the weather can throw at it. The coax run from

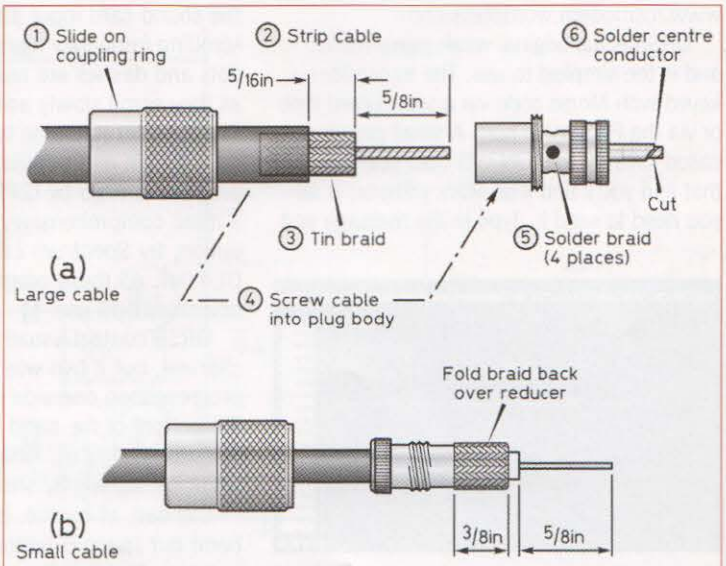

FIGURE 1: Preparation of the coax and assembly of solder type PL-259 plug (a) for RG213 type cable; (b) for RG58 type cable.

Flying Saucer Technology

by Bill Rose

Flying Saucer Technology will for many people conjure up images of extraterrestrial spacecraft and aliens and although this book does extend into some areas that might be considered UFO territory, it aims to explore the serious subject of man-made flying saucers. This involves a certain amount of myth busting and an occasional step into the world of top-secret black projects.

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By: Nick McCamley

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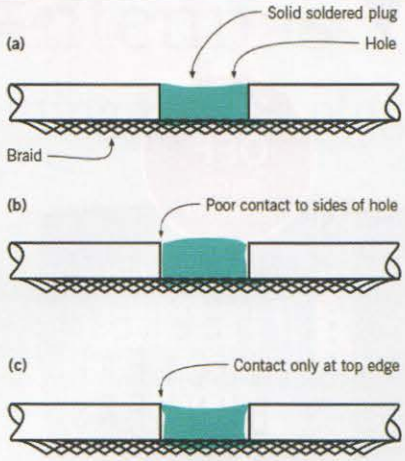

FIGURE 2: Solder connections through the hole(s) in the body of a PL-259 plug: (a) a good soldered joint; (b) and (c) are unreliable cold joints (see text).

PHOTO 2: Method of preparing RG213 cable for connection to a standard a PL-259 using the non-solder method. Note the red insulating tape, which may be necessary to ensure a tight fit to the plug body.

PHOTO 3: Assorted compression sleeve type PL-259s, all variations on the theme of Figure 3.

PHOTO 4: Centre, PL259 with built in reducer. Left, connected to RG58 with a 5mm built-in reducer. Right, connected to RG8 Super XX with a built-in 7mm reducer.

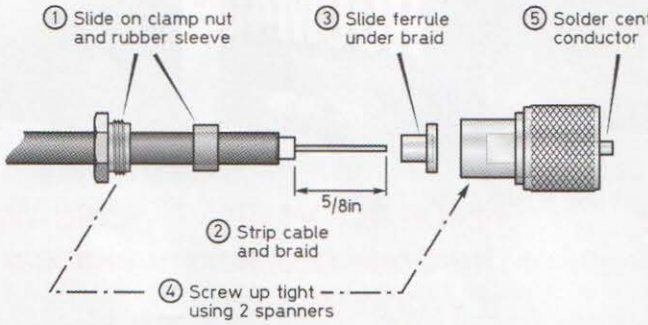

FIGURE 3: Method of assembling compression sleeve PL-259 connectors.

the shack to the antennas, with the non-soldered PL-259 plugs, fixed as described above, has been in place at my QTH for over 22 years and is still passes its annual attenuation tests.

Dave Lawley, G4BUO, wrote in to say, "I was dismayed to see you relaying the 'advice' from GW8AWT in *RadCom* on how to fix a PL-259 plug. This no-solder approach lacks mechanical and electrical integrity and makes water ingress more likely. I really do not think you should be passing this on in *RadCom*." He goes on to recommend silver plated PL-259s over nickel plated versions because they are easier to solder. Best of all, use the pressure-sleeve type connector, which makes a tight connection to the cable without having to solder the braid.

Peter Ebsworth, LB0K asked: "I wonder why you haven't also provided information about the alternative 'compression sleeve' type of PL-259 connector. This is the type promoted by Ian, GM3SEK in his In Practice columns. During my latest visit to a radio rally in the UK I saw several of the retailers displaying various solutions to this construction." He goes on to say that the major benefit of the 'compression sleeve' connector is a sensible mechanical termination onto the cable that will also withstand a certain amount of moisture ingress.

COMPRESSION CABLE CLAMPS. While there is some disagreement on methods of connecting coax to soldered type PL-259s, there is complete agreement that PL-259s with a screw-down pressure sleeve cable clamp, the same as is used with modern BNC and N connectors, is the best solution. These use a ferrule that slides up the inside of the outer braid and is held firmly in place by a clamp nut that compresses a rubber sleeve, as shown in **Figure 3**. The resulting connection to the braid is strong and reliable. The only soldering required is at the end of the hollow inner pin. Examples of compression sleeve PL-529s are shown in **Photo 3.** The body of this type of connector is often nickel plated, to keep the cost down, but the insulator is PTFE. The pressure sleeve design has another significant advantage for us radio amateurs because, unlike the professionals, we often remove and re-use coax plugs.

RG 8 SUPER XX COAX. The most popular coax cable for feeding HF and some VHF antennas is RG213. It is 10.3mm in diameter and weighs around 1kg for a 7m length. This is fine for metal antennas where the cable can be supported right up to the feedpoint of the antenna; but not so good when feeding wire antennas where the antenna elements may have to support the feeder, such as in a dipole or a quad.

The alternative is to feed the wire antenna using RG58CU, which is 5mm in diameter and only about a third of the weight. It is not suitable for a long run from the shack to the antenna because of the greater losses relative to RG213. I used to use RG213 from the shack to the base of the mast and RG58 from that point the feedpoint of the quad but always found that the RG58 link looked rather insubstantial.

Then some years ago Phill, G4UDU introduced me to RG8 Super XX coax. This type of feeder represents a compromise between RG213 and RG58. It is a very flexible 6.5mm diameter 50Ω cable with a foam dielectric giving it a low loss for its diameter. PL-259 plugs with built in reducers are available that fix easily to RG8 Super XX coax, see **Photo 4**. The method of connecting RG8 Super XX coax to connections to a PL-259 using plugs with built in reducers is similar to the method used for fixing 11.2mm coax to PL-259 body described earlier. The coax is prepared as shown in Photo 2.

RG8 Super XX coax and PL-259s with built-in reducers are available from various suppliers including **[2]** and **[3]**.

REFERENCES

[1] In Practice, *RadCom*, January 2006
[2] www.westlake.co.uk
[3] www.adurcomms.co.uk

Committee Reports for the 2014 AGM

What work RSGB volunteers have under taken in 2013

ARDF. The ARDF Committee is a group of committed volunteers who have been driving forward the development of this aspect of 'Sport Radio' in the UK.

The 2013 highlight was the international success of the RSGB team at the 19th IARU Region 1 ARDF Championships, held at Kudova Zdroj in Poland in September. Ten competitors travelled out there, all at their own expense. We had a full team in the M40 and M70 classes and were also represented in M21, M50, M60 and W50.

The M70 class again provided success for the RSGB. Robert Vickers, G3ORI won the M70 Sprint race to ensure that the National Anthem was again heard at a major ARDF Championships. Bob Titterington, G3ORY was third in the same race and as a result we had two 'Brits' on the podium.

In the 144MHz Classic race, the same duo brought home the silver medal in the M70 team competition.

To date, success at international level has only been achieved in the one age class. Elsewhere David Williams, M3WDD placed eighth in three of his four races in the M50 category. The M40 team are now in the upper half of their ten year 'wide' age group and it is hard for them to be competitive with the 5-7% advantage held by the youngest members of this group when it comes to endurance running ability.

To maintain this level of success will be difficult. As the M70 competitors get older their ability will fade faster than hitherto and they face new competition from younger competitors entering the age group.

A total of fifteen events were staged during the year. Foremost amongst these was the RSGB International ARDF Festival (incorporating the British Championships) that was held on the Surrey Hills in May. Bob Whelan, G3PJT, RSGB President, kindly came to present the trophies and certificates. He also took the opportunity to try a spot of ARDF for himself. The RSGB welcomed competitors from Bulgaria, France, Germany, Hungary, Sweden and the Ukraine.

The events also included one run in conjunction with the RSGB Centenary day at Bletchley Park on 5 July. On a glorious summer day a number of local school children and RSGB Members hunted down four transmitters placed around the grounds. This gave our activity an appropriately high profile across the RSGB's higher echelons.

The RSGB ARDF Committee has some 80m equipment available for loan. This is configured to provide 4 transmitters in a two minute cycle accompanied by ten receivers. A map of the area is not essential and it gives a realistic feel for the 'classic' ARDF format. Contact ardf.chairman@rsgb.org.uk to arrange to borrow the equipment,

The 17th IARU World Championships will be held in Kazakhstan in September 2014 and the hope is that the RSGB will again send a strong team.

Finally, I wish to acknowledge the enthusiasm and contributions of the Committee members in running events and promoting the sport. In addition those who ran events without being committee members are also thanked. These were John, RS205838, Michael, M6MDD, Jillian, M0JIN, Phil, M0GIE and the Oldham Club, David, G6HGE, Svet, RS214021, Robin, RS213497 and Vlad, 2E0VLB.

The Committee is also grateful for the unfailing support it has received from the RSGB Board member responsible for Sport Radio, Stewart Bryant, G3YSX and from *RadCom* Editor Elaine Richards, G4LFM.

R G Titterington, G3ORY

AROS. Deputy Coordinator Mario Brashill, G2DPA became silent key in January 2013. He was very active and well known within the amateur radio community and his enthusiasm and knowledge was a great asset. His work has been a good foundation for AROS to continue and develop.

Mark Jones, G0MGX was appointed as Deputy Coordinator in June of this year. Together with the Coordinator Keith Bassett, G7NBU they are responsible for coordinating the monitoring activities of the AROS Observers across the country.

The Amateur Radio Observation Service is an advisory and reporting service of the RSGB that is intended to assist radio amateurs and others who may be affected by problems that occur within the amateur bands or that develop on other frequencies as a result of amateur transmissions.

The service investigates reports of licence infringements, or instances of poor operating practice that might bring the amateur service into disrepute. Reports, complaints and associated supplementary information are accepted from any source and the contents of each communication are regarded as confidential material.

This year AROS was represented at both the Spectrum Forum and a recent Ofcom/RSGB meeting. Specific issues relating to support from Ofcom for AROS were discussed with a view to the AROS/Ofcom teams working more in unison.

The number of observers registered with AROS continues to increase and following the presence of AROS coordinators at the Hamfest in September the number of observers now stands at 99. Although the Observers are spread across the country there is still a need for more observers to effectively cover the UK, particularly the south east of England.

Since the beginning of 2013, there have been 32 recorded complaints. In some cases there have been many complaints about the same event. A few of these were resurrected cases from previously reported incidents that had not been resolved or their history was known to AROS.

So far this year, 6 of the 32 cases have resulted in letters being sent by AROS to suspected culprits advising them that their behaviour is subject of complaint. They are advised that AROS has reasonable cause to believe that their callsign/identity is associated with the bad behaviour and has been recorded by Observers. Generally the letters appear to have been received in a positive way in that

the behaviour appears to have been modified and the complaints have ceased. One letter was acknowledged.

In two cases (relating to 2m repeater abuse) the letters have been challenged or ignored and behaviour has not been modified, resulting in referrals to Ofcom.

Reported cases have included:

- Misuse of 5MHz bands. This has significantly improved during the year.
- Pirated callsigns. Sending offensive SSTV / *EasyPal* images.
- 3 cases referred to RSGB Intruder Watch.
- Feuding amateurs causing each other deliberate QRM.
- Abuse of 2m repeaters.
- Two cases relating to 2m repeater abuse referred to Ofcom.
- Another continuing case of 2m abuse already referred to Ofcom but with the problem persisting.

The vast majority of the reported nuisance activity is taking place on 2m repeaters and appears to be involving the same abusers on a regular basis. Some repeater keepers have turned off the repeaters for a period of time in an attempt to discourage their abuse. However other repeater keepers appear unwilling to take any action to control the repeater activity and this may give an impression that the bad behaviour is condoned.

The apparent failure to deal with this behaviour causes feelings to run high amongst the dedicated amateurs wishing to make good use of the repeaters. There is a mistaken belief by some amateurs that the RSGB has the power to withdraw or restrict amateur radio licences and is often criticised for the failure to act. However as RSGB is not an enforcement or regulatory body we have to confine ourselves to an advisory role.

Keith Bassett, G7NBU

AWARDS MANAGER. The Awards Manager is responsible for all Society involvement in the issue and adjudication of the RSGB Awards Programme with the specific exclusion of the IOTA Programme. In addition to RSGB Awards the Awards Manager is responsible for IARU Worked all Continents Award adjudication and further acts as a check point for ARRL WAS Awards. Involvement in other National Society award programs is a natural focal point assisting RSGB Members in day to day queries and adjudication when programmes allow a National Awards Manager to certify applications on behalf of members thus avoiding costly airmail shipment of valuable QSL cards to overseas mailing destinations.

The RSGB sponsored awards cover what can be termed lifetime achievement and take considerable skill and effort on the part of Members over a long period of time to accumulate the necessary confirmations. These are represented by the Commonwealth Series that range from 100 Commonwealth Call Areas through to the difficult 5-Band

500 Call Areas using 10-80m with special endorsements for WARC bands and 160m operation. The second lifetime award is based around ITU Zone Areas again with similar requirements to the Commonwealth Award but in this case confirmation of contacts with ITU Zones. A basic certificate is available for confirmation of 75 Zones using all amateur bands. These two awards formed the basis of the 2013 HF Centenary Award to raise awareness among the wider amateur community.

The most popular Society sponsored programme is the IARU Region 1 Award for confirmed contacts with Region 1 member countries. It has 3 levels of achievement so both newer and more modest stations can complete the award. Region 1 covers Europe, Africa, Middle East and Russia. 25 Awards have been issued representing 12 countries.

A special Listener Award based around DXCC (DX Century Club) is available to all short wave listeners starting at 100 confirmed DXCC Entities.

The Society programme covers 2m & 6m Squares and Countries from beginner to expert levels. The Foundation Award is aimed specifically at new licensees (1st year only) to encourage new operators to progress through 3 levels based on contacts in the first year.

The most time consuming event this year has been associated with the Gx100RSGB log keeping and updating *Club Log* and Logbook of The World. Indications show that the HF and VHF Centenary Award will prove to be very popular.

Commonwealth Series 5-Band Supreme Awards (500+ Areas) a total of 3 awards and 10 endorsements for new levels, WARC Claims or 160m claims. Four Certificates were issued for 100 Call Area Basic Award.

A number of SWL DXLA endorsements have been issued plus 2 new Certificates.

The IARU WAC Award is the most popular with newer UK licensees. However, as this award can now be claimed via Logbook of The World, entries via the RSGB route has dwindled almost to zero.

A number of WAS claims from UK Members have been processed and during the year. The Logbook of The World WAS award was introduced for those using LoTW as part of their DXCC programme. Again this has reduced the UK applications.

Card checking for applications is carried out at the Convention and at the GMDX Convention in Stirling each year on request.

John Dunnington, G3LZQ

CONTEST COMMITTEE. The 80m Club Championship series (February to July) continues to be a very popular series of CW, SSB and Data contests. Over 530 stations entered during 2013 with 91 clubs/groups competing for the leading club awards.

The IOTA Contest (July) attracted 2604 entries (2319 in 2012) and 239 check logs. This major RSGB all band HF contest was also designated as one of the Centenary Events with special commemorative certificates available to qualifying entrants. This year, the adjudication of this contest has been performed by largely a new team of volunteers who maintained the tradition of having the draft results available for inspection at the RSGB Convention in October.

HF National Field Day (NFD) is a 10 to 160m CW only contest run in early June. After last year's HF NFD contest, a questionnaire was sent to all 2012 entrants. As a result of this consultation, the rules were modified to sub-divide the Restricted Section into 'simple antenna' and 'complex antenna' sections. This change produced an increase in the number of entrants for the Restricted Section at the expense of a reduction in the number of stations entering the Open section. Overall, the number of entrants remained constant at 38.

Turning to VHF, the UKAC series of contests (January to December covering 6m, 4m, 2m, 70cm, 23cm and SHF bands) continues to attract large numbers of entrants. For example, over 200 stations regularly entered the 2m UKAC during 2013. Overall, 110 clubs/groups competed for the leading club award (113 in 2012) and 574 different stations entered (532 in 2012) this series of contests.

A new section was introduced into VHF National Field Day (NFD) in 2013. The new MS (Multi-band, Single station) section permits only one radiated signal irrespective of band at any given time rather than being permitted to radiate one signal on every chosen band simultaneously. This section was intended to encourage participation by small groups or individuals with limited equipment or people resources. Overall, 80 groups participated in VHF NFD, an increase of 26 over 2012 (the weather was very, very bad in early July 2012) and an increase of 11 over 2011. The new MS section attracted 12 entries with some established groups swapping to this section. VHF NFD was also designated as one of the Centenary Events with special commemorative certificates available to qualifying entrants.

The free monthly *Contest Committee Newsletter* was first published in January 2013 and provides subscribers with contest related information (eg list of recently

published results, links to the rules of non-UK contests, advanced notice of rule changes and short articles about various aspects of contesting). This newsletter has proved popular with monthly circulation of over 650. To subscribe for free to this newsletter, please visit www.rsgbcc.org/cgi-bin/subscribe.pl?subtype=news.

A lot of Contest Committee time and effort during 2013 has been consumed by a comprehensive and careful investigation of allegations of systematic and repeated cheating by one station in the UKAC series of contests. During the investigation, several field trips were made during various UKAC contests by a Contest Committee member to gather evidence about this allegation of cheating. Regrettably, the allegations proved to be correct. The Sport Radio column in the January 2014 *RadCom* contains a more detailed report on this matter.

The 1+1 (eg G0A, M9Z) Special Contest Calls (SCC) are issued to qualifying UK stations by Ofcom for a period of up to three years. The Contest Committee assists Ofcom to process all SCC applications by providing advice and this has resulted in a large amount of additional work for the Contest Committee.

The adjudication software used by the Contest Committee has been upgraded several times in 2013 to increase the automatic checking facilities available to adjudicators. All RSGB contests (except the IOTA contest; this uses dedicated adjudication software) can now be adjudicated using this software. The web Robot has also been upgraded during 2013.

A comprehensive review of the appeals procedure was undertaken during 2013 by the Contest Committee and the RSGB Board. A new, expanded appeals procedure will be released during 2014.

In parallel with this activity, a document containing the Adjudication Code of Practice covering when (and why) penalties are imposed and the governance (oversight) of adjudication process is also being prepared for release during 2014.

Further consultations with UK contesters are planned during 2014, potentially covering the public release of adjudicated logs, UKAC multiplier scheme and revitalising the 21/28MHz contest.

The Contest Committee is also intending to review and update the VHF Code of Practice in 2014.

During 2013, the Chairmanship of the Contest Committee passed from Ed Taylor, GW3SQX to Ian Pawson, GOFCT. The official handover date was 1 June although the responsibilities of the Contest Committee Chair had been gradually transferred during the first half of 2013.

Ian Pawson, GOFCT

EMC COMMITTEE. The EMC Committee addresses interference to / from amateur radio and other equipment. It meets every second month to review progress, share knowledge and set goals to maximise the effective use of our limited volunteer resources. In between, much of the work is coordinated by e-mail and teleconferences. Our current priority is to recruit more volunteers so we can provide a more effective service to RSGB Members. If you can help in any way please contact emc.chairman@rsgb.org.uk.

The main tasks conducted in 2013 were:

- The completion of the review / update to EMC advice publications, primarily the EMC pages on RSGB website and the EMC leaflets. We also started the EMC Self Diagnosis Flowcharts using examples of spectra and sound files for common sources of interference. David Lauder, G0SNO, with the help of other members, continues to address evolving EMC technical issues through EMC Matters and other pertinent technical papers.
- Representation on relevant standards committees has been enhanced with the addition of two new members John Woodhouse, G6GPF and Martin Sach, G8KDF. We are now involved in solar PV standards, wireless charging and issues about LED lighting.
- We have established Liaison Meetings with Ofcom for problem tracking and enforcement of cases of interference to amateur radio.
- The Committee has reorganised technical advice on problems, based on areas of expertise rather than regional location. Members should in the first instance report problems using the web form on the EMC pages, this allows confidential information to be provided. The moderator of the advisor group, Ken Underwood, G3SDW will assign an advisor to help resolve the issue. A moderated forum is being used to allow open discussion and knowledge sharing with society members who may have experience of similar problems.

The Committee continues to focus on the threat from Power line telecommunications (PLT) devices and was disheartened to find that, despite opposition from some quarters including the RSGB, the draft standard on this topic was generally supported in the vote of National Standards Committees in the second half of 2012. It has now been approved by CENELEC technical board but not yet published in the Official Journal of the European Union as a harmonised standard. The Committee has again been in contact with the European Commission on this.

Also of concern to the Committee were developments in the areas of LED lighting and solar PV panels and wind farms, with some instances of severe interference to radio reception being reported. The Committee continues to monitor and assess developments here and will endeavour to ensure that common sense prevails.

Recently we have witnessed problems from VDSL, the final km in Fibre To The Cabinet internet delivery. Preventing this becoming a similar interference problem to PLT will become a major priority. We will also monitor GFAST to last 100m in Fibre To The Premises internet delivery as it has the potential to cause interference to most amateur bands.

We need to work more closely with regulatory bodies, Ofcom and BIS on achieving the EMC Directive. We can work as an early warning system for non-compliant spectrum-polluting products. A draft EU Regulation on market surveillance will impose a more rigorous regime on national enforcement authorities and opens up the acceptability of technical tests by external bodies such as the RSGB. We will continue to express concerns about spectrum protection.

We will continue to press Ofcom to introduce effective Interference Regulations under the WT Act and we will continue to lobby the EU on EMC Directive matters, eg PLAs and solar PVs. We are fully involved in the IARU Region 1 EMC Working Group.

We are now well placed to contribute to CISPR and to CENELEC via our BSI standards committee membership with three new members, recognising however that there is sometimes strong industry opposition to our spectrum protection position.

We are looking to begin a database of problem equipment together with fixes, where these are known and we will support the noise floor measurement project.

Dr John Rogers, M0JAV

ETCC. The Emerging Technology Coordination Committee (ETCC) functions to develop and enhance the UK amateur radio repeater network together with data communications systems and to promote the introduction and rollout of appropriate new technologies.

The main activities are:

- To receive, scrutinise and advise on all proposals in respect of analogue and digital repeaters and data communications systems
- To process finalised and agreed proposals onwards to Ofcom
- To liaise with Ofcom and other bodies as required.

It will not be a surprise to learn that delays with frequency clearances continued to be a major issue throughout the year. We did have a significant number of NoVs issued in late 2012 and early 2013 but progress in the remainder of the year became very slow. The main problem areas were still in 70cm and the bands above although there was an Ofcom agreement with one of the Primary Users (PU) to process proposals in small batches and this appeared to be working reasonably well.

We were, however, somewhat hearted by a number of ATV clearances coming through in the latter part of the year, especially in respect of 23cm and 3GHz DATV repeaters together with one 23cm wideband 'DD' digital data proposal. The 23cm successes appear

to be as a result of choosing frequencies from the new 23cm band plan, devised to avoid wherever possible the spectrum used by aeronautical radars. It was also good to see a recent success with a 10GHz ATV proposal for GB3FY near Fleetwood.

One future development which we have been monitoring very closely in conjunction with the Microwave Manager is the proposed release of some PU spectrum at 13cm. This is likely to require many changes in frequency for installations in that band with implementation around mid-2015. In preparation for these changes a team of BATC members (including Noel, G8GTZ who joined the ETCC in March as our TV manager) had a very interesting session with Ofcom at Baldock demonstrating typical ATV equipment in 13cm and assisting with measurements.

The new online processes and forms that we have been trialling on the ETCC website are now in operational use and wherever possible automate the production of Notices of Variation (NoVs).

At the time of writing of this report there are some 30 NoV requests with Ofcom awaiting clearance.

Steve, G8SFR our Datacomms Manager has been very busy this year implementing some IARU changes to the data band plan in 2 and 6 metres. This has meant considerable shuffling of Gateway allocations so our thanks to everyone who cooperated in this exercise and especially to Steve for all his hard work in administering these moves.

One final item of note is a move by some groups away from the dominant D-Star digital standard towards the commercial DMR standard initially developed by Motorola as MotoTRBO and based on an ETSI standard. This allows two voice/data slots per carrier and a worldwide amateur network known as DMARC is growing up around it.

One word of caution here is that 70cm frequencies as we know only too well are difficult to clear. We are also still required to keep the noise floor on 70cm well down below the threshold that would impinge on radars in the band. As a consequence we will have to look very carefully at proposals for new digital systems where there is existing digital coverage of whatever mode in the area concerned.

I would in my final comments wish to put on record our thanks to Graham Shirville, G3VZV for his 30 plus years of service as TV manager so freely given to the ETCC and its predecessors.

Thanks also to Darren Storer, G7LWT who has also stepped down from the Committee due to pressure of work. During the Olympics, Darren worked as one of the amateur team assisting Ofcom in spectrum management duties and this has now led to a full time post. Darren still remains deeply committed to the 'digital' community' and the ETCC are able to call upon him for advice as required.

In conclusion, I would once again wish to

thank all members of committee for their hard work, dedication and in the giving of their time freely to provide this service to the amateur community.

John McCullagh, GI4BWM

GB2CW. The GB2CW Morse Service of the RSGB has been around for a number of years and, in 2001, there were about 30 volunteers providing Morse practice. However the activity gradually dropped and in 2003 the Morse examination was no longer required. Activity dropped even more, but in 2006 I was appointed as Coordinator for the GB2CW scheme.

Rejuvenating a scheme such as that is a slow process, there are now about 27 volunteers spread over the UK and also about 43 approved Assessors. The RSGB publishes the GB2CW schedule in both the Yearbook and on the RSGB website.

A large number of the Certificate of Proficiency have been issued. Again, there is a section of the RSGB website devoted to the proficiency scheme.

Several clubs devote a huge amount of time to tutoring and attaining certification. The Essex CW Club is a prime example, devoting a website to Morse alone (www.essexcw.org.uk/).

Two Morse Boot Camps were held at my QTH in the last year and although experimental they were very well attended. There were three tutors; myself, Malcolm Prestwood, G3PDH and Peter Lock, M0RYB. There were three separate classes based on speed level. One Boot Camp lasted five days and the other was arranged in a couple of two day sessions, including a weekend to allow those to attend that had to work. These were very successful and we plan on holding more this year.

I also write a Morse Mode bi-monthly column for *Practical Wireless* and featured the Boot Camps in that column. I had several enquiries about the Boot Camp structure and several Clubs have indicated that they will be trying a similar thing. As further evidence for the increasing enthusiasm for using Morse I have received input from all over the globe, but especially Australia where they are very keen on Morse tuition. Some clubs are emulating the GB2CW scheme over there. Volunteers are working on a weekly basis over the UK, with little publicity or thanks, trying to keep a high standard of Morse and encourage newcomers to the hobby to take up Morse. Obtaining volunteers for the scheme is very difficult however and it would be nice if some of the more prominent CW operators in the UK would offer an hour a week for their club. My aim is to have at least one volunteer per radio club in the UK, but despite publicity the response is usually zero.

Roger Cooke, G3LDI

GB2RS. Over the last few years the composition of the GB2RS News Service has remained fairly constant. Each Sunday there are some 60 separate readings of the bulletin carried out in turn by around 100 news readers. National readings take place in the 160m, 60m and 40m HF bands whilst regional and local readings operate on the 80m, 2m and 70cm bands. In the south of England a reading also takes place on 23cm accompanied by an ATV presentation. A GB2RS reading is also streamed on the internet whilst the script can be downloaded from the RSGB website.

Surveys carried out at radio rallies suggest that the majority of listeners prefer to tune in on Sunday mornings.

I have been the GB2RS News Manager for 35 years and have decided that the time has come to retire. Accordingly the Board has appointed Ken Hatton, G3VBA to take over the position as from 1 January 2014. Ken will have the pleasure of seeing the GB2RS News Service celebrate its 60th anniversary in 2015.

My GB2RS news e-mail address will terminate at the same time and anyone wishing to contact me should do so by telephone. I wish Ken all the best in his role.

I am also standing down as GB2RS news reader after 42 years in this role. My thanks go to the RSGB editorial team at HQ for their dedication to GB2RS.

Gordon L Adams, G3LEQ

HF MANAGER. On 5MHz, the new NoV took effect from the beginning of 2013 and activity during the first few months was high, which lead to a number of reports of poor operating. The main problem, not helped by the segmented nature of the allocation, was out-of-band operation caused by operators not paying attention to, or being unaware of, the transmitted spectrum of their signals. Compounding this is allocations in other countries at 5MHz that are at different frequencies from the UK. An article was published in the March *RadCom* specifically drawing attention to the 5MHz allocation and the occupied spectrum of a USB signal.

The subject of band planning created much discussion on reflectors, but much less on air. In general, the views ranged from operators

who did not believe in any form of band planning to those who felt it the RSGB should create and enforce a band plan. The RSGB has adopted the principle of supporting the active users of the band to agree a plan. This has been implemented in the 2014 RSGB HF band plan and noted as being based on current usage, therefore providing a guide as to where activity may be found on various modes. This was also presented in a paper at the IARU Region 1 Interim Meeting. As more countries gain access to 5MHz, it is expected that band planning at 5MHz will become an item for discussion in C4 and the RSGB will continue to take an active role.

The RSGB continues to contribute at CEPT and the ITU on Agenda Item (AI) 1.4 for a possible amateur allocation at 5MHz.

The IARU Region 1 Interim Meeting Vienna was held in Vienna in April. The RSGB presented three papers covering the removal of the downlink-only restriction in the 28MHz satellite band, endorsing and promoting the DXpeditioners Code of Operating Practice, and promotion of 5MHz in the UK and WRC-15 AI 1.4. All three papers were accepted by the meeting. A fourth paper on a proposed revision to the 30m band plan to bring it in line with the Region 2 plan was withdrawn following its rejection by the RSGB board.

Other key items covered operation of unmanned stations, discussion on keeping the 3rd weekend in October contest free to support JOTA operation, and various contest issues.

The IARU Region 1 General Conference takes place in September 2014. The RSGB intends to submit a number of papers to the Conference. At this time, papers, or suggestions for papers, are encouraged for inclusion in the C4 (HF) agenda.

The IARU Region 2 band plan at 7MHz was recently revised and is now in line with the Region 1 band plan. This is particularly significant at 7MHz as the data segments are now fully aligned, which is hoped will end some of the persistent problems of datamode activity outside the current Region 1 plan.

At 10MHz, Region 2 datamode activity starts at 10.130MHz, which is also resulting in significant datamode operation below 10.140MHz in Region 1, in contravention of the current band plan, as the band offers propagation between the Regions for much of the time.

The RSGB continues to work towards the acceptance of AI 1.4, the consideration of an amateur allocation at 5MHz, at WRC-15. The RSGB has participated at the CEPT PTC meetings in December 2012, April 2013 and October 2013 as a member of the UK delegation, headed by Ofcom.

The RSGB presented a paper on HF Compatibility Studies at 5MHz at the PTC meeting in April 2013 in support of the AI 1.4. Within CEPT the 5MHz agenda item was always seen as a challenging opportunity and it is too early to see whether the RSGB input to the IARU effort will be successful in gaining support from CEPT ahead of WRC-15

The RSGB is fortunate in also having members who participate in the ITU WP1 and WP5 meetings where much of the WRC-15 preparatory work is done. Participation will continue in further CEPT meetings in 2014.

The 472kHz band has been available since the beginning of 2013 via an NoV. After discussions regarding a band plan, the general UK consensus was that it was too early and unnecessary to create a band plan at this stage. A paper from NRRL (Norway) at the Region 1 Interim meeting in Vienna proposed a suggested usage of the band.

As more countries gain access to 472kHz following WRC-12, we would expect IARU Region 1 to agree a plan for the band. The RSGB will play an active role in this and will consult with members and users of the band for inputs.

Ian Greenshields, G4FSU

INTRUDER WATCH. Tradition was upheld again this year when the largest number of intruders by far on our exclusive amateur bands were data signals from the Russian military. They tend to return to the same frequencies at the approximately the same time of the year, depending on propagation.

NATO modems, known as STANAG 4285, also paid a number of visits to our bands but all apparently in error. On four occasions, on the 14 and 7MHz bands, the Ofcom Monitoring Station at Baldock was given a live report of each intrusion. The number of minutes taken for the offending signal to go QRT has varied from 38 down to 2! Baldock have contacts in very useful places and can often sort this kind of problem by means of an informal phone call. We, as radio amateurs, are certainly served well by the Operations Room at Baldock.

A mysterious CW numbers station occasionally shows up on 7166kHz and its location has been identified as being in the Loire Valley in France. It appears to be operated as a kind of practice transmission run by the French military. Reports were received in January and July and the French authorities have been made aware of the status of this intrusion in an exclusive amateur band. Reports of this reappearing would be welcomed.

A conversation on 7050kHz USB between two trawlers attracted considerable attention in July. A call to Baldock resulted in a Coastguard station being heard moving the intruders out of the band.

The appearance of a Chinese broadcast station on 7105kHz during 2012 was brought to the attention of Baldock and a long formal procedure was followed in order to get an official notice sent to the Chinese by the ITU. This eventually happened and the frequency was cleared.

