

# Practical WIRELESS

*Britain's Best Selling Amateur Radio Magazine*

## Rig Review

**Alinco DJ-V17E**  
hand-held  
transceiver

**Universal**  
antenna

**Miffed by Smith?**

**2008 PW QRP**  
Contest details

**What Next?**

## Special Offer

**Save on a**  
**SOTA Beam**  
**Antenna**



## Kit Review

**Build an**  
**Elecraft K3**  
transceiver  
kit and get  
something  
special!



R 19





# WATERS & STANTON



**SCOTTISH STORE • W&S @ JAYCEE, 20 WOODSIDE WAY, GLENROTHIES, FIFE KY7 5DF -CLOSED MONDAYS**

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**New Hockley D-Star Repeater GB7SS! Rx 439.8625 Tx 433.2625**

**Waters & Stanton Eighteenth Annual**

## HOCKLEY OPEN DAY



Our Massive Open Day gives you bargains galore! FREE food & drink plus raffle. Support from Yaesu, Icom, Kenwood & Repeater groups.

**SUNDAY 25th MAY 2008**  
From 10am

**FT-450**

**NEW**



160m - 6m 100W  
SSB CW AM FM  
IF DSP  
Voice Memories  
23 x 8.4 x 22 cm



Also get voice recorder and announcer!

**W&S**  
**£529 D**

**Deal: Get FREE Extra DC Lead! Exclusive to PW Readers - Request when ordering**

**FT-450AT with Built-In ATU £609 C**

**FT-950**

**NEW**



100W  
160 - 6m

**W&S**  
**£999 D**

DSP filtering, incorporating features such as Variable Bandwidth, IF Shift, and Passband Contour tuning. Digital Noise Reduction and Digital Auto-Notch Filtering. On transmit you get a three-band graphic equaliser and the ability to change the transmit SSB band-pass. There are plenty of other features which you will get from the Internet. What you won't get elsewhere is our offer to PW readers!

**Deal: Get FREE W-25XM power supply worth £99 when you buy FT-950 from W&S. Offer to PW readers only at time of order.**

These Yaesu offers expire 31/5/08

**PAY NOTHING FOR 12 MONTHS**

**BUY NOW PAY LATER AT ALL 3 STORES**



**AVAILABLE ON ALL SALES OVER £200**



On most items over £200 in value it is now possible to buy with a finance agreement and pay nothing for 12 months without incurring ANY interest charges. If paid in full within 12 months then a £29 settlement fee is payable. **Typical example** of Buy Now Pay Later: Cash price - £600. Pay no deposit and pay the full amount in 12 months. **Pay no interest - just £29 fee. OR - 29.8% APR** - Then repay £30.85 per month for 36 months. No settlement fee. Total amount due £1110.60. Interest is calculated from date of agreement. All finance is subject to status - written quotation on request.

**NEW Icom IC-7700 HF Transceiver**

• 1.8 - 54MHz up to 200W PEP • SSB CW FM AM

Icom have produced a realistically priced transceiver based on the IC-7800 technology. Dual DSP units form the heart of the design. The rx. front end has a preselector and boasts 40dBm i.p. that equals the IC-7800 at twice the price! The 7" colour LCD panel is truly amazing in clarity. The spectrum scope allows close signal and band monitoring. Includes built-in PSK31 and RTTY and FREE IC-7000kbd keyboard - no PC needed! Other features: IF notch, professional grade 6m rx, digital voice recorder, dual USB ports, auto atn etc.

**Exclusive - get FREE IC-7000kbd with matching lead for instant RTTY/PSK31**



**In Stock!**

**£3995 C**

**Exclusive W&S Offer!**

**YAESU**

**FT-897D+**

**Crazy Price! Save £100!**

\*HF + 6m, 2m, 70cm  
\*CW, SSB, AM, FMN, FMW, PACKET, DIGITAL  
\*HF/6m 100W, 2m 50W, 70cm 20W



The FT-897D+ is exclusive to W&S and comes with dual DC leads making it the ideal base portable radio.

**STOCKS LIMITED**

**W&S**  
**£469 D**

**FT-2000**

**YAESU**

1.8-30MHz +6m 100W

**£1695 D**

**FT-2000D 200W**

**£2399 D**

The FT-2000 series has become the DXpedition favourite. With front end preselector and dynamic range, it handles crowded bands with ease. You can dial in selectivity right down to 25Hz. Transmitted audio quality can be adjusted over an enormous range via the built in DSP. And if you opt for the FT-2000D, it is almost having a 2 el. Yagi for FREE.

**PART EXCHANGE? We take in almost any ham gear - even old clunkers!! Give us a call TODAY**

**FT-857D**



\*Tx: 160-6m(100W), 2m(50W), 70cm(20W)  
\*USB, LSB, CW, AM, FM (WFM Receive)

**W&S**  
**£479 D**

**FT-DX9000D**



Yaesu's top radio series of transceivers for the ultimate experience!

**FT-DX9000Contest £3799 D**  
**FT-DX9000MP £8299 D**

**FT-817ND**

\*TX: 160-10m, 6m, 2m, 70cm  
\*USB, LSB, CW, AM, FM, WFM, Digital (AFSK), Packet (1200/9600 FM)



**Deal: bhi DSP fitted £449**

**W&S £349 D**

**Get Ready For D-Star!** (first repeater at Herne Bay)  
Log on to GB7WW repeater at Hockley

**ICOM IC-E2820**

This dual band mobile offers D-Star facilities with digital speech as well as normal FM at 50W

**IC-E2820 Mobile FM £379 C**

**IC-E2820 with D-Star £519 C**



**PW customers can claim an extra DC lead when ordering!**

**IC-E91**

Fitted with D-Star

**£349.95 C**



**D-Star Repeater** - Low cost subsidised Icom repeater available to clubs when purchasing D-Star Radios from us. Phone for details.

**TM-V71E**

**NEW**

**KENWOOD**

EchoLink Memories & NODE Terminal  
50W on 2m & 70cms!

**W&S**  
**£269 D**



**FTM-10R/E**

**NEW**



**Bluetooth**

**W&S**  
**£249 D**

New 2m/70cm Mobile with Bluetooth option  
\*50W 2m 40W 70cms  
\*Removeable front  
\*Built-in PTT & Microphone!  
\*Size: 11 x 3.7 x 17 cm

**Deal: FTM-10E with Bluetooth Adaptor (BU-1), Headset (BH-1) & Charger (CAB-1) Total List Price £382 Offer Price £279.95 D**

**IC-7700**

**NEW**



\*160m-6m \*200W \*SSB CW AM FM \*40dBm Intercept \*7" Colour TFT Spectrum Scope

Billed as a Contest Radio, the design takes features from the IC-758 & IC-7800 to give you a transceiver packed with features. Available February.

**Deal: NC-4 Headphones FREE**

**W&S**  
**£3995**

**IC-7800**

Icom's greatest HF transceiver ever. Invest in the best! 200W HF Built-in PSU



**Deal: SP-120 Filter Spkr FREE**

**W&S £6400 D**

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



# Orderline



01702 206835

# Online Catalogue



www.wsplc.com

# UK's Lowest Prices



Zero Deposit  
Zero Interest



**FREE!** Get this AM - FM  
LW MW SW Airband & VHF  
Radio FREE when you buy any New  
Icom, Yaesu or Kenwood HF transceiver  
on these pages. You must quote this  
advert when ordering - whilst stock lasts.

## NC-2 & NC-4 NOISE CANCELLING HEADPHONES!



\*32 Ohm Imped \*Supply:  
1x AAA \*3.5mm Jack Plug  
\*Lightweight

**£14.95 C**



\*32 Ohm Imped \*Supply:  
1x AAA \*3.5mm Jack Plug  
\*Folding Design

**£14.95 C**

## TS-2000



- \*100W All-mode
- \*160m - 70cms
- \*Duplex operation
- \*Satellite ready
- \*DX cluster QSY

The TS-2000 offers all-band  
coverage in one very neat &  
effective high performance system.  
This is one of the best buys in ham  
radio. Add our W-25AM 13.8v supply  
(£89.95) and you are ready to go.

**W&S**

**£1295 D**



**TS-480SAT**

100W HF+6m **£679 D**

**TS-2000X** with 23cms

**£1599 C**

## IC-756PROIII

**ICOM**



HF + 6m  
100W  
All-Mode

**W&S £1749 D**

## IC-756PROIII Special Deal

- IC-756 Pro III
- + SM-20 Desk Mic
- + NC-2 Noise cancelling 'phones
- + W-25AM power supply
- + Spare DC lead

**Only £1829 D**

## IC-7000

**ICOM**



HF/VHF/UHF  
All-Mode  
Transceiver

**W&S £799 D**

**Deal2: With TFT PAL TV Screen £989**

**Deal3: With TFT + Power-Mite PSU £1009**

## IC-7400

**ICOM**

HF - 70cms 100W transceiver plus  
SP-21 spkr and SM-20 mic

**£1295**

**IC-718** HF 100W transceiver **£439**

## IC-706IIGDSP

**ICOM**



HF/VHF/UHF  
100W  
Transceiver

**Deal: IC-706 + New  
Power-Mite-NF FREE**

**W&S £649**

## IC-703DSP

**ICOM**



10W QRP  
HF-6m built-in  
Auto ATU + DSP

**W&S £449.95 D**

Visit our eBay shop for more bargains!

**eBay**

Go to  
www.wsplc.com  
& click on the link  
to our eBay shop

## KENWOOD



Exclusive to Waters & Stanton!

## Radiomate NEW

For **YAESU**  
Keyboard  
For FT-817,  
FT-857 & FT-897



Rig not included!

- \* Direct frequency entry
- \* Mode change
- \* Carrier tune mode
- \* VFO A/B
- \* 20 Memories
- \* Self-Powered

**£99.95 C**

## bhi DSP Noise Cancelling

## NES10-2 MkII



Speaker and  
programmable DSP unit.  
Offers dramatic noise  
reduction.

**£99.95 C**

## ANEM

"Noise Away" Amplified  
Noise Elimination Module.  
Fits in-line between the  
equipment & speaker.