Chris Cummings, G4BOH

IOTA STEERING COMMITTEE. The IOTA Steering Committee devoted particular effort in 2013 to the forthcoming celebrations of the programme's 50th anniversary due in 2014. The two year IOTA Marathon that had ended in December attracted activity from over 550 IOTA groups, half the total number ever activated, and looks set to achieve its purpose of drawing attention worldwide to IOTA's 50 years of promoting island activity. The Board has agreed the holding of a special IOTA Convention at Windsor from 4-6 July 2014 to celebrate the event.

In September IOTA Manager, Roger Balister G3KMA attended the Russian Robinson Club's 20th Anniversary convention in Moscow celebrating 20 years of Russian IOTA island operations. It was a very successful event that has undoubtedly helped to strengthen relations with a keen Russian island-chaser and DXpeditioner group, particularly experienced in Arctic island operations.

Back at home, IOTA administration fees were increased by an average 35% with effect from 1 January 2013, and certificate fees by between 14% (paper) and 50% (sent electronically) to reflect increased handling costs. Plaques and Trophies also saw significant increases following steep postage rate rises. The cumulative effect of these has been a 14.3% increase in IOTA Programme revenue over the year.

The year saw a drop in the number of award applications processed (-12%) and credits confirmed by checkpoints (-9%) compared with last year's figures. This was probably influenced by the announcement in late 2012 of increased charges from 1 January 2013 as there was a 29% higher throughput in November/December 2012 than in the same period of 2013! Volume remained high in the early part of the year but tailed off towards the end. The late availability of customers' access to the 2013 IOTA Contest logs for QSO matching was a factor as was the delay by choice of some applicants to update until January in the expectation of receiving cards for operations from a number of recently activated IOTA groups.

The overall number of participants who qualify for the annual Honour Roll by updating at least once every five years had remained constant over recent years at around 1,400. The February 2013 Honour Roll outturn was somewhat better at 1441. Given the current world economic situation this was reassuring.

Calendar year 2013 saw 109 new applications for the basic IOTA award and, overall, 529 certificates, 12 Plaques (750 Islands), 6 Trophies (1000 Islands) and 97 Plaque/Trophy Shields issued. Comparable 2012 figures were 110 new applications and 518, 23, 8 and 105 prestige items respectively. The drop in plaques and trophies was undoubtedly due to the price increase.

Work continued throughout the year on fine-tuning new software to provide an

additional route for applications/score updates on the IOTA website through submission of ADIF logs. The system will analyse the log and flag up potential IOTA counters, thus making the applicant's task of identification of suitable contacts much easier, and will then allow online submission, saving on manual data entry time.

The hike worldwide in postal charges is having a damaging effect on the long established practice of exchanging cards as is the discontinuation by many countries of the sale and redemption of IRCs. For many DXpeditioners faced with ever-increasing logistic costs in mounting an operation, the expense of funding QSLs is seen as an unnecessary burden unless fully recompensed. This is an unfortunate development.

As mentioned in last year's report, the Board's main strategic aim remains to develop the programme's IT capability to deliver a credit submission capability so that at some future date credits for most new IOTA activations from the rarer IOTA groups can be achieved online without the need for QSL cards. The continuing difficulty in recruiting volunteers both for the vacant IT Coordinator post and as programmers to assist the current IT team of Dom Smith, M0BLF and Martin Atherton, G3ZAY has meant that little progress has been made. Furthermore it has increasingly narrowed prioritisation of the IT Team's work during 2013 on to the ADIF log module, launching of which is now imminent. With both IT Team members indicating that they wish to reduce their work progressively from now on prior to standing down, replacement has now become a serious resilience issue.

Mid-year John Gould, G3WKL stood down as chair of the IOTA Steering Committee and his position was taken by Stan Lee, G4XXI. Two committee meetings have been held, at the second of which priorities for the IT Team's work in 2014 were agreed.

Roger Balister, G3KMA

MICROWAVE MANAGER. The Microwave Manager is responsible for all bands above 1GHz. These are home to a wide variety of activity, innovation and modes including narrowband, beacons, ATV and EME. Active groups in the UK include data and repeater users, UK Microwave Group (UKuG), BATC and AMSAT-UK.

The first half of the year was particularly busy as the full effect of the Public Sector Spectrum Release (PSSR) process came to the fore. This will cause a loss of parts of the 2.3 and 3.4GHz bands and a restriction in the lower section of the 10GHz band. We are particularly fortunate to have close engagement with Ofcom, so that when the formal 2.3/3.4 amateur consultation ran during June-July, their document was well-informed regarding our characteristics. Many individual amateurs were motivated to reply and particular thanks go to BATC and UKuG

for their help with this, which included a visit to Ofcom Baldock for ATV testing. Ofcom assessments and our liaison are ongoing and we are expecting a formal update in the first part of 2014.

Despite the spectrum pressures, the year was far from wholly negative. Whilst timely NoVs continue to be a challenge, some were issued, including for 23cm high-speed D-Star Digital Data (DD), 2.3GHz beacons and the first 3.4GHz DATV repeaters. The space scene saw continued success with the launch of FUNcube-1 and growing use of their microwave-capable FUNcube Dongle receiver, plus the launch of the Ham Video payload to the International Space Station. Meanwhile support by the Society and IARU Region 1 has continued for microwave matters as amateur submissions were made to both CEPT and EU activities, including WRC-15 and early planning for WRC-18.

Close liaison was maintained throughout the year with the various interest groups. They have all been undertaking initiatives to develop new techniques and activity in the bands. Spurred by its 'spectrum-friendly' bandwidths, DATV developments continue apace and offer real potential at both microwave and lower frequencies. This also resulted in RSGB highlighting such developments in a batch of DATV and digital Beacon papers at the interim meeting of IARU Region 1 at Vienna. As technology improves there is no doubt that further opportunities will arise, thus a current request for >275GHz access as mentioned in the January *RadCom* leader.

Murray Niman, G6JYB

PLANNING ADVISORY COMMITTEE. The Planning Advisory Committee continues to provide advice to Members about planning issues. The advice booklet (available on the RSGB website) remains a good source of advice for members and feedback suggests it is well read and its advice, when followed, proves effective.

Advice to Members continues to be provided on a case by case basis direct from the Committee. In addition, the Committee had a stand at the National Hamfest and advice was given to over 40 Members.

The RSGB has a letter of support that is sent from HQ in support of members planning applications. The text of the letter has been revised this year and opportunity is taken to vary the text so as to deal with any issues specific to the application. If you need the letter sent for an application you intend to make please contact me after submission.

I would like to thank the other Committee members for the work they have done on behalf of the Society this year.

Stephen Purser, G4SHF

PROPAGATION STUDIES COMMITTEE. The Propagation Studies Committee (PSC) continued to be very active in 2013, both in terms of helping RSGB members understand propagation matters, and in pushing forward our own research, from LF to light waves.

PSC returned to the Newark Hamfest this year and ran a stand for both days, fielding lots of questions about propagation.

In terms of member activities, Barry, G8AGN has continued his experimentation using nanowaves (light), helping to extend the daylight and night-time distance records. Barry also gave a talk to the Denby Dale ARC in November on Communicating with Light. He is also moderator/owner of the Yahoo Group UK Nanowaves.

Gwyn, G4FKH continued to prepare the HF propagation predictions for *RadCom*, the RSGB website and two other international societies. He was also heavily involved in the Noise Measuring Campaign (NMC), which aims to see if man-made and other noise is increasing on the HF amateur bands. Around 10 operators regularly submit manual observations. Five automatic recording stations are also in operation using standard equipment.

Gwyn is also acting as the link between the NMC project and the EMC Committee-sponsored Noise Floor Study (NFS), which is based around an MSc project at Leicester University.

Meanwhile, John, G4BAO is now treasurer of the UK Microwave group. John successfully put together the team that set up the new transatlantic 144MHz propagation beacon GB3WGI in 2012. Reports have been received from Spain and Portugal via Es, but not from across the Atlantic at this stage.

The group expect to approach Ofcom in six to twelve months to request an increase in power to 1kW.

John also continued to contribute to the UKuG newsletter *Scatterpoint* and the *RadCom* GHz Bands column. He also gave a talk on VHF propagation at King's Lynn ARC in November.

Corresponding member Jim, G3YLA also gave a number of talks on Sporadic-E and wrote two features for *RadCom*.

Sam, G4DDK has now started to produce a low-cost, high-performance transverter kit for 4m to try and increase activity. A 2m one will follow soon.

Martin, G3USF continued working on the Six & Ten Report. He also maintains the beacon lists for HF and 50MHz and remains Region 1 HF Beacon Coordinator.

Ron, G3SVW continued his club 'clinics', with Q&A sessions on propagation.

Alan, G3NYK helped prepare an update, with additional material on LF propagation, for Mike Dennison's latest edition of the book *LF Today*.

Meanwhile, solar enthusiast Neil, G0CAS continues to collect solar and ionospheric data from various sources on a daily basis in preparation for the weekly GB2RS solar report. He is now into his nineteenth year of doing this. His Twitter account (@spotsandflares) has solar information on a daily basis, and has around 200 followers.

PSC chairman Steve, G0KYA continues to publish monthly ionospheric propagation charts at G0KYA.blogspot.com and wrote the propagation pages for the annual RSGB *Yearbook*. His latest project has been looking at night-time MF propagation across the North Atlantic.

Finally, the Propagation Studies Committee has a vacancy for a new full member with an active interest in HF propagation. Interested parties should contact G0KYA via infotechcomms@googlemail.com.

Steve Nichols, G0KYA

SPECTRUM FORUM. The Forum brings together the RSGB Spectrum Managers, AROS and Intruder Watch, RSGB specialist consultants, chairs of RSGB committees that have an interest in spectrum management, and representatives from special interest groups within the UK amateur community. The Forum conducts most of its work via e-mail and meets annually. Input papers and the approved minutes of the annual meeting, that took place in early November, are available on the Society's website.

One of the Forum's roles is to assist in the initial preparation for the IARU Region 1 Interim Meeting at the beginning of the 2013, and latterly for the IARU Region 1 General Conference in September 2014. The Forum approved a proposal to move consultation to earlier in our preparation process for policy matters concerning the two spectrum committees in these IARU meetings.

The Forum also discussed our input to an Ofcom request for possible agenda items for the World Radiocommunication Conference in 2018 (WRC-18), and considered remote operation from airborne platforms ahead of Ofcom's Licence Review in 2014.

Other aspects of the Forum's focus in 2013 included reviewing the EMC Committee's work on interference from PLAs, LED lights, solar PV and VDSL. The Forum also expressed concern over the pressure on the microwave bands from the Spectrum Release, the delays within Ofcom/Primary Users on beacon and repeater clearances, and the challenging issue of deliberate interference, mostly to DXpedition operations, on the HF bands. This year note was taken of the pressure on the datamode segments and the lack of activity on the 432MHz and the microwave bands.

John Gould, G3WKL

TECHNICAL FORUM. The Technical Forum is responsible for the technical side of RSGB's activities and is a Reflector and e-mail based group allowing rapid response and discussion with all members having access and being able to contribute immediately. There has been no annual meeting this year.

Technical review of articles for *RadCom* forms the bulk of the activity taken on by the Forum. A variety articles have been allocated by the Technical Editor for review, for their suitability, technical merit and for any safety implications. Articles are taken by individuals on a first-come-first-served basis. Normally this process works well, but there has been a recent case where one article 'fell though the net' and got lost in the system. The problem was only realised when the author started chasing after he'd heard nothing. This is one area that needs to be improved, with articles going through the review process being be tagged and followed through in a more rigorous way.

The RSGBTech Yahoo Group http://groups.yahoo.com/group/rsgbtech/ is open to all and continues to gain in popularity with the current membership now standing at 1313, over 180 up on this time last year. The breadth of subjects have covered too huge a range to even begin to list here, going from basic construction right through to advanced and specialist techniques being discussed. Antennas appear to be the most popular subject, with EMC matters being a close second. Some seemingly quite trivial areas have generated a huge response.

With the wide range of expertise and experience amongst the members, most questions soon get answered to the satisfaction of their originator. The 'ground rules' for moderation were defined last year and seem to be working well. Moderation is aimed to be 'light touch' with very few messages being rejected on grounds of unsuitability or illegality, or individually warned of unsuitable comments. Thanks should go to the moderators who rarely show their heads and make sure most stuff appears within a short time of posting.

It has proved particularly difficult to make any headway on the RSGB new website. Our intention to include a fully searchable technical index of *RadCom* articles has proved to be a lot more difficult that was originally thought, but this is now planned for later in 2014. Volunteers may be requested to generate suitable content. Forum members have also taken part in discussions of the future direction of the Society's technical publishing programme.

Finally I would like to thank all the members of the Technical Forum for their time and the support provided.

If you have any ideas on areas you would like the Society's publications to cover, or any direction you think we should take, please let us know.

Andy Talbot, G4JNT

TRAINING & EDUCATION COMMITTEE. The Training & Education Committee is a virtual entity with over thirty members. There have been new joiners and some leavers during the year but the numbers remain about the same as last year. As Chair I would like to thank all those who contributed and gave support to our work in 2013.

Committee members are volunteers who work in a number of project teams to deliver against the various roles that the committee was established to carry out. Some of the project teams have been more active than others but the Committee has delivered some key outputs against the RSGB Operational Plan.

An outline of activity against each of the Committees roles is set out below.

- **Work with the RCF in consideration of how the training structure is working and how it might be improved:**
  - Alan Betts, the RCF's Chief Examiner and I presented a lively Training & Education Forum at the RSGB Convention in October. That allowed trainers and students to air their views on the current training/exam system and to hear about new developments. A video of that meeting was shared on the Trainers Yahoo Group and an extract dealing with the new Optical Marking system was made available on the main RSGB website.
  - We had expected 2013 to see the start of a full three-tier syllabus review for the amateur radio exams. Unfortunately, the RCF were unable to staff this so it remains on the 'to do' list and is expected to consume much of our resource in 2014.
  - We are expecting some change in the content of the three levels but no major changes are currently planned.
- **Represent the RSGB at the RCF's Examinations and Standards Committees.**
  - I have had regular (almost daily) e-mail/telephone contact with the Exam Committee Chair. We keep each other informed of any developments/concerns and try to work out joint solutions.
  - There was large amount of work carried out in assisting the RCF to implement their new Examination Management System and the associated

change to optical marking of exam papers. That project is now complete and a new Conduct of Examinations booklet was published.

- I attended the RCF Standards Committee in April and have been working with the Chair of the Standards Committee on his review of the Exam malpractice/appeals procedures following an Ofcom decision.

- **Consider how training might be extended to provide additional member benefits; 'Continuing Amateur Development' or 'After Advanced'.**
  - This project has not moved forward very far but we have helped to set in train the production of a *RadCom* supplement aimed at the 'more technical' end of the spectrum. An editor has been appointed and the compilation of the first edition has begun.
  - In 2014 we are hoping to start a wider project with a working title of 'After Advanced'. The idea is to make available training and education events for those who have passed the exams and are looking to dive deeper into specific topics.
- **Investigate, with the RCF, different ways for training to be provided including possible extension of distance learning and internet based technologies.**
  - No formal progress has been made in this role. However, my own team continues to offer Distance Learning level through the Bath Based Advanced Distance Learning.
  - The use of Virtual Learning Environments was demonstrated at the RSGB Convention in October. Derek Hughes, G7LFC, showed how his club uses the Edmodo system and I gave an overview of a Moodle site. Some of my team have since been trialling the Edmodo system for Intermediate Distance learning.
  - Some initial investigative work has been carried out regarding online examinations but the costs and technical complexity make further work on this prohibitive at this point.
- **Develop mentoring within the hobby to aid progression and as a form of personal development.**
  - No work has been done in this role during 2013.
- **Better support the tutors with core training resources and a revamped 'Train the Trainers' scheme.**
  - **Training Resources**: a series of guides have been published on how to set up and deliver training and assessment. Taken together with the RCF's Conduct of Examinations guide they provide end-to-end guidance. Patrick Kirkden, M0ZPK, has been cataloguing what Training Resources are available from Clubs and other Training Providers to identify any gaps that can be filled in 2014. That catalogue should be published before the 2014 AGM. We also hope to add more 'school-specific' content during 2014.
  - **Promotional Video**: work has been underway to produce two short videos targeted at specific audiences. A competition was held to obtain video material from clubs and another competition is being worked up for media schools/colleges to produce material. The proposal to update the 2004 promotional video is also being re-evaluated.
  - **Train the Trainers**: This popular course had to be stopped in 2011 due to lack of resources. The project team reviewed the extant material in 2012 and had hoped to deliver a revised course in 2013. Unfortunately, this did not happen and the project team leader had to step down for personal reasons and we wish him well for the future. We will be refocusing our efforts on this important topic in 2014.
- **Make recommendations and take action on any other training or education related issues.**
  - **IT Support**: committee members mapped the existing web pages that related to training and/or education across to the new RSGB website. Martin Wheeler, G5FM also used his skills to produce new web pages, including the Training & Assessment Guide, which has been very well received.
  - **Youngsters On The Air:** at the time of writing plans are at a very early stage but it is hoped that the RSGB will be able to send a team of young members to the IARU sponsored event in Finland in July 2014.
  - **Centenary Day:** the PSK receiver project designed for the event at Bletchley Park in July has proven to be very popular with newcomers with hundreds of PCBs and crystals sold. Details were published in the September 2013 *RadCom*.
  - **Exam Item Writing Workshops**: Tony Howard, G1TKX, arranged a very successful workshop in Sheffield in November. The Committee plans to run four of these workshops each year and by the time this report is printed the plans for 2014-15 should be out there. The idea behind this initiative is to assist the RCF in populating its exam item database; this is very much a joint venture and I hope many trainers will support it.

2013 was a busy year and 2014 looks like being every bit as busy. Thanks go to all the volunteers who run courses, assessment and exams, and to those who reach out to schools and the wider community. Please keep supporting the Society's work in training and education; it is our investment in the future of the hobby.

Steve Hartley, G0FUW

VHF MANAGER. The VHF Manager is responsible for the VHF amateur bands primarily 50-432MHz. John Regnault, G4SWX was appointed VHF Manager in December 2012.

HIGHLIGHTS

- Inputs to Ofcom on 146MHz and other VHF spectrum release activities.
- Progress at IARU Vienna Interim Meeting on most VHF matters.

LOWLIGHTS

- Very slow progress with 432MHz beacon & repeater licensing accompanied by an ongoing decline 432MHz activity.

REVIEW OF THE VHF BANDS

Band plans and descriptions have been updated on RSGB website as part of an ongoing review.

50MHz:

- Minor band-plan changes to realign internet gateways
- A proposal has been drafted and submitted to Ofcom for (WRC-18 Agenda item) the 50MHz allocation to the amateur service to be harmonised across all of ITU Region 1.

70MHz:

- A number of discussions have been held with Ofcom where the case has been made for extending the 70MHz band in the forthcoming spectrum release.

144MHz:

- A paper has been submitted to Ofcom where the case has been made for extending the 144MHz band in the forthcoming spectrum release to 146-147MHz for digital amateur services.
- Minor band-plan changes as a result of IARU Region 1 meeting; datacomms + WSPR
- GB3WGI transatlantic beacon now active

432MHz:

- Loss of beacons combined with very slow progress with 432MHz beacon & repeater licensing
- A continuing decline 432MHz activity
- Specified activity periods promoted by the VHF column in *RadCom*.

IARU VIENNA – INTERIM MEETING APRIL 2013

VHF papers presented by RSGB were:

- VIE13_C5_02: 70MHz Band Plan
- VIE13_C5_03: Increased Amateur-Satellite Service 144MHz Usage
- VIE13_C5_04: Band Plan Modernisation & Updates
- VIE13_C5_33: Beacons – MGM Alignment
- VIE13_C5_34: 50MHz Synchronised Beacons

All papers were well received and the majority of the detailed proposals accepted.

John Regnault, G4SWX

March 2014 • RadCom
John Welsh, G0NVZ • e-mail: johnwelsh_1@yahoo.co.uk

Moving On

The Earth Image

INTRODUCTION. In aerial technology, it is often stated that the effect of the nearby earth (or ground) should always be taken into account because it forms an 'anti-phase image' of the aerial the same distance below the ground as the aerial is above it. How is this image formed and what effect does it have? The following is a theoretical treatment and, except where stated otherwise, the ground is considered a perfect conductor. In practice the ground has both resistive and dielectric properties and, except where an extensive conducting earth mat is laid around the antenna, it can be far from perfect.

A SIMPLE AERIAL. A dipole could be envisaged as having a positive charge at one end and a negative charge at the other at a particular instant in time (**Figure 1**). The circles at the centre represent the feed points. These can be imagined as short circuited so charge 'bounces' from one end to the other.

ISOLATED CHARGE. Electric charge has emanating from it an electric field, usually envisioned as 'lines of force' equally spaced from the charge and dispersing into space, the strength of the field represented by the closeness of the lines in any region. When the charge is brought near a conducting object, some of the electric field lines anchor themselves onto the object at 90° to the object. **Figure 2** shows a (positive) charge near a conducting sheet (or ground plane) and the resulting field lines.

The charge attracts negative charges (electrons) from elsewhere in the ground plane to positions just under the surface as shown. Their distribution ranges from high at the nearest point under the charge, to relatively low at a distance. This distribution is exactly the same as if a negative charge had been placed below the ground plane at the same distance as the positive charge was placed above it and is the justification for the imaginary image of opposite polarity below the conducting ground plane.

AERIALS AND EARTH. In the case of a horizontal dipole at above a ground plane an instant in time, it and its image can be represented as shown in **Figure 3**. An observer in a position where the maximum signal might normally be expected to be received would get nothing, as the signal from the dipole and its image would be equal and in anti-phase, ie there is a null in the vertical radiation pattern at ground level.

In the case of a vertical dipole at an instant in time above a ground plane, it and its image would be as shown in **Figure 4**. An observer anywhere on the ground would receive the two waves from the dipole and its image in phase. In fact, even a single 'half dipole' or monopole could be used to radiate effectively, the other half of the dipole being 'synthesised' by the anti-phase image in the ground (**Figure 5**). This is a monopole 'tuned against ground'. Although an unbalanced system such as this would seem ideal for connecting to 50Ω unbalanced coax, the theoretical impedance at the input is half that of a full dipole, 36Ω instead of 72Ω, so a mismatch of about 1.5:1 would be incurred.

RADIATION CONSIDERATIONS OF THE MONOPOLE. **Figure 6** shows a vertical monopole and a perfect ground, with the capacitance of the monopole to ground (C), radiation resistance, (Rr) and a couple of electric field lines.

Current from the feeder completes its circuit through Rr, C and ground. In practice, the ground is not perfect but has resistance that raises the input resistance to the system and introduces loss. This loss can be ameliorated by using an 'earth mat'. (As well as changes to the radiation pattern, the centre feed point impedance of both vertical and horizontal dipoles varies considerably with their height above ground).

THE EARTH MAT. This usually takes the form of a set of radial wires laid just above or just below the surface around the monopole and connected to the coax braid. It provides a low resistance termination for the electric field lines, thus reducing loss, and reflects the whole of the image of the monopole. Ideally, it should extend to infinity, but in practice, efficiency is satisfactory if it collects *most* of the electric field lines so that only a few weak (more distant) ones return through the lossy earth.

The earth mat should be large enough that the whole of the monopole is reflected at the elevation angle at which it is desired to propagate (eg for reflection off the F2 layer). The geometry can be imagined by a pencil (representing the monopole), standing upright on its blunt end in the centre of a horizontal mirror. At high angles between the mirror and the eye of the observer, the whole of the inverted image of the pencil can be seen. However, the nearer the observer gets to the plane of the mirror (the smaller the elevation angle), the larger the mirror needs to be to image the whole of the pencil, ie low take-off angles need a large earth mat.

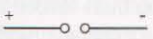

Figure 1: Charges on a dipole at an instant of time.

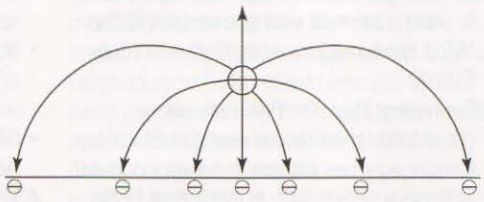

Figure 2: Electric charge above a conducting ground plane.

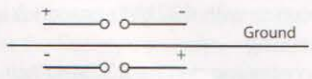

Figure 3: Dipole and its image in the ground.

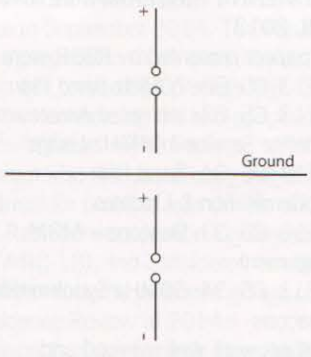

Figure 4: Instantaneous charges on a vertically polarised dipole and its image.

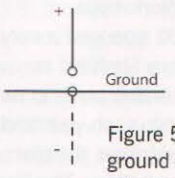

Figure 5: Monopole with ground synthesising 'the other half'.

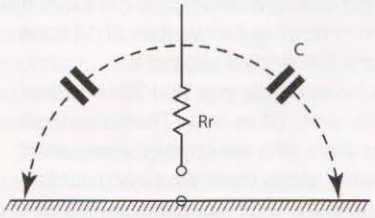

Figure 6: Electrical representation of a monopole over perfect ground.

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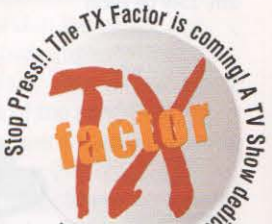
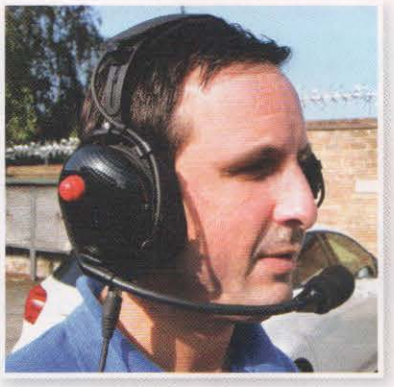


RADIOSPORT HEADSETS



Manufactured by Arlan Communications in the USA, they were first shown to Hams at the recent RSGB Convention in October. The response was so good we doubled our order to the factory.

Designed around their professional series of race headsets, the new Radio Sport range is aptly named. Ever tripped over a lead of your existing headset only to find you can't simply unplug it and pop in another? A mandatory requirement in contest conditions and just one example of how Arlan have taken a different approach to existing products design. Using a miniXLR 5P interface plug & socket you can be up and operating again in a matter of seconds.

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All headsets are supplied with GEL Cushions giving extra comfort and FREE cloth covers.

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Design Notes

Driving R/C servos, plus a new GPS module

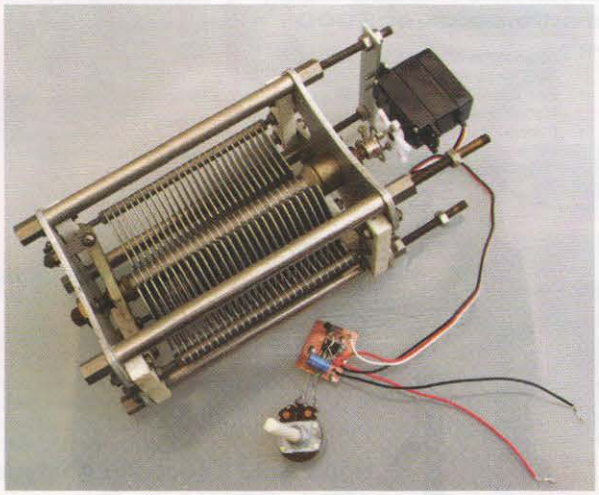

PHOTO 1: The Maplin 'standard servo' driving a wide spaced tuning capacitor. They were coupled by dismantling an old flexible shaft coupler then matching the two mounting holes to those in an adapter supplied with the servo. The circuit board contains the driver shown in Figure 1.

RADIO CONTROL SERVOS. These days small servos designed for radio control models are readily available and quite reasonably priced. Richard, G8JVM has been using these to adjust variable capacitors remotely. He writes, "I was surprised how much torque these little servos have. 180 degrees of rotation makes them ideal for variable capacitors, although not so good for potentiometers with their 270° range. But I think you can pull the limits off the servos and get them to over-travel. I've been playing with them for modelling and realised how useful they are for remote knob twiddling. Even with the cheap £2.50 servos I reckon there is enough torque for a rotary switch. There are bigger ones rated at a torque of 20kgf/cm for about £15, which would easily turn a multi way rotary switch.

"The only thing to watch is the amount of shaft sticking out of the top, about 2mm, so you need to use the push-on arm and glue it to a small knob or 6mm shaft extender. The cheap ones have nylon gears, so trying to grip the end of the shaft with a grub screw is just not acceptable."

I was intrigued by this, but could not find the £2.50 units mentioned by Richard. Instead, I looked to see what Maplin Electronics had available. Their webpage [1] listed the 'standard servo' with the description "A complete unit with motor and electronics. The three wire system requires 5V DC on the red wire, 0V on the black 3V to 5V pulse on the white wire between 0.75 and 2.25ms long every 18ms approx."

To control the position of the servo requires that a logic level pulse be generated, with a width variable over the range given. This is a standard for nearly all model control now. Officially the width range is 1 to 2ms, but there is some leeway on this value. The position the servo settles at is defined by the width of the pulse. So, all that is required to be able to set any rotational position over a 180° arc is to generate a series of pulses whose width can be varied by, for example, adjusting a variable resistor.

There are many ways of generating a variable width pulse in a repeating chain. The circuit of **Figure 1** shows how the ubiquitous NE555 timer IC can be configured to produce a variable-width pulse chain at the required repetition rate. An annoyance with the 555 is that in its normal astable mode of operation it generates a pulse chain with a duty cycle greater than 50%. We want pulses of 1 to 2ms with a repetition rate of 18ms. That corresponds to a duty cycle of just 5.6% to 11%. Capacitor C charges up via the series combination of R1 and R2; this defines the period when the output is high. When a threshold of 2/3Vcc is reached, the capacitor is discharged through R2. When the voltage across C drops to a threshold of 1/3Vcc, the sequence repeats. The discharge corresponds to the off period. See the 555 data sheet [2] for design equations.

The easiest way to turn this into a suitable drive signal for the servos is simply to add a transistor (as shown) or a logic gate to invert the signal. The discharge period now defines the pulse width, 0.7 * R2 * C. By making R2 variable, the resulting 1 to 2ms pulse is formed. The charging time, defined by R1 and to a lesser extent R2, sets the slower repetition period, 0.7 * (R1 + R2) * C.

If the servo is to be mounted some distance from the controller, as in a remote ATU, there may be some advantage in using optical isolators, or even optical fibre, in the drive circuitry. Now the polarity inversion is inherent in the action of the opto-isolator, which switches to ground when the input LED is driven on. My prototype, driving a variable capacitor, is shown in **Photo 1.**

A better solution with lower component count, especially if more than one servo is to be controlled, would be to use a microcontroller such as a PIC to generate the pulse stream. Choosing a PIC with an integral A/D converter and multiple analogue inputs will allow several potentiometer inputs to generate independent output pulse chains for controlling multiple servos. By adding push buttons, the value of any settings can be stored in the controller's non-volatile memory for recall next time. A simple pulse generator such as this would make an ideal learning exercise as an introduction to microcontroller programming.

GPS RECEIVER MODULE. The August 2010 edition of this column looked at the RF Solutions 1513R GPS receiver module. This postage stamp sized module requires just a 3.3V supply and a GPS antenna to supply National Marine Electronic Association (NMEA) navigation and timing data. The data is sent out of the module as serial stream in RS232 format at 4800 baud. The data appears at 3.3V logic levels so it needs to pass through a level converter such as a MAX232 chip before being able to be displayed on a PC. However, most users will want to use the data stream directly and the 3.3V logic level output will just about interface directly to standard a 5V logic based microcontroller. Not everyone is too happy with this direct 3.3V output to 5V input interface. The switching thresholds of 5V logic input are a bit too close to 3V to guarantee absolute reliability, although in practice is does work. If you aren't happy with this direct connection, a 2N7002 MOSFET can be employed in the transmit direction – remembering the serial data polarity will then be inverted. Two resistors are used to reduce 5V output from the controller to the desired 3.3V input levels in the receive direction.

I wanted to make a controller to generate WSJT modes for a beacon by directly programming a fractional-N synthesiser

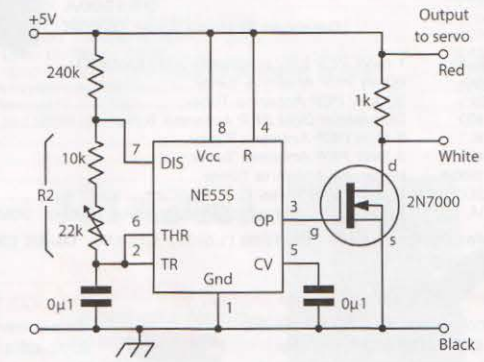

FIGURE 1: Using an NE555 Timer IC to produce a manually adjustable control signal for a standard pulse width controlled servo designed for model control.

in real time to generate the tone sequence directly at RF. All the WSJT modes need quite accurate timing; each transmission sequence starts exactly on the minute and needs to be accurate to within just a few seconds. The easiest way to ensure constant accurate timing is to incorporate a GPS receiver into the beacon source so the exact time is always available by reading the NMEA data.

Rather than just get the same module from a supplier I had had a bit of difficulty finding on the web, I thought I'd look at my preferred suppliers, RS and Farnell, to see what they had in the way of GPS modules. Both companies offer a range of broadly similar GPS modules. The low cost A2200 GPS module from Maestro Wireless Solutions, available from Farnell for £12 and for a little more from RS, looked ideal. It appeared to have several improved features over the older RF Solutions one, not least claiming to have eight channels of anti-jamming capability as well as faster lockup. 30 seconds from cold was claimed, meaning there was no need for a backup battery if the module was to be switched on or off frequently. A datasheet can be downloaded from the Farnell website [3].