**£124.95 C**

## NEIM-1031

Noise Eliminating  
In-Line Module.



**£139.95 C**

## NEDSP-1061-KBD

Noise Eliminating DSP module designed  
for retro-fit in a number of transceivers,  
FT-817, TS-50, IC-  
706MkII, FRG-100,  
DX-77. With Keyboard.



**£99.95 C**

## NEDSP-1062-KBD

Noise Eliminating DSP module  
simply fits into Loudspeaker  
path, features a small  
keyboard to control  
functions.



**£104.95 C**

## Icom VHF/UHF Mobile/Base

### IC-E208

Dual Band FM Mobile  
\*144-146MHz, 430-  
440MHz Tx \*55/50W (3 pwr steps each  
band) \*Wideband Rx 118-173,  
230-549 & 810-999MHz



**£219.95 D**

### IC-910H

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

**£1089 D**

### IC-910HX

As Above but with 23cm Module ready  
fitted and a big saving as well.

**£1239 D**

### IC-2200H

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

**£179.95 D**

### IC-2725E

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

**£279.95 D**

## Kenwood VHF/UHF Mobiles/Base

### TM-271E

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



**£149 D**

### TM-D710E Low Price

Dual band APRS 50W FM

**£399 C**

## Yaesu VHF/UHF Mobiles/Base

### FT-7800E

\*2m/70cm Dual Band  
Mobile \*High power  
50W 2m /40W 70cms  
\*Wide receive inc. civil & military airband  
\*CTCSS & DCS with direct  
keypad mic. \*1000 memories



**£169 D**

### FT-1802E Low Price!

\*2m FM Mobile transceiver \*5,10,25,50W

**£99 D**

### FT-8800E Low Price!

\*2m/70cm Dualband FM Mobile transceiver

**£219 D**

### FT-8900R Low Price!

\*2m/70cm/6m/10m Quadband FM Mobile

**£249 D**

## Yaesu ADMS Software

**Programming Software For Your Radio**  
Programme Memories and all your radio's  
functions from your PC. Includes Windows  
software and serial lead with adaptor for your Radio.

**ADMS-1 F** for VX-110/150 / **ADMS-1 G** for VX-7  
**ADMS-1 H** for VX-2E / **ADMS-1 J** for FT-60E  
**ADMS-2 H** for FT-8900 / **ADMS-2 I** for FT-8800  
**ADMS-2 J** for FT-2800 / **ADMS-2 K** for FT-7800  
**ADMS-3** Programming Kit for VR-500  
**ALL £39.95** with FREE PC Radio Data Lead.

**ADMS-4A** for FT-817 & **ADMS-4B** for  
FT-857/8 **BOTH £29.95** both these items require  
a separate CT-62 lead at **£29.95**

## IC-E92 NEW ICOM

2m/70cm Handheld with  
Built-in DSTAR



- \* 144-146MHz /  
430-440MHz
- \* FM FMN WFM AM  
(Rx) DV
- \* 5W/2.5W/0.5W/0.1W
- \* 1304 memories
- \* 100 scan ranges
- \* Rx range  
0.495kHz-999.9MHz
- \* CTCSS, DTCSS, DTMF  
Includes antenna, and  
charger.

A fully fledged digital  
radio using D-Star as well  
as traditional dualband.

**W&S  
£299.95 C**

## Icom VHF/UHF Handhelds

### IC-E91 D-Star Ready

Latest dual-band handheld  
transceiver. receiver that covers  
0.495 to 999MHz.



**£239.95 C**

### IC-E91 with D-Star

**£349.95 C**

### IC-V82 7W 2m Digital

**£159.95 C**

### IC-U82 70cms Digital

**£159.95 C**

### IC-E90 6m/2m/70cm

**£199.95 C**

### IC-T3H 2m 5W

**£129.95 C**

### IC-E7 2m/70cm Wide Rx

**£89.95 C**

## Kenwood VHF/UHF Handhelds

### TH-F7E

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



**£199.95 C**

### TH-K2E 2m 5W

**£99 C**

### TH-K2ET 2m 5W FM

**£145 C**

### TH-K4E 79cm 5W FM

**£139 C**

## Yaesu VHF/UHF Handhelds

### VX-7R (Black)

**Limited Special Offer**

Totally waterproof. Wide  
frequency coverage  
500kHz-900MHz AM/FM.



**£209 C**

### VX-6E 2m/70cm wide rx 5W

**£169 C**

### FT-60E 2m/70cm wide rx 5W

**£129 C**

### VX-120 2m 5W w/8-key pad

**£99 C**

### VX-170 2m 5W w/16-key pad

**£99 C**

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



# WATERS & STANTON

General Enquiries



01702 204965

UK's  
Lowest  
Prices

Online Catalogue



www.wsplc.com

## AirNav RadarBox

It Feels Just Like Being a Controller!

Direct 1090MHz  
Reception

**New 2008 Version!**  
**New Low Price!**

- \*Watch The Action Live From Home!
- \*Real-Time Radar Mode-S & ADS-B Decoder
- \*Zoom Worldwide to Runway level!
- \*Network Your Station With Others.
- \*Self Powered From USB Port. Plug and Play
- \*Centre map on your Home - Direct Reception
- \*Everything You Need Apart From The PC!

### NEW < RADAR-RAMA EXTERNAL 1090MHZ ANTENNA

These two antennas give you a choice of performance and out-perform anything similar. Both are fitted with "N" type connectors.

**Radar-Rama** £49.95 C  
**Radar Extender** £79.95 C

### RADAR-EXTENDER > 1090MHZ GAIN ANTENNA

**Includes Software, Receiver, Antenna & Leads.**

Also available from AOR UK, Lam Communications, Transair (UK)Ltd, Radio World, The Aviation Shop, Pooleys Flight Equipment, ML&S



**£399.95**

We are exclusive distributor for world sales

**AirNav Systems**  
The Most Trusted Name In Flight Tracking

**WATSON**

Official Distributer  
UK's Lowest Prices

### Power-Mite-NF

NOISE OFFSET POWER SUPPLY



22 Amps of continuous power output with variable voltage plus the new Noise Offset Function (NF). This allows you to move any noise spikes out of the ham band with the front panel tuning control.

**W&S £59.95 C**

### W-25AM WATSON POWER SUPPLIES



25A Variable Power Supply.  
\*Output Voltage 0-15V DC \*Output Current 25A (30A Peak) \*Over Current Protected \*Dual Meters \*3 sets of Terminals \*Cigar socket \*Front Panel Fuse \*Supply 230V AC 50Hz

**W&S £89.95 D**

**W-3A** Output 3A, 13.8V DC, supply 230V AC **£22.95 C**

**W-5A** Output 5A, 13.8V DC, supply 230V AC **£29.95 C**

**W-10AM** Output 10A, 0-15V DC, supply 230V AC **£59.95 D**

**W-25XM** Output 25A, 9.7-17V DC, Dual meters **£99.95 C**

**W-30AM** Output 30A, 0-15V DC, Dual meters **£119.95 D**

**W-25SM** Output 22A, 13.8V DC, supply 230V/115V AC **£79.95 C**

### DM-15W 15W DUMMY LOAD



Ideal for testing handhelds and lower powered transceivers. \*Range DC-600Mhz \*Power 15W (20W CW) \*VSWR 1:1:1 \*Connector PL-259 \*50 Ohms Impedance \*Size 34x72mm \*Weight 76g

**W&S £15.95 A**

### Power-Max-25-NF

NOISE OFFSET POWER SUPPLY



This very compact base station supply delivers 22 Amps of continuous power with the new Noise Offset Function (NF) that moves noise out of the band. Includes cigar socket.

**W&S £89.95 C**

### Bargain Price Antennas



#### Pre-tuned & Weather Sealed Fibre-glass encapsulation

**W-30** 2m/70cms 3/6dB length 1.15m 150W SO-239 **£29.95 C**  
**W-50** 2m/70cms 4.5/7.2dB length 1.8m 150W SO-239 **£39.95 C**  
**W-300** 2m/70cms 6.5/9dB length 3/1m 150W SO-239 **£49.95 D**  
**W-2000** 6m/2m/70cms 2.15/6.2/8.4dB length 2.5m 150W **£59.95 C**

### Mobile Whips Bargain Prices



Watson mobile antennas are made to a high specification and employ stainless steel whip sections with SO-239 receptors. All models are pre-tuned and will withstand at least 100 Watts RF.

**Watson - the name you know!**

**W-2LE** 2m 0dBv length 0.48m **£9.95 C**

**W-285** 2m 3.4dBv length 1.33m **£12.95 C**

**W-77LS** 2m/70cm 0/2.4dBv length 0.43m **£10.95 C**

**W-770HB** 2m/70cm 3/5.5dBv length 1.1m **£16.95 C**

**W-7900** 2m/70cm 5/7.5dBv length 1.58m **£24.95 C**

**W-627** 6/2/70cm 2/4.5/7.2dBv length 1.6m **£27.95 C**

### QS-112 HANDHELD SPEAKER MIC



Handheld Speaker Mic available in 4 different models. \*PTT Side Button \*Curly Cord \*Electret Insert \*High Quality Speaker \*Compact & Lightweight.