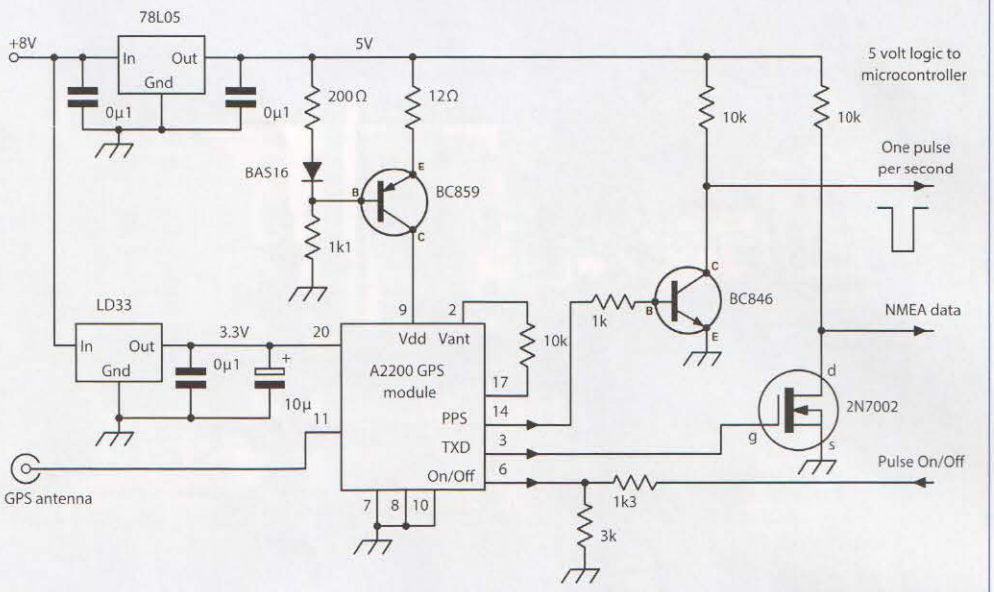

FIGURE 2: Interfacing circuitry for using the A2200 GPS module to a microcontroller with 5V logic levels.

Figure 2 shows the interfacing needed to a microcontroller with 5V logic lines. A 2N7002 MOSFET interfaces the 3.3V logic output level to the 5V inputs. The resulting polarity resulting inversion conveniently makes the 5V signal directly readable by any RS232 terminal. The one pulse-per-second (PPS) signal, unfortunately, is of a lower amplitude, being only a 1.8V pulse. This is below the threshold of a 2N7002, so a bipolar transistor with associated base resistor must therefore be used for the interface. The resulting active part of the 1 PPS signal marking the UTC one-second epoch is therefore the negative going edge.

Unfortunately this module is not quite as easy to drive as the old RF Solutions one was. It does not start generating serial data immediately power is supplied. You need first of all to strobe the on-off pin with a logic pulse. The data sheet is quite clear about the requirement and there is no easy way around it. The on-off pin has to be pulsed before the unit will do anything. Not a problem when the module is being used in conjunction with a microcontroller, but does mean this module cannot be used on its own, for example to provide time synchronisation to other 'dumb' user that cannot switch it. For standalone operation (without any additional microcontroller) it would no doubt be possible to provide this strobe pulse from a bit of additional logic circuitry providing a simple delayed pulse.

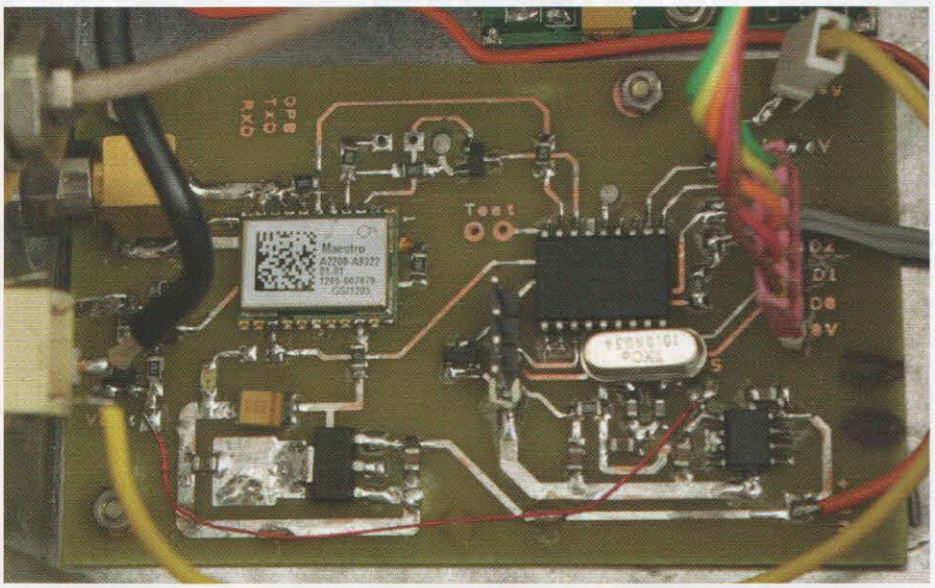

PHOTO 2: Homebrew PCB with Maestro A2200 GPS module and a PIC microcontroller.

Like other GPS modules, the A2200 will supply a positive voltage on the GPS antenna input pin to supply power to active antennas. A dedicated Antenna Supply pin is provided to which any voltage up to 5V can be connected, but there is no current limiting inside the chip to protect against a short circuit on the antenna feed. To prevent damage to the chip in the event of a short, the antenna supply to this pin should be current limited. The datasheet shows suitable circuitry to do this. The circuit shows a PNP transistor configured as a constant current source to limit the short circuit current to about 70mA. Typical active GPS antennas consume significantly less than this, even from a 5V supply. The DC supply is not switched onto the antenna pin until the chip has been pulsed on – something that had me a bit confused when first testing this unit!

In spite of its interfacing niggles, this small GPS module is a delight to use. Once it has been pulsed on, 30 seconds later valid NMEA data appears and the 1 PPS signal starts. No other configuration, no uncertain hot or cold starts; 30 seconds from turn on, it's running. Sensitivity, as with most modern GPS units, is far better than the surplus GPS receiver modules of a decade ago and means that in many cases an antenna sitting on a window sill is more than adequate.

Photo 2 shows a PCB containing the A2200GPS module and PIC controller.

WEBSEARCH

[1] www.maplin.co.uk; enter the term Standard Servo into the search box
[2] NE555 data sheet: www.ti.com/lit/ds/symlink/sa555.pdf
[3] www.farnell.co.uk, order code 2281694

Roger Balister, G3KMA • e-mail: g3kma@dsl.pipex.com

IOTA's 50th Anniversary

RSGB IOTA Convention, Beaumont House, Windsor, 4-6 July

LOCATION. Arrangements are well in hand to celebrate IOTA's 50th Anniversary at Beaumont House, Windsor over the weekend of 4-6 July. The Beaumont features in many DXers' memories. It was where the annual HF and IOTA Convention was held from 1991 to 2001. They recall its beautiful setting in 40 acres of countryside just by the River Thames. Nearby is Magna Carta Island where the famous charter of civil rights was sealed, with Windsor, its castle and other attractions just up the road. The Beaumont has undergone major refurbishment and is now one of the most popular conference centres/hotels in the area.

PROGRAMME. The event will start on the Friday afternoon with a welcome of guests followed by a celebration dinner. The 4th July event will have an American flavour in view of a quite large number of Americans who have booked or are in the process of doing so. The Saturday will be taken up with a full programme of IOTA talks by speakers well known to the IOTA Community. These will include a report on the two-year long IOTA Marathon by Cezar Trifu, VE3LYC from both participants' and adjudicators' viewpoints. We are hoping that some of the overseas prize winners will have made the trip to receive their awards.

As this will be the largest gathering of IOTA aficionados in recent years, we are sure that there will be much discussion of IOTA's achievements over the past 50 years and expectations for the future. IOTA DXpeditioners do not always see things the same way as island chasers and this will be an occasion for a lively discussion on subjects such as the future of QSLing (including the route to paperless QSLing), the cost of DXpeditions, the IOTA Contest and challenges faced in accessing those remaining New Ones. This will no doubt spill over into the Gala Dinner which with musical entertainment will be a fun occasion.

A partners' programme will be organised on the Saturday to include a visit to Windsor. Sunday morning breakfast will feature a breakfast presentation by a well-known speaker, after which the formal part of the event will close. Guests will be able to stay as long as they wish in the public areas and lunch can be purchased if required. Given sufficient interest, a river trip will be arranged mid-morning at cost for those wanting something special.

TRAVEL. Whether or not you have been before, this is an opportunity not to be missed. Travel connections are easy, with access to the M3, M4 and M25 nearby. By train the connection is either Windsor Central to Paddington via Slough or Windsor and Eton Riverside to Waterloo. For those travelling by air, Heathrow is just 10 miles away – special taxi rates are available if arranged through Beaumont House.

Hotel packages, dinner tickets, lunch tickets and day tickets can all be booked online via www.rsgbevents.org. On the basis of early expressions of interest, demand is likely to be high and for room capacity reasons we have had to place a limit on attendance. To avoid disappointment it is best not to delay but act now and take advantage of the early bird discount by booking before 31 March. Day visitors will be very welcome and can also book attendance. The programme will, as it develops, appear on the RSGB IOTA Convention webpages at www.rsgb.org/iota50 with the finalised programme in the July *RadCom*.

JOIN US. This will be a truly international celebration of IOTA. Well-known island enthusiasts both from the UK and overseas have booked to come. Some were at the Beaumont in those early years, particularly at the 30th anniversary party in 1994 or at the millennium celebration, and want to experience the pleasure of 'HF and IOTA Convention Revisited' in such attractive surroundings. The occasion is not just for returning visitors but for new ones who want to enjoy the camaraderie of IOTA island chasers and activators mingling together and discussing their experiences on near and remote islands. The dates were chosen to encourage overseas visitors intending to attend Friedrichshafen 2014 (27-29 June) to make it a summer holiday by travelling across to Britain afterwards. You will find the warmest of welcomes here in July. We intend it to be truly a convention to remember.

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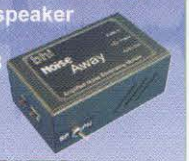

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The Lambda Loop

A practical and novel antenna for 2m horizontal mobile

INTRODUCTION. The Lambda Loop is an omnidirectional horizontally polarised antenna that is described briefly in past editions of the RSGB *VHF/UHF Manual* but, as the author found, that was not a recipe for construction. The following contains details of the development of a practical mobile antenna that gives excellent performance for both SSB and horizontal FM. It should be easily reproducible in a few hours by anyone with moderate skill using hand tools.

HISTORY. In 2006 I constructed an Elecraft 2m transverter to match the K2/100 I had made in the previous year. The small size of this equipment invited its use in my similarly small car and, with the addition of a Microset SR200 PA in the boot, produces about 150 watts PEP of SSB. So there was merely the matter of a mobile antenna. For 2m SSB use it should, of course, be horizontally polarised. My first experience of 2m mobile SSB operation, many years ago, had been using the original J-Beam circular 'Halo' antenna, later replaced by their 'Squalo' (square halo). These consisted of a gamma-matched half-wave dipole, bent round in a circle (or square). I found that neither matched nor performed particularly well, and were not really mechanically suited to the fortitudes of mobile use. So I decided to look for an omnidirectional antenna with better overall performance. To this end I developed a set of criteria, listed in the coloured box below.

CHOICE OF ANTENNA. I considered first the 'clover-leaf' antenna, but decided that its large dimensions, mechanical complexity,

PHOTO 1: The Lambda Loop antenna mounted on my car.

and intrinsic fragility render it unsuitable. Then I came across the 'Lambda Loop' described in an old RSGB *VHF/UHF Manual* [1]. Although I had never knowingly met anyone using one on 2m, nor ever seen one (it does not seem to be well known), I decided from its size and predicted performance that this was the one to try. The finished prototype is pictured in **Photo 1** and it satisfies all my 'ideal antenna' criteria. Incidentally, this project was runner up in the Newbury and District ARS Construction Contest, October 2007.

The Lambda Loop differs from the Halo by being one wavelength long rather than half a wavelength. Hence the name, after the Greek letter lambda (λ) used to represent a wavelength. It exhibits a good omnidirectional radiation pattern, which varies from equal to that of the Halo to about +7dB, >1 S-point (**Figure 1**). The exception

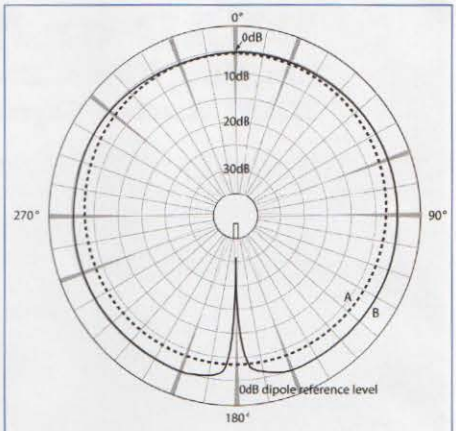

FIGURE 1: Radiation pattern of the Lambda Loop (solid line) compared with the Halo (dashed line), after Figure 89 in [1].

is a deep null in the direction of the feed line, but according to this plot it is only about 10 degrees wide at -3dB and 5 degrees at -10dB, which would make it suitable for a direction finding antenna. However, when mobile one is always changing direction, so this is unlikely to produce anything more than very occasional additions to the variations in strength ('flutter') that are normally present on 2m mobile signals.

The antenna length includes the parallel matching section (see **Figure 2**). The diameter of the Lambda Loop is 50% larger than the Halo, but it is supported at the centre, resulting in an antenna which is better balanced and (in my opinion) aesthetically more attractive.

IMPEDANCE MATCHING. The original source [1] states that the feed impedance of this design is 50Ω and recommends a 1:1 (λ/4 length) Pawsey stub as a balun (balanced to unbalanced feed) to connect to coax. This also serves as a convenient way of supporting the loop (it is sometimes known as the 'metal insulator'). However, [1] gives no information on the dimensions or the materials used for construction. After building the loop as pictured using the materials and dimensions described, the impedance was measured at the end of a length of coax one (electrical) wavelength long, to ensure that the value measured was the same as that at the feed point. It was found to be much higher than the claimed 50Ω [2]. Fortunately, the Pawsey stub can be used as a transformer to match almost any complex impedance by adjusting the position of the tap point and its length.

DIMENSIONS. Since the horizontally polarised antenna will primarily be used in the SSB section of 2m (144.1 to 144.4MHz), the SSB centre of activity frequency of 144.3MHz was used as the design frequency. This translates into a wavelength λ of 2080mm (I round off these dimensions to the nearest mm or so, as they

THE IDEAL 2m SSB MOBILE ANTENNA

Electrical requirements
Horizontal polarisation
Efficient radiator (implies a high-Q resonant antenna)
Good match to transmitter over band (144.15-144.4MHz in particular)
Omnidirectional horizontal coverage but limited vertical beamwidth, giving useful gain
Element(s) grounded at DC, reducing out-of-band signals and avoiding static buildup.

Mechanical requirements
Low weight
Low wind resistance
Overall size appropriate, not overhanging car
Constructed from materials resistant to rust or corrosion
Strong enough to withstand normal driving plus wind speeds
Rapid assembly and disassembly for easy storage within vehicle boot
Robust, able to withstand frequent assembly/disassembly and storage.

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PHOTO 2: Close up of the assembled Lambda Loop.

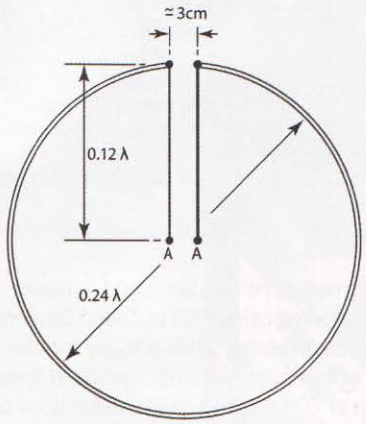

FIGURE 2: Dimensions of the Lambda Loop. Circumference = 0.7536λ, total loop size A to A ~ λ. Taken from [1] Figure 88b.

are not so critical). The diameter of the loop is specified (**Figure 2**) as 0.24λ = 500mm, thus the length of the two radial sections are 250mm. The circumference is specified as 0.7536λ = 1566mm. The overall length of the loop plus two radial lengths is 2066mm. Because a 2m length of aluminium was used to construct the loop, there is 66mm missing. Hence the radial sections are made 217mm long, and the extra 33mm is provided by the supporting brackets (see **Figure 3**).

The length of the Pawsey stub was found empirically to be 215mm, but the total length is specified as 250mm, to allow for some adjustment. The coax is connected 138mm from the top. For protection and convenience, the coax is fed up the centre of the support tube, an angled hole being drilled to bring out the coax about 10mm below the tapping point (to allow for some adjustment).

MATERIALS AND CONSTRUCTION. No high level of skill is needed for its construction. You will need a number of hand tools (drill, hacksaw, files, hammer, pliers, ruler and scribing tool, and abrasive paper) and a vice. Round off all corners and sharp edges with a file and emery paper; you do not want any possibility of accidental injury or damage when handling the antenna. **Table 1** shows the materials required.

In the mobile environment, where the antenna is probably going to be continually mounted and dismounted, I wanted to use something that was not easily damaged and would spring back if bent, ie a pre-stressed loop. Strip rather than a tube is more appropriate for this design. I came across 2m x 25mm extruded hard aluminium strips, intended for decorative purposes, at B&Q. These are ridged on one side and one edge is curved over, which improves the rigidity and also locks with the edge of the support brackets to keep the loop horizontal. When you bend this material, do not make the 90° bends too sharp, or you may fracture the material.

The length of the support tube is optional, but remember that to work properly the antenna should be mounted at least 0.34λ (0.7m) above the ground plane **[3]** and, indeed, the higher the better. On the other hand, consider what overhead limits you are likely to encounter. One of the car parks I use regularly has a height limit of 6ft 6in to exclude commercial vehicles. An adjustable telescopic support might be a future improvement, to be set according to the journey I intend to make.

On the principle that a picture is worth a thousand words, it should be possible to reproduce the antenna using the dimensions given in **Figures 3** and **4** plus **Photos 2, 3, 4** and **5**.

Three insulating pieces are used: two to hold the loop in shape and one to hold the stub tubes together at the open end. This latter was made from a piece of reinforced PTFE measuring 55 x 20 x 10mm. For the loop insulators I used two 30 x 12.5mm (1/2") diameter PTFE rods; round has slightly less air resistance than square section, but there is no reason why they should not be made from the same rectangular material used for the stub support – hence I have specified one piece of material from which all three insulators can be cut. Their position is not critical. Suppliers of PTFE can be found on the internet.

The two pieces used for mounting the loop and the shorting bridge are made by suitably bending the 20mm strips of aluminium around the tubes. The two tabs holding the coax to the stub are made by cutting the fourth strip in half and bending these around the tubes. These are all secured by M3 nuts and bolts.

To feed the antenna, I used a 1.5m length of RG58 to reach the PA located in the boot. Although this coax is best avoided on the 2m band, over this length the loss is negligible provided there is a good match (SWR near to 1:1).

Finally, you will need something to hold it all together. I used metric rust-less nuts and bolts, with toothed lock washers. For those with older stock, these could be substituted by BA sizes as indicated. You could also use self-tapping screws in most positions, but these might vibrate loose. Blind pop rivets would probably give a more professional finish, but assemble first with nuts and bolts until any adjustments that may be necessary have been made and only then replace them with rivets. However, bolts and wing nuts with lock washers are essential for fixing the loop to the support, for rapid but secure assembly and disassembly. I used the pane of a hammer to flatten the ends of these screws to prevent the wing nuts from getting lost.

MOUNTING THE ANTENNA. I mounted the antenna with the feed lines pointing towards the front of the vehicle, as seen in Photo 1. The loop is more stable in this orientation because it is supported forward of the air flow and so the loop streams naturally behind. Although the notch in the polar diagram is in the direction one is travelling, this becomes less important with time if you are travelling towards the source. Also, the minimum radiation is in the direction of the occupants of the car, if you worry about such things (and mine's a soft top, so no Faraday cage!).

The actual method of mounting will depend on the vehicle and personal preference. I use a triple mag-mount on the boot lid, with a heavy-duty bayonet connector for rapid removal.

ADJUSTMENTS. I made the adjustments to the stub with the antenna *in situ*, using

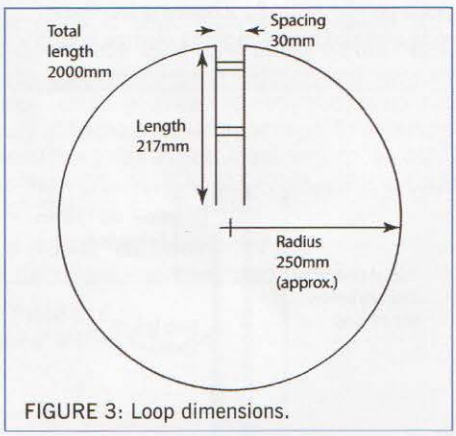

FIGURE 3: Loop dimensions.

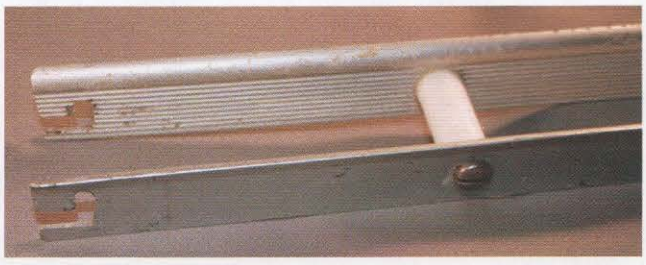

PHOTO 3: Detail of mating end of loop.

March 2014 • RadCom

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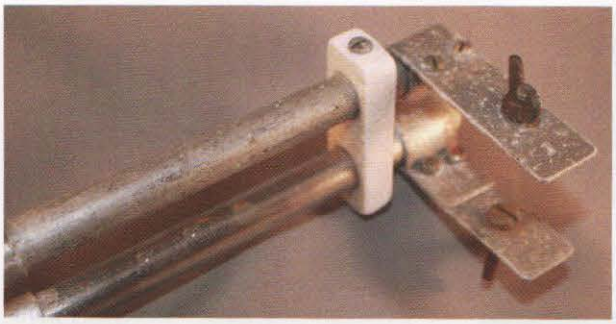

PHOTO 4: Detail of support brackets and feed.

PHOTO 5: Detail of loop connected to bracket.

a noise bridge [4] with the mobile rig as detector. This has several advantages over adjusting for minimum SWR using a transmitter. First, no high level emissions are made while doing these adjustments, so there is no possibility of causing interference. Second, *any* level of mismatch is tolerated and, third, one can make the initial adjustments by ear, leaving the eyes and hands free for manipulation. Final adjustment is best done using the S-meter. However, starting from my dimensions, very little mismatch should be found, so the use of a noise bridge should not be necessary. Adjustments to the stub length and tap point can be made by loosening the fixing nuts and sliding the tapping clamps and/or shorting piece along the rods. Then, when satisfied, remove it and drill and tap for the M2.5 screws through the two mounting clamps, the shorting piece and the spacing insulator, for extra security and strength. You may like to finish it off and retain that 'new' look, as well as protect against the weather and particularly the salt used on the roads during the winter, by spraying it with a protective finish (excluding, of course, the contact surfaces between the loop and the mounting brackets). Photos 3, 4 and 5 were taken after the antenna had been in use for more than seven years.

RESULTS. It is never easy to measure completely the performance of an antenna. The SWR across the band is shown in **Figure 5** and is completely satisfactory. Neither the polar plot nor the absolute gain have been checked, because it is unlikely that the measured values would be more accurate than the predicted values shown. However, most amateurs will judge by the results. So having completed the antenna, I drove up to a nearby high point, about 220m / 730ft ASL on the Berkshire Downs. Tuning across the beacon band only GB3VHF was strong, indicating that conditions were 'normal'. My first SSB CQ on 144.3 was answered by two stations, both using only 10W, and both stations were worked without difficulty. Joe, GOJJG was located in Stowemarket, Suffolk, some 110 miles away, while Bernard, GOFIR in Charlbury was only about 25 miles away, but it turned out he was using a fixed Yagi in the loft, pointing north (away from me).

Subsequent use has confirmed its performance and reliability. I have worked using SSB to EI and DL from my area, the latter while actually mobile. The antenna has survived sustained speeds of up to 70mph, and can be assembled or disassembled in about one minute.

MOBILE OPERATION - IMPORTANT! If you *do* operate while actually moving, be sure to follow best 'hands-free' practice, always putting safe driving first. Moreover, I advise joining the Institute of Advanced Motorists, receiving their guidance and taking their test, however long you have been driving and however good you think you are.

TABLE 1: MATERIALS REQUIRED.

1 pc	Aluminium strip 2m x 25mm trim (B&Q)
1 pc	Aluminium tube, hard drawn, thick walled, length optional (see text) x 12.5mm (or near) diameter
1 pc	Aluminium sheet (hard), 120mm x 80mm x 1.5mm, cut into 4 strips 20mm wide
1 pc	PTFE block (or see text) 60mm x 30mm x 10mm
	Use rust free material for the following:
2 pc	M5 x 10mm bolts, plus wing nuts, and lock washers (2BA could be used)
8 pc	M3 x 5mm bolts, plus nuts, and lock washers (4BA could be used)
6 pc	M2.5 x 10mm bolts (6BA could be used)

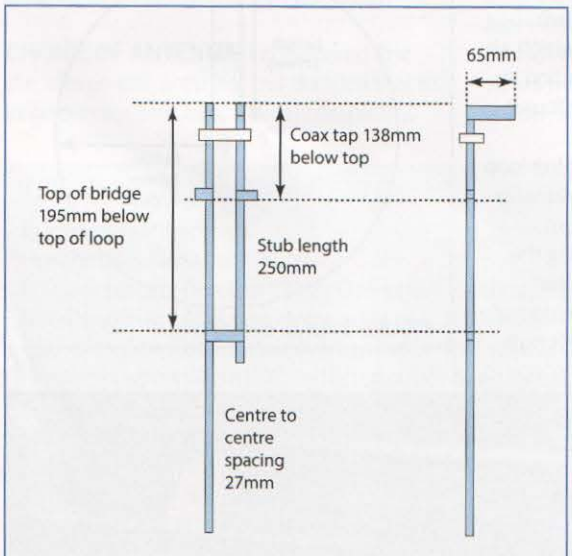

FIGURE 4: Essential dimensions. The insulator is shown in white; the position is not given, as it is non-critical.

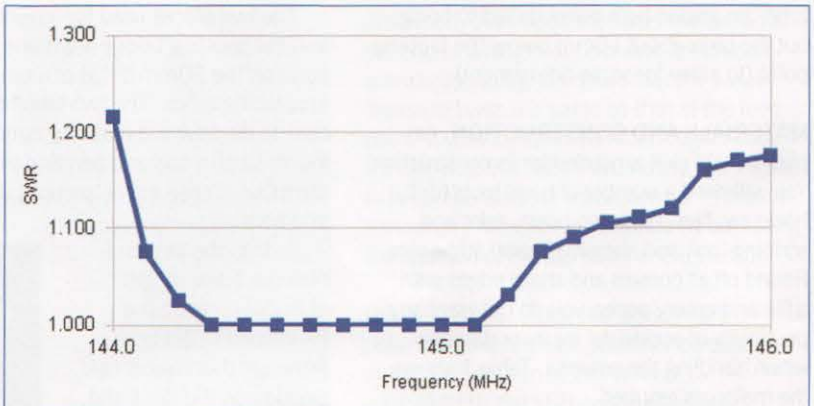

FIGURE 5: Measured SWR of the Lambda Loop. A Bird model 43 Wattmeter was used for these measurements, using a 100W 100-250MHz insert to measure forward power (just below 100W), and a 10W 100-250MHz insert to measure reverse power.

REFERENCES

[1] *VHF/UHF Manual (4th ed)* pp 8.35 – 8.36; Jessup (editor), RSGB (1983); ISBN 0 900612 92 4

[2] I understand from the author of the chapter referred to in [1] (R G Powers, G8CKN) that this was a mistake in the original text (private communication)

[3] *VHF/UHF Manual (4th ed)* p 8.35

[4] RF Noise Bridge, *VHF-UHF Manual* (3rd ed) p 10.17; Evans & Jessup (editors), RSGB (1976); ISBN 0 900612 31 2. Other designs could, of course, be used.

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HF

All the latest news for the HF bands

GENERAL NEWS. I'm pleased to see that Col, MM0NDX, has restarted the IOTA column and will be introducing a fresh approach to island coverage so I will be focussing on general HF and DX issues as did my predecessor, G3XTT.

The sun may have finally peaked in late December/early January when the daily flux index hit 218 – the highest so far in the current cycle. The main contribution came from the southern hemisphere but the northern was still ticking over and one has to wonder what the solar maximum would have been if the two halves of the sun had been in sync. The flux has since declined but there is no need for despondency as conditions should be good for a few more years.

FT5ZM Amsterdam Island DXpedition departing Australia (Tnx VK6IR).

I was very sorry to see that Max de Henseler, HB9RS, the founder and president emeritus of the 4U1UN station at United Nations headquarters in New York, passed away on 30 December at 80 years of age. I remember meeting Max at the UN building in the 1980s for a tour of the station – though sadly the equipment wasn't working that day so I didn't make any QSOs from this rare DXCC entity. There was also an access issue at the time as the station had to be approached through the women's changing room of the gym – which rather limited operating hours! The Daily DX reports that the station was dismantled in early 2010 due to a massive renovation project on the Secretariat Building. All of the antennas were removed from the roof and all of the equipment put into storage. The club is now looking at several options in order to get 4U1UN back on the air as quickly as possible. Some of the options being considered include running the station remotely, putting it on the ground floor and running some 500 feet of coax to the top of the building or moving the station to another sovereign UN building. Let's hope it is back on the air soon.

Joe, W1JR, in conjunction with The Daily DX, has again produced a summary of DX activity during 2013 including a list of DXCC entities that were NOT activated during the year. You can find it at http://hamgallery.com/W1JR/2013.pdf.

DX sound clips for 2013 can be found at http://hamgallery.com/dx2013. The collection of 156 clips covers the major DXpeditions, plus rare and semi-rare DX. There are also some recordings on the site from the 1960s and 1970s. Tom, K8CX is looking for "old or interesting DX recordings" to be added to the site. Please contact him (k8cx@hamgallery.com) if you have any you can offer.

DXCLUSTER. Everyone by now will have their favourite way of picking up cluster spots, including the original DX Summit from Finland and the low bandwidth smartphone system *DXLite* designed by Michael Wells, G7VJR. The latest website to come along is DX Heat at www.dxheat.com built by DH1TW that includes a range of analytic tools as well as integration with a webSDR so you can listen to the spots through your browser. If you haven't seen it yet it is well worth a look.

YASME. The Yasme Foundation was originally established in 1959 to help support the DXpedition activities of British yachtsman Danny Weil in his boat *Yasme*. Danny passed away in America a few years ago but the Foundation continues to support DXers and DX activities and has recently announced its 2014 grants. Recipients include:

- Tom Roscoe, K8CX for his excellent hamgallery.com website
- Lee Sawkins, VE7CC for his dxcluster software
- John Devoldere, ON4UN for his work on LF DXing
- Ken Claerbout, K4ZW for his work on DX and contest webinars
- Ashraf Chaabane, 3V/KF5EYY for his work representing amateur radio in North Africa
- N4MC, K7LS, AE7Q and AH0A for providing convenient access to information in FCC databases
- The World Radio Team Championship 2014
- The Reverse Beacon Network
- The CW ops CW Academy
- The ARRL Second Century Fund

Details can be found on the website at yasme.org. Trivia fans may like to know that the name Yasme derives from the Japanese Yasumi meaning holiday or free time. A short biography of Danny Weil can be found at http://hamgallery.com/Tribute/VP2VB/.

FORTHCOMING ACTIVITY. A group of six British operators will be QRV from the island of Raivavae in the Australs (OC-114) from 20 March to 1 April, all bands CW, SSB and RTTY. The Austral Islands are #38 in the European wanted list according to *Club Log*. The operators will be Don, G3BJ, Chris, G3SVL, Nige,l G3TXF, David, G3WGN, Don, G3XTT, Hilary, G4JKS and Justin, G4TSH. They plan to run up to three stations, each consisting of a K3 plus amplifier. Antennas will consist of various verticals on the beach. The team will upload logs to *Club Log* and, bandwidth permitting, to LoTW as the expedition progresses. QSLs will be handled by G3TXF and requests can be made directly or via the *Club Log* OQRS facility. See their website at tx6g.com.

A large team from the Radio Club de Provins may still be active as TO7CC from Reunion Island (AF-016) when you receive this column in the UK. They were expected to be running four stations on all bands SSB, CW and RTTY, with emphasis on the low bands and RTTY. See www.to7cc.com. Similarly, the Amsterdam Island DXpedition may still be QRV for a day or two after UK readers receive this issue.

Klaus, DK1AX and Heidi, DK1MA, will be active holiday style as A35AX from Tongatapu (OC-049) and Vava'u (OC-064), Fiji from 24 February to 7 March. They will operate CW, SSB and RTTY. They would prefer people to QSL through the OQRS provided by *Club Log*.

Barry, ZS1FJ/ZL1MFJ says his ZL7AAA Chatham Islands team is all set to be QRV from 20 March to 1 April. There will be 5 ops and they will be QRV all modes with amplifiers. They will have a 2 element SteppIR beam, a BigIR vertical and vertical dipole arrays for 15, 17 and 20. 160m operation is not planned. They should by now have a website at www.qsl.net/zl7aaa.

DL7DF has announced he and his team are planning a DXpedition to Sri Lanka from 10 to 23 March. Plans are to have several stations QRV on CW and SSB on 1.8 through 50MHz, with one of those stations dedicated to activity on RTTY, PSK31 and

SSTV. They will be using two 18m lowband verticals, a 40m delta loop, 30m delta loop, two Spiderbeams for 10-20m, a five element 6m Yagi and Beverages for receive antennas. They have a web page at www.dl7df.com/4s7/index.php.

To celebrate the 25th anniversary of the demolition of the Berlin Wall, which paved the way for German reunification, a special callsign DQ25GRENZE (Grenze is German for border) will be active until the end of the year from several historic sites in northern Germany. A dedicated website can be found at http://dq25grenze.de.

The Extreme DX & Contest Group will use special callsign II3CV from 15 February to 4 March to celebrate the Carnival of Venice. Information on the associated award can be found at www.extremegroup.org.

Jon, K7CO, Christian, K7CXN and possibly one more op will be QRV as VK9X/K7CO from Christmas Island (OC-002) on 1-11 March. Activity will be on 10-80m SSB, CW and PSK31. They have a website at http://vk9x.com.

DJ9KH will be QRV as ZD8D from Garden Cottage on Ascension Island between 24 February and 11 March including the ARRL DX CW contest.

VK3BY will be QRV from Palau, T88, from 8-14 March on SSB only but hasn't received his callsign yet.

VO1AU will be QRV as VO2AAA from the VO2WL club station in Labrador City, Labrador, CQ Zone 2, from 6-10 March.

It may be a little while before we hear Nauru C21 on the air again as it is now home to a massive camp for asylum seekers trying to reach Australia. Most of the available accommodation is taken up by officials associated with the camp. An April DXpedition led by K5YY has had to be cancelled.

NORWEGIAN AWARD. The Norway 1814 Award is being issued by the NRRL to celebrate 200 years of the Norwegian constitution. To qualify for the award UK stations have to contact at least 56 different Norwegian stations during 2014; 28 of which must be using the special LI or LJ prefixes. The LM1814 station counts as 10 LJ QSOs but can only be claimed once. The award costs $10 and various endorsements are available. E-mail norway1814@nrrl.no for more information.

TABLE 1: 2013 Worked DXCC Entities - Final Scores

Call	CW	SSB	Data	All
G4IDL	191	0	0	191
G0RPM	128	88	150	188
MU0FAL	179	97	37	182
M0BVE	178	0	0	178
G4XEX	0	169	94	178
G3HQT	151	0	114	170
M0BKV	121	108	22	164
G4FVK	81	76	0	118

TABLE 2: 2014 Worked DXCC Entities

Call	CW	SSB	Data	All
G3HQT	60	0	28	69
M0BVE	43	0	0	43
G4FVK	20	33	0	42

CORRESPONDENCE. Dave, M0BVE reports a good haul of CW DX: Swaziland, Brazil, Kuwait and Chile on 10m; St Lucia on 12m; Ascension Island, US Virgin Islands, French Guiana and Dominica on 15m; Trinidad on 20m; St Kitts, Sierra Leone, Dominican Republic, SMOM, and Namibia on 40m.

Fred, G3SVK was very busy on 40m and worked a huge range of DX on his folded dipole including: much of the Caribbean and South America, Jordan, Greenland, the UAE, Angola, India, Brazil, Zambia, Thailand, Algeria, Australia, New Zealand, Malaysia, China and the Amsterdam Island team maritime mobile en-route from Australia. On 30m he found Australia, New Zealand, Thailand, Indonesia and Malaysia; on 20m Malaysia, Thailand, China, Taiwan, Japan, Vietnam, Indonesia and Australia; on 17m Australia, New Zealand, Philippines, Japan, China, Vietnam, Laos and the Seychelles; and on 10m Libya and Vietnam.

John, G3PQA is an LF specialist and reports a number of interesting stations including V5/DL3DXX from Namibia heard several times on 80 and 160, HD2RAE from Ecuador on 160 on 29 December and Hawaii long path on 80m during the evening of 8 January. Conditions to New Zealand weren't so good – perhaps as expected given the short nights down there at this time of year – but should improve nearer the equinox.

Peter, G3HQT has added 5 metres of wire to each end of his inverted V, which has improved its tuning and LF performance and notes on 30m a data QSO with Namibia and a CW one with Angola, and on 40m CW Senegal, Sierra Leone, Martinique and Vietnam.

Nigel, G0RPM sent in a final 2013 update, which gained him second place in the table. He worked 13 new DXCC entities last year including 3 in December (New Caledonia on 15m CW, Laccadives on 30m RTTY/CW and San Andres on CW and/or RTTY from 17-80m). Other QSOs included Afghanistan on 12m PSK, Indonesia on 20m RTTY, Pakistan on 30m JT65 and Djibouti on 40 CW. He plans to focus on 160 during 2014 so hopefully we'll hear about some more DX on that band.

XR0ZR Juan Fernandez QSL Card (Tnx DX World).

Colin, MU0FAL reports ZD8UW on 20m SSB (think I heard that QSO being made!), PJ7/G3TXF on 17 CW and PJ4DX on 10m SSB. He also worked WB2REM on 10m SSB using a 5/8 wave vertical – and the power accidentally set to minimum on his FT-1000 so that QSO was probably made with a few hundred milliwatts!

Peter, G4XEX focussed on 10m and worked Bonaire, Namibia, Nicaragua, Cayman Islands, ZS9MADIBA (station in honour of Nelson Mandela), Chad and Thailand. Brief excursions LF produced Cameroon on 12m and Saipan and Namibia on 15m.

CDXC MARATHON. The UK Chiltern DX Club is running a DX Marathon Challenge with scores maintained on *Club Log*. This is open to all – but only CDXC members can win the trophies. DXCC entities count only once regardless of the number of band/mode slots. Check www.cdxc.org.uk for more information. I plan to report the leaderboard from time to time and I see that three weeks into January the leading scorer already has over 200 DXCC entities worked.

GMDX CONVENTION. The 2014 GMDX event will be held at the King Robert Hotel in Stirling on Saturday 12 April. The principal speaker will be Ralph Fedor from the FT5ZM Amsterdam Island DXpedition but delegates will also hear from G7VJR, G3XTT, G3RWF and even G3ZAY. See www.gmdx.org.uk for more information.

2014 TABLE. No strong opinions have been expressed on a table for 2014 so I propose to run the same as last year – though if most people upload their CDXC Marathon logs to *Club Log* for the CDXC table I may simply use the *Club Log* results. In the meantime, congratulations to G4IDL for topping the 2013 table.

Please note that I would appreciate reports by the middle of the 3rd week each month (or about a week after you receive your *RadCom*).

Finally – thanks as always to Daily DX, DX-World and 425 DX News.

March 2014 • RadCom
Richard Staples, G4HGI • e-mail: g4hgi@live.com

VHF UHF

Extreme weather brings damage and poor radio conditions

AERIALS DOWN. Terrible weather conditions kept many stations grounded for a lengthy period. A seemingly endless conveyor belt of deep depressions, storm force winds and torrential rain went on week after week during late December and into early January. Many multi Yagi stations had to luff their towers over and tie them down to prevent damage, so were unable to be on the air. One silver lining above all the cloud was the Quadrantids meteor shower that peaked during the afternoon/evening of 3 January. The characteristics of this shower are high intensity short bursts ideal for meteor scatter (MS) propagation and a type of reflection that the FSK441 mode in the *WSJT* suite excels in.

Pine, ZS6OB operating ZS9MADIBA on 144MHz EME.

Meteor scatter conditions generally are quite poor during the first few months of the year. With no showers to speak of, QSOs can still be made using the reflections from sporadic meteors. However, extreme patience is required to complete contacts as the hourly reflection rate, especially during the day time, can be very low. The next notable event should be the April Lyrids shower, peaking on 22nd of the month, but there can be a slow but steady increase in sporadic meteors up to this period. There are numerous websites that give predictions for major meteor showers. Over the years I have found some of them quite inaccurate but dates and times can be viewed at sites similar to EarthSky.org [1].

BEACONS OFF THE AIR. It is a great testament to the dedication of all beacon keepers throughout the spectrum that when a beacon goes off air, the first thing that most stations do is check to see if their own station is still working properly. Unfortunately, during the January storms, there were two beacon casualties: GB3NGI (IO65) and GB3VHF (JO01), which many people use as propagation indicators on 2m. At the time of writing, GB3NGI had just come back on 2m with its distinctive JT65b signal and the 6m beacon is also working nicely.

The beacon keeper for GB3VHF (Chris, G0FDZ) confirmed that the beacon was back on the air at 1045UTC on 20 January having suffered a power supply problem caused by an electricity company transformer failing and a large power surge. It would seem the repairs by the electric company are temporary so it is possible that GB3VHF will be off again for a short period in the future. For more information check out the GB3VHF website information page [2].

On behalf of us all who use beacons, a big thank you to all keepers and supporters for the time and effort in keeping them on the air. Another excellent resource is the website maintained by Stewart, G0LGS that details beacon information right throughout the spectrum from HF to SHF [3].

BAND REPORTS. Conrad, G0RUZ (IO93) operates from the North Wakefield Radio Club shack from near Wakefield in West Yorkshire. After some time out from the hobby, he returned in the spring of 2013. Along with other club members, he has been building the VHF station up slowly. Last year they were active in the 4m Cumulatives and also put GJ4NOK on the air from the Jersey Amateur Radio Society shack. Along with his own callsign operations, the G4NOK callsign should become familiar during 2014. They are hoping to be active on 6m, 4m and 2m with 70cm and 23cm later on. During the Geminids it was obvious to Conrad that 4m operators don't stay up late as the activity levels are nowhere near as high as on 2m. In the past he was active on 2m EME from the same location so running without a big PA and 4 Yagis seemed rather strange. The club had an old Eagle BV OPT2 3 wavelength Yagi that had been up since late 2001 without any attention. They fixed the battered old thing and found it still worked very well. Conrad tried some MS with this antenna during the Quadrantids and along with 30m of Ecoflex 15 and a barefoot IC-7400 with 100W, the system produced remarkable results. Completed QSOs were as follows: RX1AS, RM1A (KO59), UR5BFX (KN29), CS7/PD0HNL (IM67), SM2CEW (KP15), IV3NDC (JN61), IK0HWJ, E77GS (JN84), OH1MN (KP10), SP7BUZ (KO00), S58M, S57VW (JN76), SA3AZK (JP73), OK2PMS (JN89), IK2DDR (JN55), IK1SPR (JN34), SM7THS (JO76), SM4GGC (JO69), SQ1FYB (JO73), DF5NK (JN59), DK3XT (JN49) with a fantastic QSO with UT5DL in KO50 at a distance of 2187km. There are more developments planned at the station with a new 2m PA and change of antennas in the spring. Plenty of hard work ahead for Conrad and other team members Robert, M0RCX and Mick, M6MWP to deliver all the improvements and hopefully try and encourage other club members to help out with the contests.

Lyn, GW8JLY (IO80) was active on 2m during the Quadrantids meteor shower and on 6m where he was lucky enough to catch some winter Sporadic-E in December. His 6m log included S50A, OE9MON, OE9ICI, IW4BET, IW2CAM and IW4AOT all worked using SSB. On 2m, the Quadrantids predictions showed a very short and sharp peak that became very evident on the afternoon of 3 January. The meteor reflection rate shot up rapidly at around 1400UTC and remained high into the early hours of the 4th. In this shower, Lyn managed to complete 36 QSOs, with 7 of these contacts being new initials. He focused for a time on working as many stations as possible in Finland (OH) as MS is one of the few modes that enables him to work that country. There were completed QSOs with OH1MN, OH2NHP (KP10), OH4LA (KP20), OH3AWW (KP11), OH3KLJ (KP21) and OH6KTL, OH6PA in KP02. QSOs with the Ukraine are hard to complete on MS as he has only managed two contacts previously, so he was pleased to work both UT5DL (KN18EP) and UW8SM (KN28IV) during this shower, although KN28 was the only new locator worked. Once again Lyn cracked the 2k barrier with his QSO with OH3KLJ (KP21) at 2045km.

Steve, M0BKL (IO80) reported no exotic tropo or meteor scatter activity. However, as a keen EME operator, he completed with several new initials in the first couple of weeks of January, with SM0NKZ, JH8CMZ, OK7FA, ZS9MAD, KE4PT, DM1CG, YT1AR and DL1RNW all in the log. It's interesting

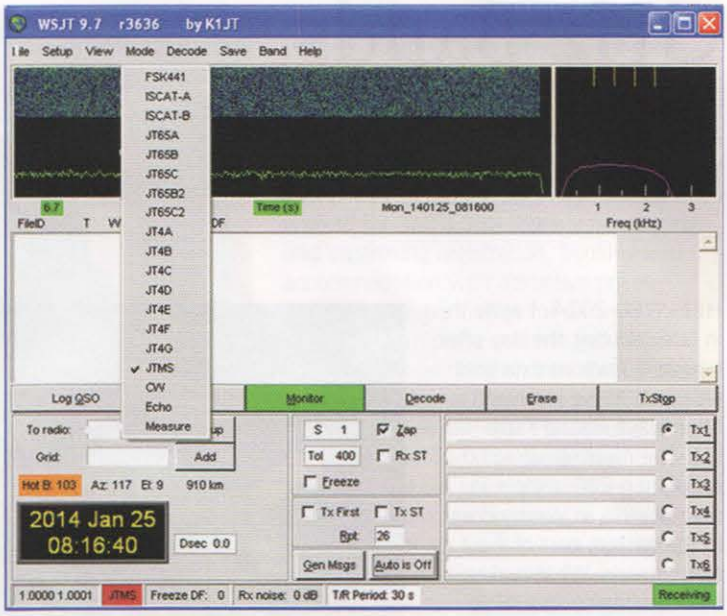
to note that his mast head preamp failure has not compromised his EME success rate as much as he first feared as Steve has completed over 50 QSOs without it. In late January, Steve's system is getting a major overhaul that will include straightening the antennas after the storms!

John, GW4MBN (IO71) comments that there has been a welcome increase in 6m meteor scatter activity over the December period thanks to the UKSMG Winter Marathon, with a mix of MS and winter Sporadic-E (Es) openings. Stations logged on 26 December were IK0FTA, IW1AZJ, IK6DTB, IW4AOT, 9A2NA, IK4HLQ, I2PJA, OE5UAL, OE9ICI, SP2CHY (SSB), IS0EBO, S58P (JT6M). Then on 28 December, YO5LD (JT6M) and the 30th SQ9HZM, SQ9ANT (SSB), SQ9QU, OK2BRD (JT6M). Into January and the 10th brought YU1FE (SSB) and the 16th and 18th EA2ARD (IN93), EA3KU (JN00) and LI4LN in JP50.

Like many, Mike, M5MUF (IO92) didn't have much to report in this last month, mostly some mid-winter Es openings on 6m. The worst of the storms seemed to miss Mike's QTH fortunately, but even so his 4m antenna was down most of the time and the rest were stuck facing into the wind to reduce drag. He did venture on the air for a look at the Christmas Cumulatives, but the bands were so flat and with so little activity he couldn't even muster the enthusiasm to complete the first session. 50MHz Es QSOs logged on 20 December were IZ4AIK (JN63), IK5RLP (JN52), 23 December IS0GQX (JM49) and a good opening on Boxing Day IW4BET (JN54), I2PJA (JN45), IK6DTB (JN72), IK4HLQ (JN54) and IS0EBO in JN40, whose signal was a mixture of Es and MS over the distance of 1516km.

Unfortunately, John, G4SWX (JO02) had his 4 Yagi 2m array down for around 4 weeks because of the gales and storms that battered the Suffolk coast. Back on the air and within a week, John had added 56 EME QSOs, some with stations that are hard to work resulting in 6 new squares! Some highlights from the log include a number of special event calls. ZS9MADIBA was worked a couple of times as was RM22DU (KO85), RA22AL (KO59) and RM22MR (KO86). One MS QSO with only 10W output was completed on 13 January – just goes to prove that if you get strong reflections you can use low power.

The callsign ZS9MADIBA (ZS9MAD) was established by the South African Radio League commemorating the life and recent passing of Nelson Mandela. It was encouraged by SARL that the callsign be operated from individual stations and, in the case of 2m EME, Pine, ZS6OB (KG44) provided many operators with this prestigious callsign around the world and was on the air until 11 January. As ZS9MADIBA he worked 196 stations, all via EME, although the callsign had to be shortened to ZS9MAD to fit in the *WSJT* text box. During December under his own callsign of ZS6OB, he applied to ARRL for the first DXCC on 2m from South Africa. In fact this could be only the 2nd DXCC in the Southern Hemisphere for 2m EME.



Screenshot from the new release of WSJT 9.7.

NEW WSJT RELEASE. The latest *WSJT* release WSJT9.7 R3636 has several improvements over older versions. The main one is the introduction of JTMS options direct from the menu. JTMS has been available with the suite for quite a long time but under beta test before release into the full programme. JTMS uses a variation of FSK called minimum shift keying (MSK) that allows a faster transmission rate per unit bandwidth. JTMS performs approximately as well as FSK441 and tends to produce cleaner decodes. Quoting from Joe's website, "ISCAT now has two sub-modes. ISCAT-B is the original ISCAT mode with total bandwidth 1809Hz. ISCAT-A runs at half the rate, uses half the bandwidth and, (for average decodes on steady signals) is about 1dB more sensitive. It has been found very effective for making aircraft scatter QSOs at 10GHz. ISCAT-B probably remains the best mode for 6m, but experimentation is encouraged!" JT65B2 and JT65C2 use the same tone spacing as JT65B and JT65C, respectively. They are keyed at twice the rate, and T/R sequences are 30 seconds rather than one minute. Sensitivity of the fast modes is 3dB worse than the standard modes. The B2 and C2 modes allow EME contest QSOs to be made at twice the rate, up to about 20 QSOs per hour. For further information check out the *WSJT* website **[4]**.

70cm ACTIVITY PERIODS. There has been a good start to this project but the effort needs to be continued. Activity seems to mirror the UK Activity Contests with stations active in the North West. GW8ASD, GD8EXI plus many members from Bolton Wireless Club have been on the air on Wednesday and Sunday especially on FM. Shropshire stations G3SMT and G3UBX were all worked as well as G8EOP over in IO93. Radio and weather conditions have been extremely poor on these occasions so all credit to those who have come on the band. There will be more news to come about special events involving clubs. A note from Nik, M5DND says he has been working on the idea to promote 70cm around the South Shropshire area where he lives. With lots of high ground to operate from it helps as although his home QTH is 700ft ASL he has rising ground around the compass! A better plan is to try and operate from Long Mynd Hill at 1500ft. Nik had a number of QSOs on 70cm simplex and told all of the plan to try and increase activity on the band.

YEARLY TABLES. Unknowingly there have been two of us working on the same idea regarding reintroducing the squares/countries worked table idea. Lawrence, GJ3RAX has developed a self editing table within his Yahoo VHF/UHF that is an excellent real time self administering option **[5]**. There is obviously a requirement to sign up for the group; that isn't really a bad thing as the group is well moderated and a good place to discuss ideas and propagation etc. All bands are covered from 6m to 23cm and the input of information is very easy. So please try and sign up to the group and try it out. Hopefully, as Spring arrives there will be some DX to work!

Many thanks to all contributors this month and here's looking forward to better weather and radio conditions and please keep reports coming in.

WEBSEARCH

[1] http://earthsky.org/space/earthskys-meteor-shower-guide
[2] www.gb3vhf.co.uk/GB3VHFservicenewsannouncements.html
[3] www.g0lgs.co.uk/Beacons.php
[4] www.physics.princeton.edu/pulsar/K1JT/wsjt.html
[5] http://groups.yahoo.com/neo/groups/VHFandUHF/info

March 2014 • RadCom
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GHz Bands

Ideas for multiband operation from home and an update on EME2014

HEELWEG 2014. I write this in late January, the day after returning from an excellent weekend at the Heelweg Microwave Round Table [1]. The meeting attracted more than 200 visitors to the Cafe Vos in Westendorp, in the eastern part of the Netherlands. What makes this meeting so special is that it is all about practical things. There are lots of measurement bays to get all manner of items tested and lots of small traders selling all manner of VHF and microwave gear. Heelweg is probably the best meeting in Europe for access to test facilities. In fact much of the room is taken up by the test positions, with each one specialising in a particular aspect, such as ATV, power amplifiers, LNAs etc. **Photo 1** shows just how well-equipped each position is. It was a most enjoyable meeting, with lots going on and many European EME and microwave operators in attendance to chat with and make plans. As it is held at the Cafe Vos, food and drink was available all day. After the meeting a group of us always go for a Chinese meal in nearby Varsseveld – and this gathering is getting bigger each year. My thanks to the organisers PE1FOT, PA0BAT, PA3CEG and PA7JB. See you at Heelweg next year?

PHOTO 1: One of the many test positions at Heelweg 2014. Photo: G4HUP.

MULTIBAND OPERATION FROM HOME. I'm sure many readers, like me, do not have the luxury of a crank-up, tilt-over tower for their antennas, but just have a simple pole on a gable end. Microwave antennas are generally small, light and have no more visual impact than a fringe area TV aerial, so quite a competitive system can be put up without frightening the neighbours. The bigger issue if you want to run more than one band can be the weight of low loss feeders. Add this to last month's topic of the vulnerability of such feeders to twisting and breaking, you need to minimise the number of these low loss feeders. To really optimise a system you need a low loss on transmit but, with a masthead preamp, you can use quite lossy feeders from the preamp to the shack. Remember that if you have enough gain *in* the preamp the noise figure is largely determined *by* the preamp and any loss between it and the antenna, so loss after the preamp is not a big problem.

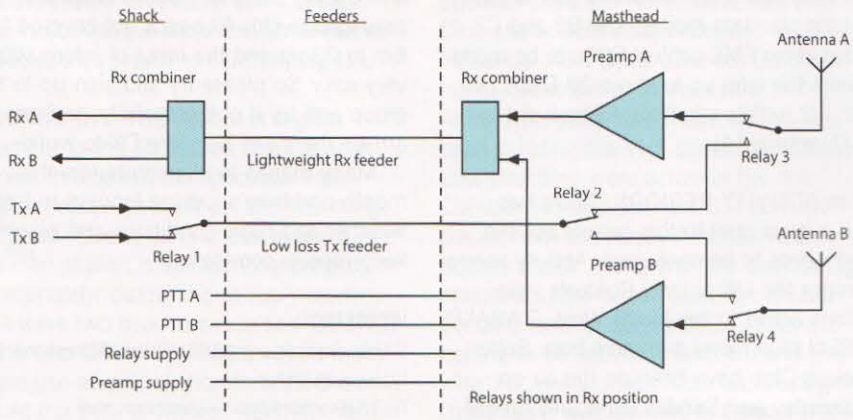


FIGURE 1: Two bands with a single low loss transmit feeder.

Even at 3.4GHz, the loss of 10 metres of RG223 is only about 10dB, and with a gain of 29dB typical in modern preamps like the G4DDK VLNA9 [2] you still have 10dB to play with. A quick check with the VK3UM *EMEcalc* receiver performance calculator [3] will still show around a 2dB noise figure (NF) with such a preamp and 22dB(!) of feeder loss (10dB of coax loss plus 12dB in splitting/combining, see **Figure 1**). Even under these circumstances, it's the loss between the antenna and the preamp input that dominates and the loss of sensitivity when the antenna is looking at the horizon is negligible. For a number of years I ran 1.3 and 3.4GHz using a single length of low loss coax on transmit and one length of quarter inch RG223 on receive. This arrangement is shown in Figure 1. The antennas were a 45cm Sky dish for 3.4GHz in the centre of a box of four 23-ele Tonna Yagis. I will be using a similar arrangement on 1.3 and 2.3GHz shortly using two Yagis. The receive feeds were resistively combined at the top end of the coax and resistively split in the shack. I ensured that the 1.3GHz preamp was turned off when 3.4GHz was in use, and vice versa. On transmit I used a single length of FSJ4-50 switched top and bottom with a pair of N type relays. The whole thing was carefully sequenced by a variant of my PICwencer [4] PIC-based sequencer. E-mail me if you would like more details of the control hardware and PIC firmware. The relay sequence can be worked out by looking at Figure 1. To transmit, first remove the supply from both then for A, PTT A line needs to energise relay 3 preamps. To transmit on B, PTT B line needs to first energise relay 4 then relay 1 and 2 together. The advantage of using a PIC controller and relay driver FETs for sequencing is that you can use both latching and non-latching relays in any combination. This system trades coaxial cables for relays but keeps the weight of feeder to a minimum.

ACTIVITY NEWS. Conditions in January were flat and added to the post-Christmas malaise that gets many of us. Activity was low. Only a handful of terrestrial QSOs over 600km were spotted on 1.3GHz and even fewer over any distance on the higher bands, with only Ralph, G4ALY (IO70VL) continuing his successful daily multiband sked over 247km with F9OE (IN78QJ) of any note. Tony, G4CBW (IO83UB) reported hearing the new DL0SHF EME beacon on 10368.025MHz, which was easily copyable on a 1.1m dish. This beacon runs QRO, so I hope a few of you will try to look for this while it's still operating. Andy, G4JNT continues his beacon experiments with JT modes on 1.3GHz, so this has given a few people a reason to switch on their

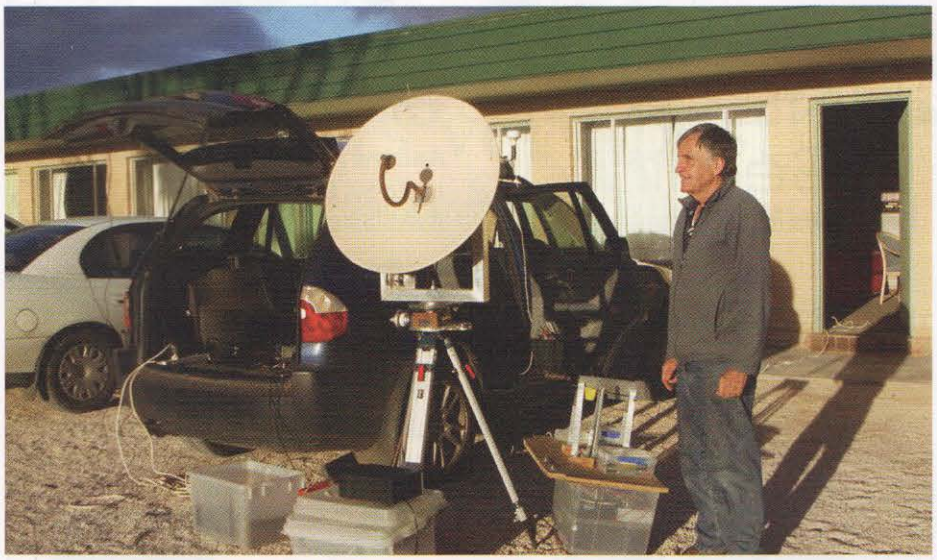


PHOTO 2: VK7MO's portable 10GHz EME system. Photo: VK7MO.

equipment despite the low activity levels. Neil, G3RIR e-mailed me to express his thanks to Andy for putting up the personal beacon on 1296. Over the weekend of 18/19 January he spent a couple of hours monitoring the JT65C2 from Andy. Neil reports that he had an average decode of about 25% from IO92jl at 176km. His system is a 35-ele beam with a masthead preamp with the tower down so only about 7m AGL. He tried to correlate the decodes with aircraft and nearly all were when there was an aircraft over Oxford but several really good decodes occurred at other times. He has a suspicion that at least one very good decode was when there was an aircraft overhead at Andy's QTH, and wonders if this makes sense? It's certainly possible to get these 'end point' reflections on meteor scatter (in fact I wrote my PhD thesis [5] on exactly this!) so it merits further investigation as a method on aircraft scatter. Neil took his TS-2000X to the Rugby Amateur Radio Society (RATS), who have a decent beam and masthead preamp and was able to demonstrate the copying of Andy's beacon at the club. They were also able to work Ray, GM4CXM on CW using the club callsign G7APD and I think he may have sparked some enthusiasm for CW and aircraft scatter at RATS. By the time this goes to press, I plan to be back on the 'low' bands from the Fen Edge with 150W to a shiny new 44-ele WiMo Yagi and on 2.3GHz with 100W from a homebrew transverter to an old G3JVL 44-ele quad loop that I inherited from the estate of local microwaver, Ron, G8GRT who sadly passed away last year.

EME. Rex, VK7MO continues to amaze me with his small dish 10GHz EME activity and, last November, he went on a DXpedition around Australia. Charlie, G3WDG and Petra, G4KGC have been working Rex on a regular basis and managed QSOs with him from 14 different locations with 100% success rate. He also managed to work OK1KIR and W5LUA from many locations. One of Charlie's interesting QSOs was with Rex operating entirely off batteries while in a national park that does not allow generators. In addition, Rex also made many terrestrial contacts via a number of different propagation modes including aircraft scatter, troposcatter, ducting and local cloud reflections. Rex's best 10GHz terrestrial distance, during a ducting event, was 2293km to VK6DZ using JT4F. The same equipment was used by Rex for terrestrial and EME, 45W to a 77cm dish.

Charlie and Petra were running a new homebuilt 50W SSPA into their 3m dish and using 0.9dB NF WDG004 preamps. The operating mode used for all the EME activity was JT4F. All the stations participating have the capability for automatic compensation for Doppler shift. This is not absolutely necessary as manual compensation can be used successfully, as recently tested by OK1KIR and G3WDG, but certainly eases the workload and is probably beneficial with very weak signals. VK7MO and G3WDG use VK1XX's software [6] that takes the Doppler calculated by *WSJT* and automatically tunes the rig to compensate. It can be set to also tune the rig to transmit with the opposite amount of Doppler so that the receiving station also sees the signal at a constant frequency.

EME2014 UPDATE. Plans are well underway for EME2014 and the website [7] came on line during January. The conference will be held at the Parc du Radôme of Pleumeur-Bodou, France, on 25 and 26 August 2014. About 200 participants are expected. The Parc du Radôme, in North Brittany, close to the Channel coast, is renowned worldwide for hosting the first transatlantic TV broadcast in July 1962. You will also have the opportunity to enjoy the gorgeous Côte de Granit Rose with its pink granite boulder clusters, beaches and other tourist spots. As I know from EME2012 in Cambridge, it's a huge amount of work organising an EME conference and finding a location to cater for 200+ delegates is not easy. Guy, F2CT, his XYL Corine and many others have worked for over a year already negotiating and organising registration, booking and accommodation with attractive prices and interesting activities for partners. This is now in place and the technical committee is working on contributed papers, measurements, test facilities and EME demonstrations with the Pleumeur-Bodou 13.50m dish. The dish works well on 5.7GHz, and the team are working to put 10 and 24GHz feed systems in. The first tests are planned for 5/6 April during the REF *Dubus* contest. For measurement and test they plan two technical rooms and will include NF tests up to 47GHz. The team are looking for plenty of contributions and talks about EME topics. All papers are welcome and they propose to offer all selected contributors a 10% discount on package prices. In addition to these contributions, CNET engineers will talk about radio astronomy. Booking will be closed on 30 April, as the group need to pay the Belambra resort in advance for a maximum of 300 delegates.

BEACON NEWS. In December, Ofcom issued the NoV for the 10368.945MHz beacon GB3PKT at St Osyth nr Clacton (JO02MT). Tony, G0MBA reports that he has the beacon ticking away in the workshop and is just waiting for an improvement in the weather. He is confident that the next month or two it will be installed and working. I hope that by the time this is published the beacon will be on the air. Dave, G4FAW tells me that the slotted waveguide antenna he was making for the 2.3GHz beacon GB3BSS (IO81SR) has now been finished and has been shipped to the beacon keeper, Tony, G3CJZ. At the time of writing (late January) Tony tells me that the site owners have two commercial antennas to fit in the next few weeks and dependent on weather conditions they hope to install the GB3BSS antennas at the same time.

WEBSEARCH

[1] Heelweg microwave: pamicrowaves.nl/website/index.php
[2] G4DDK preamps: www.g4ddk.com/VLNASept13.pdf
[3] VK3UM *EMEcalc*: www.vk3um.com/eme%20calculator.html
[4] PIC sequencer: www.microwavers.org/scatterpoint/2005/Scatterpoint_Oct_2005.pdf
[5] A study of the end point geometry in meteor burst systems: http://bit.ly/1hmuZO7
[6] VK1XX Doppler software: www.vk3hz.net/microwave/doppler141.zip
[7] EME 2014: www.eme2014.fr

GM100RSGB – amateur radio at its very best

More stories from the clubs who operated the RSGB Centenary station

WIGTOWNSHIRE ARC. The Mull of Galloway is a dream radio site – the most southerly point in Scotland, 200ft above open sea on three sides, electrically quiet and with on-site accommodation. The entire site, except for the lighthouse tower, is now locally owned and the Mull of Galloway Trust gave us a very warm welcome. We rented one of the former lightkeepers' cottages, which have been converted into comfortable holiday homes, and were given full access to erect antennas and to park our trailer mast and camper vans. The two radio shacks used one bedroom in the cottage and a small staff room next door called the Bothy, leaving the rest of the cottage free for sleeping, eating and relaxation.

The plan was to operate two 400W HF stations, to give as many people as possible the opportunity to work GM100RSGB, and as many club members as possible the chance to operate and take the second chair. One station was dedicated to 40m as this band is open full-time in late November and the second station covered all other bands. There would also be a secondary effort on VHF and UHF as manpower allowed. As everything would depend on conditions – particularly the weather at this extremely exposed site – the rest of the planning was best described as 'prepare for anything'. To be a success for the club as well, we wanted it to be a satisfying and fun weekend for as many members as possible, involving club members at all levels of experience and skill.