**W&S £16.95 A**

### WEP-601 HEADSET WITH BOOM MIC

Adjustable Headset with Boom Mic. \*Heavy Duty \*Swivel Boom \*Earbud type Earpiece \*PTT In-Line Switch \*Choice of Connectors \*32 Ohm Earpiece

**W&S £19.95 A**

### SP-160 COMPACT MOBILE SPEAKER



\*8 Ohms \*Power rating 1.5W \*3m of lead \*Fitted 3.5mm mono jack plug \*Adjustable mobile mount \*Size 97x67x27mm \*Weight 165g

**W&S £9.95 A**

### SP-170 COMPACT MOBILE SPEAKER



\*8 Ohms \*Power rating 1.5W \*Volume Control \*Switchable Filter \*3m of Lead \*Fitted 3.5mm mono jack plug \*Adjustable mobile mount

**W&S £12.95 A**

### WD-24 / WD-25 DUPLEXERS



**WD-24** SO-239 Socket & 2x PL-259 Plugs. Port1: HF + 6m + 2m Port2: 70cm  
**WD-25** SO-239 Sockets Port1: HF + 6m + 2m Port2: 70cm  
**WD-24** **£22.95 A**  
**WD-25** **£24.95 A**

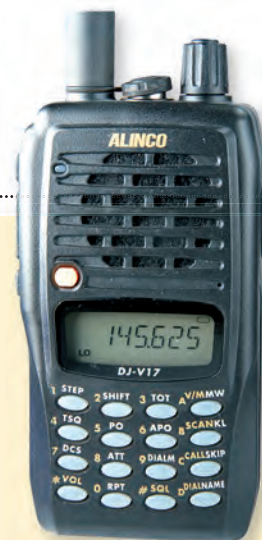
**Carriage Charges: A=£3, B=£4, C=£6.95, D=£10, E=£12**





# contents

Volume 84, Number 6, Issue 1214. On sale 8 May 2008



17

## 6 Keylines

**Rob Mannion G3XFD** discusses problems with radio controlled clocks.

## 7 Readers' Letters

These pages give you a chance to air your views and comments.

## 9 News

**Elaine Richards G4LFM** brings you product news and happenings of interest within the hobby.

## 13 Rallies

Find out when the next rally is in your area.

## 17 The Alinco DJ-V17E Review

**Richard Newton G0RSN** takes a good look at this quality hand-held for the 144MHz band.

## 20 The Universal Antenna

**Roy Walker G0TAK/2E1RAF** describes his most enjoyable antenna – a dipole 'cut' for the operational frequency.

## 26 Elecraft K3 Transceiver Kit Review

**Geoff Cottrell G3XGC** had to wait a long time to get his K3 transceiver but it was worthwhile!

## 32 Miffed By Smith – Antenna Workshop

**Ray Fautley G3ASF** says that Smith Charts needn't be difficult to understand in part 2 of his look at the 'dreaded charts'.

## 35 PW QRP Contest 2008

Details of the 25th Annual *Practical Wireless* G4HLX 144MHz QRP Contest.

## 40 Carrying On The Practical Way

**Rev. George Dobbs G3RJV** looks into methods of tuning without using variable capacitors and ends up playing with a lipstick case!

## 44 Technical for the Terrified

**Tony Nailer G4CFY** aims to dispel the terror, myths and mysteries lurking inside phase locked loop synthesiser circuitry.

## 47 Valve & Vintage

**Phil Cadman G4JCP** dons his brown dust coat and amongst the valves there are some transistors too!

## 52 Club News

**Elaine Richards G4LFM** brings you news of club events and meetings in your area.

## 54 What Next?

**Colin Redwood G6MXL** has advice for anyone new to portable operating – come rain or shine!

## 58 VHF DXer

This month **David Butler G4ASR** has details of how to catch Sporadic-E openings on the v.h.f. bands.

## 62 HF Highlights

**Carl Mason GW0VSW** brings you up to date with the latest news on the h.f. bands.

## 66 In The Shop

**Harry G3LLL** chats about tackling valve heater switching problems and oscillators – mechanical and electronic!

## 68 Save Money on a SOTA Beam 144MHz Antenna

*PW Readers' Offer.*

## 71 In Vision

**Graham Hankins G8EMX** turns his lens and looks into the ATV scene.

## 72 Traders' Tables

## 74 Classified Adverts

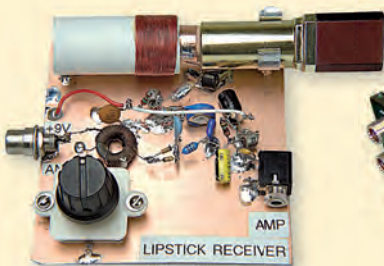
## 75 Bargain Basement

## 76 PW Publishing Bookstore

## 80 Subscriptions

## 81 Topical Talk

**Rob Mannion G3XFD** discusses last month's Keylines, a letter about callsign use and another praising the 'true' spirit of Amateur Radio.



40



26



68 Special Offer

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**Rob Mannion's**

# keylines

Rob discusses his radio controlled clock and the Leicester Show.

**N**owadays, many radio hobbyists need an accurate time source, or some method of ensuring that the various clocks and timers we seem to have in abundance today, are accurately set. This is because most of us have equipment or systems in the shack that require precise timing to be achieved and maintained. My main requirement is for an accurate time checking source to enable the setting of the timing on my prototype *PW* International Beacon Clock – the version employing 18 light emitting diodes (l.e.d.s.) – to indicate the time when each of the 18 beacons is due to transmit.

Over the years I've required an accurate time-checking and setting source, the very accurate clock available on the BBC teletext service has been invaluable. It's proved to be most reliable from the Rowridge Band IV transmitter on the Isle of Wight, although I'm not sure what's to happen when the analogue transmissions cease sometime in the future, because of the replacement digital system's 'latency'.

Latency is the term used for the inherent delay caused by the digital encoding and decoding processes. Incidentally, I have checked the accuracy of the teletext clock when compared to a clock working with the 60kHz transmissions from the now closed Rugby MSF transmitter. As the teletext clock proved to be reliable and accurate, and will probably continue to do so up until the time the analogue system is shut down or replaced, I'll continue to set a stop watch while watching TV, before setting my IBP clock when I go into the shack.

Of course, the other main method we all tend to use for accurate time-keeping checks are the ubiquitous 'radio controlled' clocks that now receive the 60kHz time signals from the new GBZ callsign transmitter in Anthorn, Cumbria (adjacent to the Solway Firth), not far from Carlisle. However, unlike the previous time signal service from the much lamented British Telecom International's transmitter at Rugby, Warwickshire, I've found that the new service (provided by **VT Communications** on behalf of the **National Physical Laboratory**) from the GBZ Anthorn transmitter to be less-than-reliable at my home on the south coast of England.

The larger radio controlled clocks in my

shack and in the house re-set themselves to British Summer Time (BST) with few problems. However, the smaller radio controlled clocks in the house obviously didn't receive the re-set signals from the new Anthorne transmitter and I had to remove the internal batteries and place them on a north facing window sill before they re-set correctly. This is because the very low frequency (VLF) signals are prone to interference from television and computer timebases and switch mode power supplies.

Unfortunately, even when I've seen them re-set accurately, I've found that the various clocks cannot be relied on to be set to the correct time during the day (particularly) when there can be a noticeable difference of several seconds. Because of this I've recently been relying on the terrestrial television teletext service and I would be very interested to hear from anyone else who has experienced similar problems as I'm sure that it's not an isolated problem.

## Eddystone EA12 Receiver

I've recently spring-cleaned my shack, and over a period of weeks as I went through the entire shack, I found much of interest – including the Eddystone EA12 owner's handbook. I sold this receiver to another Amateur several years back at an event in the north west and I would be pleased to send it to the new owner, who will remember where and what we were doing at the time!

I would be grateful if any friend of the new owner could pass on my request to contact him as I promised him that the book would turn up eventually!

## Leicester Show

I was absolutely delighted when the **Leicester Amateur Radio Show** organisers confirmed – on the 4th of April – that the 37th show will take place at Donington Park on **Friday 24th and Saturday 25th of October**. The LARS Committee have done their utmost to avoid a weekend that clashes with motor racing and I'm really looking forward to meeting and chatting to anyone who missed this vital show last year. I'll be waiting for you!

**Rob Mannion G3XFD/EI5IW**

## Practical Wireless

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In general all components used in constructing PW projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

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### Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by PW, then please write to the Editorial Offices, we will do our best to help and reply by mail.





# readers' letters

The Star Letter will receive a voucher worth £20 to spend on items from our Book Store or other services offered by *Practical Wireless*.

## Two Letters Of Callsign Only?

**Dear Rob,**

I hope I'm not wasting your time on a subject you may not find very important but I just had to E-mail you about the rising practice of sending two letters of a callsign when calling a DX station!

I have checked with Ofcom and **it is a contravention** of the UK licence to send other than full calls. It also seems to me that it is only European stations that do this, all other countries I have checked with during QSOs tell me that it's also forbidden by their administrations also.

You know it does put us at a disadvantage when calling as by the time we say GXXXX the other calling station says XX ( the last 2 letters of their call ) the dx station has already answered them!! and lot's of expedition station actually encourage this practise which doesn't help!

I have talked about this to Ofcom and the RSGB and all I seem to get in reply is "well it seems to be accepted practice now and would be difficult to stop" What an answer! Please use your influence Rob and see what can be done!

Thanks for letting me bend your ear Rob! I love the new format of the magazine and have been getting *PW* for over 50 years now, keep up the good work, 73 to all, especially your design department.

**Mike Baker G3TMB**  
**Southport**  
**Lancashire**

*Thanks for your comments Mike.*

*Please join me on the Topical Talk page for further commens. Rob G3XFD.*

## The True Spirit Of Amateur Radio!

**Dear Rob,**

After many years of faithful reading of *Practical Wireless* (I still remember building a 'one valver' from a *PW* blueprint sheet!), I have finally put pen to paper to write this letter to you!

## Star Letter

### Copyright & The Internet

**Dear Rob,**

I fully agree with your comments (Keylines May 2008) regarding Internet problems. The very nature of the internet makes it all too easy to help oneself to a picture, text, or a circuit drawing without giving a second thought to intellectual property issues! Although internet users may get away with it here or there, it's illegal. Although there are exceptions, picture copyright belongs exclusively to the photographer. The moment it's used publicly or republished in any way is when the trouble starts. The problem – unfortunately – goes much deeper than an odd picture or section of text.

On the Amateur Radio scene, there's currently a dispute rumbling over the copying of a complete website dealing with a special topic. A particular organisation, under what many saw as a flimsy ownership pretext, copied the website of a well known event claiming it as their own property. On the surface, it looked very much like an attempt to take over the event, lock, stock and barrel without any apparent legal, ethical or moral consideration whatsoever. A number of unconvinced 'old-timers' promptly resigned – including official representatives from Europe, Australia and South America. Suffice to say there are now two very similar websites claiming to be genuine!