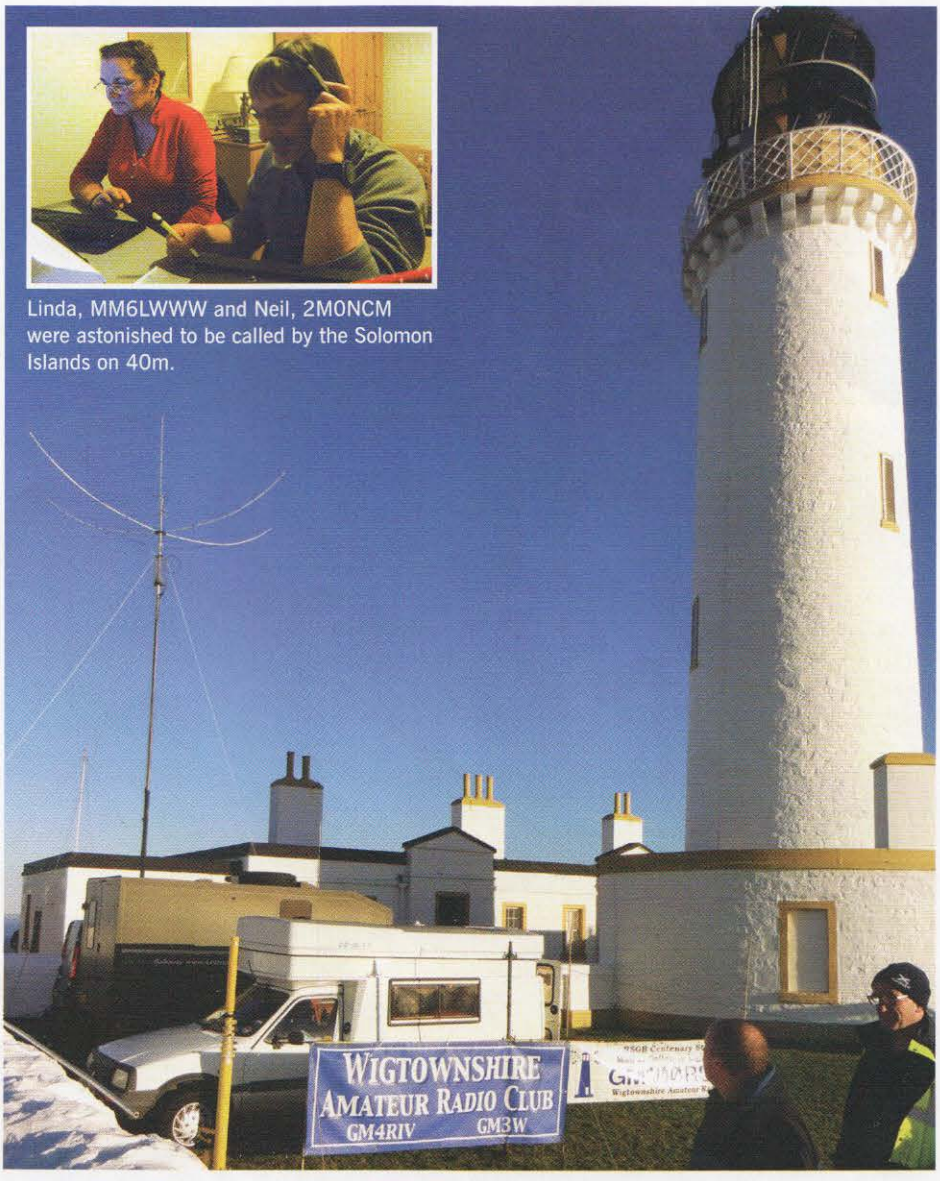
Several site visits took place to measure up and ensure that spaces were big enough to accommodate antennas and to check out the accommodation. As the club regularly operates special event stations, we took this opportunity to invest in a G3TXQ Hexbeam for all bands from 6-20m, which was duly ordered from MW0JZE. The Hexbeam was mounted on a crank up mobile mast borrowed from Dumfries & Galloway RAYNET, which could be parked very close to the shack. Antennas for 80 and 40m were mounted on a 40ft guyed mast contributed by GM3JKS and an elevated GP for 30m was constructed on a Spiderbeam pole. The bedroom station on 40m used the club's IC-756 Pro III with an old Heathkit SB-1000 amplifier, while the Bothy station used a K3 and Yaesu Quadra amplifier to hop around the other bands. To allow the two 400W stations to operate comfortably together, project manager GM3SEK equipped both stations with 5B4AGN/W3NQN bandpass filters and built a QRO harmonic filter for the 40m amplifier.

Preparation wasn't only about radio. Nick, MM0WWH created a matrix to show who was available on what days, what skills they had to offer and what their accommodation and food requirements would be; all of which ensured that the infrastructure was in place in terms of catering, bed space, power hookups for campers etc. Over the weekend more than 25 different people passed through a cottage designed for six, and enjoyed excellent meals that had all been planned, purchased and prepared by Linda, MM6LWW (ably assisted by Nick). Kitchen activities peaked on Saturday night with dinner for 15.

To our enormous relief, Friday 22 November dawned sunny and still, with the same forecast for the weekend. By 0900, 2m was busy with mobiles converging on the lighthouse and by 1000 a dozen people were onsite. By lunchtime the main mast, the Hexbeam and the vertical for 30m were all were in the air and power hookups were laid out for three camper vans. Meanwhile Nadine, MM0WNW and Linda, MM6LWW had dismantled beds and shifted furniture and had brought all the stores on site. The afternoon saw the shacks assembled and tested so by dinnertime we were ready, waiting for the NoV to start at midnight.

In the 48 hours that followed, the

Linda, MM6LWWW and Neil, 2M0NCM were astonished to be called by the Solomon Islands on 40m.



GM100RSGB at the Mull of Galloway Lighthouse.

From back to front, Bob, MM1AWV, Kai, MM1AUF and Steph, MM3YGE.

Drew, GM3YOR.

Left to right, George, GM8YUI, Paul, Assistant District Commissioner Scout Activities and Steph, MM3YGE.

bedroom station on 40m SSB was continually busy until the last few hours. The 1,130 QSOs included many hundreds of UK and European stations along with North and South America (including Alaska), many Caribbean Islands, Australia and H44MS in the Solomon Islands. Late Sunday evening we added 57 QSOs on 80m, taking the total for this station to 1,187 by midnight. It was unusual to get anything less than a 59 report on 40m with many '+++' reports including some at '+60dB'.

Meanwhile the Bothy station was hopping around the other bands, covering 80, 20, 17 and 12m on SSB; 80, 30 and 20m on CW; and 30 and 17m on RTTY. We were unable to make more RTTY contacts because of the CQWW CW contest, but Frank, GM3JKS made a rapid run of CW contacts on Sunday morning and further visits to CQWW helped bring the Bothy total to 1,271 contacts.

A modest 4m, 2m and 70cm station ran during the daytimes utilising an Icom IC-7100 and a log periodic at 6m above ground. Contacts were completed as far south as Yorkshire on all three bands with 59 signals at 270km. Although not a state-of-the art station, there was clearly an unrealised opportunity for many more stations to have worked GM100RSGB on VHF/UHF all modes, although some SOTA operators were a bit taken aback to be called by GM100RSGB on 145.5MHz FM.

All volunteers got a chance to do as much operating and logging as they wished. More importantly, the weekend enabled everyone to move out of their comfort zone and try some new aspect of amateur radio – which, after all, was one of the major objectives of the Gx100RSGB initiative. Nobody felt overworked, and we all had the chance to chill out in the comfortable sitting room and talk over our experiences. WARC is already a good radio club; but we are an even better club for having experienced GM100RSGB together.

On Monday morning, tired-looking bodies arrived in the kitchen for breakfast and soon after 0800 the pull-down commenced. It's amazing that something that takes a day to put together comes apart so quickly and by 1200 we were back in the kitchen with vehicles packed, for a last coffee together before heading away.

Would we do it again? Yes! Every one of us broadened our experience during GM100RSGB, so our future activities will be the better for it. Many photographs were taken and the 18 January club meeting is booked to show the video that is being edited by Ian, MM5WIG. Finally, thanks again to the Mull of Galloway Trust for their welcome... and to all the callers for making us very hoarse, very tired and very happy.

Foreground Kai, MM1AUF with mic and in background Eunice, MM3UVL, logging.

GREENOCK AND DISTRICT SCOUTS AND GUIDES ARC is a small group situated in Greenock District, Inverclyde. We are very fortunate to have a superb radio shack located in the District Scout Headquarters building that allows us to operate on all modes and bands. Our usual focus in addition to delivering Foundation courses is to assist young people from both youth organisations to complete various levels of communication activity awards. Many of them now hold an amateur radio licence undertaken as part of the Duke of Edinburgh Award Scheme.

As Members of the RSGB, both as a club and as individuals, we were excited to be such an integral part of the centenary year celebrations.

On hearing that our application to host the centenary call GM100RSGB was approved – and with support and encouragement from the District Commissioner and his team – we set about assembling a team of operators and making preparations for the event. As we are such a small group we were only able to host the callsign for one day, 15 November 2013. We wanted to make the most of the experience and planned to operate on phone and CW using whichever bands were open at the time. Our team consisted of Drew, GM3YOR, George, GM8YUI, Bob, MM1AWV, Kai, MM1AUF, Steph, MM3YGE and Eunice, MM3UVL.

When the day arrived we began operating CW early in the morning and followed with phone from 8am. During the day we contacted a total of 726 stations; of these, 458 were CW. We managed 52 DXCC countries including notable contacts with St Kitts and Nevis, Saba and St Eustatius and we were also delighted to make contact with the Falkland Islands.

On phone we operated on various HF bands, the change being determined by propagation at the time. Unfortunately we were forced to close the HF phone station earlier than planned due to deteriorating conditions. On several occasions throughout the day we attempted to operate on 2m but the silence was deafening. We managed only 1 QSO, which was very disappointing.

The team thoroughly enjoyed the day whether operating, logging contacts or keeping those who were operating fed and watered. As it was a working day or school/university day for some of our members, several of them could only manage to visit the station for brief periods. In the evening we were visited by our Assistant District Commissioner for Scouting Activities who was amazed by the variety of contacts we had made. His visit coincided with one of our pileups that was being ably handled by our YL operators. We had several pileups during the day created, in part, by the RSGB Alerts system and spots on the DX clusters, which provided a good learning experience, particularly for our more recently licensed members.

On reflection, not only did we have a great time, helped support the RSGB Centenary Year, but also staging the event enabled us to raise the profile of amateur radio within the community and the Scout Movement in particular, producing excellent reports in the local and Scouting press.

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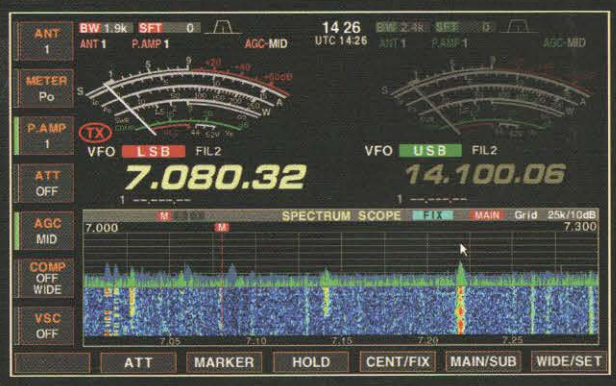
Audio scope indication with waterfall



PC mouse pointer example

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Sport Radio

Statistics on log entries and a Commonwealth Contest traveller tells of his experience.

POSITIVE NUMBERS. The number of people entering RSGB contests continues to increase. A good indicator of this is that the Contest Committee's entry robot had to work harder than ever in 2013, because it received and processed 15,017 logs. This comprised 5517 HF logs (5308 in 2012 and 6216 in 2011) and 9500 VHF logs (8175 in 2012 and 8110 in 2011). The CC adjudicated the results for 182 different contests in 2013 (each individual band for multiband VHF contests counting as a separate event). 38 were HF contests. Incidentally, IOTA is not included in these figures, because it is not adjudicated by the CC.

There are now 670 active subscriptions to the CC's monthly Newsletter (which is delivered by e-mail) and 911 users are registered on the contest e-mail reminder system, which sends people automated reminders ahead of contests.

A TRAVELLERS' DIARY. Every March I like to include an item in this column about one of the people who has invested time, effort and money into travelling abroad to take part in the Commonwealth Contest. Without these people there would surely be far fewer teams and fewer countries available to work. The Commonwealth Contest takes place in March and this year will be no exception.

In 2013, Colin Smithers, G4CWH operated from Bermuda as VP9/G4CWH. I thought it would be particularly interesting to hear of his adventures, as he was a first-time Commonwealth Contest traveller. Surely he must have experienced a steep learning curve. Here's his story.

"I started doing BERU relatively late on during the 90s, often entering the Restricted category on account of creating too much TVI. It's always fun, but sometimes slow going and external EMC issues increasingly limit who I can hear. In 2013 a business trip to New York threatened to make being ready for BERU from home a bit of a challenge; how was I going to get back in time? Planning permission issues limit what I keep erected at home, so when to put up the antennas? What time zone would my body be on?

"I had recently bumped into Bob, G3PJT, at my first meeting of the Camb Hams group – proudly boasting to be a 'club without committee' that meets only in a pub on the first Wednesday of the month and yet managed to come 2nd overall in the 2012/3 AFS Super League. It also has younger members that it nurtures by a close association with the Cambridge University club. Hmm... much to be learned here.

PHOTO 1: G4CWH operating VP9GE's station.

"I've known Bob since we worked briefly for the same company the late 1980s and of course asked him where he was going for BERU. Grenada was the answer. While the few remaining days were fast running out two facts connected in my head: Bermuda is on the way home from New York – well, kind of – and Grenada also decodes as 'Not Bermuda', where I know Bob had been the previous year. So I explored routing and pricing and, of course, owing to the 'staying over a Saturday night' air ticket lunacy it was going to save my employer £500 if I went home via Bermuda – a gift that simply had to be exploited. So I mailed Bob and asked how he had found somewhere to operate. 'It's easy' Bob said, 'You ring Ed, VP9GE and he rents you his apartment. He'll even get you from the airport and help you sort out the licence.' Wow! That easy? I thought. I'll not exploit his generosity though, I'll rent a car.

"I first made contact with just two weeks to go and the apartment was still free. After a delicately phrased question at home along the lines of 'Darling, do you remember that book about the BERU contest I showed you a few years ago by that bloke I know called Bob?' followed by the partial acknowledgement 'Er, yes...' "Well, I was thinking of becoming one of the travellers. It works out really well with my trip and I won't have to put those big antennas up yet again'. The decision was made and the trip re-routed. A quick scrabble for my perpetual licence documentation – updating and downloading was quickest in the end – and the licence had been issued care of Ed's help in just three days. Fantastic!

"What to take? I don't do checked luggage, so that helps with the decision process – it must all fit in one roll-aboard and one smaller bag along with my suit and shoes. Ed has antennas up (A4S, 80m dipole, 40m dipole, 160m inverted-L, plus a few more) and a rig for hire (an FT-920 – an FT-1000 derivative that works fine). No linear needed – the national power limit is still 150W DC input. Morse key; headphones; laptop, spare laptop; spare Morse key; WiNRADiO Excalibur SDR receiver for band watching; connectors – lots of connectors – can't be caught out; Oh, and why not another receiver (an AOR 7030)? And a few more connectors. Will customs or security stop this lot? Let's trust to luck. It all fits and gets through the US, Bermuda and UK customs, no questions asked. When all combined with my battery-filled tracking device (tool of my trade) and spare laptop batteries but not a shred of supporting documentation, I was really quite surprised. The bags were all a bit heavier than normal though.

"But the idea of hiring a car is put paid to by local rules. Cars cannot be hired on Bermuda; taxis only. So Ed comes to get me as promised. 'Look out for my number plate, VP9GE', he says. I arrive Thursday night, which gives me a day to get set up and used to things. Getting SD to talk to the rig looks easy; I made sure it was all working fine with my FT-1000MP at home and packed everything. Except that in the interim Yaesu changed the gender of the CAT connection. Aargghhhh! Trusty Ed had a spare serial lead though, so all was okay. There was some QRM, some of which was traced to my spare laptop PSU that had perfect brand markings but awful EMC performance. A lesson – check your entire station before departing. Ed had a spare linear PSU, which bailed me out.

"Getting oriented with the new Great Circle directions is a new experience and propagation timing is a bit different nearer the equator. I'd signed up as fifth member of Team Caribbean and in preparation was being given propagation and band timing tips from the others who know BERU from there – particularly Bob, J34G (G3PJT) and Dave, J88DR (G3TBK). Thanks guys.

"So then it started; a quick burst of VEs on 80m, then to 40m and so on. I should probably have gone to 28MHz sooner, but the runs when they occurred were impressive from abroad. The Commonwealth Contest is quite like doing 80m AFS multiple times over, because many calls are so familiar. Convincing people to change bands is of course so much easier as a traveller, and you are also left with a strong impression of those who are efficient at doing the same (VE3EJ, G4BUO, G4PIQ etc). I'm sure VE6BF was actually laughing when I successfully dragged him from 15 to 20, to 10 and then to 40, all in four minutes." Colin is shown in **Photo 1** operating VP9GE's station.

"When to sleep? The 6am Bermuda start

RSGB HF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Mar 3	80m Club Championships	2000-2130	Data	3.5	RST + SN
Mar 8-9	Commonwealth Contest *	1000-1000	CW	3.5-28	RST + SN (HQ stations also send "HQ")
Mar 12	80m Club Championships	2000-2130	CW	3.5	RST + SN
Mar 20	80m Club Championships	2000-2130	SSB	3.5	RS + SN

RSGB VHF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Mar 1-2	144/432MHz +	1400-1400	All	144/432	RS(T) + SN + Locator
Mar 4	144MHz UKAC	2000-2230	All	144	RS(T) + SN + Locator
Mar 9	70MHz Cumulative #2	1000-1200	All	70	RS(T) + SN + Locator
Mar 11	432MHz UKAC	2000-2230	All	432	RS(T) + SN + Locator
Mar 18	1.3GHz UKAC	2000-2230	All	1.3	RS(T) + SN + Locator
Mar 25	50MHz UKAC	2000-2230	All	50	RS(T) + SN + Locator
Mar 25	SHF UKAC	2000-2230	All	2.3-10G	RS(T) + SN + Locator

Best of the Rest Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange (info)
Mar 1-2	ARRL International DX	0000-2359	SSB	1.8-28	RS + Tx power (Ws send State, VEs Province)
Mar 2	UKuG Low Band #1	1000-1600	All	1.3-3.4G	RS(T) + SN + Locator
Mar 15-17	BARTG HF RTTY Contest	0200-0200	RTTY	3.5-28	RST + SN + time
Mar 15-16	Russian DX	1200-1200	CW, SSB	1.8-28	RS(T) + SN (Russians send Oblast code)
Mar 29-30	CQWW WPX SSB	0000-2359	SSB	1.8-28	RS + SN

* HF Championship event; + VHF Championship event. For the latest RSGB contest info and results, visit www.rsgbcc.org.

time is great for this, but eventually you get drowsy at the wheel. I took one lot of 30 minutes and another couple of hours. It's important to work the VKs and ZLs early, as they are simply not there on Sunday, despite the path being wide open.

"On my return I spotted what I took as Ed's NVIS antenna for 80m, but then I noticed it had a large, loose attachment (see **Photo 2**). Known simply as 'Go-at' – and apparently by some as GOAT – he is allowed to run his pulley along the length of the cable to keep the grass short and has three feral cats as friends."

This year HQ station GB5CC will be operated by Don, G3BJ. VO1AU will be operating from Labrador again as VO2AAA. Ian, MOPCB will be on Montserrat as VP2Mxx; Nigel, G3TXF will be ZF1A and Alan, G3XAQ will be 5X1AQ. The Addiscombe Club will be operating from Gozo as 9H1AL and G3PJT will be J34G again from Grenada. More news as it comes in will be on www.beru.org.uk.

THIS MONTH'S EVENTS. The 80m Club Championship series that began last month continues. This month it's datamodes first, on Monday 3rd. The ever-popular Commonwealth Contest runs for 24 hours from 10am on Saturday 8th. Last year the sunspot cycle was around its peak, conditions were good and the event enjoyed a record entry of over 300 stations. Hopefully the upper HF bands will co-operate again this year. Invariably there are DXpeditions to some countries that you don't hear on the bands every day, so for most of us – even if we are not making a serious entry – there are some new ones to work. It's back to the 80m Club Championships for the remainder of the month, with CW on Wednesday 12th and SSB on Thursday 20th.

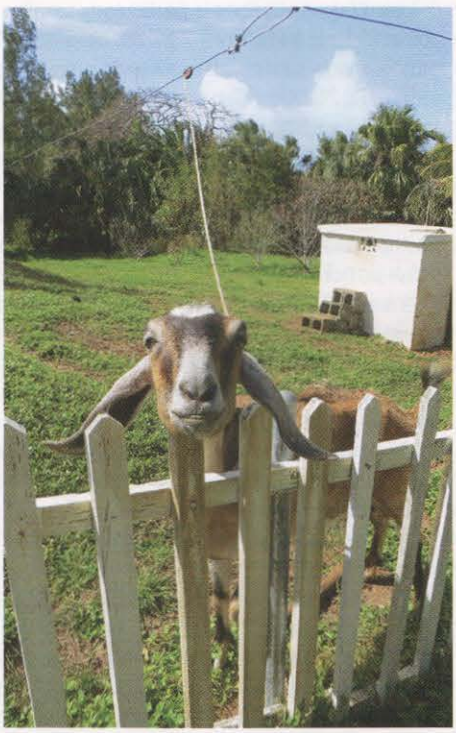


PHOTO 2: The large, loose attachment on what looks from a distance like VP9GE's 80m NVIS antenna.

On VHF, the weekend of 1st-2nd sees the 144/432MHz contest. It has 6- and 24-hour categories and is one of the earliest contests of the year in which hardy souls or groups are likely to brave the elements and operate portable for 24 hours. It is followed by the first UKAC session of the month – 2m on Tuesday 4th (Shrove Tuesday). After that we have the second 70MHz Cumulative, on Sunday 9th. There will be three further cumulative sessions in the coming months. For the remainder of March the UKACs dominate, with 70cm on the 11th, 23cm on the 18th, and 6m and SHF on the 25th.

There are two major American-run contests this month, both on SSB. The first is the ARRL International DX, which runs for the full 48 hours of the weekend of the 1st-2nd. Work US stations in the contiguous 48 States, plus Canadians. Send a signal report and your transmit output power (there are sections for QRP/low/high power). US stations send a signal report and 2-letter State abbreviation, while Canadian stations send a signal report and 3-letter Province code. The first in this year's series of five Low Band contests organised by UKuG takes place on Sunday 2nd. Two weeks later you will need to be up very early if you want to catch the start of the BARTG HF RTTY Contest: 2am, to be exact. It runs for 48 hours. Exchange signal report, a serial number and the time. Next, the Russian DX Contest on the 15-16th. There are lots of entry categories, mostly for single ops. An interesting twist is that it is permitted for a single-op station to make two single-band entries. Usually this would be to take advantage of bands that aren't open at the same time (eg 10m and 80m). The second – and final – major American contest is the SSB leg of CQWW WPX on the 29-30th. Everybody works everybody, exchanging a report and serial number. Expect the contesting bands to be heaving and some large serial numbers to be exchanged.

ARDF

Using GPS to track your progress at an ARDF event

YOUR RSGB
ARDF: DEDICATED TO DF HUNTING

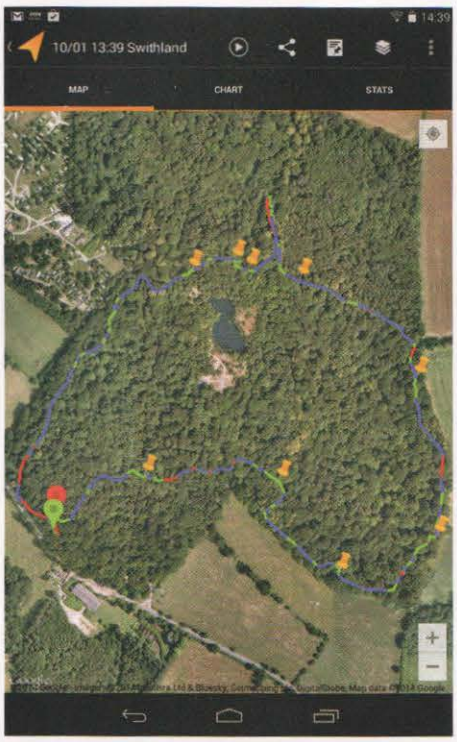


PHOTO 1: Screen grab from *My Tracks* (Android app). GPS track is coloured according to speed thresholds, which can be adjusted. Pin markers can be added manually or set to specific time (or distance) intervals. If the time interval is set to the normal Tx cycle of 5 minutes it will help to work out which Tx was transmitting.

GPS TRACKING. After an ARDF event it can be instructive to know where you went and how long it took to track down a particular fox. Ideally, you should know where you are at all times but it is easy to lose contact with the map and forget some transmission cycles. One scenario is that you have used the time productively since you last heard the fox you are seeking to get closer to the area where you expect it to be. Alternatively, you are convinced you are in the right area but you have not been able to find it despite searching along the last bearing you got before it went off. You get yourself into a place where you will have the best opportunity to hunt it down during the minute it is on air, so you find somewhere where you can move quickly, preferably in all directions. When the fox comes on the air, you get a new bearing and you run off to hunt it down. At that point you are likely to lose contact with the map. Hopefully you will find the transmitter, but all too often, particularly on 2m, it seems the minute has gone and the fox stops transmitting for another four minutes. Were you heading in the right direction? Did you just miss it? Find out after you finish with the aid of GPS.

In *RadCom* March 2011, Robert Vickers, G3ORI wrote about how he used the Ventus GPS stick to track his progress at ARDF events. The Ventus has no display, so any analysis had to be done on a PC, most likely at home.

GET SMART OR TAKE A TABLET. Since that article was written, smart phones with GPS have become much more common and many use software to enhance their GPS performance. Some good Android phones can now be bought new for under £150 and a second hand iPhone 4 can be purchased for a similar amount. It would be sensible to put your phone in a bag to minimise the risk of damage or loss. Unless your bag is particularly small you could use it to carry a 7 inch tablet and there are now some with excellent displays for around £120. Although tablets are physically larger and slightly heavier than a phone the extra size of the display is very useful.

Although most phones and tablets come with some basic software that will display your position on a map it is their ability to download software from the various 'app stores' that opens up new ways to view and share the data. There is no longer any need to export the data to a computer and you can do quite a bit of analysis in the car park after the event. Some apps even allow you to broadcast your position live to others, but who would want to give away the position of the foxes?

There are many GPS apps to choose from and I have not tried them all. Many are free or inexpensive so you can check them out to see which you prefer. I have found that general ones such as Google's *My Tracks* and *MotionX-GPS* have some useful features. *My Tracks* has the option to add splits at set times or distances and to colour the route (see **Photo 1**). There are also several fitness type apps aimed specifically at running, such as *Run Keeper* and *Strava*, but I have not found the additional features useful. *Ski Tracks* can be used for other activities and this has the ability to replay tracks.

Smart phones can connect to the internet, although this is not guaranteed in most ARDF car parks! With an internet connection you could share information via social networks, or to a web page. Alternatively, you can save the data in the almost universal .gpx format and send it via old fashioned e-mail for analysis using programs such as *Quickroute* mentioned by Robert.

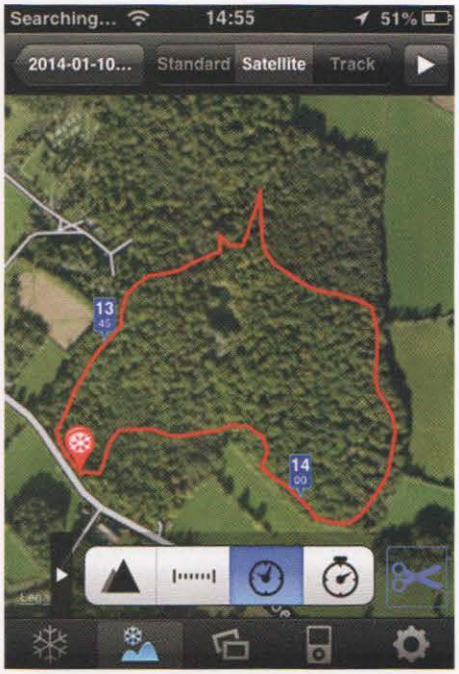


PHOTO 2: The *Ski Tracks* app (iPhone & Android) lacks some of the features of *My Tracks*. However, it shows the GPS track and 15 minute markers and can also replay the track directly.

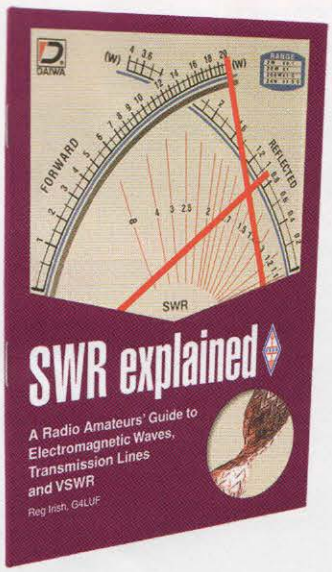
CAUTION. GPS use can shorten battery life considerably but it should be sufficient to last for the duration of a typical ARDF event.

It should also noted that there are restrictions in the IARU rules on taking phones or communication devices into the competition area, even if they are switched off. This includes GPS devices with display facilities. In domestic competition, organisers will usually agree to the carrying of GPS devices fitted with displays in order to enhance the post-race analysis conducted by the participants.

FUTURE DEVELOPMENTS. Current GPS satellites transmit on two main frequencies: 1.57542GHz and 1.2276GHz. They are in orbit about 21,000km above the earth and transmit with an EIRP of 500W, which is about -155dBW on the earth's surface. The signal strength has been referred to as being equivalent to a candle at 100 miles, so it is not too surprising that it sometimes fails to penetrate the tree canopy. The European Galileo GPS constellation, which will offer stronger signals and accuracy about 10 times greater, is in the test phase with 22 satellites on order and full operation planned for 2019.

Book Review

Tales of impedance and history



SWR Explained

Reg Irish, G4LUF

This book's author is no stranger to the pages of *RadCom*, having written two articles on the VSWR meter in the last couple of years. Now, he has turned his attention to a wider view of the general topic. The subtitle is quite descriptive: "A radio amateur's guide to electromagnetic waves, transmission lines and VSWR". And this is one of those occasions when a book is exactly what it says on the cover; a detailed yet accessible guide to a subject that, for many amateurs, is one of mystery.

I find that Reg has the knack of presenting material in a fairly straightforward, easily-understood manner. From his opening introduction on the nature of waves – describe in terms of watching the sea as a child – through to more advanced concepts such as coaxial line bandpass filters, he makes it all seem quite straightforward. There is a certain, unavoidable amount of maths but this is deliberately kept to the minimum. However, for those who do wish to pursue the definitions further, there are Appendices that go into rather more mathematical detail.

But the majority of the book is far more digestible than formulae. Reg returns to the seaside from time to time to illustrate various points about waves, Incidentally, I was fascinated by his piece of advice on what to do if you are swept off a promenade into a raging sea: if you swim out to sea a quarter (or threequarters) of the waves' wavelength you'll find there is a relatively calmer area where the incoming and reflected waves cancel – thus making for a slightly less uncomfortable time whilst you await rescue. Although it's interesting, I don't recommend anyone to actually set out to try and prove or disprove this assertion!

It's fair to say that *SWR Explained* won't immediately show you why your half-size G5RV won't load properly on Top Band, although if you read and understand its contents you will certainly be able to comprehend this, and a lot more. It's an excellent, approachable work that covers what is sometimes seen as a difficult and complicated topic. Definitely one to consider.

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Non Members' price £7.99
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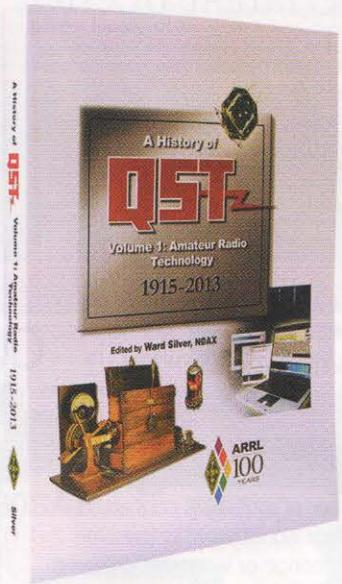


A History of *QST*, Volume 1

Edited by Ward Silver, NØAX

2014 is the American Radio Relay League's centennial and this book is part of its celebrations. Covering amateur radio technology from 1915 to 2013, it reproduces selected articles from the ARRL magazine *QST*, along with brief modern-day introductions by guest contributors who set the articles in context.

Some long-forgotten devices and techniques get an airing. One of the first reproduced articles concerns the partially-evacuated Audion tube, a precursor to the technologically superior vacuum valve. I found it very interesting that back then, in August 1916, terminology hadn't settled down into the familiar terms of today. The three electrodes of the Audion, for example, are referred to as the "filament", "grid" and "wing", although the latter is also mentioned as the "plate" – the term by which the thermionic anode is now normally known in American English.

It genuinely feels as though the whole history of amateur radio progress is laid out in this book. From spark transmitters, early reports of Long Duration Echoes in the 1920s, through to amateur investigation of propagation and much more, it's all in there. The report on the first amateur VHF EME experiments are fascinating: success came after the receiver front end was improved to a *4dB* noise figure (today's EME enthusiasts look for 0.2dB) – but one of the receive antennas was a 30-wavelength rhombic, presumably steerable to track the moon. An unrelated caption from a 1934 20m antenna article states "W3CIJ's [over 50ft high] rotary 14-MC. beam antenna makes a striking appearance on its private hill 650 feet from his shack". Truly worlds apart from modern-day living!

From spark to SSB to satellites, A History of *QST*, Volume 1 gives a fascinating glimpse into how amateur radio got where it is today.

(Volume 2 is a 384 page selective reprint of adverts carried by the magazine over the same time frame. Whilst it is quite interesting in its own right to see how equipment has developed, I didn't feel it had the same level of appeal as Volume 1. It's available direct from ARRL.)

Volume 1: ISBN 978-1-62595-003-1
352 pages, 276 x 206mm
Non Members' price £32.99
Members' price £28.89

March 2014 • RadCom
Steve Hartley, G0FUW • e-mail: tec.chair@rsgb.org.uk

Keeping up to date

How much do you know about the exam system and the latest licence regulations?

EXAM REQUIREMENTS. How up to date are you? No matter how long it is since you sat an amateur radio exam, you are expected to keep up to date so you can continue to operate legally. You also need to know what the current requirements are in order to be able to advise newcomers to the hobby. The following quiz will help you to assess your knowledge of current UK amateur radio training, assessments, exams and licences.

Last year, I was asked to do a talk at the City of Bristol RSGB Group on these topics; a number of members confessed to not being clear about what is involved in obtaining a licence or what the different licences allow. This article is based on that talk.

More recently, it has come to light that many UK amateurs are also in the dark on the current licence terms and conditions; as Chair of the RSGB Training & Education Committee I have learned of Foundation licence holders being told they cannot do things that their licence allows and exam invigilators who have challenged exam questions based on licence conditions that were superseded years ago. I also hear many quips about the current exams being too easy/dumbed down, whilst others say they have been made too difficult. Interestingly, a similar debate is ongoing in the USA over their three-tier licence system.

So, I have put together a multiple choice quiz. You can use it to test yourself, or you could run it as a 'pub quiz' at your local cub. It's only for fun, but we'd be very interested to hear how you (or your club) got on (e-mail radcom@rsgb.org.uk). The answers and some explanation will follow in the next *RadCom*. Good luck!