Before anyone rushes off with the idea of copying a website for themselves – beware! It's a minefield and really not worth it. However remote it may seem, someone, somewhere will soon spot what's going on or a copyright infringement. Walking a legal tightrope introduces a very real risk of an expensive and destructive national or international court appearances.

Even the innocent can get caught up in legal wrangles. I know of a case where one photographer sued another for publishing a photograph taken at a high profile civic event some years ago. In the ensuing court case it was found there were two identical photographs with very minor differences. It seems both photographers stood side by side at the front of the crowd and took their pictures from the same angle at exactly the same time.

Radio Amateurs, short wave listeners and other electronics enthusiasts are renowned for their exemplary examples and good attitudes. Let's keep it that way. Although international laws do not cover the issues anywhere near adequately enough, in my humble opinion, we should make every effort to respect the intellectual property of others legally, morally and ethically. If Amateur Radio did not promote international friendship and goodwill in the way it does, I'm quite sure many enthusiasts would hang up their headphones!

**Peter Leybourne MM5PSL**

**Virkie**

**Shetland Islands**

*Thank you Peter. Please join me on the Topical Talk pages. Rob G3XFD.*



There have been times in recent years when I have read letters with moans and groans about the hobby "going down the drain" and the "general quality of operating deteriorating", etc., etc.

Well I am here today to tell you otherwise! One of the greatest personal joys for me has been making friends on the air. Over the past few years I have been part of a net on 80 metres and got to know some of the regulars quite well. We sometimes talk technical but also enjoy a good laugh together!

A while ago due to personal circumstances I was forced to "cut my cloth" and eventually this inevitably led me to have to part with my cherished transceiver! Ah well.. I thought. I can always buy a cheaper radio. I did so but sadly after a couple of weeks it broke down and proved too expensive to repair. So I was radio-less! Ah well, I thought. I E-mailed my friend to say that I would be off the air for some time due to my circumstances.

But the word got around and one evening I received a phone call from my friend **Steve M5STC** and he said "Pete I have got a radio for you which you can use for as long as you like..it belongs to my friend **Jim M3ZHI**..I will post it of to you next week". It was like a breath of fresh air! Thanks to them I will soon be back on air again! So stop moaning and groaning my friends and spread the word – the Amateur Radio Spirit still lives on!

Thanks Steve and Jim for your help and to Rob and staff for a great magazine! All the best and 73!

**Pete G4HAK**  
**Ramsgate**  
**Kent**

*The true spirit is always there Pete – it often breaks through the QRM coming from moaners! Well done to everyone involved! **Rob G3XFD**.*

### **Come Back Rugby Clock**

**Dear Rob,**

While Rugby was providing the 60kHz time transmission I never had any problems with my 'radio controlled' clock. But now that the transmitter is way up north – none of our large radio controlled clocks reset themselves

to British Summer Time! Is it just my location down here in Cornwall or is it a general problem? Best wishes to everyone at *PW*.

**Mike Sawyer**  
**Falmouth**  
**Cornwall**

### **Rugby Clock**

**Dear Rob,**

Having chatted to you and **Stan Brown G4LU** at the Leicester Show regarding the old Rugby 60kHz transmitter site several years ago, our friendly chat came to mind when the radio controlled clocks at my home failed to reset to British Summer Time at the end of March!

I remember Stan G4LU telling us about the problems they had with the fire at Rugby during the Second World War – but they kept the service going under very difficult conditions when the country needed a reliable wireless telegraphy service!

I now understand – thanks for your reply – that you've also had problems with your radio clocks and I hope that the service from Anthorn near Carlisle will become as reliable as that from Rugby! In closing, I thank you for up-dating me on Stan G4LU's health and I hope he'll make it up to the Leicester show again some time. Best wishes to everyone.

**Ron Harding**  
**Wells**  
**Somerset**

### **Clock Problems!**

**Dear Rob,**

Thanks for reply to my E-mail! I was rather relieved to find that you were also having problems with your radio controlled clocks up there in Dorset. Here on the edge of Dartmoor I've found that my radio clocks didn't reset this year. I wonder how many other readers are finding problems with the new 60kHz transmitter in Cumbria? I hope the situation can be resolved as many of us need a good source of accurate time.

I'll certainly try the method you suggested – using the BBC1 teletext

### **Send your letters to:**

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clock – but for how much longer will we have this useful service for I wonder? Best wishes to the *PW* team and thanks to your Art Dept. for the new look pages.

**Ron Goodyear**  
**Tavistock**  
**Devon**

### **Radio Clocks**

**Dear Rob,**

I was sorry to find out, when I first E-mailed you, that you too had radio controlled clock problems at the beginning of British Summer Time. When the radio clocks should have gone forward an hours none of our large clocks reacted. In your E-mail back to me I was surprised that you had the same problem because I thought it might have just been a problem here.

I have noticed that during the day one of my radio clocks seems to gain time. Perhaps this is when the 60kHz transmissions from the new transmitter are at their weakest?

My youngest daughter who lives just north of Exeter said that they had the same problems and it seems that some of her class (she's a teacher) and the other teachers had problems too. Perhaps you might hear from other readers with the same problems? Regards to you all.

**Steve Tanner**  
**Crewkerne**  
**Somerset**

*It seems as though I wasn't alone in having problem with my radio controlled clocks! I invite interested readers to join me on the Keylines page where I discuss the problems I've come across. In replying to Ron Harding. I'm pleased to say that when I last spoke to Stan Brown G4LU, he was recovered well from his stroke and I'm also looking forward to meeting him again the the Leicester Show. **Rob G3XFD**.*

A great deal of correspondence intended for 'letters' now arrives via E-mail, and although there's no problem in general, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please include your full postal address and callsign with your E-Mail. All letters intended for publication must be clearly marked 'For Publication'. **Editor**





**Elaine Richard's**

# news & products

A comprehensive round-up of what's happening in our hobby from G4LFM.



## Relay for Life

**O**n June 28th, *PW* author **Richard G0RSN** will be joining other members of the family and friends in a 24 hour event called **Relay for Life** at Ferndown Sports Centre in memory of Richard's father, **John G8EAM**. This will be the second year they have been involved. It is 24 hour team event where the team has to walk or run around a course, keeping at least one member of the team on the track at any one time, raising money for Cancer Research UK.

They have decided to add a bit of radio

interest to it this year and will be airing **G8EAM** as a special event call. They do not anticipate getting a lot of contacts but hope a few people would sponsor them per contact or something like that?

If you have an Amateur Radio licence, there may be an opportunity for you to pop along for an hour and encourage them and operate the station (the 3am spot is still open!) or in any case sponsor them per contact? Those with a licence may want to give us a contact? For further details, E-mail Richard at: [info@g8eam.org](mailto:info@g8eam.org)

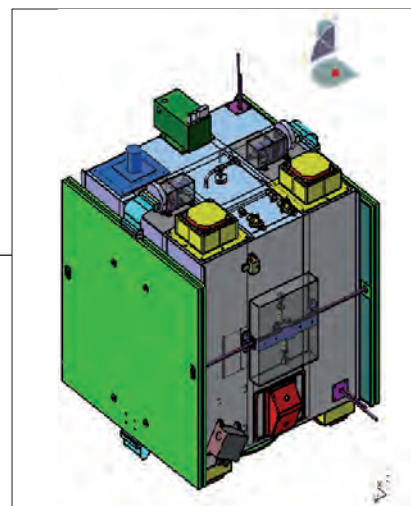
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## The ESEO Project Update

**T**he ESEO (European Student Earth Orbiter) is a 110kg student satellite project intended for launch in to low inclination GTO elliptical orbit. The plan has been to develop a package to provide downlink telemetry at 400bps and provide backup tele-command and ranging facilities for the mission management teams. It would, additionally, provide a 435 - 2400MHz (Mode U/S) linear transponder using both analogue and DSP based systems.

The launch date is now not expected to be earlier than 2011. See the website at: [www.uk.amsat.org/](http://www.uk.amsat.org/) for more information.



## Intermediate Success

**A**ll 14 students on an Intermediate level course organised by **Scarborough Amateur Radio Training Group (SARTG)** have recently been successful in passing the exam.

For his or her practical project, each student constructed a 40m variable frequency oscillator (v.f.o) obtained as basic kit from DC Kits in the USA. In addition to assembling the printed circuit board, winding the r.f. coil and mounting and wiring the components within an enclosure, each student was required to align the v.f.o. as part of the course curriculum.

When a course is in progress, Scarborough Amateur Radio Training Group meet at **Crossgates Community Centre, Scarborough**, normally on Tuesday evenings. This venue is also a registered examination centre.

An Advanced course is scheduled for later in the year. Anyone interested in attending should contact **Robert** at [g0who@amsat.org](mailto:g0who@amsat.org), **Bob** at [bobm0gap@btinternet.com](mailto:bobm0gap@btinternet.com) or **Bob** at [bob.g4yko@virgin.net](mailto:bob.g4yko@virgin.net)



*The successful students undertaking instruction.*

## New D-STAR NOV

The application of the Notice of Variation (NoV) for **GB7OK** has been cleared and has been issued. Confirmation of the order has been made to Icom and GB7OK should be on the air soon.

More information can be found at [www.gb3ok.com](http://www.gb3ok.com)

The Wyre Forest Repeater Group D-STAR repeater **GB7WF** is now operational on new frequencies. The change was implemented to avoid issues with licence exempt low power devices on the original input frequency. The input is now 430.7875MHz and the output is 439.7875MHz. The repeater group says that GB7WF is the first D-STAR repeater in the Midlands.

Full details of the repeater, including coverage data and technical information, is on the Internet at [www.wfrg.net](http://www.wfrg.net)

## New E7 Callsigns

On March 21st, Amateurs in Bosnia-Herzegovina began using their new E7 callsigns. At present, E7+two and E7+three-letter callsigns have been issued. From April 14th, the country's communications regulator starts accepting applications for single letter calls. These should start being issued in May. The E7 callsigns replace the T9 series following an ITU decision announced on August 8th last year.