Does this bring back memories, or will you be sitting an exam in the near future?

Amateur Radio in 2014 Quiz

1. In what year was the first UK amateur radio licence issued?
   a. 1890
   b. 1897
   c. 1900
   d. 1904

2. How many had been issued by 1906?
   a. 6
   b. 60
   c. 1,600
   d. 6,000

3. How many had been issued by 1914?
   a. 6
   b. 60
   c. 1,600
   d. 6,000

4. Approximately how many are now in circulation?
   a. 20,000
   b. 40,000
   c. 60,000
   d. 80,000

5. What is that maximum power allowed by the three licence levels?
   a. 3W, 10W, 400W
   b. 5W, 25W, 400W
   c. 10W, 50W, 400W
   d. 50W, 100W, 400W

6. In most cases, the maximum power permitted by the UK amateur radio licence is measured:
   a. By multiplying the supply voltage by the current drawn by the power amplifier.
   b. At the output of the transmitter
   c. At the feedpoint of the antenna
   d. By multiplying the RF power supplied to the antenna by the gain of the antenna

7. What is the *minimum* age to hold an amateur radio licence in the UK?
   a. 4
   b. 6
   c. 14
   d. No age limit

8. Which of the three levels of licence are permitted to use a club station *without* supervision?
   a. Full only
   b. Full & Intermediate
   c. All three
   d. None

9. What is the licence definition of the suffix '/P'?
   a. At an address other than the Main Station Address
   b. At a location other than the Main Station Address
   c. Pedestrian
   d. Portable

10. Which of the three licence levels is allowed to use maximum licence power to control their equipment by remote control?
    a. Full only
    b. Intermediate & Full
    c. All three
    d. None

11. Which of the following bands are Foundation licence holders permitted to use?
    a. 472kHz, 5MHz & 10GHz
    b. 136kHz, 5MHz & 1.3GHz
    c. 136kHz, 28MHz & 10GHz
    d. 472kHz, 28MHz & 1.3GHz

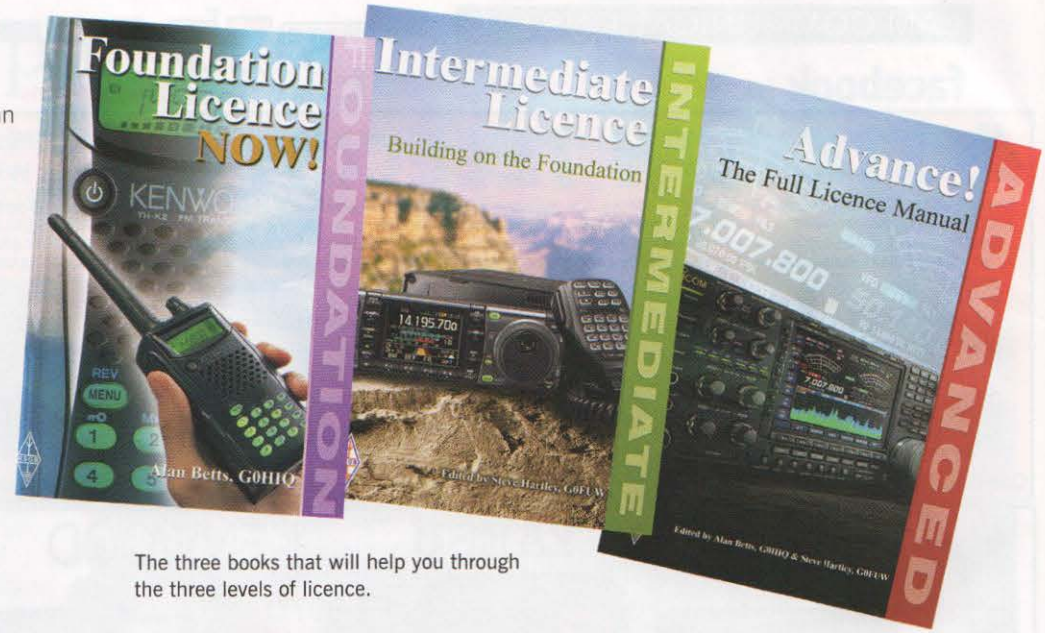
12. Which of the following is a Foundation licence holder *NOT* allowed to do?
    a. Operate from a vessel on an inland waterway
    b. Operate homemade transmitters
    c. Operate through repeaters
    d. Operate through satellites

13. What is the maximum power permitted for an unattended 1.8MHz transmitter using an Intermediate licence callsign?
    a. 500mW
    b. 20W
    c. 32W
    d. 50W

14. What is the maximum power permitted for an unattended 1.8MHz transmitter using a Full licence callsign?
    a. 500mW
    b. 20W
    c. 32W
    d. 400W

15. Which of the licences allows the holder to supervise another UK radio amateur using their radio equipment?
    a. None
    b. Full only
    c. Intermediate and Full
    d. Foundation, Intermediate and Full

16. Tuning a dipole is part of the assessment for which licence?
    a. All three
    b. Foundation
    c. Intermediate
    d. Full



The three books that will help you through the three levels of licence.

17. How many HF SSB contacts is a Foundation candidate allowed to make under supervision before they pass the exam?
    a. None
    b. One
    c. Five
    d. No limit

18. The practical assessments for which licence requires the candidate to build a radio-related project?
    a. None
    b. Foundation
    c. Intermediate
    d. Full

19. How many questions were in the very first Radio Amateurs Examination?
    a. 8
    b. 18
    c. 48
    d. 80

20. If you sat one exam at each of the current three levels, how many questions would you be asked in total?
    a. 75
    b. 114
    c. 133
    d. 156

21. The exams for which licence are marked locally?
    a. None
    b. Foundation only
    c. Foundation & Intermediate
    d. All three

22. How long did it take to use up the G3 plus 3 letter callsign series?
    a. 5 years
    b. 15 years
    c. 25 years
    d. 35 years

23. How long did it take to use up the M3 plus 3 letters callsign series?
    a. 6 years
    b. 12 years
    c. 25 years
    d. 30 years

24. What was the highest number of radio amateur exams sat in a single calendar year?
    a. 850
    b. 2,500
    c. 8,500
    d. 25,000

25. In which year did the largest number of candidates sit the City & Guilds Radio Amateurs Examination?
    a. 1952
    b. 1962
    c. 1982
    d. 2002

There are rules governing the exam situation, do you know what they are?

TX Factor

TX Factor is the UK's first TV show dedicated entirely to amateur radio. Bob McCreadie, G0FGX, Mike Marsh, G1IAR and Nick Bennett, 2E0FGQ will be hosting the streamed TV show, which goes live on Friday 21 February. The show aims to explore all aspects of our diverse and fascinating hobby. There are no charges for the programme at www.txfactor.co.uk and will stream to a smart TV, PC, tablet or phone, adapting the quality to the speed of the connection. If the broadband is fast enough viewers can watch in full HD, but it also looks great on portable devices via 3G. The show is sponsored by Martin Lynch and Sons and Yaesu Musen Co, Japan.

Episode 1 includes the Marconi Centre, SOTA and the Norman Lockyer Observatory Radio Group, with Episode 2 in March looking at the Bath Buildathon, FUNcube dongle and rig reviews.

TX factor
amateur radio explored

First Youth Hostels Radio Day

Following the success of GB1YHA on Youth Hostels Association Day, the Youth Hostels Amateur Radio Group (YHARG) has recently been formed and is now affiliated to the YHA.

The aim of the YHARG is to raise awareness of youth hostels as excellent bases for portable amateur operations in the UK and elsewhere, also to introduce youth hostellers, especially young people, to the delights of the amateur radio hobby.

The first Youth Hostels Radio Day will be at the YHA HQ in Matlock on the YHA's Let's Get Cooking Day (run jointly by the YHA and the charity The Childrens' Food Trust) on 25 March. MX0YHA will be on air on the 40m band and others bands if circumstances permit.

Plans are developing to have further MX0YHA Youth Hostel Radio Days at hostels in the Peak District during the spring and farther afield in the summer, also to extend the scheme across the UK. Information on proposed events is updated regularly on the YHARG website, www.YHARG.org.uk.

SOTAbeams

Received noise and RFI are often a problem for radio amateurs. Stopping noise and RF on feeders can be helpful. To make the task of diagnosing and curing noise problems easy, SOTAbeams has introduced their Noise Nobbler. The Noise Nobbler is a connectorised common mode choke with excellent performance across the HF spectrum. Because the Noise Nobbler offers predictable performance, it eliminates much of the guesswork that can result from the use of unknown and potentially unsuitable alternatives such as clip-on ferrites or scramble wound chokes. It is fitted with BNC sockets and is rated at 125 watts. See www.sotabeams.co.uk

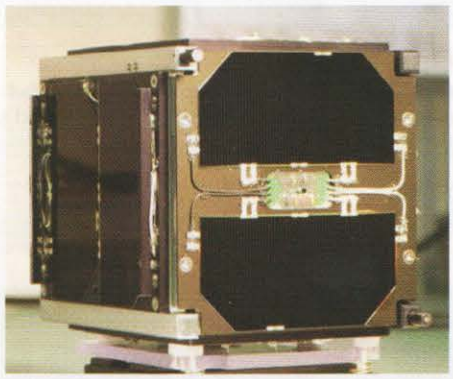
Nevada Kevlar 32

With the high winds experienced recently, Kevlar 32 antenna wire offers a strong, lightweight, solution to wires that constantly break, says Nevada. With a military style green PVC jacket, it has a low visual impact, but a breaking strain in excess of 150kg. The Kevlar 32 wire is constructed with an Aramid (Kevlar equivalent) core, covered with a heavy duty tinned copper braided conductor and tough green PVC jacket with an overall diameter of 3.2mm.

The Nevada Kevlar 33 wire can handle high power well above the UK legal limit with ease. It is supplied by the 100 metre drum, or by the metre, according to need, and is available from Nevada, www.nevadaradio.co.uk, 02392 313 090.

FUNcube Guide

An instructional guide to help teachers and radio amateurs access and use the AMSAT-UK FUNCube Materials Science Experiment (MSE) resource carried onboard FUNcube-1 (AO-73) can be found at http://amsat-uk.org/2014/01/18/new-guide-promotes-funcube-1s-educational-value/.



New antenna products

M0CVO Antennas is proud to announce some new products for 2014. First, the CV-2 duplexer (2m/70cm) is ideal for dual band satellite ops. Secondly, there are new 1.5kW QRO ranges in both the monoband HF dipoles and Off Centre Fed Dipole ranges. Full details of all these can be found on the website at www.m0cvoantennas.com.

Icom anniversary

2014 marks the 50th anniversary of the founding of ICOM Inc. Started in 1954 by Tokuzo Inoue, the company has grown into a world renowned manufacturer of business, amateur, marine and aviation radio, navigation products and communications receivers.

Today ICOM looks very different from 50 years ago. ICOM Inc is now a publicly held Japanese corporation; its stock is traded on the Tokyo and Osaka Stock Exchanges. Despite their size and success, ICOM's founder Tokuzo Inoue is still a huge influence in the running of the company.

Dave Stockley, Chairman of Icom UK said, "Our relationship with ICOM Inc began in March 1974 discussing ways that we could develop the brand and sales of the product range in the UK. Since then the relationship has been extremely successful and Icom UK are thought of as one of the most progressive companies in the ICOM family."

GB1BST

GB1BST, marking the start of British Summer Time, will be on the air on 30 March from Mount St Bernard Abbey in Charnwood Forest, Leicestershire (SK41). The abbey is home to a community of Cistercian monks who have kindly given permission for the Special Event to operate from the abbey lawn. The station will be operated by the Phoenix Radio Group (www.M0PHX.org.uk) on 40m, 20m and 2m plus other bands if conditions allow.

Mho's Resistance

Mho's Resistance is a game app where you complete circuits. You set the resistor colour bands to the correct values to complete each circuit, but incorrect values will unleash the 'Blue Smoke Monster'! It runs on IOS devices and costs $0.99 from www.adafruit.com/mhosresistance.

The latest Amat

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HAPO	Haynes Manual for Apollo 11	£19.99	**£16.99**
BSAC	Between Silk and Cyanide: A Code maker's War	£14.99	**£12.74**
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EXSE	Amateur Radio Exam Secrets	£12.99	**£9.74**
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RadCom

HF F-Layer Propagation Predictions for March 2014

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	872....38888	..633467884.	..4778888...	...999997...	...78998....	....777.....	.....
*** Asia								
Yakutsk	.....4..	5654	..3...567775	..36665.....	...46.....	....5.....	.....	.....
Tokyo	.....33..	.....6873.	.....24...	.....	.....	.....	....5.....	.....
Singapore	.....122.	68773	.....563..	.....264...	.....674...	.....55....	.....5.....	.....
Hyderabad	.....	4444	26543	.....563..	.....455...	.....45....	.....44....	.....
Tel Aviv	98.....8889	996....39999	..4....387..	...3..577...	...788887...	...46677....	.....	.....
*** Oceania								
Wellington	.....	.....6...	.....47...	.....3..5...	.....	.....	.....	.....
Well (ZL) (LP)	.....	..2.....	..2.....	.....	.....	.....	.....	.....
Perth	.....	.....542.	.....7875.	.....466...	.....	.....	.....	.....
Sydney	.....	.....776..	.....6885..	.....4786...	.....	.....	.....	.....
Melbourne (LP)	.....	..89.....	26897.....	66.99.....4	...88....45.	....7.....	.....	.....
Honolulu	.....	.....	...65.....	....4.....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....6...	.....	.....	.....	.....
W. Samoa	.....	...3.....	...6544.....	....667.....	....577.....	.....66.....	.....4.....	.....
*** Africa								
Mauritius	2.....222	7.....7877	6.....68877	.....8873.	.....54...	.....4....	.....	.....
Johanesburg	.....	44.....4665	66.....9988	39863	.....686..	.....68...	.....66...	.....4....
Ibadan	12.....11	67.....2566	776.....6776	7.7.....78..	...64.3687..	...7656787..	...776778...	....77776...
Nairobi	3.....12	86.....7778	65.....5566	.....3665.	.....666..	.....466...	...656676...	....6677....
Canary Isles	666.....666	877.....4887	8886...37888	5.4754578884	...58999997.	....699999..	.....88885..	.....8787...
*** S. America								
Buenos Aires	.....	433.....24	7656.....77	...6.....35.	.....4..	.....	.....	.....
Rio de Janeiro	.....	544.....35	7762.....787	.....86.	.....7..	.....45..	.....	.....
Lima	.....	4322.....2	6537.....66	...5.....5.	.....	.....	.....	.....
Caracas	.....	433.....3	8767.....87	...65....683	....453467..	.....66677..	.....7777...	.....44...
*** N. America								
Guatemala	.....	22.....	63.7.....5	.....	.....	.....	.....	.....
New Orleans	221.....	6662.....6	73.6.....6	.....5.	.....	.....	.....	.....
Washington	343.....1	7774.....27	7635.....67	.....367.	.....45..	.....455...	.....	.....
Quebec	665.....25	777.....277	...5.....76.	....4.3566..	.....44...	.....	.....	.....
Anchorage	.....	354.....	5.4.....3356	.....66..	.....56..	.....	.....	.....
Vancouver	.....	.32.....	.....	.....	.....5...	.....	.....	.....
San Francisco	.....	.2.....	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....	.....6....	.....6....	.....6....	.....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 February, March & April 2014 are respectively (SIDC classical method – Waldmeier's standard) 66, 65 & 63 and (combined method) 73, 75 & 77. The provisional mean sunspot number for January was 82.0. The daily maximum / minimum numbers were 117 on 6 January and 52 on 17 January.

Please send news reports to radcom@rsgb.org.uk. To get future events listed here and put on GB2RS, e-mail details of your meetings as early as possible to radcom@RSGB.org.uk and we'll do the rest. We need to know your club name, RSGB Region number, contact name & phone number, date of meeting and detail of meeting. Example: South Bristol ARS, Region 11, Len, G4RZY, 01275 834 282,29 October. On the Air. It's that simple. Please note that we don't normally print 'closed', 'TBA' or 'every Tuesday' type submissions. The deadline for the April *RadCom* is 19 February and for the April edition it's 24 March. For GB2RS, the deadline is 10am on the Thursday for the week of broadcast. If you need to amend your club details, please visit www.rsgb.org/clubupdates.

INTERNATIONAL

Pafos Radio Club, Cyprus,
Richard, 5B4AJG, 00 357 97 857 891,
5B4AJG@cyprusliving.org

NATIONAL

AMSAT UK
http://amsat-uk.org/
Weekly net every Sunday 10am, 3.780MHz.
Civil Service Amateur Radio Society
Weekly net every Tuesday, 8pm, 3.763MHz.

REGION 1: SCOTLAND SOUTH & WESTERN ISLES

REGIONAL MANAGER: JASON, O'NEILL, GM7VSB, RM1@RSGB.ORG.UK

Ayr ARG
Ralph, GM4SQO, 01292 285 281,
aargsecretary@sky.com
5 The real engineers behind John Logie Baird, Dennis, GM3YDN
19 Talk on Raspberry Pi, Morgan, MM0CDW & Alan, GM3MWX
Border ARS
Alex, GM8BDX, 01890 830 607
14 Fibre optics talk
Cockenzie & Port Seton ARC
Bob, GM4UYZ, 01875 811 723,
www.cpsarc.com
7 Normal club night
12 On the air
21 Aurora by Ian, GM3VEI
Lothians RS
Alan, GM3PSP, 0131 623 4580,
alanjmasson@virginmedia.com
12 Astronomical Radio Sources, John, GM8OTI
26 RSGB Dip into the Archives - Transatlantic Tests 1921-25 & Wartime, Alan, GM3PSP
Stirling District ARS
John McGowan, gm0fsv@gm6nx.com
2, 9, 16, 23, 30 Construction, training, projects and operating, 10.30am till late afternoon
6, 13, 20, 27 Weekly club meeting

NEXT DEADLINE

The deadline for Around Your Region in the April edition of *RadCom* is 19 February. Send your news and hi-res photos to radcom@rsgb.org.uk.

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

REGIONAL MANAGER: DENNY MORRISON, GM1BAN, RM2@RSGB.ORG.UK

Aberdeen ARS
Fred, MM0ODL, 01975 651 365
6 Junk sale
13 Construction evening
20 Talk
27 Morse and on the air

Glenrothes and District Amateur Radio Club presented the club awards at the end of 2013. John, GM4AQO received the Chairman's Cup from Ken, GM3YBQ for services rendered to invigilating exams (top photo). Tam, MM0TGB received the Club Key for organising Morse instruction and also for work at GB0SSB (centre photo). Doug, GM0AIR receiving the Club Shield for organising and sending slow and fast Morse every week (GMORSE) (lower photo).

REGION 3: NORTH WEST

REGIONAL MANAGER: KATH WILSON, M1CNY, RM3@RSGB.ORG.UK

Bolton Wireless Club
boltonwireless@gmail.com
24 Portable operating, Richard, G3CWI of SOTAbeams
Chester & DRS
Bruce, M0CVP, 01244 343 825
4 Operating evening
11 Committee meeting
18 SDR on a USB stick, M0PEA
25 Arduino, M0XPD
Fleetwood Radio Enthusiasts Group
John, M0JFE, 07940 815 659,
GB0FRG@hotmail.com
4 Event planning & natter night
11 Indoor antennas
25 Planning for NARSA
South Manchester R&CC
Ron, G3SVW, 01619 693 999
6 Winter project update
13 The wonders of China part 4, Dave, G4UGM
20 Spring equinox surplus equipment sale
27 Propagation theory and practice, Ron, G3SVW
31 Technical forum
Stockport RS
Nigel, 07973 312 699, info@g8srs.co.uk
4, 18 Meeting at Walthew House
29 On the air from Walthew House
Thornton Cleveleys ARS
John, G4FRK, 01253 862 810
3 Club night
10 Radio, G8RDP
24 NARSA discussion
31 Auction
Wirral & DARC
Simon, G6XHF, 0151 601 3269,
G6XHF@WADARC.Com
4 UKAC 2m Contest
5 Social at Chimneys Hotel, Hooton
11 UKAC 70cm Contest
12 Bring and Tell Night
18 UKAC 23cm Contest
19 Social at The Wheatsheaf, Raby
25 UKAC 6m Contest
26 High altitude balloons, Mike Sterling
Workington & DARC
Alex, G7KSE, mx0wrc@gmail.com
17 Dip into the RSGB Archives 1

NEXT DEADLINE

The deadline for the May issue is 24 March.

Workington ARC was heavily involved with the SOS Radio Week special event stations in January with the first weekend being run reasonably successfully. Once again the strong winds made antenna choice difficult but all four of the LBC (Life Boat Cumbria) stations made it on the air. GB1LBC was at Silloth, GB2LBC at Workington, GB4LBC was at St Bees and GB5LBC was at Barrow and run by the Furness ARC.
In addition to this the club has dipped their toes into the UKAC VHF contests but as they all operate /P they are, once again, at the mercy of the weather that has done its best to 'challenge'. The club will be supporting Harrington Scouts in their Communications badge and will work with Cockermouth in the near future.

REGION 4: NORTH EAST

REGIONAL MANAGER: NIGEL FERGUSON, G0BPK, RM4@RSGB.ORG.UK

Angel of the North ARC
Nancy, G7UUR, 01914 770 036, nancybone2001@yahoo.co.uk
1 Advanced examination
3, 10, 24, 31 On the air
17 Talk, all welcome

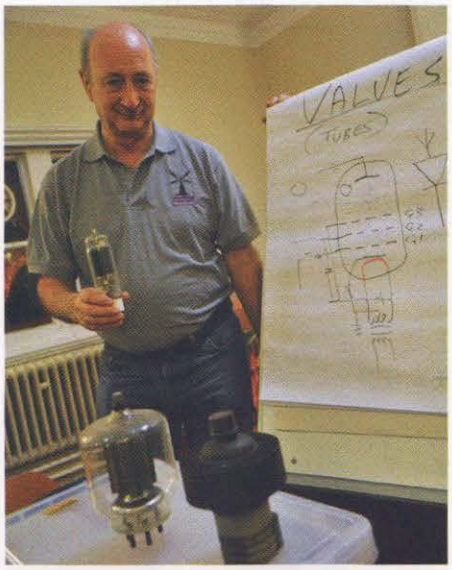
Denby Dale RC
Richard, M0RBG, 07976 220 126, m0rbg@talktalk.net
5 Annual surplus auction sale
12, 26 On the air, 7.30pm, 145.575MHz±
16 Operating G6LD from Cartworth Moor 6-10pm for WAB 3.5MHz Phone
19 Constructors competition – with prizes

Mexborough & DARS
Darrell, G0FUO, 0788 742 3221
7 Future event planning
14 Film night
21 Vintage radio, Allan, M0GVX
28 Shirt printer

Sheffield & DWS
Krystyna, 2E0KSH, 07884 065375, info@sheffieldwireless.org
5 Construction & repair workshop
19 Software defined radio, Bob, G4APV & David G8EQD

Spen Valley ARS
Russell, G0FOI, 01274 875 038
6 Portable operating my way, Geoff, G1DYN

Sheffield & District Wireless Society meets from 7.30pm on 1st & 3rd Wednesdays at the Rutland Hotel, S10 2PY and meets socially for 'cheers n beers' at the University Arms, S3 7HG on the 2nd and 4th Wednesdays of each month. Meals out take place on all months with a fifth Wednesday. It was re-formed as a society in Sheffield in 2013, having first coming into existence in 1922. The new society callsign is G5TO, previously used in 1961 by Jack Thorpe and kindly donated to the Society by his surviving son, Roger. The society is planning to establish a training and examination centre in the coming months and are very keen to establish a growing contesting team, already making good scores in the recent RSGB Affiliated Societies contest. The Society's main values are mutual respect and friendship, offering free lifetime membership so that everyone who takes an interest will come to enjoy a fascinating hobby in a relaxed and very friendly environment. A recent talk by David, G8EQD saw him lead a successful presentation and discussion on valves and their use, enjoyed by both older amateurs who haven't attended a club in over 10 years as well as Foundation licence holders new to the hobby.



Mexborough & District Amateur Radio Society has had another Foundation success. Seen here is Sue Kitchen carrying out her on air contact prior to taking her Foundation exam. Sue now holds the call M6URG. Congratulations from all at MADARS.

Tynemouth ARC had planned to activate the Isle of Arran but had to cancel the original DXpedition. They will now activate Arran, EU123 using the callsign GS0NWM from 26 March to 2 April. They will be on the air on most HF bands and full details are on QRZ.com.

NEXT DEADLINE

The deadline for Around Your Region in the April *RadCom* is 19 February 2014.

REGION 5: WEST MIDLANDS

REGIONAL MANAGER: VAUGHAN RAVENSCROFT, M0VRR, RM5@RSGB.ORG.UK

Aldridge & Barr Beacon ARC
Albert, G0KFS, 01922 614 169
3 AGM
17 Aerial workshop

Central Radio Amateur Circle
Martin, G1TYV, 07906 905 071, radio-circle@live.co.uk
4 144MHz UKAC Contest
9 Wythall Radio Rally
13 Group meeting
15 Barr Beacon Plug and Play day
27 Night on the air

Cheltenham ARA
Derek, G3NKS, 01242 241 099, secretary@caranet.co.uk
18 Lunch
20 Constructors' exhibition

Coventry ARS
John, G8SEQ, 07958 777 363
3, 17, 24 Club net, 145.375MHz, 8pm
7 Multa Paucis
14, 21 Project 2014 construction night
28 President's night

Dudley and District ARS
Carl, M0ZCR, m0zcr@live.co.uk
4 UKAC 2m night on the air
11 Forthcoming special events discussion
18 On the air & natter night
25 Club casual – open discussion

Gloucester AR&ES
Anne, 2E1GKY, 01242 699 595, daytime, www.g4aym.org.uk
3 How electronics helped to solve the mystery of how bats navigate, Richard Tofts
10 DF hunt in the dark
17 Construction competition
24 VHF/HF operating/workshop
31 Informal meeting

Midland ARS
Norman, G8BHE, 07808 078 003
5 Open meeting, shack on the air and training classes
9 Visit to the Wythall Radio Rally
12 Shack on the air and training classes
19 Social Events and planning, training classes
26 Shack on the air, ragchew and training classes

Rugby ATS
Steve, G8LYB, 01788 578 940, stephen@tompsett.net
1 Classical electronics, Mike, G8CTJ
4 UKAC 144MHz, radio operation and projects
8 PIC/Arduino/PC problem solving, C programming and general assistance, Steve, G8LYB
11 UKAC 432MHz, radio operation and projects
15 Video about vintage electronics, Mike, G8CTJ

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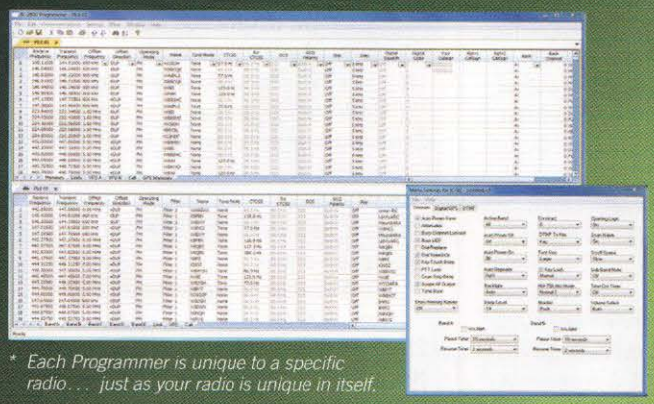

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18 UKAC 1296MHz, radio operation and projects
22 General radio and technical activities
25 UKAC 50MHz, radio operation and projects
29 Practical project session, bring your current project along

South Birmingham RS
Gemma, M6GKG, gemmagordon.m6gkg@gmail.com
3 Sorting stock for stand at Wythall Rally
4, 11, 18, 25 Coffee Morning in the shack 11am to 1pm, all welcome
6, 13, 20, 27 Training classes with Dave, G8OWL
7 Loading trailer with rally stock for Wythall Rally
9 Club Stand at Wythall Radio Rally
14, 21, 28 Work in the shack
17 Rally debrief meeting

Sutton Coldfield ARS
Robert Bird, spirit.guide@hotmail.co.uk
3, 17 Open net, 145.250MHz, 7.30pm
10, 24 Club meeting at Sutton Coldfield Rugby Club, 7.15pm
11 Open net, 70.475MHz, 7.30pm

Telford & DARS
Mike, G3JKX, 01952 299 677, mjstreetg3jkx@blueyonder.co.uk
5 Committee Meeting & GX3ZME OTA
12 Construction competition
19 SOTA beams, G3CWI
26 AGM

Worcester RAA
Rich, M0UVA, secretary@m0zoo.co.uk
11 Remote radio control

Wythall Radio Club
Chris, G0EYO, 07710 412 819
2, 9, 16, 23, 30 Club net, 145.225MHz, 8pm
3 80m Club Championship Contest – data, 8pm, Foundation exam, 8.30pm
4, 11, 25, 28 Morse Class, 7.45pm
4 Final rally preparation meeting and 144 MHz UKAC Contest, 8.30pm
7, 14, 21, 28 19:30 Friday Shack Social
8 Setting up for Wythall Radio Rally
9 Wythall Radio Rally
11 Committee meeting/rally debrief, 8.30pm
12 80m Club Championship Contest – CW leg, 8pm
20 80m Club Championship Contest – SSB leg, 8pm
25 Summits on the Air, Brian, G8ADD, 8.30pm
28 CQ WPX SSB Contest, Lee, G0MTN, 8.30pm
29-30 All day CQ WPX World Prefix SSB Contest
31 Curry night at the Monsoon, 6.30pm

NEXT DEADLINE

Details by 19 February please

REGION 6: NORTH WALES

REGIONAL MANAGER: MARK HARPER, MW1MDH, RM6@RSGB.ORG.UK

Dragon ARC
Stewart, GW0ETF, 07833 620 733
3 RSGB CC Data contest
17 DIY space projects and amateur radio, by Jo, MW6CYK

Marches ARS
club secretary, marchesars@hotmail.co.uk
13 Natter night, on the air, Morse practice, new club project: simple RF probe
27 Ideas for programme for next 12 months

North Wales Radio Society
Liz Cabban, lizcabban@vodafoneemail.co.uk
6 General meeting including contest planning for 2014
13 Technical topics
20 A view on HD TV from a BBC engineer, Peter, GW6SIX
27 AGM

Powys ARC
Dave, GW4NQJ, 07870 827 887
www.parc.care4free.net
6 Microscopy by Hugh, M0DSZ

REGION 7: SOUTH WALES

REGIONAL MANAGER: JIMMY SNEDDON, MW0EQL, RM7@RSGB.ORG.UK

Aberystwyth & DARS
Ray, GW7AGG, 01970 611 853, ray@clocktower.go-plus.net
13 4x4 Response Club and using APRS, Fred, MW0LBR
27 Night on the air, 145.500 then 145.550MHz, 8pm

REGION 8: NORTHERN IRELAND

REGIONAL MANAGER: PHILIP HOSEY, MI0MSO, RM8@RSGB.ORG.UK

Mid Ulster ARC
Brian Burns, MI0TGO, muarc.secretary@yahoo.co.uk
9 Monthly meeting followed by a review of the Club's build of the Bidx 20, 20m QRP SSB radio

Bushvalley Amateur Radio Club will resume club meetings after their winter break on Thursday 6 February at 8pm in the Community House, 13 Travers Place, Dervock.

AGM 2014

The 2014 AGM will be held at the Renaissance Hotel, Manchester M32EQ on 12 April

REGION 9: LONDON & THAMES VALLEY

REGIONAL MANAGER: LARRY SMITH, G4OXY, RM9@RSGB.ORG.UK

Burnham Beeches RC
Dave, G4XDU, 01628 625 720
3 AGM plus wine and nibbles
17 Bring a kit or other construction project

Edgware & DRS
Mike, G4RNW, 02089 500 658, michael.stewart5@ntlworld.com
13 Round table discussion looking forward to the Sporadic-E season
27 Round table discussion on ideas for short contests

Harwell ARS
Malcolm, G8NRP, 01235 524 844, info@g3pia.org.uk
11 40 years of technology in the BBC Part 2, Tony, G0OVA
25 Shack activity night

Newbury & DARS
Rob, G4LMW, 01635 862 737, g4lmw@btconnect.com
26 Defence HF comms in the 1960s, Richard, M1CFW

Radio Society of Harrow
Linda, G7RJL, 02083 868 586, www.g3efx.org.uk
4, 11, 18, 25 Social at Windsock Club
6 Contest logistics, M0ICR
13 AGM
20 The use of new materials for antennas, M6CWG

Reading & DARC
Pete, G8FRC, 01189 695 697
13 YL Expedition to Falklands and Shetlands, Liz, M0ACL & Brian, G0UKB
27 Spring junk sale, see rules at www.radarc.org

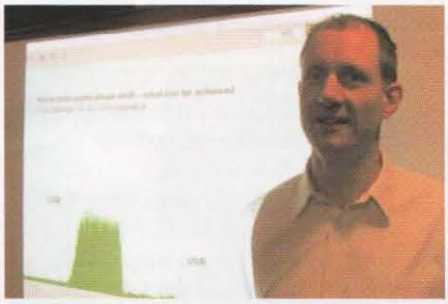
Shefford & DARS
John Burnett, 2E0OAK, 07860 804 793
6 AGM and your chance to have your say
13 What is happening in the RSGB, Larry, G4OXY
20 Inter club quiz
27 Mull of Kintyre DXpedition, Paul, G1GSN

Southgate ARC
K Mendum, G8RPA, g8rpa@arrl.net
12 Spring junk sale

Verulam ARC
Ralph, G1BSZ, 01923 265 572, g1bsz@aol.com
13 Social with GB3VH Repeater Group, 7.30pm, Rose and Crown
18 Satellite technology, Roger, M0RBK

Verulam ARC has got off to a good start to 2014. At its meeting in January, Alex, M0HCL gave an illustrated talk to 25 club members on SSB and phasing, also explaining phasing methods for data modes including BPSK and QPSK. Roger, M0RBK held the first session of an Intermediate training course that was attended by 15 candidates. A special Foundation exam is being

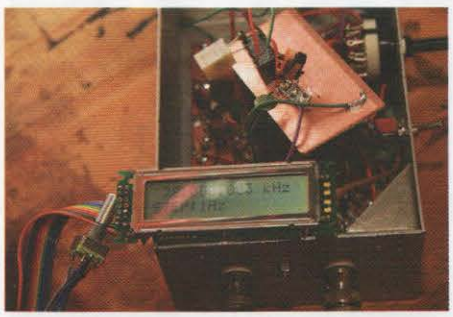
held at the home of a disabled candidate. Several club members visited the club's field site cabin for the AFS contests to maintain masts, antennas and other radio equipment in readiness for use for the year ahead.