## Croatian Telegraphy Club



**O**n December 12th, 2001 several active radio amateur 'old timers', lovers of telegraphy, founded the International Croatian Telegraphy Club – CTC. The club welcomes membership applications from telegraphy lovers across the world. The only requirement for prospective members of CTC is that Morse (c.w.) should be their main or only mode of operation on the Amateur bands.

If membership application is submitted by E-mail, then membership is free. For postal applications the cost is 5 Euro or \$8 US (cash, sent airmail, which is a contribution towards postage charges).

Send your application, quoting callsign and, where possible, an E-mail address to : **Croatian Telegraphy Club, Franjevačka 5, 42220 Novi Marof, Croatia, Europe.**

E-mail: [ctc@hamradio.hr](mailto:ctc@hamradio.hr) [www.hamradio.hr/ctc](http://www.hamradio.hr/ctc)

## New Signal Link Equipment

**T**his very neat metal boxed SLS-2 from LDG allows owners of the Tigertronics Signal-Link sound card interfaces to switch between two rigs. Before this unit was released, the only way to control two different rigs was to buy two Signal-

Links! Operation is very simple – configure your Signal-Link in straight-through mode and configure the internal jumpers of the SLS-2 to your two radios. A simple press of the button on the front panel switches the Signal-Link between the two.



Available in May, priced at £39.95, from **Martin Lynch & Sons Ltd., Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS. Tel: 0845 2300 599. [www.hamradio.co.uk](http://www.hamradio.co.uk)**

## Piel Island DXpedition

Members of the **CQ CQ Portable Group UK** will active as **GB0PIA** from Piel Island on May 24th - 25th. Operators are: John M0JFE, Ian 2E0EDX, Brian 2E0OYG, Nathan 2E0OCC, Greg 2E0RXX, Sean 2E0BAX and Liam M3ZRY.

The activity is planned for 160m - 70cm (no 30m) with band conditions determining which will be used. h.f. equipment consists of FT-817 rigs with 80W linear and various

antenna systems. v.h.f./u.h.f. equipment consists of various radios for 2m, 6m and 70cm, with beams and verticals.

Piel Island lies 1km (half a mile) off the southern tip of the Furness Peninsula in Cumbria (WW Loc. IO84JB, WAB square SD26). This operation will also count for the Piel Island 14th Century Castle (CASHOTA reference G/151/C). For more information and updates, visit: <http://www.hamuniverse.com/pielislanddxpedition.html>

## Chelmsford Amateur of the Year

**M**embers of the **Chelmsford Amateur Radio Society (CARS)** recently voted for the Radio Amateur of The Year. The winner was **John Bowen G8DET** who has devoted many years service to the club.

John became involved in radio when he served in the armed forces as Captain In-Charge of Radio & Line Transmission Training based near Reading. In 1969, John obtained his Amateur licence, **G8DET**, and in the 1970s he was involved in the formation of the Essex Repeater Group and was a member of the Danbury 23cm group.

Under John's Chairmanship, the club has grown significantly from a membership of about 35 in the early 1990s to over 120 today, a spectacular achievement.

CARS meet on the first Tuesday of each month at the **Marconi Social Club, Beehive Lane, Great Baddow, Chelmsford CM2 9RX**. The doors open at 7.15pm and visitors are most welcome. Car parking is free and a bar is available for refreshments. To find out more, have a look at: <http://www.g0mwat.org.uk/>



## Boys Brigade 125 years!

Over the weekend of October 3rd - 5th, it is hoped that **Boys Brigade Battalions** from around the world will try to link-up using amateur radio. In the UK, stations that are put on for a BB Battalion or Company over this weekend can apply for **GB125+callsign**.

The first confirmed station is **GB125BB** for the **Grimsby & District** Battalion but there are others following - the more stations the better.

More details on <http://andy-glassman.me.uk/gb125bb.htm>

## North American Data Communications Museum

Pictures of the exhibits at North American Data Communications Museum (NADCOMM) can be seen on the museum's website. The museum is committed to the project of collecting, displaying and operating the equipment that has powered the communications revolutions of the 20th century, from telegraphy to digital telephony.

Among the many pictures are some of the early teletypes from the 1920s are to be found on the website: <http://www.nadcomm.com/>

## Special Event GB6GEO

Special event station **GB6GEO** will be on the air from the prehistoric caves of **Kent's Cavern, Torquay**. The caves are, probably, the oldest home in Britain. The area has Geo Park status and the organiser hope that GB6GEO will help to promote geological heritage to the general public. There are only six Geo Parks in the UK and 53 in the world. There will be a special open day at the caves on Sunday, May 25th and GB6GEO will be on the air during the weekend of May 24/25th. Operation will be on 80m - 2m and the station will be run by **Martin G3VOF** with help from **John G7HIK**, **Paddy M1EIW** and **Roger 2E0GHR**.

There will be a special QSL card sent for all QSOs made with GB6GEO via the bureau.

**Kents Cavern, 89 Ilsham Road, Torquay, Devon TQ1 2JF.**



# More than just a Radio!

**T**he eton FR350 is more than just a portable radio, it is a torch, mobile phone charger and has a siren on it too. It's cheap to run too – as hand cranking for 60 seconds can power the radio for up to one hour. There's a mini earphone jack and a fine-tuning control knob built into the main tuning control. The FR350 can be powered in different ways: the built-in rechargeable Ni-MH battery that takes charge from the dynamo crank or from an AC adaptor (not included), three AA batteries and the dynamo crank alone, even with no battery pack installed. The radio is also waterproof.

Costing £39.95, the eton FR350 is available from: **Nevada, Unit 1 Fitzherbert Spur, Farlington, Portsmouth, Hampshire PO6 1TT. Tel: 023 92 313090** or visit: [www.etoncorp.com](http://www.etoncorp.com) or [www.nevada.co.uk](http://www.nevada.co.uk)



## W&S Lowe Electronics Matlock

Due to proposed redevelopment of the Bentley Bridge, Matlock site, Waters & Stanton's shop at Lowe Electronics closed down on Saturday March 15th.

The Directors of W&S thanked the many customers who had used the shop over several years and also the staff who had built up a loyal clientele. In particular, tribute was paid to **Dave Corfield** and **Roger Baines** for their work in promoting the company's products so

successfully.

The staff at Hockley head office will provide assistance to all Lowe customers wishing to make future purchases with freephone 08000737388 available for their use.

Alternatively, several independent radio retail outlets in the area stock most Waters & Stanton products and, of course, the Rally Team will be at the Leicester Radio Show.

<http://www.wsplc.com/>

## Junior Club Success

**O**n Saturday, February 9th, three members of the **Pontefract Junior Radio Club** passed the Foundation licence examination. The young people are: **Matthew Noakes, Jacob Sowter** and **Charlie Mackintosh**.

Matthew, Jacob and Charlie will all be on the air on Saturdays when the Junior Radio Club meets from 12.30pm at the Cooke Hall, Bondgate, Pontefract WF8 2LQ. [www.pdars.com](http://www.pdars.com)

*The three candidates preparing for their Morse appreciation.*



## New Authorised Kenwood Dealer

Following on from obtaining Icom dealership for the Norfolk area in November 2007, **GMS Electronics** of Dereham in Norfolk has now become Kenwood Authorised Resellers and can now also carry out repairs to Kenwood transceivers.

The company tells us that they have had lots of interest from people who require transceiver repairs and spares – antennas, connectors, cables and so on and thank those people for their support. (GMS Electronics was started in April 2007 and so will soon be celebrating its first anniversary.)

GMS Electronics ([www.gms-electronics.co.uk](http://www.gms-electronics.co.uk)) can be contacted on **01362 698754** or E-mail: [enquiry@gms-electronics.co.uk](mailto:enquiry@gms-electronics.co.uk)

## UK Amateur Radio Licences

The UK regulator, Ofcom, has supplied the figures for the total number of Amateur Radio Licences issued as at March 31st, 2008

### Change since last month

Grade	31st Mar 08	29th Feb 08	Change
Foundation	10,042	9776	+266
Intermediate	4274	4167	+107
Full/Advanced	50,398	50,189	+209
Club Stations	1287	1272	+15

## Version 2 Gateway Software

Icom (UK) Ltd is now able to distribute Version 2 of the **D-STAR Gateway Software (G2)** in the UK. It offers a number of enhancements over the original release, including self-registration of users and repeaters via a web browser interface, multicasts or 'nets' of repeaters and much improved infrastructure communication. The requirement for a fixed IP address has been dropped, except for a trust server.

As part of their u.h.f. D-Star promotion, one copy of G2 will be supplied to holders of a Notice of Variation (NoV) for UHF (70cm) D-STAR repeaters at no-cost. The software is supplied on the strict understanding that it will not be copied or distributed in any way to any other person without the express permission of Icom (UK) Ltd. The software is not free but, if you qualify, it is provided at no cost to you. Subject to qualification, Icom UK Ltd will purchase a licence on your behalf, ownership of which will be transferred to you on delivery. All terms and conditions of that licence will apply as if it were purchased directly by you. This offer is available until May 31st, 2008.

For details of how to qualify for this G2 D-Star Gateway Software offer, check out their website [www.icomuk.co.uk](http://www.icomuk.co.uk)

**Icom (UK) Ltd., Unit 9, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 01227 741741 [www.icomuk.co.uk](http://www.icomuk.co.uk)**



## Pro-case

**M**artin Lynch & Sons Ltd. (ML&S) are stocking a series of super-tough carry cases, ideal for safe transportation of fragile electronics – like your rig. Made by MyDEL, the PC-3810 measures 385 x 295 x 115mm and is water, air and dust tight. It has a tough outer ABS outer shell with fold down carry handle, O-ring seal for perfect rejection of water and condensation and comes supplied with foam inserts that you can cut to suit your equipment. The photo shows typical use (items not supplied) FT-817 complete with spare batters, microphone, charger, WonderWand & TCP and still room to spare!

The PC-3810 costs £59.95 inc VAT. **Martin Lynch & Sons Ltd., Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS. Tel: 0845 2300 599. [www.hamradio.co.uk](http://www.hamradio.co.uk)**



## Updates For RadarBox

Waters & Stanton have announced the release of version 1.4 of the *RadarBox* software – 80% of source code has been changed from V1.3. Owners with previous versions will be given download details from **[www.airnavsystems.com](http://www.airnavsystems.com)**

Just some of the main changes are: all databases are now in *SQLite* format, so 60% less memory is used; it is totally compatible with all existing available Addons; there is a new MyLog feature with reports, alerts, filtering and populate capabilities; Airline Logos now has over 1200 airline logos and there is a new Alert type based on Squawk.

In addition, two new antennas have been introduced to offer improved reception of the 1090MHz signals. These are the Radar-Rama which is a 450mm long external vertical (£49.95) and the Radar-Extender that measures 1m long offering 6dB gain and fibre glass encapsulation (£79.95), both antennas are available now.

Finally, the Elad1090MHz mast-head amplifier is now available to overcome cable losses on external antennas.

**Waters & Stanton plc, Spa House, 22 Main Road, Hockley, Essex SS5 4QS. Tel: 01702 204965. [www.wspc.com](http://www.wspc.com)**

## Celebrations For RAF

On April 1st, 2008, the Royal Air Force (RAF) celebrated its 90th anniversary and, on the same day, the **RAF Amateur Radio Society (RAFARS)** achieved 70 years.

The RAF was formed on April 1st, 1918 and consisted of 293,532 Officers and men and had 22,000 aircraft. It was formed from an amalgamation of the Royal Flying Corps and some Royal Naval Air Service squadrons.

The Royal Air Force Amateur Radio Society (RAFARS) was formed on the same day in 1938 from the **Cranwell Amateur Transmitting Society (CARTS)**, which had been formed two years previously.

As a celebration of the twin event, RAFARS organised an on air meeting for April 1st, 2008. Twenty two stations were planned, the object being to meet and greet RAFARS members and members of the amateur radio fraternity generally.

Some of the callsigns, including GB2AIR and 2E1RAF, had to resort to alternative temporary antennas due to wind damage. Most of the operation was conducted on 40m and 80m and the usual RAFARS 'slots' of 3.515, 3.710, 7.015 and 7.045MHz were well attended through out the day. By the sound of things on the air, the event was a great success.

All the RAFARS stations will send out an appropriate QSL card to mark the event and cards would be appreciated via the bureau.

## American Amateurs up!

There's some moderately good news regarding growth in numbers of FCC licenced Radio Amateurs.

In his latest posting of license statistics to QRZ dot com, **George Mc Couch, K3UD**, says that it looks like overall Amateur Radio Service numbers have increased by 912 from January through March 2008.

According to George, the Technician and Technician Plus category had large increases while General had small increases. As expected. Novice and Advanced declined. It appears as if the Technician license is still the most popular entry to the hobby for newcomers, making good gains over the last six months. Also, the movement to upgrade to Extra class is continuing.

On the downside, it seems like the large movement from Amateurs upgrading to General after the last round of restructuring has slowed to trickle over the last six months.

George says that this is the largest quarterly increase he has seen in a long time. You can read the good numbers on the news pages at QRZ.com under the title 'Amateur Radio Growth in the 1st Quarter 2008: A look at the numbers'. And our thanks to **George Mc Couch, K3UD**, for his ongoing volunteer effort to keep the Amateur Radio public so well informed.

A direct link to article: **<http://forums.qrz.com/showthread.php?t=157889>**

## History Returned

**A** QSL card that was sent by **Arthur G2FTK**, now president of the **Coventry Amateur Radio Society** was spotted on eBay by **Andy G6ULX**. Society member **Brian G8GMU**, successfully bid for the QSL card and it was presented on President's Night, Friday March 28th to Arthur by club Chairman **Bob G4GEE**. The card confirmed a Morse contact made by G2FTK on February 22nd, 1953 with W2BJQ. Arthur was absolutely delighted with his quite unusual gift. And he is one of the founder members of the Coventry Amateur Radio Society in 1932.

The rear of the card is of interest to vintage vehicle collectors, as it printed by the Standard Motor Company. The image of the new 1953 Standard Vanguard has as one of its passengers the managing director Sir John Black, clearly chauffeur driven. The car itself, a prototype, was gold in colour and photographed in Stoneleigh Village Warwickshire.





# rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations.

## Send all your rally info to

PW Publishing Ltd.,  
Arrowsmith Court,  
Station Approach,  
Broadstone,  
Dorset BH18 8PW  
E-mail: [pwnews@pwpublishing.ltd.uk](mailto:pwnews@pwpublishing.ltd.uk)

**May 18th**

**Magnum Radio Rally**  
**Helen. Tel: 0777 638 5247**  
**E-mail: [Helen@magnumrally.org](mailto:Helen@magnumrally.org)**  
**[www.magnumrally.org](http://www.magnumrally.org)**

The Magnum Radio Rally will be held in the Magnum Leisure Centre, Harbourside, Irvine, Ayrshire KA12 8PP. There is plenty of free car parking and doors open at 10.30am. Entry fee is £3.50 and there will be trade stands, a Bring & Buy and special interest groups.



**National Amateur Radio Car Boot Sale**  
**[www.ddrcbootsale.org](http://www.ddrcbootsale.org)**

The National Amateur Radio Car Boot Sale will be held at Stockwood Park, Farley Hill, Luton, Bedfordshire LU1 4BH. Gates open for sellers at 7.30am and 9am for buyers. Entry fee is £2.

**June 1st**

**Spalding Rally**  
**Alan. Tel: 0776 777296**  
**E-mail: [rally-secretary@sdars.org.uk](mailto:rally-secretary@sdars.org.uk)**  
**[www.sdars.org.uk](http://www.sdars.org.uk)**

The Spalding Rally 2008 will be held at The Sir John Glead Technology School, Halmer Gardens, Spalding, Lincs PE11 2EF. Doors open 10am. There will be a Fleamarket, free parking and plenty of catering.

**Newhaven Fort Museum Amateur Radio Group Rally**

**Eddie. Tel: 01273 300772**  
**E-mail: [eddie@zamboodle.demon.co.uk](mailto:eddie@zamboodle.demon.co.uk)**

The Newhaven Fort Museum Amateur Radio Group Rally will be held at the Newhaven Fort Museum, Fort Road, Newhaven BN9 9DL. The NAAFI will be open for food and drinks. Tables cost £7 and set up is at 9am. Doors open at 10.30am and admission is £2 with free parking. It is possible to camp outside on the Saturday evening (caravan or camper van only) but this must be pre-booked.



**Red Rose QRP Festival**  
**Les. Tel: 01942 870364**  
**E-mail: [g4hzj@ntlworld.com](mailto:g4hzj@ntlworld.com)**

The Red Rose QRP Festival will be held in Formby Hall, Alder Street, Atherton M46 9EY. There will be free car parking and doors open at 11am. There will be trade stands, special interest groups and a Bring & Buy. Admission is £2.

**June 15th**

**Newbury & Districts ARS Rally and Boot Sale**  
**Phil Morris. Tel: 07771 504738**

**E-mail: [rally@nadars.org.uk](mailto:rally@nadars.org.uk)**  
**[www.nadars.org.uk](http://www.nadars.org.uk)**  
The 21st Newbury & District ARS Rally and Boot Sale will be held at the Newbury Showground - nearest postcode RG18 9JU. Pitches are £10 each or you can erect your own marquee for £50. The entry fee for visitors is £2. Gates open for visitors at 9am and 8am for sellers, car parking is free and catering is available.

**Bangor & District ARS Radio & Computer Rally**  
**Bill. Tel: 0289 1816707**

**E-mail: [bill.langtry@btinternet.com](mailto:bill.langtry@btinternet.com)**  
**[www.bdars.com](http://www.bdars.com)**  
The Bangor & District ARS Radio & Computer Rally will be held at Crawfordsburn Country Club, Main St, Crawfordsburn, Bangor BT19 1JE. Doors open at 12 noon and admission is free. There will be trade stands and a Bring & Buy.

**June 27th - 29th**

**Hamtronic Show**  
**[www.hamradio-friedrichshafen.de/html/en](http://www.hamradio-friedrichshafen.de/html/en)**  
The Hamtronic Show will be held at Messe Friedrichshafen, Neue Messe 1, 88046 Friedrichshafen, Germany. There will be trade stands, special interest groups and a large RSGB Bookstall.

**June 29th**

**West of England Radio Rally**  
**Shaun. Tel: (01225) 873 098**  
**Email: [rallymanager@westrally.org.uk](mailto:rallymanager@westrally.org.uk)**  
**[www.westrally.org.uk](http://www.westrally.org.uk)**

The West of England Radio Rally will be held at the "Cheese & Grain" venue, Frome, Somerset. Doors open from 10am to 4pm. There will be inside and outside trade stands, local club stalls, free parking, cafe, disabled facilities (disabled car parking spaces, level/ramped access to all areas, disabled toilets).

**July 5th**

**Reddish Rally**  
**Nigel. Tel: 0161 428 8413 evenings and weekends**  
**[www.reddishrally.co.uk](http://www.reddishrally.co.uk)**

The Reddish Radio Rally will be held in St. Mary's Parish Church Hall, St Mary's Drive, Off Reddish Road, Stockport, Cheshire SK5 7AX. Doors open at 10.30am and entry is £1. There will be car parking available. Tables are available at £10 each. Please note this is a Saturday rally as the venue is in use on Sundays!

**July 6th**

**Barford Radio Rally**  
**David. Tel: (01953) 458844**  
**[www.norfolkamateurradio.org](http://www.norfolkamateurradio.org)**

The Norfolk ARC Barford Radio Rally will be held in Barford Village Hall, Barford, Norfolk NR9 4AB. There will be car parking available and the doors open at 9am. There will be trade stands, a Bring & Buy, special interest groups and the RSGB bookstall.