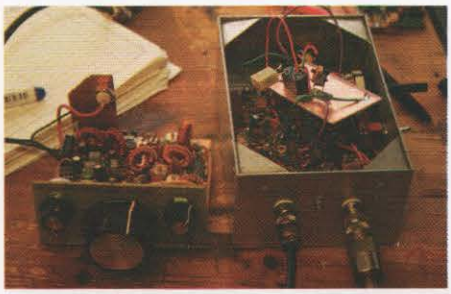
REGION 10: SOUTH & SOUTH EAST

REGIONAL MANAGER: MICHAEL SENIOR, G4EFO, RM10@RSGB.ORG.UK

Brede Steam ARS
Steve, 01424 720 815, M0NUC@aol.com
1, 4, 11, 18, 25 At the shack
Bromley & DARS
Andy, G4WGZ, 01689 878 089
8 Foundation course day two
18 Foundation level mentoring
Coulsdon ATS
Steve, G3WZK, 01883 620 730, secretary@catsradio.org
10 Raspberry Pi, Chris, 2E0CTH
Crawley ARC
John, G3VLH, 01342 714 402
9 Assembling the Elecraft K3 Transceiver, John, G3VLH and the self resonating coaxial loop antenna (mag loop), Peter G4FYY 11am
26 How to operate our radio shack, Mike G4KAD, 8pm
Crystal Palace R&EC
Bob, G3OOU, 01737 552 170, g3oou@aol.com
7 Small aerials in difficult locations, Mike, G3LHZ
Dorking & DRS
Garth, G3NPC, 01737 359 472
www.ddrs.org.uk
25 The history of FM broadcasting in the UK, Prof Tony Davies
Fort Purbrook ARC
Neil, M0NEH, 02392 378 559
07740 056 451
28 A look at oscilloscopes and signal generators, 7pm
Hastings E&RC
Gordon, 01424 431 909, gordon@gsweet.fsnet.co.uk
28 The internet and building a website, Steve, 2E0GHX
Horndean & DARC
Stuart, G0FYX, 02392 472 846, www.hdarc.co.uk
6 Natter night/social and activities evening
20 NATS air traffic control, Andrew Rankine
Horsham ARC
Alister, G3ZBU, 01932 242 243, www.harc.org.uk
6 Junk sale
Southdown ARS
John, G3DQY, 01424 424 319
5 Operating at Hailsham shack
Surrey Radio Contact Club
John, G3MCX, 020 8688 3322, john.g3mcx@btinternet.com
3 Surplus sale
Sutton & Cheam RS
John, G0BWV, 020 8644 9945, info@scrs.org.uk
20 The Atacama Large Millimetre Array, Neil Phillipson of Astronomia
Swindon & DARC
Kevin, G6FOP, www.sdarc.net
6 Annual construction contest
13, 27 Activity night
20 The Bletchley Park story, Ray, G4FON
Wimbledon & DARS
Kim, G6JXA, 07812 735 507, G6JXA@yahoo.co.uk
14 Direction finding, M0NDJ
28 Construction evening with G4ADM or G4WYJ
Worthing & DARC
John, G8FMJ, 01273 593 232
2 Monthly breakfast meeting
5 A day in the life of a highways traffic officer, Norman, 2E0RKO
12 Discussion evening & 80m CC CW contest
19 The top 10 things that go wrong with your PC and how to fix them Andrew, G1VUP
20 80m CC-SSB contest
26 G3WOR on the air



Andover Radio Amateurs Club started 2014 in fine fettle. The genius of Jim, G4NWJ, is being brought to bear in designing a multi band HF radio capable of delivering from about 5 watts to around 30 watts of CW and SSB. The photos show the PA and VFO stages built in a mixture of Manhattan and dead bug style by David, G4YVM. The PA is being driven by David's Walford Berrow that, running through the hastily added 80m unit seen atop the PA, gave Jim, G4NWJ his first chance to actually hear his creation. Award for first actual use does go, of course, to Jim! Around 18 members of the club have signed up to build either the VFO, the PA (useful for all those FT-817s), the receiver or the whole lot and form a proper rig. Many club members are involved with the project – Jim, G4NWJ as chief designer, David, G4YVM as prototype builder, Martin, M0MWS who is putting the designs onto PCB layouts, Terry, G8ALR is the procurement officer and Terry, G3VMT is software designer! The club is always happy to welcome new members and now might be a great time for amateurs in the area to offer themselves a New Year's challenge. Prospective members (and prospective amateurs) should either get in touch or just turn up.



REGION 11: SOUTH WEST & CHANNEL ISLANDS

REGIONAL MANAGER: PAM HELLIWELL, G7SME, RM11@RSGB.ORG.UK

Appledore & DARC
Brian, M0BRB, 01237 473 251
Zepp Net: Monday, Tuesday and Thursday, 4pm, 145.450MHz. GB3DN net Wednesday 4pm. HF net, Friday, 4pm, 7.185MHz ±QRM
17 AGM
Bristol RSGB Group
Robin, G3TKF, robin@g3tkf.co.uk
31 Solar flares & their effect on GPS signals, Prof Cathryn Mitchell, Bath University
Cornish Radio Amateur Club
Steve, G7VOH, 01209 844 939, G7VOH@btinternet.com
5 Committee evening
6 Club evening
20 Activities evening
Exeter ARS
Nick, M0NRJ, 01363 775 756, info@exeterars.co.uk
2, 17 HF net on 3.675MHz at 7.45pm
4, 11, 18, 23 2m net on 145.575MHz at 7.45pm
10 AGM, Moose Centre, 7pm followed by a demonstration of the Raspberry Pi by Nick, M0NRJ
24 The RTL-SDR receiver
Exmouth Amateur Radio Club
Mike, G1GZG, 01395 274 172
5 Starting computer programming, Dean, G0UIL
19 SDR update, Dean, G0UIL
Flight Refuelling ARS
John, G4POF, g4pof@hotmail.com
2 Committee meeting
5, 12, 19, 26 G4RFR on the air
9, 23, 30 Social and natter night
16 ATV demo by John, M1BAI

Plymouth Radio Club
Robert, 01752 777 888,
robert.2e0itn@gmail.com
11 Natter & new members' night
South Bristol ARC
Andrew, G7KNA, 07838 695 471
6 DX Challenge
13 Film night
20 Spring table top sale
27 Open house and on the air
Torbay ARS
Dave, G6FSP, g6fsp@tars.org.uk
7, 14, 21 Natter night
28 Presentation of buffet evening
Yeovil ARC
Rodney, M0RGE, 01935 825 791,
rodney.edwards@uwclub.net
13 Aerial radiation patterns, G3MYM
20 Morse practice with G3MYM
27 Station on air

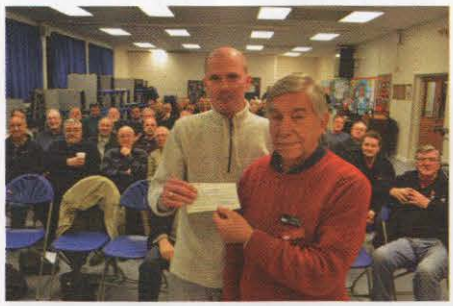
REGION 12: EAST & EAST ANGLIA

REGIONAL MANAGER: MARK SANDERSON, M0IEO, RM12@RSGB.ORG.UK

Braintree & DARS
John, M5AJB, 01787 460 947
3 Morse evening, two club group natter by the key
17 Essex RAYNET by club members
Chelmsford ARS
Martyn, G1EFL, 01245 469 008,
www.g0mwt.org.uk
4 Digital TV, radio and amateurs – what's next? Murray Niman, G6JYB, Oaklands Museum
13 Intermediate course, Danbury Village Hall
17 Amateur radio skills workshop, Danbury Village Hall
Harwich ARIG
Michael, 2E0GUI,
michael.2e0gui@gmail.com
12 Inter-club Scalextric night with CRA
Hilderstone R&EC
Chrissie, hilderstoneclub@gmail.com
13 Natter night
14 National Science Day at St Lawrence College
16 Rally at Dover club
27 Construction evening
Norfolk ARC
Chris, G0DWV, 01603 898 678,
cmdanby@btinternet.com
5 Visit from *RadCom* Editor Elaine Richards, G4LFM
12 Informal
13 Visit to the Orwell Observatory
19 Table top sale
26 Informal and bright sparks
South Essex ARS
Dave, G4UVJ, 01268 697 978,
g4uvj@btinternet.com
11 The lighter side of avionics repair, Vic, G6BHE

The first meeting of **Hilderstone R & EC** in 2014 saw a pleasing turnout on a cold wintry evening. They welcomed a new member, Michael, G6GJT, who has been an amateur radio enthusiast for many years but never joined a club. Discussions took place on the arrangements for the special event radio station, GB1RLS, at the Ramsgate Lifeboat Station on 25 January from 10am to 3pm as part of the SOS Radio Week. They hope to have plenty of helpers on the day and donations to the RNLI.

Norfolk Amateur Radio Club recently presented a cheque for £497 to Hospital Radio Norwich (HRN), its charity of the year for 2013/2014. Each year the club has a nominated charity and holds fundraising events and activities.



HRN is a voluntary organisation and registered charity whose aim is to relieve the stress and distress of hospitalisation by befriending patients at their bedsides and entertaining them through broadcasting. Each evening a personal choice of music and dedications are played on its popular request programme to the Norfolk and Norwich University Hospital.

HRN's Nik Grey (pictured left) accepted a cheque from NARC president Malcolm Prestwood, G3PDH, saying: "Many thanks to all members of NARC for the great work in the charity collection for us this past year. We would like to offer members the chance to come and visit our studios."

The requirement of a radio amateur to pass a Morse test to obtain a licence is no longer present, but the sound of the dits and dahs over the bands still has a fascination that draws the listener to want to send and receive Morse code. There are many ways of learning Morse code, one being the use of computer software and Americans recommend having an 'Elmer' to guide you. **Chelmsford Amateur Radio Society** has a class of Elmers who guide students on the use of the Morse key and paddle key. The only requirement is dedication! You must be prepared to dedicate 15 minutes each day to study until the code is mastered. Due to popular demand there are now two classes: Andrew, G0IBN tutors the complete beginner up to the RSGB 10wpm test and the correct way to use the straight and twin-paddle key, while Colin, M1OCN helps those that wish to improve their CW speed; to boost confidence on the use of the Morse key and to carry out CW QSOs with confidence on the bands.

If you have in interest in learning Morse code, or just want to improve your CW skills, come to The Bell Function Room, Danbury, CM3 4DT on a Thursday evening, 7pm (except for the first week of the month when it is a Wednesday); you will be made very welcome.

For further information contact Andrew, G0IBN on 01621 868 347 or by e-mail to g0ibn@kersey1.freeserve.co.uk.

On Saturday 25 January **Bredhurst Receiving and Transmitting Society** held another brilliant club event. Peter, 2E0PLG had organised that the club could operate as part of the RNLI SOS week from the Medway Yacht Club headquarters in Kent. It was a beautiful day and the view over the river Medway towards the Thames was spectacular. Many members joined in, the wire aerial being hoisted up the flagpole in record time. The club's banner, designed by Steve Cole, was erected and the station was soon on the air on the 40m band using an IC-7400. Contacts came thick and fast from both the UK and the Continent and the log screen was soon filling up. The lads took it in turns to run the station and, at the end, many hands dismantled the setup

in just 15 minutes. During the day, a bucket was passed round and both the BRATS and the Yacht club members donated over £100 in an impromptu collection. The club would like to thank the members of the Yacht club for their food, facilities, help and support with the venture and we hope to repeat the success next year.

Monday 20 January saw the first Amateur Radio Skills Workshop organised by the **Chelmsford Amateur Radio Society**. This new initiative is aimed at providing help and advice for those new to the hobby, allowing amateurs of all levels to try something new, and offering more experienced operators the chance to pass on their knowledge to the next generation of amateurs. Over forty people turned up and attendees had the chance to try out some hands-on demos of Echolink, APRS and the new logging program *uLog*, written by Chelmsford-based Charlie, M0PZT and launched at the event. Also in attendance were representatives from the Essex CW Club and the Essex Repeater Group. Questionnaires were handed out, designed to allow attendees to set the agenda for the next monthly workshop, which is planned for Monday 17 February. Pictures and a video of the first event can be found at www.essexham.co.uk/skills-jan14. To find out about upcoming Skills Workshops, go to www.hamskills.co.uk/.

The two **Braintree and District ARS** meetings in January were, as usual, interesting. The 6th was a natter night with a difference. The first part of the evening was a presentation by Edwin, G0LPO, entitled the history of the RSGB, part one. This was using the text and photos downloaded from the Society's archive. All members present found the presentation interesting and look forward to part 2. Also at that meeting Tony, G0IAG brought along a selection of his Clansman ex military radio equipment. With examples of the 320, 350 and 351 models which he uses HF, 4 and 6m bands respectively. He says these radios are great for the amateur bands, if a little bulky. With members picking each others brains with technical questions, natter nights are always popular.

The meeting on 20 January was the annual PAK testing night. As the Braintree club is involved in many special events, they always make sure our equipment is safe. Members also sensibly bring along their own equipment for testing. They also had some of the club's older and no longer used equipment on sale to members, prior to taking it to sell at the local Canvey Rally. Yet another interesting evening at Braintree.

Loughton and Epping Forest Amateur Radio Society held their 27th Foundation course in January with 9 candidates and one more for the assessments and exam only. All 10 candidates passed and marks were quite high, with the lowest being 21 and the highest 26 out of 26. All enjoyed the course and favourable feedback was given. Hopefully they will go on to the Intermediate, to be held on 1 March. Congratulations to all candidates and look forward to seeing you on air. The photo shows at the rear Paul Abbot, Takis Bozikis, Lucian Edwards, Ben Staszewski, Cyrus Bakes & Matej Urban. In front are Sorin Banda, Annie Bishop, Edward Zieba & Frank Riches. Thanks must go to the instructors and helpers: John, G8DZH, John, G1DJI, Derek, M0XDA, Ron, G6LTT and Dave, G3ZXF as well as Marc, G0TOC who managed to do some admin from his sick bed. The club all wish Mark a speedy recovery.

NEXT DEADLINE

The next two deadlines for Around Your Region are 19 February (for the April *RadCom*) and 24 March (for the May edition)

REGION 13: EAST MIDLANDS

REGIONAL MANAGER: STEVE BODEN, G4XCK, RM13@RSGB.ORG.UK

Derby & DARS
Richard, radio@dadars.org.uk
4 Junk sale
11 Committee meeting
18 AGM
25 On the air

Lincoln Short-Wave Club
Pam, G4STO, 01427 788 356, pamelagrose@tiscali.co.uk
4 144MHz UK CC Contest, 7.30pm
5, 12 Shack activities & natter night, 7.30pm
6 Repeater net GB3LM, 8pm
11 432MHz UKAC, 7.30pm
13, 20, 27 Simplex net 145.375MHz, 8pm
17 Committee meeting, 7.30pm
18 1.3GHz UK CC contest, 7.30pm
25 Committee meeting, 7.30pm
26 The new look RSGB presented by Graham Coomber, RSGB General Manager

RAF Waddington ARC
Bob, G3VCA, 07971 166 250
13 RAYNET, Alan, G8EVI

South Kesteven Amateur Radio Society
Nigel, M0CVO, 01476 402 550
5, 19 Informal
12, 26 Net on 145.525MHz, 8pm

On 8 January **South Kesteven ARS** had its annual prize giving event followed by the club AGM. They would like to congratulate the following on their awards this year:
Andrew, M6GTG awarded a certificate for most promising newcomer following his work on high altitude balloons and radio telemetry, and satellite decoding. Graham, 2E0GLE (now M0HLO) as the SKARS 144MHz UKAC and AFS champion 2013. Nigel, M0CVO, as the SKARS 6m UKAC Champion 2013.

Grantham Amateur Radio Club's long serving Club Secretary, John, G8WWJ stood down after 33 years in office. He had, in fact, been secretary since the formation of the club. His replacement is Kevin, G6SSN.

Classified Ads

For Sale

WANT A DATA INTERFACE ? You need an ISOTERM, Various models for your needs. PSK, WSJT, WSPR, CW & RTTY. New Model for Elecraft KX3 available See www.g3liv.co.uk

THINK ITS TIME TO TIDY up your Morse key connections? NEW GOLD PLATED UNIVERSAL CABLETIDYS for most BUG's and PADDLES, VIBROPLEX, JA7GHD,etc 40mm to 60mm spaced connections. See www.g3liv.co.uk email:johnny@melvin.com tel: 0191 2843028

FIBREGLASS TUBE High strength tube, square box, rod, and other sections all from stock in 6m lengths. Engineered Compositions, Chester. Tel: 01244 676000 e. barbara@engineered-composites.co.uk www.engineered-composites.co.uk

BAOFENG, TYT & VERO HANDHELDS at best prices from authorised UK importer. Full range of accessories available. www.sinotel.co.uk, 01926-460203, sales@sinotel.co.uk

CTCSS ENCODER AND DECODER KITS, DTMF Kits and Modules, PIC Microcontroller Development Kits. www.cstech.co.uk

Cards & Design

QSLERS SPECIAL OFFER 1000 full colour both sides qsl cards £40 plus postage. 07720 580968 www.QSLers.co.uk

LOW COST AND HIGH QUALITY QSL cards by LZ1JZ QSL PRINT http://www.LZ1JZ.com

"QUALITY QSL CARDS FROM £29/1000, full colour cards from £45/1000. For samples /enquiries /easy payments contact Charles MØOXO, 60 Church Hill, Royston, Barnsley, Sth Yorks S714NG ; Tel 07900 500775 Email charles@m0oxo.com/ Web www.ux5uoqsl.com/

Aerials

M0CVO ANTENNAS for all your amateur radio antenna needs. Full details at: http://www.m0cvoantennas.com

VORTEX ANTENNA SYSTEMS UK Manufacturer and hardware supplier. Delta Loops, Yagis, Monoband and Multiband, OWA Arrays, Bespoke Designs. Antenna parts and mounting solutions. 6082-T6 Metric Tubing, Stainless U-Bolts and much more. www.vortexantennas.co.uk or 07943 871893

G4TPH PORTABLE MAGLOOPS Remote and manual tune models for 40m through 10 metres Details at www.g4tph.com

SIGMA EURO-COMM LTD HF Vertical, Wire, G5RV & Mobile Antennas, VHF Base Station Antennas Mounting Poles, Magnetic Mounts Tel 0121 766 8146 stores.ebay.co.uk/sigmaeurocommltd

"WESTERN HF 10" 67ft wire dipole 160-6m, full details lookup m0bzi at: www.qrz.com buy direct: m0bzi@hotmail.co.uk or 07748331458 reviews at: http://g0kya.blogspot.com/2010_08_01_archive.html or http://www.eham.net/reviews/detail/9424

Wanted

UNWANTED VALVE AMPLIFIERS, working or not. Known makes only (Kenwood, Yaesu, Drake, Linear Amp, etc), not home-brew. Also 3-500Z/ZG valves. Cash paid. Contact Peter G3ZRS on 01482 862323 or g3zrs@hotmail.co.uk

VINTAGE RADIO & VALVES WANTED - national cash settlement for silent key, shack clearouts 07552678725, vintageradio@btinternet.com

Computer Software

PROGRAMMING SOFTWARE FOR YAESU RADIOS Http://www.g4hfq.co.uk bob.freeth@g4hfq.co.uk (01425) 618092

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

PAFOS, CYPRUS. Pafos, 2 bed villa. Simple HF station 300m ASL. www.domsvilla.co.uk

ACCOMMODATION NORTH COAST SCOTLAND. Self catering, B&B, camping. Discounts for licensed amateurs. GM4JYB Tel: 01847 851774. Web: www.letsgonorth.co.uk/dunnet_head Email: briansparks@dunnethead.co.uk

HOLIDAY WITH YOUR AERIALS. Self-catering, smoke-free twin-bed studio cottage, near middle of long 2 1/2-acre garden. Sleeps 2. Peaceful, electrically-quiet rural area. Non-amateur owner OK with (big!) aerials. Diana, 01308 485301, dianapread@icloud.com (W-Dorset).

Equipment

REPAIRS to all amateur and vintage RX/TX cost effective service phone or call in for details. Kent Rigs, 52, Salisbury Road, CHATHAM, Kent, ME4 5NN, 07903 023437

RELIABLE REPAIRS for all amateur and vintage equipment. Professional service, reasonable rates. Call: 01807 580376 E: radiorepairs@btconnect.com

Classified advertisements 58p per word (VAT inc.) with a minimum of 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
Payment to: RSGB, 3 Abbey Court, Priory Business Park, Bedford, MK44 3WH

Business Cards

Adertisers Index

FREE MEMBERS' ADS

Charges are waived for Members' Ads submitted by e-mail to memads@rsgb.org.uk. One ad per Member per month; other important terms & conditions apply (see grey box on page 94).

FOR SALE

1.2-2.5GHz 20W SWR/power meter Daiwa CN650, with instructions. £45 plus P&P. Collins mechanical filter F455 Z 6829 2.8 lower sideband, approx 3/8" dia x 3" long, £20 plus P&P. Dummy load 50Ω 200W £25 plus P&P. Brian Atkinson, G3GSI, 01435 883 248, g3gsi@tiscali.co.uk (Barklye).

ANYTONE AT-5555 10m mobile multimode radio v4 for sale in excellent condition and working order. Complete with original box, fist mic, power leads, mounting bracket, v4 software on CD and programming lead. £100 plus postage. Lee, MODDU, 07506 870 733 (Portsmouth).

APPROX 46 COPIES of Eddystone *Lighthouse* magazines in immaculate condx, £20 plus £5 p&p. G3YPS, 07803 601 176, atko99@tiscali.co.uk (Lincs).

ASCOM SE550 4m FM fully modified for 4m and beyond! £45. ATU bits: 10kV 25pf bolt mounting ceramic capacitors, PTFE feedthroughs, silver plated wire coils. £5 per item, £35 for the lot. Adrian, G4UVZ, 01823 421 751, adrianwhatmore248@btinternet.com (Taunton).

BC 3500 as new. Boxed, with data lead, manual, software, £140. GRE PSR- 282, as new, boxed, manual etc, £45. DX-394, no box, whip antenna, manual, £45. Lowe HF-225, boxed, PSU, manual, £135. Prices include UK only carriage. Dave, G0IXZ, 01246 824 061, g0ixz_dave@sky.com (Bolsover).

BOLTS, LARGE TITANIUM CAP HEAD Allen bolts 160 x 20mm, threaded 2.5mm Metric coarse plus nut. Ewan, MM0BIX, 01674 676 740, ewandcameron@yahoo.co.uk (Montrose, Scotland).

CHINESE MAKE HB-1A 3-band CW QRP transceiver. Very portable, as new condition with operating data, £120. MKARS-80 CW/SSB transceiver. Homebrew from kits to high standard, with full original data, £70. Both items ONO, plus postage. Ian, GM3LGU, 01620 825 639 (Haddington, East Lothian).

EDDYSTONE 940 gen cov, £275. EA12, amateur band, £385. Both radios in very very smart condition and working well. Buyer to try, inspect and collect. Robert Riddington, G4IHT, 01285 841 203, robert@riddington.me.uk (Tetbury, Glos).

EDDYSTONE EA-12, working, manual, scratched case, £175. Eddystone 840, half moon dial, rare, working, needs TLC, £85. Reception set, R107, spares or repair, £20. Ekco Mariner (PYE Export series), excellent, £40. Collect only. Richard, GM0OGN/P, 01789 293 375, gm0ogn@gmail.com (Stratford-upon-Avon).

EDDYSTONE receiver model 940. Transceiver IC-765. Amplifier Ranger 811H. Morse key HK-704. Equaliser microphone SM-10. Mr J Durrand, GM4XLN, gm4xln, 01955 604 463, ollie@breadalbane.freeserve.co.uk (Wick).

E S ROLAND bench power supply TX53050. DC Master supply 0 to 30V 0 to 5A, DC Slave supply 0 to 30/60V 0 to 5A, DC Supply 4 to 6V 2.5A. £130 + P&P or collect. Mike, G3EBP, 07763 933 975 (Milton Keynes).

G4TPH PORTABLE ML40HP magnetic loop (remote) 40 through 10m, 6 to 12V, 100W SSB, 50W CW. Like new, loft located. £85 plus £10 postage. T Sorbie, GM3MXN, 01698 330 248, gm3mxn@blueyonder.co.uk (Lanarkshire).

KENWOOD TR-751E 144MHz multimode transceiver, 25W o/p, good condition, manual included, original box. Photographs available via e-mail. £150 including P&P. Dave, G8ZRE, 01244 316 673, g8zre@hotmail.com (Chester).

KENWOOD TS-2000 HF, 6m, 2m, 70cm transceiver complete with original cartons, microphone, power lead and manuals, £850. Prefer buyer collects but can be sent by courier at cost to UK only. Peter, G4IZH, 07706 158 886, g4izh@yahoo.co.uk (Wakefield).

KW107 MANUAL HF ATU. 80 to 10m with 300W inbuilt dummy load, £20. Buyer collects. Geoff, G3CYL, 01252 617 521 (Fleet, Hants).

LAMCO DU1500T ATU, 1.8-30MHz, roller coaster, diff. atu, h/book. Exc condx, £225. Carriage at cost extra. Daiwa CN801HP PWR/SWR meter, h/book, boxed, exc condx, £55. Carriage at cost extra. Non-smoker. R Chambers, G8BCA, 01638 714 051 (Mildenhall, Suffolk).

LINEAR AMP UK RANGER 811H HF linear amplifier. Serviced by Linear Amp UK in 2012, including 4 x new 572B's fitted, and hardly used since. In good condition with manual and service report including 2 tone test results. £595. David, G4ERW, 01233 860 266, david.lurcook@btinternet.com (Ashford, Kent).

R1155N. ASR version, steel cab. Later T35 S/M drive. Neat onboard P/S and speaker. Receives signals. Rarer version good cosmetically, no corrosion. Best email offer by 31/3/2014. R Young, M0BGA, rcry100@yahoo.com (Cornwall).

***RADCOM*: 50 YEARS** of back numbers free to pick up, also valves and parts for sale. List from Jeremy, G3IMW, jmw@comloft.eclipse.co.uk (Exeter).

SILENT KEY SALE: KW ATLANTA. Last used in the 1990s and stored in a clean dry loft since then, so there is a chance that it might come to life again. Enquiries by email only to Arnold Cronin, croninsurv@aol.com (London).

SILENT KEY SALE de G3HAG. Racal RA1772 receiver. Offers invited. Must be collected. Marion Hughes (G3HAG XYL), 0114 274 7950 (Sheffield).

TEKTRONIX 2245A, 4-ch, 100MHz oscilloscope with AUTOSETUP. C/w foam lined fibreglass carry case, 4 probes (2 x1, 2 x10) and full operators manual. Currently has a repairable PSU fault, otherwise condition very good. Buyer collects (14kg). Photos available. Reasonable offers. John Totten, G7LWF, 01380 729 197, kingfisher28@talktalk.net (Devizes, Wilts).

THREE BEDROOM link-detached house, built in 1970, with garage and ten by six foot shack in garden, £250k. W S Blythe, GOPPH, 01239 232 386 (Fareham).

TS-120V, working OK, however 10m sometimes goes into oscillation on Tx. A 'tap on the case' cures this! £70. Timewave DSP9, £30. Buy both for £90. Prefer buyer collects. Harvey, G1RRG, G1RRG@talktalk.net (Otley).

YAESU FT-847 EARTH STATION. Original owner, non-smoker, 1.8-450MHz (including 5MHz). 1.8 to 50MHz 100W, 145 & 450MHz 50W, 4m 85W Tx, with extra 4m low noise preamp. Ideal for using the new satellite Fun Cube. Offers around £850. A Lenton, G8UUG, 01252416 363, a@lenton.org (Hampshire).

WANTED

CAN ANYONE REPAIR my Sangean ATS-803A? It powers on but no audio. Signal meter works but looks weaker than normal. Tried some amateur radio service companies but they would not even look at it – can you help? Ray, G0VSS, 07909 878 302 (Somerset).

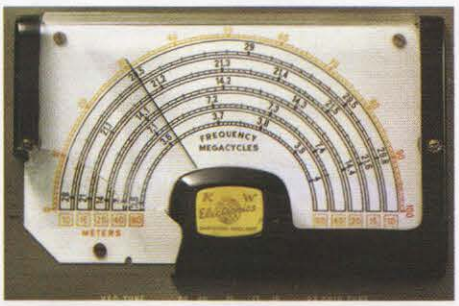
COMPUTER MAGNETIC TAPE. Half-inch wide, probably on 10.5" diameter reel. Need not work (for static display). Godfrey, G4GLM, 020 8958 5113, cgmm2@btinternet.com (Edgware).

DATONG D70 MORSE TUTOR in good condition, if possible. I am willing to travel to purchase one in good condition. Brian, G8NHN, 07792 859 886 (Manchester).

DOES ANYONE HAVE a copy of *Radio Constructor* for March 1971 that I could borrow please? Also, any info on mods for the Trio JR310 or 500? All costs reimbursed, naturally. Laurence, G7MZH, 01293 520 155, g7mzh@btopenworld.com (Sussex).

FIVE PIN PLUG that goes into rear of FR-101 (the VFO socket). I don't have the lead so I'm making one up. Ross Bradshaw, G4DTD, 01726 891 320 (Cornwall).

GELOSO VFO FRONT PANEL, or complete VFO to complete the restoration of my vintage KW Vanguard transmitter. A complete transmitter would be also considered. Alan, G3WXI, 0114 288 1692, g3wxi@qsl.net (Sheffield).



I AM WANTING TO PURCHASE a complete and working PSU for an ITT W3MC/3F TWT amplifier. Contact me with a price. Will collect or courier. John Randall, M0ELS, 07881 892 136, m0englandlondonspain@yahoo.co.uk (Basildon).

LATTICE TOWER, 30ft or so, suitable for HF beam. James Durey, M6JEK, 01621 892 042 (Maldon).

RACAL RA1218 & SIEMENS E311 to complete my receiver collection. Steve, M6WAA, 07552 678 725, chunky9@btinternet.com (Warrington).

ROLLER COASTER INDUCTOR (around 30mH) in clean working condition for ATU project. Des, G4OBB 07833 898 721, radioham73@gmail.com (Oxfordshire).

TEN-TEC CENTURY 22 HF Tx/Rx. Also looking for RSGB *Callbooks* 1964 -1969 and *SWM* & *PW* issues 1959 – 1965. Rupert, G4XRV, 01494 758 361, rupert@g4xrv.fsnet.co.uk (Chesham, Bucks).

WANTED FOR PRESERVATION, restoration, and demonstration. Early valve, spark, amateur equipment, ephemera and photos, also WW2, RAF, USAF, Army and clandestine wartime communication equipment, accessories and ephemera. Any condition considered. Help also offered with shack clearances. Martyn, G4RLF, 01722 743 270 (Salisbury).

YAESU FT-857D or 897D. William, M6KIK, 01256 781278, iam@willdover.co.uk (Basingstoke).

YAESU XF-8.9GF FM FILTER, as fitted to FM board in FT902DM. Alan, GW8KSF, alansal@msn.com (Wrexham, N Wales).

HELPLINES

ARE THERE ANY Members whom are serving or ex-members of The Rifles, Royal Green Jackets, Ox & Bucks Light Infantry or its antecedent Regiments? I'm planning events for 2014/5, Geoff Day, G4DED, Ex Ox & Bucks, RGJ, g4ded@gmx.com, 07775 981 088 (Kidlington).

MULTI CONTACT ROTRTY UNISELECTOR. All costs will be covered. Graham, G7KYX, 01205 871 624 (Lincolnshire).

RALLIES & EVENTS

Members of the RSGB Regional Team will be present with a bookstall at the rallies this month marked with an RSGB diamond

1 MARCH – LAGEN VALLEY ARS ANNUAL RALLY – the Village Centre, Ballynahinch Street, Hillsborough. OT 11.30, CP, C, B&B, SIG, TS. Jim, GI0DVU, 02892 662 270.

2 MARCH – EXETER RADIO & ELECTRONICS RALLY – America Hall, De La Rue Way, Pinhoe Exeter EX4 8PW. OT 10.15/10.30, £2. TS, B&B, C. Pete, G3ZVI, 07714 198 374, g3zvi@yahoo.co.uk.

9 MARCH – WYTHALL RC ANNUAL RADIO RALLY – Woodrush Sports Centre, Shawhurst Lane, Hollywood, nr Birmingham B47 5JW on the A435, 2 mi from J3 M42. TI S22 (V44), CP, OT 10am, £3. TS, C. Chris, G0EYO, 07710 412 819, g0eyo@blueyonder.co.uk. [www.wrcrally.co.uk].

15 MARCH – 39th DUTCH NATIONAL RADIO FLEA MARKET – "Autotron", Rosmalen, just off A59 motorway. TI PI4SHB, 145.500MHz, CP, OT 9am. TS, FM, C. Details: info@radiovlooienmarkt.nl. [www.radiovlooienmarkt.nl].

16 MARCH – DOVER RADIO RALLY – Whitfield Village Hall, Sandwich Rd, Whitfield, Dover, Kent CT16 3LY. OT 10am, £2. TS, B&B, A, C, CP. Tables £10. Ian Keyser, ian.g3roo@googlemail.com.

This list shows all rallies and events we are aware of as of press deadline. 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. We also recommend you check the details are correct in *RadCom* and tell us if not.

TI Talk-In; CP Car Park; £ Admission; OT Opening time - time for disabled visitors appears first, (eg 10.30/11am); TS Trade Stands; FM Flea Market; CBS Car Boot Sale; B&B Bring and Buy; A Auction; SIG Special Interest Groups; MT Morse tests; MA Foundation Morse Assessments; LB Licensed Bar; C Catering; DF Disabled Facilities; WIN prize draw, raffle; LEC Lectures/Seminars; FAM Family attractions; CS Camp Site.