**July 6th**

**Cornish Mobile Rally**  
**Ken. Tel: (01209) 821073**  
**E-mail: [keng0fic@fsmail.net](mailto:keng0fic@fsmail.net)**

The Cornish RAC 45th Mobile Rally with Kernow Microscopical Society will be held at Penair School, Truro, Cornwall TR1 1TN. Doors open 10.30am (10.15am for disabled visitors). There will be trade stands, a Bring & Buy, refreshments, disabled facilities and car parking.



**York Radio Rally**

**Arthur. Tel: 07841 120 738**  
**E-mail: [apalg8@aol.com](mailto:apalg8@aol.com)**

The York Radio Rally will be held at York Racecourse (Knave'smire) YO23 1EX. There will be trade stands, a Bring & Buy and free car parking. Doors open at 10.15 for disabled visitors and 10.30am for others.

**July 13th**

**McMichael Rally and Boot Sale**  
**M. Standen. Tel: 01189 723 504**  
**E-mail: [g0jms@radarc.org](mailto:g0jms@radarc.org)**  
**<http://www.radarc.org/MMRally.htm>**

The McMichael Rally and Boot Sale will be held at Reading Rugby Football Club, Holme Park Farm Lane, Sonning Lane (B4446), Sonning on Thames, Reading RG4 6ST, just off the A4 East of Reading, Berkshire. It is a large site and the boot sale area is on level ground. There will be Special Interest Groups, computer equipment, demonstrations and lectures, catering services, a fully licensed bar and plenty of parking areas with disabled special parking on level ground. Gates open at 9.30am and admission is £2. Gates open for sellers from 8.30am. Boot Sale Pitches costs £10, no booking required. Hall traders, tables £10 pre-booked or £12 on the day.



### Log Periodic

- MLP32** .....£119.95  
 \* Frequency:100-1300MHz TX & RX  
 \* Boom:142cm Longest Element 150cm  
 \* Gain 11-13 dB
- MLP62** .....£199.95  
 \* Frequency:50-1300MHz TX & RX  
 \* Boom:200cm Longest Element 300cm  
 \* Gain 10-12 dB



### AM-Pro Mobile HF Whips (with 3/8 base fitting)

- AM-PRO 6 metre** (Length 4.6' approx).....£17.95  
**AM-PRO 10 metre** (Length 7' approx).....£17.95  
**AM-PRO 17 metre** (Length 7' approx).....£17.95  
**AM-PRO 20 metre** (Length 7' approx).....£17.95  
**AM-PRO 40 metre** (Length 7' approx).....£17.95  
**AM-PRO 80 metre** (Length 7' approx).....£19.95  
**AM-PRO 160 metre** (Length 7' approx).....£49.95  
**AM-PRO MB6** Multi band 6/10/15/20/40/80m can use 4 Bands at anyone time (Length 250cm).....£69.95

### Slim Jims

- SJ-70** 430-430MHz slimline design with PL259 connection. Length 1.00m with N-TYPE socket.....£19.95  
**SJ-2** 144-146MHz slimline design with PL259 connection. Length 2.00m with SO-239 socket.....£24.95



### VHF/UHF Mobile Antennas

- MICRO MAG** Dual band 2/70 antenna complete with 1" magnetic mount 5mtrs of mini coax terminated in BNC.....£19.95
- MR700** 2m/70cm, 1/4 wave & 5/8, Gain 2m 0dB/3.0dB 70cm Length 20" 3/8 Fitting.....£8.95
- MR 777** 2 Metre 70 cm 2.8 & 4.8 dBd Gain (5/8 & 2x5/8 wave) (Length 60") (3/8 fitting).....£17.95
- MR0525** 2m/70cm, 1/4 wave & 5/8, Gain 2m 0.5dB/3.2dB 70cm Length 17" PL259 fitting commercial quality.....£19.95
- MR0500** 2m/70cm, 1/2 wave & 2x5/8, Gain 2m 3.2dB/5.8dB 70cm Length 38" PL259 fitting commercial quality.....£24.95
- MRQ750** 2m/70cm, 6/8 wave & 3x5/8, Gain 2m 5.5dB/8.0dB 70cm Length 60" PL259 fitting commercial quality.....£34.95
- MRQ800** 6/270cm 1/4 6/8 & 3 x 5/8, Gain 6m3.0dB/2m 5.0dB/70 7.5dB Length 60" PL259 fitting commercial quality.....£39.95
- GF151** Professional glass mount dual band antenna. Freq: 2/70 Gain: 2.9/4.3dB. Length: 31".....£29.95



### Rotative HF Dipoles

- RDP-3B** 10/15/20mtrs length 7.40m.....£119.95  
**RDP-4** 12/17/30mtrs length 10.50m.....£119.95  
**RDP-40M** 40mtrs length 11.20m.....£169.95  
**RDP-6B** 10/12/15/17/20/30mtrs boom length 1.00m.....£239.95

### Single Band Mobile Antennas

- MR214** 2 metre straight stainless 1/4 wave 3/8 fitting.....£4.95  
 PL259 type.....£5.95  
**MR214S-2** 2 Metre stainless steel 1/4 wave with built in spring PL259 fitting.....£9.95
- MR258** 2 Metre 5/8 wave 3.2 dBd Gain (3/8 fitting) (Length 58").....£12.95
- MR268S** 2 Metre 5/8 wave 3.5dBd gain Length 51" S0239 fitting.....£19.95
- MR290** 2 Metre (2 x 5/8 Gain: 7.0dBd) (Length: 100"). PL259 fitting, "the best it gets".....£39.95
- MR444S-2** 4 Metre straight stainless 1/4 wave with spring and PL259 fitting.....£14.95
- MR614** 6 Metre loaded 1/4 wave (Length 56") (3/8 fitting).....£14.95
- MR625** 6 Metre base loaded (1/4 wave) (Length: 50") commercial quality.....£19.95



### Single Band End Fed Base Antennas

- 2 metre** 1/2 wave (Length 52") (Gain 2.5dB) (Radial free).....£24.95  
**4 metre** 1/2 wave (Length 80") (Gain 2.5dB) (Radial free).....£39.95  
**6 metre** 1/2 wave (Length 120") (Gain 2.5dB) (Radial free).....£44.95  
**6 metre** 1/4 wave (Length 150") (Gain 4.5dB) (3 x 28" radials).....£49.95

### Vertical Fibreglass Co-Linear Antennas

New co-linear antennas with specially designed tubular vertical coils that now include wide band receive! Remember, all our co-linears come with high quality N-type connections.

- SQBM105 Mk.2** Dual Bander Radial FREE!.....£29.95  
 (2m 2.0dBd) (70cm 4.5dBd) (RX:25-2000 MHz) (Length 28")
- SQBM100 Mk.2** Dual Bander.....£39.95  
 (2m 3dBd) (70cm 6dBd) (RX:25-2000 MHz) (Length 39")
- SQBM110 Mk.2** Dual Bander (Radial FREE!).....£49.95  
 (2m 3dBd) (70cm 6dBd) (RX:25-2000 MHz) (Length 39")
- SQBM200 Mk.2** Dual Bander.....£49.95  
 (2m 4.5dBd) (70cm 7.5dBd) (RX:25-2000 MHz) (Length 62")
- SQBM223Mk.2** Tri Bander.....£59.95  
 (2m 4.5dBd) (70cm 7.5dBd) (23cm 12.5dBd) (RX 25-2000MHz) Length: 62"
- SQBM500 Mk.2** Dual Bander Super Gainer.....£64.95  
 (2m 6.8dBd) (70cm 9.2dBd) (RX:25-2000 MHz) (Length 100")
- SQBM800 Mk.2** Dual Bander Ultimate Gainer.....£119.95  
 (2m 8.5dBd) (70cm 12.5dBd) (RX:25-2000 MHz) (Length 5.2m)
- SQBM1000 MK.2** Tri Bander.....£69.95  
 (6m 3.0dBd) (2m 6.2dBd) (70cm 8.4dBd) (RX:25-2000 MHz) (Length 100")



### Single Band Vertical Co-Linear Base Antenna

- BM33** 70 cm 2 X 5/8 wave Length 39" 7.0 dBd Gain.....£34.95
- BM45** 70cm 3 X 5/8 wave Length 62" 8.5 dBd Gain.....£49.95
- BM55** 70cm 4 X 5/8 wave Length 100" 10 dBd Gain.....£69.95
- BM60** 2m 5/8 Wave, Length 62", 5.5dBd Gain.....£49.95
- BM65** 2m 2 X 5/8 Wave, Length 100", 8.0dBd Gain.....£69.95
- BM75** 2m 2 X 5/8 Wave, Length 175", 9.5dBd Gain.....£89.95

### MFJ Products

See our website for full details.