SILENT KEYS

We regret to record the passing of the following Members:

Name	Date
Mr K S Turner, 2E0KST	31/08/2013
Mr D Gilpin, 2E1HCM	24/11/2013
Mr F A Wilson-Whitford, G0EBX	10/12/2013
Mr R Minford, GI0EIO	22/11/2013
Mr B E Howell, G0OTM	21/12/2013
Mr C J G Purcell, G0RHZ	08/12/2013
Mr E J White, G0RJH	28/01/2014
Mr J Flint, G0SDB	02/12/2013
Mr L Walker, G1YGH	12/11/2013
Mr J H Davey, G3AID	
Mr M C Farley, G3DFD	26/05/2013
Mr P G Lewis, G3EMF	05/11/2013
Mr R E Wand, G3FNY	01/2014
Mr R J Hughes, G3GVV	14/12/2013
Mr G A Farrall, G3MNT	09/12/2013
Mr C Whelan, GW3NJW	21/11/2013
Mr A Ellis, G3PJR	26/12/2013
Mr J B Wilson, G3PNH	01/01/2014
Mr F B Stanbridge, G3PZS	18/12/2013
Mr A Bartlett, GW3YSA	
Mr P G Hildebrand, G3VJO	16/11/2013
Mr D Lawson, G4JHO	03/12/2013
Mr F Knapp, GM4JRP	20/01/2014
Mr P A Crooks, G4KGG	18/10/2013
Mr B F Stubbs, G4KPN	19/12/2013
Mr D S Tompkins, G4MJN	06/11/2013
Mr P I Roberts, G4WSU	07/12/2013
Mr J Heath, G7HIA	02/2013
Mr P R Plant, GU7IOJ	30/12/2013
Mr G Slater, G7PMT	12/12/2013
Mr M G Simpson, G8BOI	10/12/2013
Mr J E Parsons, G8VJF	23/11/2013
Mr N Burrows, G8XCD	16/11/2013
Mr J Whittaker, M0AAS	09/08/2013
Mr J Blakeley, M0ANM	24/10/2013
Mr W L Gray, M0CPH	
Mr R Nottage, M0PMP	10/05/2013
Mr R P Lapham, M0RPL	04/12/2013
Mr H W G Ford, M1EIM	08/01/2014
Mr A Reay, M3JNH	21/12/2013
Mr M K Harding, M3UUX	02/12/2013
Mr T Ashton, M6MFI	09/12/2013
Mr J Baldock, RS162951	
Mr K Bowdler, RS171904	04/2013
Mr A Clarke, RS214506	20/12/2013
Mr J A Fegan, VE3QF	2012

An administrative error led to the Silent Key list from January being repeated in the February edition. We apologise unreservedly for any distress this caused, and have included everyone whose details should have appeared in February in the above list.

OBITUARIES

We welcome obituaries from clubs or individuals when someone sadly passes away. They are published at www.rsgb.org/sk. Please send submissions by e-mail (only) to sk@rsgb.org.uk. All submissions are moderated and may be edited for reasons of style, grammar, length etc..

SILENT KEY ENTRIES

The Silent Keys column is **separate** from the online obituaries section. To notify the RSGB that a Member has passed away (and their subscription should end and they should be listed in Silent Keys), please e-mail sales@rsgb.org.uk or telephone 01234 832 700 and then select option 1. We will need to know the deceased's name, callsign or RS number and, if possible, date of death.

SPECIAL EVENTS STATIONS

These callsigns are valid for use from the date given, but the period of operation may vary from 1 - 28 days before or after the event date. Operating details are provided in an abbreviated form as follows: T = 160m; L = 80 or 40m; H = HF bands (30 - 10m); V = 6 and/or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet. Details published here are kindly provided by Ofcom.

Date	Callsign	Phonetics	Location	Bands	Keeper
01/03/2014	GB0BVL	Blind Veterans Llandudno	Llandudno	TLHV27	G0PQQ
02/03/2014	GB2MS	Multiple Sclerosis	Macclesfield	LHV27	G0JNJ
02/03/2014	GB2GED	Croydon Airport's old callsign	Croydon	L2	G4FAA
08/03/2014	GB1WLD	World Ladies Day	Portsland	LH	M0HZT
08/03/2014	GB5CC	Commonwealth Contest	Church Stretton	LH	G3BI
10/03/2014	GB1SPD	Saint Patricks Day	Omagh	TLHV27	MI1CCU
28/03/2014	GB6RAF	Rednal Air Field	Shropshire	LH27	GW1YQM
29/03/2014	GB1BST	British Summer Time	Leicestershire	LV2	G7HZZ

22 MARCH – 2nd LAUGHARNE RADIO RALLY –Millenium Memorial Hall, Laugharne SA33 4QG. OT 10am to 2pm, £FREE, tables free. Matthew, GW6KOA, 01994 427 581, matthew.twyman63@btinternet.com.

6 APRIL – 51st NORTHERN AMATEUR RADIO SOCIETIES ASSOCIATION EXHIBITION – Norbreck Castle Exhibition Centre, Blackpool FY2 9AA. TI, CP, OT 10.15/10.30. TS, B&B, SIG, MT, LB, C, DF, RSGB book stall. Dave, M0OBW, 01270 761 608, dwilson@btinternet.com. [www.narsa.org.uk].

6 APRIL – DEVON & CORNWALL REPEATER GROUP AND CALLINGTON ARS RALLY – Callington Town Hall, New Road, Callington PL17 7BD. OT 10am. CS. Bookings & info Roger, 2E0RPH, 2e0rph@gmail.com.

6 APRIL – CAMBRIDGE REPEATER GROUP RALLY – Foxton Village Hall, Hardman Road, Foxton, CB22 6RN. OT 10.00, £2. TI, TS, B&B, C, DF. Lawrence, M0LCM, 07941 972 724, rally2014@cambridgerepeaters.net. [www.cambridgerepeaters.net]

13 APRIL – HACK GREEN BUNKER RALLY – Hack Green Secret Nuclear Bunker, Nantwich, Cheshire, CW5 8AL Sale of electronic equipment, amateur gear, components, military radio sets and vehicle spares. OT 10.00, TS, C. Lucy, 01270 623 353, Lucy@hackgreen.co.uk. [www.hackgreen.co.uk]

13 APRIL – SOUTH GLOUCESTERSHIRE RADIO RALLY – Scout Activity Centre, Woodhouse Park, Almondsbury, BS32 4LX. OT 10am, B&B, CP, C, CBS, TI S22 (V44). Mike, M1DPB, 07806 310 095. [southglosradiorally.org.uk].

13 APRIL – WEST LONDON RADIO & ELECTRONICS SHOW (Kempton Rally) – Kempton Park Racecourse, TW16 5AQ. TI, free CP, OT 9.50/10am. TS, FM, B&B, SIG, C, DF, WIN, LEC. Paul, M0CJX, 08451 650 351, info@radiofairs.co.uk. [www.radiofairs.co.uk].

20 APRIL – RADARS RALLY AND SURPLUS EQUIPMENT SALE - The Hugh Ripley Hall, Ripon, North Yorkshire HG4 2TP. TI, OT 10.00, stallholders 7.30, £2. C, tables £10, Raspberry Pi demonstrations and sales. Details from rally@ripon.org.uk [www.ripon.org.uk].

27 APRIL – ANDOVER RADIO AMATEURS CLUB SPRING BOOT SALE - Wildhern Village Hall, Andover. CP, TS, FM, C, DF, WIN, CBS, OT 10.00. Aracsec@hotmail.co.uk. [www.arac.org.uk/events.html]

27 APRIL – 30th YEOVIL QRP CONVENTION

4 MAY – DAMBUSTERS HAMFEST

5 MAY (Bank holiday Monday) – DARTMOOR RADIO RALLY

11 MAY – LOUGH ERNE ARC RALLY

16 – 18 MAY – DAYTON HAMVENTION®

1 JUNE – SPALDING & DARS ANNUAL RALLY

8 JUNE – 13th JUNCTION 28 QRP RALLY

15 JUNE – 27th NEWBURY RADIO RALLY

21 JUNE – SOUTH LANCS SUMMER RALLY

22 JUNE – EAST SUFFOLK WIRELESS REVIVAL

27-29 JUNE – HAMTRONIC, FRIEDRICHSHAFEN

29 JUNE – WEST OF ENGLAND RADIO RALLY

5 JULY – BANGOR AND DISTRICT ARS RALLY

6 JULY – CORNISH RAC 51st MOBILE RALLY

13 JULY – McMICHAEL RADIO RALLY & CBS

20 JULY – FINNINGLEY ARS SUMMER RALLY

27 JULY – HORNCASTLE SUMMER RALLY

8 AUGUST (Friday) – COCKENZIE & PORT SETON ARC 21ST MINI-RALLY

17 AUGUST – RUGBY AMATEUR TRANSMITTING SOCIETY RADIO RALLY

10 AUGUST – FLIGHT REFUELLING ARS HAMFEST

25 AUGUST (Bank holiday Monday) – HUNTINGDONSHIRE ARS RALLY

31 AUGUST – TELFORD HAMFEST

14 SEPTEMBER – TARS 50th ANNUAL COMMUNICATIONS FAIR

14 SEPTEMBER – WEST KENT ARS RADIO AND ELECTRONICS FAIR

26 & 27 SEPTEMBER – NATIONAL HAMFEST

10-12 OCTOBER – RSGB CONVENTION

12 OCTOBER – HACK GREEN BUNKER RALLY

12 OCTOBER – HORNSEA ARC RALLY

18 OCTOBER – CARRICKFERGUS AMATEUR RADIO GROUP RADIO RALLY

19 OCTOBER – GALASHIELS & DARS RALLY

26 OCTOBER – 24th GT. NORTHERN HAMFEST

9 NOVEMBER – WEST LONDON RADIO & ELECTRONICS SHOW (Kempton Rally)

23 NOVEMBER – CATS RADIO & ELEC. BAZAAR

6 DECEMBER – SOUTH LANCS WINTER RALLY

7 DECEMBER – 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.

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. You should receive an automatic acknowledgement almost immediately. Ads may still be submitted by post but must be accompanied by a payment of £5 to cover administration costs.

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.**

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 anyway. 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.

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded in 1913 incorporated 1926. RSGB is a trading name of Radio Society of Great Britain, a limited company registered in England and Wales with company number 00216431. 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.

RSGB MEMBERSHIP

Annual rates from 1 January 2011

Full membership (by Direct Debit). £47.00
(individual & club)
Family membership (by Direct Debit). £56.00

Paying other than by Direct Debit attracts a £4 premium.

Student (21-25). . . . . Free
Ham Club (under 21). . . . . Free

Subscriptions include VAT where applicable.
Special arrangements exist for visually impaired persons. Details and membership application forms are available from RSGB HQ or see www.rsgb.org/join.

YOUR RSGB

This page provides names and contact details for Board Members, Regional Managers, Committee Chairmen and Honorary Officers. Members seeking advice and guidance on any aspect of Amateur Radio or the Society's work are free to contact the relevant person below. Before doing so, please do check the comprehensive FAQs on the RSGB website, www.rsgb.org/faq/ to see if your question is answered there.

For HQ staff below, both e-mail addresses and telephone details are provided, including the option to select when dialling through the RSGB switchboard (01234 832 700).

Chairmen and Honorary Officers:
These are all volunteers and give their time freely to support the Society. Members should respect the fact that many also have full time day jobs, and so e-mail is the appropriate method of communication.

General Manager:
Graham Coomber, G0NBI,
e-mail: graham.coomber@rsgb.org.uk

Honorary Treasurer (Acting):
Richard Horton, G4AOJ, e-mail: g4aoj@rsgb.org.uk

Company Secretary:
Rupert R Thorogood, G3KKT, e-mail: g3kkt@rsgb.org.uk

THE RSGB BOARD

Dr Bob Whelan, G3PJT (President), e-mail: g3pjt@rsgb.org.uk

Graham Murchie, G4FSG, (Board Chairman)
e-mail: g4fsg@rsgb.org.uk
Phillip Brooks, G4NZQ, e-mail: g4nzq@rsgb.org.uk
Stewart Bryant, G3YSX, e-mail@ g3ysx@rsgb.org.uk
Stan Lee, G4XXI, e-mail: g4xxi@rsgb.org.uk
Len Paget, GM0ONX, e-mail: gm0onx@rsgb.org.uk
Dr John Rogers, M0JAV, e-mail: m0jav@rsgb.org.uk

Note: The General Manager, Company Secretary and Acting Honorary Treasurer are not Directors, but are in attendance at Board Meetings.

REGIONAL MANAGERS

Region 1 – J O'Neill, GM7VSB, e-mail: rm1@rsgb.org.uk
Region 2 – D Morrison, GM1BAN, e-mail: rm2@rsgb.org.uk
Region 3 – K A Wilson, M1CNY, e-mail: rm3@rsgb.org.uk
Region 4 – N Ferguson, G0BPK, e-mail: rm4@rsgb.org.uk
Region 5 – V Ravenscroft, M0VRR, e-mail: rm5@rsgb.org.uk
Region 6 – M Harper, MW1MDH, e-mail: rm6@rsgb.org.uk
Region 7 – J Sneddon, MW0EQL, e-mail: rm7@rsgb.org.uk
Region 8 – P Hosey, M1OMSO,
e-mail: rm8@rsgb.org.uk
Region 9 – L Smith, G4OXY, e-mail:rm9@rsgb.org.uk
Region 10 – M Senior, G4EFO, e-mail: rm10@rsgb.org.uk
Region 11 – P Helliwell, G7SME, e-mail: rm11@rsgb.org.uk
Region 12 – M Sanderson, M0IEO, e-mail: rm12@rsgb.org.uk
Region 13 – S Boden, G4XCK, e-mail: rm13@rsgb.org.uk

SPECIALIST AREAS – CHAIRMEN & HONORARY OFFICERS

Abuse and poor operating
Amateur Radio Observation Service (AROS), Keith Bassett, G7NBU, AROS coordinator, e-mail: aros@rsgb.org.uk, www.rsgb.org/aros/

Amateur Radio Direction Finding
Bob Titterington, G3ORY, Chairman, ARDF Committee, e-mail: ardf.chairman@rsgb.org.uk, www.rsgb.org/ardf/

Contests
Ian Pawson, G0FCT, Chairman, Contests Committee, e-mail: cc.chair@rsgb.org.uk, www.rsgb.org/radiosport/

EMC
John Rogers, M0JAV, Chairman, EMC Committee, e-mail: emc.chairman@rsgb.org.uk, www.rsgb.org/emc/

General Technical Matters
Andy Talbot, G4JNT, Chairman, Technical Forum, e-mail: tech.chair@rsgb.org.uk, www.rsgb.org/technicalmatters/

General Spectrum & Regulatory Matters
John Gould, G3WKL, Chairman, Spectrum Forum, e-mail: spectrum.chairman@rsgb.org.uk www.rsgb.org/committees/spectrumforum/

GB2RS News Service Management
Ken Hatton, G3VBA, GB2RS Manager, e-mail: gb2rs.manager@rsgb.org.uk
(GB2RS news items should be sent to gb2rs@rsgb.org.uk)

HF Matters
Ian Greenshields, G4FSU, HF Manager, e-mail: hf.manager@rsgb.org.uk

Intruders to the Amateur Bands
Chris Cummings, G4BOH,
e-mail: iw@rsgb.org.uk www.rsgb.org/intruders/

IOTA Activity Programme
Roger Balister, G3KMA, IOTA Manager, e-mail: iota.manager@rsgb.org.uk, www.rsgbiota.org/

Microwave Matters
Murray Niman, G6JYB, Microwave Manager, e-mail: mw.manager@rsgb.org.uk

Planning Advice
Stephen Purser, G4SHF, Chairman, Planning Advisory Committee, e-mail: pac.chairman@rsgb.org.uk, www.rsgb.org/planning/

Propagation Studies
Steve Nichols, G0KYA, Chairman, Propagation Studies Committee, e-mail: psc.chairman@rsgb.org.uk, www.rsgb.org/psc/

Repeater and Data Communications
John McCullagh, GI4BWM, Chairman, ETCC, e-mail: etcc.chairman@rsgb.org.uk, www.ukrepeater.net

RSGB Awards
John Dunnington, G3LZQ, Awards Manager (Contact HQ in the first instance on 01234 832 715), e-mail: hf.awards@rsgb.org.uk, www.rsgb.org/operating/awards/

Training & Education
Steve Hartley, G0FUW, Chairman, Training & Education Committee, e-mail: tec.chair@rsgb.org.uk, www.rsgb.org/clubsandtraining/

VHF Matters
John Regnault, G4SWX, VHF Manager
E-mail: vhf.manager@rsgb.org.uk

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

HEADQUARTERS STAFF

General Amateur Radio Issues
E-mail: AR.dept@rsgb.org.uk
Telephone: 01234 832 700, Option 5

Amateur Radio Examinations
E-mail: exams@rsgb.org.uk
Telephone: 01234 832 700, Option 4

***RadCom* (news items, feature submissions, etc)**
Elaine Richards, G4LFM or Giles Read, G1MFG
E-mail: radcom@rsgb.org.uk
Telephone: 01234 832 700, Option 3

GB2RS and Club News
E-mail: GB2RS@rsgb.org.uk
Telephone: 01234 832 700, Option 3

Sales department
(Membership, books and other products)
E-mail: sales@rsgb.org.uk
Telephone: 01234 832 700, Option 1

Subscription renewals
Telephone: 01234 832 700, Option 2

IOTA
E-mail: IOTA_HQ@rsgb.org.uk
Telephone: 01234 832 700, Option 5

General Manager
E-mail: GM.dept@rsgb.org.uk
Telephone: 01234 832 702

HEADQUARTERS AND REGISTERED OFFICE

3 Abbey Court, Fraser Road,
Priory Business Park, Bedford MK44 3WH,
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Consultations
From time to time you will find we are consulting the Membership on aspects of Society policy. You can find current consultations at www.rsgb.org/consultations/

National Radio Centre
Don't forget to tell your friends about the National Radio Centre at Bletchley Park. Full details can be found at www.nationalradiocentre.com

Licensing & Special Event Stations
Licensing and Notices of Variation (NoVs) for special event stations are handled by Ofcom, 0207 981 3131, www.ofcom.org.uk

FAQs
The RSGB has compiled the questions most frequently asked by Members at www.rsgb.org/faq/

Band plan
The latest version of the band plan is always available on the website at www.rsgb.org/committees/spectrumforum/band-plans.php

Good Operating Practice
The RSGB fully supports the code of conduct and encourages all amateurs to read the advice. www.rsgb.org/tutors/pdf/good_operating_practices.pdf & www.rsgb.org/operating/ethics/docs/ethics_and_operating.pdf

RSGB Tech
The purpose of this service is to be the first port of call for technical queries on amateur radio matters. It is open to all radio amateurs. http://groups.yahoo.com/group/rsgbtech/

RSGB Shop
All RSGB goods - books, filters, clothing - can be purchased online at www.rsgbshop.org/

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Log in using your callsign ***in lower case*** as the user name and your Membership number, without the leading zeros (see your *RadCom* address label) as the password.
If you need to update your Membership details, please visit www.rsgb.org/myaccount/.

ONE FUTURE?

Stephen Slater, G0PQB

I read the article One Future for Amateur Radio (January 2014) by Prof Peter Cochrane. I have been a member of the RSGB since 1989 and an active radio amateur since 1991 and prior to that was a short wave listener for over thirty years and have been on the committee of my local radio club since 1991 in four different capacities, so I would like to think I know something about amateur radio. I am proud to be a radio amateur having passed the City and Guilds RAE course in 1990 some twenty five years after doing my GCE O levels rather badly and I am proud to be a Member of the RSGB.

This hobby, for that is what it is, has so many facets that one man's pursuit of the hobby may differ widely from the next man. But I fail to understand the point of Prof Cochrane's article; it seemed yet another opportunity to have yet another go at the 'dumbing down' of the hobby.

Whilst having a cup of tea at the Kempton Park rally in November, I started talking to a disabled M6 amateur who told me that this was the first rally he had ever been to and how amateur radio had made such a difference to his life, despite the fact he only had a dual-band handheld. This is what the hobby is about and you can use a handheld and get enjoyment, pleasure and purpose from it without getting bogged down in big words and lots of formulae.

Ross Bradshaw, G4DTD

The article started off quite well but then vanished into the realms of higher electronics, beyond the understanding of the run of the mill amateurs.

Amateur radio will *not* improve, there is too much competition from the internet, it will always steadily decline in the face of modern technology. Not only that, when I took my licence it was six half hour questions, then this was dumbed down with multi choice questions. Whereas we had one exam and the only difference between the Class A and B was the Morse test, without the Morse test we have *three* exams. To improve amateur radio we should go back to a single exam to get the licence, the licence could also be used as a qualification for those who wish to enter electronics or the IT field.

Prof Alex Shafarenko, Dip Phys, PhD, SM IEEE, M0SFR/G0T

I am writing with reference to the article by Professor Peter Cochrane. The article left me in the state of deep bewilderment despite the long list of its author's degrees, titles and the callsign at the end.

It is true indeed that our hobby is in the state of mild crisis (although as you would be aware new license applications are strong and growing). The crisis is more ideological than organisational: ham radio, *quo vadis*? And Peter is right to point out that long distance communication is not really a challenge in and by itself especially since the SDR technologies, tuneable and directional antennas and digimodes/advance DSP processing make it almost universally available to operators with little or no technological awareness and experimental skills.

However, it is a hobby and, as such, it is supposed to give its lovers the sense of fulfilment, empowerment and self-development.

So what does Peter suggest?

In short, two things: to experiment with short-distance, extremely-low-power under-the-thermal-noise wide-band communications. To what end? Merely to break records of such communications, demonstrate nanowatts per Gbit/s using intricate DSP and FEC techniques. And to boldly go where no pro has gone before? But this would require (as he himself surely realises and that he explains using himself as an example in the article) a professional approach. These things require good knowledge of DSP and coding theory at the very least, with all the attendant mathematics and research literature.

Here's what *amateur* radio is all about:

1. Community. Our hobby is to communicate with one another, we like this sort of thing: rag chewing, DXing, moonbouncing, etc. We collect contacts with rare stations in challenging conditions. We like unusual modes of communications that make it possible to communicate in a new way.
2. Sport. We develop skills that are not really practically necessary. Like the ability to read 25wpm Morse in a pile-up at 449 correctly. These skills just might be useful in an emergency when all else fails but there is still amateur radio. On the other hand, they may not. But certainly the sport side of radio is a lot of fun. It is strong and steadily growing.
3. Experimentation with propagation, antennas and modulation/coding. Electronics is a means to an end, not an end in itself or else *RadCom* would publish general purpose computer, audiophile or home automation circuitry *as well,* but it does not.

Peter's passionate article kind of assumes that our hobby is about No 3 entirely. And not only that, it calls upon our community to consider high-throughput, low-power, short distance communications primarily in the sub-centimetre microwave area exclusively. Because the communication technology will be pushing its boundaries mainly in this field. This means no community and no sport anymore. No communication either, since I can't imagine who I would communicate with sending terabytes per second over tens of metres – and what kind of signal report, QTH or any personal information I could pack into that extremely short QSO to make it last at least a millisecond at those speeds?

So what should be the future of amateur radio?

I think the sport side is safe, both for now and for many years to come. All those extremely challenging regimes such as SO2R requiring amazing operator skills will progress further and further just like any other sport where human limits are being constantly challenged. There is a whole unexplored area of digital contesting, extreme low power contesting, and there could be more elaborate versions of the team sport etc.

What about the society side? That is the real issue. Peter is right that society can now communicate over Skype and an internet chat much more easily than over the short waves and VHF/UHF. Soon enough the last remote village on Earth will have an internet connection and even the worst internet connection is probably orders of magnitude better than a radio channel – and is truly distance-independent.

However, several things are happily surviving the technological revolution in global telecoms:

i. DXpeditions and their chasers are as vibrant as ever, in fact probably more so these days than before when DX clusters were not as ubiquitous.
ii. QRP/P fun: the pursuit of thousands km/milliwatt is as hot now as it ever was, with lots of work towards propagation studies, digimodes and DSP. This involves communities such as Knights QRSS, G-QRP club etc.
iii. Communal use of amateur radio: xOTA groups such as JOTA, SOTA, CHOTA, etc are going from strength to strength using radio as a stimulus for engaging with a broader community. New xOTA communities will likely form in future.

DUMMY LOADS

Rob Dancy

An inexpensive but effective dummy load for the HF bands can be made using ten 500Ω one watt metal oxide resistors connected in parallel, bunched closely together, and wired to a coax connector with the shortest possible leads. One such dummy load has survived for many years and has not changed in resistance, though it has become somewhat discoloured.

Modern resistors can be run at surprisingly high temperatures – just don't touch them immediately after use. Most testing can be done at low power for just a few seconds. Generally you are either more or less right, or very wrong!

Steve Withnell, G0AIN

Ray Howes' letter 'Dummy Loads' brought back an experience I had as a new licence holder, G8JEH, around 1974. I was doing exactly as Ray described. I nearly jumped out of my skin when I heard "G8JEH, G3ORK, Steve you do know you are transmitting?"

The Last Word - Letters

Letters published in 'The Last Word' do not necessarily reflect RSGB policy. 'Last Word' letters may be e-mailed to radcom@rsgb.org.uk Please note that letters submitted for 'The Last Word' may not be acknowledged. The RSGB reserves the right not to publish any letter, with no reason being given. It is a condition of publication that all letters may be edited for grammar, length and / or clarity. Due to the limited space available, please keep letters as short as possible.

I was 5/5 over 10km away. Hardly DX, but clearly the dummy load was not dissipating all of the 10 watts of my 2m transmission. The dummy load was a cage of carbon resistors immersed in engine oil (!!!) and sealed in a small paint can with an SO239 connector fixed to the lid. Overheating was detected by the oil bubbling out of a small hole in the lid to prevent the lid blowing off. An interesting lesson for a beginner.

Tony Preedy, G3LNP

I share with your correspondent, Ray J Howes who writes in the February *RadCom*, a loathing of tuner uppers who wipe out my signal report at the crucial moment before the pile-up resumes calling a weak DX station. You can easily illustrate this by spotting a SSB station on the cluster and listening to the response of carriers that appear in his passband. However, lack of a dummy load is not always the problem because the offender may be tuning his antenna to make it look like the dummy load into which his radio had previously been tuned. The culprit is the designer of radios that produce a tuning carrier in the passband of the radio. An operator may easily eliminate this nuisance by either using the AM mode whilst tuning or by offsetting his frequency by the few hundred hertz of CW pitch necessary to put his tuning signal zero beat with the DX station. In this way we can, if we must, tune our antennas on the DX stations frequency with minimal annoyance to others.

Adrian Soane, MOABY

I agree wholeheartedly with G4OWY's comments on those who tune up. Unfortunately, I do not see how one can match a solid state transmitter into a multi-band doublet without the on-air use of an ATU. You can match the rig into a 50Ω dummy load if you want to, but the antenna will be anything but 50Ω. The problem can be minimised by careful use of an antenna analyser (if you have one) in conjunction with the ATU and carefully noting the *exact* settings for the desired frequencies. Do this when the bands are dead.

Nevertheless if the aerial has a high Q, it is almost inevitable that the settings will need tweaking to obtain a low VSWR and this can only be done on air. Be as quick as possible and tune on one side of the required frequency, but first ensure that there is not another station already there.

It is not easy and if anyone else can come up with a better solution, please tell us all.

2m TRANS-ATLANTIC BEACON

Geoffrey H Grayer BSc PhD, G3NAQ

The 2m 'Trans-Atlantic' beacon GB3WGI has been sited in Northern Ireland. In my opinion this is not the ideal location, considering the likely propagation modes. The *RadCom* article announcing the Brendan Awards **[1]** includes an extensive discussion of the propagation possibilities. My conclusion was that the most likely mode was Sporadic-E, as this has provided trans-Atlantic signals on the lower VHF bands (50 and 70MHz), and I have shown the existence of 2-hop 2m Es contacts **[2]**, and by the method of convoluting the local probabilities, that 3-hop 2m east-west contacts are theoretically possible [1, 2].

However, the path needs to pass through the region where temperate-zone Es is most likely to occur **[3]**. Inspection of a terrestrial globe will show that the great circle path from Northern Ireland passes quite far north, through a region where the probability of Es is extremely small. To avoid this one needs to go as far south as possible. Within the UK, I would have chosen the Scilly Islands but, given the choice, Finisterre or the north-west tip of Spain would be preferable, even if the distance is a little further.

If you doubt this, I suggest you take a look at the reception of the US 4m beacon in Europe, reported recently in *Dubus*. Among a number of reports, most are in the Mediterranean region, the most northerly report originating from the Channel Islands.

It is also true that if the alternative of a tropospheric duct is considered, this is far more probable in the warmer regions.

As a long time friend and collaborator **[4]** of the late Charlie Newton, G2FKZ, I am sorry to see his generous donation has not been given the optimum possibility of success.

[1] G H Grayer, G3NAQ, 'The Brendan Awards', *RadCom* June 1995
[2] G H Grayer, G3NAQ, 'VHF/UHF Propagation', Chapter 2, *The VHF/UHF DX Book*, ed I F White, G3SEK (RSGB 1995); Fig 2.34, p2-43
[3] See [2]; Fig 2.37, p2-46
[4] C Newton, G2FKZ, *Radio Aurora* (RSGB, 1991); see Foreword.

I was sorry to hear that you were disappointed with the Propagation Studies Committee's (PSC) decision to part-fund the GB3WGI 2m trans-Atlantic beacon in Northern Ireland, but I thought it might help to outline a few of the facts about the project.

Firstly, when PSC learned of the late Charlie Newton, G2FKZ's legacy of £1,000 we published a request for suitable projects in RadCom. *The result was that the only suitable project submitted was for the GB3WGI beacon.*

A detailed proposal was submitted for the GB3WGI project and its authors acknowledged that the most likely transatlantic path would be from the south, but felt this was already covered by the GB3SSS 2m beacon in Poldhu and other beacons further south (outside of the UK).

Unfortunately, GB3SSS was off the air at the time due to storm damage – and still is. I am currently in discussions with Poldhu ARC about seeing if it can be resurrected, but there are issues surrounding the fact it is on National Trust land.

PSC were asked to help with GB3WGI as the original intention of using a free US-supplied transmitter fell through when the shipping costs proved to be uneconomic. PSC then agreed to fund the project to the tune of £500 (and a UK transmitter was sourced) to get GB3WGI on the air as quickly as possible, which it has been since June 2013.

The difficulties of finding a suitable site, getting the antennas rigged professionally, providing a state-of-the-art driver, a transmitter, an emergency shutdown operator, and a free mains supply shouldn't be underestimated and I think the team did well to get the beacon up and running.

We still have £500 of the legacy left for a future project(s), plus potential access to other funds from the Foundation (RCF).

As I understand it there are plans to increase GB3WGI's power and while the beacon already runs the JT65B mode as well as CW, the longer-term plan is to investigate changing the type of JT mode automatically, based on the season and possibly meteor showers.

Recent reports from VHF manager, G4SWX, of MS-enhanced Es between northern Europe and EA8, means the GB3WGI team plan to investigate the possibility of MS-enhanced Es on more northerly Atlantic paths.

There have also been recent reports of combined meteor scatter/tropospheric propagation on 2m that could provide a path across the Atlantic at these latitudes.

However, I have taken on board your comments about a potential beacon further south, perhaps with Scilly/Gibraltar as a possibility, and we plan to discuss this at the Spring PSC meeting.

To quality for RSGB funding any additional beacon would need to be on UK soil, but I can assure you that GB3WGI is just one piece of a larger jigsaw puzzle in the quest to cross the Atlantic with two metres.

Steve Nichols, G0KYA
RSGB Propagation Studies Committee

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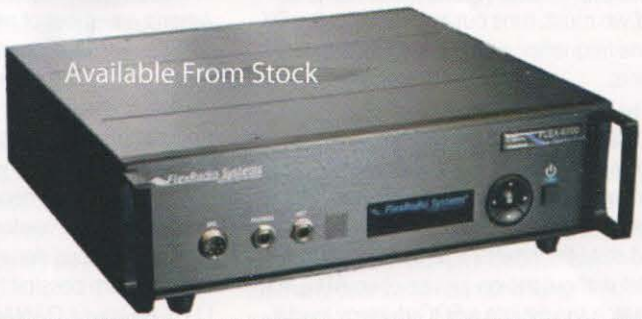

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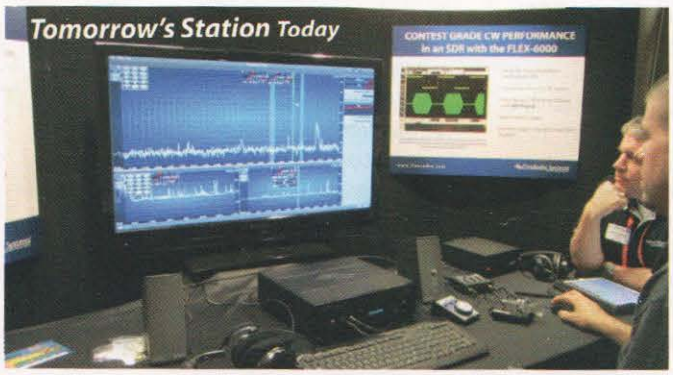

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KXPA-100 100W Amplifier

This amplifier covers 160m to 6m and delivers 100W output. It is designed for use with the Ekecraft KX3 or the Yaesu FT-817. The drive input is switchable between 5 or 10 Watts to suit either transceiver. There is also an optional internal auto ATU available. For a KX3 the is now a PA to KX3 (KXPACBL) **£32.95b**

KXPA-100F Built £749d **KXPA-100K Kit£699d**
KXPA-100AT-F Built £1098d **KX(A-100AT-K £998d**

KPA-500 600W Amplifier

The KPA-500 covers the bands 160m to 6m and delivers 600W with a drive level of aroound 30W. It can be used with any transceiver and features auto band switching through RF sensing. It has a built in AC supply and is the same sixe as the K3 transceiver. This is a great solid state design with full protection. No warm up and capable of full QSK switching.

KPA-500F Built £2199d **KPA-500K Kit £1999d**

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

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