- Automatic Tuners**
- MFJ-991B** 1.8-30MHz 150W SSB/100W CW ATU.....£159.95
- MFJ-993B** 1.8-30MHz 300W SSB/150W CW ATU.....£179.95
- MFJ-994B** 1.8-30MHz 600W SSB/300W CW ATU.....£279.95
- Manual Tuners**
- MFJ-16010** 1.8-30MHz 20W random wire tuner.....£49.95
- MFJ-902** 3.5-30MHz 150W mini travel tuner.....£69.95
- MFJ-902H** 3.5-30MHz 150W mini travel tuner with 4:1 balun.....£109.95
- MFJ-904** 3.5-30MHz 150W mini travel tuner with SWR/PWR.....£89.95
- MFJ-904H** 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun.....£129.95
- MFJ-901B** 1.8-30MHz 200W Versa tuner.....£74.95
- MFJ-971** 1.8-30MHz 300W portable tuner.....£79.95
- MFJ-945E** 1.8-54MHz 300W tuner with meter.....£99.95
- MFJ-941E** 1.8-30MHz 300W Versa tuner 2.....£99.95
- MFJ-948** 1.8-30MHz 300W deluxe Versa tuner.....£109.95
- MFJ-949E** 1.8-30MHz 300W deluxe Versa tuner with DL.....£119.95
- MFJ-934** 1.8-30MHz 300W tuner complete with artificial GND.....£179.95
- MFJ-974B** 3.6-54MHz 300W tuner with X-needle SWR/WATT.....£149.95
- MFJ-969** 1.8-54MHz 300W all band tuner.....£159.95
- MFJ-962D** 1.8-30MHz 1500W high power tuner.....£239.95
- MFJ-986** 1.8-30MHz 300W high power differential tuner.....£299.95
- MFJ-989D** 1.8-30MHz 1500W high power roller tuner.....£329.95
- MFJ-976** 1.8-30MHz 1500W balanced line tuner with X-needle SWR/WATT meter.....£379.95



### HB9CV 2 Element Beam 3.5dBd

- HB9-70** 70cm (Boom 12").....£19.95
- HB-2** 2 metre (Boom 20").....£24.95
- HB9-4** 4 metre (Boom 23").....£34.95
- HB9-6** 6 metre (Boom 33").....£44.95
- HB9-10** 10 metre (Boom 52").....£69.95
- HB9-627** 6/2/70 Triband.....£64.95



### Halo Loops

- HLP-2** 2 metre (size approx 300mm square).....£14.95
- HLP-4** 4 metre (size approx 600mm square).....£24.95
- HLP-6** 6 metre (size approx 800mm square).....£29.95

These very popular antennas square folded di-pole type antennas

### G5RV Inductors

- Convert your half size G5RV into a full size with just 8ft either side. Ideal for the small garden
- G5RV-IND**.....£19.95



### Crossed Yagi Beams (fittings stainless steel)

- XYG5-2** 2 metre 5 Element (Boom 64") (Gain 7.5dBd).....£89.95
- XYG8-2** 2 metre 8 Element (Boom 126") (Gain 11.5dBd).....£109.95
- XYG13-70** 70 cm 13 Element (Boom 83") (Gain 12.5dBd).....£79.95



### Yagi Beams (fittings stainless steel)

- YG4-2C** 2 metre 4 Element (Boom 48") (Gain 7dBd).....£29.95
- YG5-2** 2 metre 5 Element (Boom 63") (Gain 10dBd).....£49.95
- YG8-2** 2 metre 8 Element (Boom 125") (Gain 12dBd).....£69.95
- YG11-2** 2 metre 11 Element (Boom 185") (Gain 13dBd).....£99.95
- YG3-4** 4 metre 3 Element (Boom 45") (Gain 8dBd).....£59.95
- YG5-4** 4 metre 5 Element (Boom 128") (Gain 10dBd).....£69.95
- YG6-6** 6 metre 3 Element (Boom 72") (Gain 7.5dBd).....£64.95
- YG5-6** 6 metre 5 Element (Boom 142") (Gain 9.5dBd).....£84.95
- YG13-70** 70 cm 13 Element (Boom 76") (Gain 12.5dBd).....£49.95



### ZL Special Yagi Beams (Fittings stainless steel)

- 2 metre 5 Element** (Boom 38") (Gain 9.5dBd).....£39.95
- 2 metre 7 Element** (Boom 60") (Gain 12dBd).....£49.95
- 2 metre 12 Element** (Boom 126") (Gain 14dBd).....£84.95
- 70 cm 7 Element** (Boom 28") (Gain 11.5dBd).....£34.95
- 70 cm 12 Element** (Boom 48") (Gain 14dBd).....£49.95



The biggest advantage with a ZL-special is that you get massive gain for such a small boom length, making it our most popular beam antenna

### G5RV Wire Antenna (10-40/80m) (Fittings stainless steel)

- |   | HALF   | FULL   |
|---|--------|--------|
| <b>Standard</b> (enamelled)                                     | £19.95 | £22.95 |
| <b>Hard Drawn</b> (pre-stretched)                               | £24.95 | £29.95 |
| <b>Flex Weave</b> (original high quality)                       | £29.95 | £34.95 |
| <b>Flexweave PVC</b> (clear coated PVC)                         | £34.95 | £39.95 |
| <b>Deluxe 450 ohm PVC</b>                                       | £44.95 | £49.95 |
| <b>Double size standard</b> (204ft)                             | £39.95 |        |
| <b>TS1</b> Stainless Steel Tension Springs (pair) for G5RV..... | £19.95 |        |



### Reinforced Hardened Fibreglass Masts (GRP)

- GRP-125** ★ Length: 2m ★ Size: 30mm OD Grade: 2mm.....£14.95
- GRP-150** ★ Length: 2m ★ Size: 37mm OD Grade: 2mm.....£19.95
- GRP-175** ★ Length: 2m ★ Size: 44mm OD Grade: 2mm.....£24.95
- GRP-200** ★ Length: 2m ★ Size: 51mm OD Grade: 2mm.....£29.95

### Portable Telescopic Masts

- LMA-S** Length 17.6ft open 4ft closed 2-1" diameter.....£79.95
- LMA-M** Length 26ft open 5.5ft closed 2-1" diameter.....£89.95
- LMA-L** Length 33ft open 7.2ft closed 2-1" diameter.....£99.95
- TRIPOD-P** Lightweight aluminium tripod for all above.....£39.95

### 5ft Poles Heavy Duty (Swaged)

- 20ft Heavy Duty Swaged Pole Set**  
 These heavy duty aluminium (1.8mm wall) have a lovely push fit finish to give a very strong mast set
- 1.25"** set of four 5ft sections.....£29.95
- 1.50"** set of four 5ft sections.....£39.95
- 1.75"** set of four 5ft sections.....£49.95
- 2.00"** set of four 5ft sections.....£59.95



### Mini HF Dipoles (Length 11' approx)

- MD020** 20mt version approx only 11ft.....£39.95
- MD040** 40mt version approx only 11ft.....£44.95
- MD080** 80mt version approx only 11ft (slimline lightweight aluminium construction).....£49.95



CHECK ON-LINE FOR ALL UPDATES, NEW PRODUCTS & SPECIAL OFFERS

[www.moonrakerukltd.com](http://www.moonrakerukltd.com)

★ Postage is a maximum of £7.00 on all orders ★  
 (UK mainland only)



## Connectors & Adapters

PL259/9 plug (Large entry).....	£0.75
PL259/9C (Large entry) compression type fit.....	£1.95
PL259 Reducer (For PL259/9 to conv to PL259/6).....	£0.25
PL259/6 plug (Small entry).....	£0.75
PL259/6C (Small entry) compression type fit.....	£1.95
PL259/7 plug (For mini 8 cable).....	£1.00
BNC Screw type plug (Small entry).....	£1.25
BNC Solder type plug (Small entry).....	£1.25
BNC Solder type plug (Large entry).....	£3.00
N-Type plug (Small entry).....	£3.00
N-Type plug (Large entry).....	£3.00
PL259 Chassis socket (Round).....	£1.00
PL259 Chassis socket (Square).....	£1.00
N-Type Chassis socket (Round).....	£3.00
N-Type Chassis socket (Square).....	£3.00
PL259 Double female adapter.....	£1.00
PL259 Double male adapter.....	£1.00
N-Type Double female.....	£2.50
PL259 to BNC adapter.....	£2.00
PL259 to N-Type adapter.....	£3.00
PL259 to PL259 adapter (Right angle).....	£2.50
PL259 T-Piece adapter (2xPL 1XSO).....	£3.00
N-Type to PL259 adapter (Female to male).....	£3.00
BNC to PL259 adapter (Female to male).....	£2.00
BNC to N-Type adapter (Female to male).....	£3.00
BNC to N-Type adapter (Male to female).....	£2.50
SMA to BNC adapter (Male to female).....	£3.95
SMA to PL259 adapter (Male to PL259).....	£3.95
PL259 to 3/8 adapter (For antennas).....	£3.95
3/8 Whip stud (For 2.5mm whips).....	£2.95

Please add just £2.00 P&P for connector only orders  
PLEASE PHONE FOR LARGE CONNECTOR ORDER DISCOUNTS

## Mounting Hardware (All galvanised)

Tripod-2 (free standing with 2-OD for use with 2" joiner or 1.5" pole inside).....	£69.95
Tripod-3 (free standing with 3" OD for use with 2.5" pole inside).....	£79.95
6" Stand Off Bracket (complete with U Bolts).....	£6.00
9" Stand off bracket (complete with U Bolts).....	£9.00
12" Stand off bracket (complete with U Bolts).....	£12.00
12" T & K Bracket (complete with U Bolts).....	£17.95
18" T & K Bracket (complete with U Bolts).....	£19.95
24" T & K Bracket (complete with U Bolts).....	£24.95
36" T & K Bracket (complete with U Bolts).....	£39.95
Single chimney lashing kit (suitable up to 2 mast).....	£14.95
Double chimney lashing kit (suitable up to 2 mast).....	£19.95
3-Way Pole Spider for Guy Rope/wire.....	£3.95
4-Way Pole Spider for Guy Rope/wire.....	£4.95
Mast Sleeve/Joiner (for 1" pole).....	£6.95
Mast Sleeve/Joiner (for 1.25" pole).....	£7.95
Mast Sleeve/Joiner (for 1.5" pole).....	£11.95
Mast Sleeve/Joiner (for 2" pole).....	£13.95
Earth rod including clamp (copper plated).....	£9.95
Earth rod including clamp (solid copper).....	£19.95
Pole to pole clamp 2"-2".....	£4.95
Di-pole centre (for wire).....	£4.95
Di-pole centre (for aluminium rod).....	£6.95
Di-pole centre (for wire but with an PL259 socket).....	£6.95
Dog bone insulator.....	£1.00
Dog bone insulator heavy duty.....	£1.50
Dog bone (ceramic type).....	£1.50
EGG-S (small porcelain egg insulator).....	£1.95
EGG-M (medium porcelain egg insulator).....	£2.50
EGG-XL (extra large porcelain egg insulator).....	£5.95
CAR PLATE (drive on plate to suit 1.5 to 2" mast/pole).....	£19.95
PULLEY-2 (Heavy duty adjustable pulley wheel).....	£19.95

## Cable & Coax Cable

RG58 best quality standard per metre.....	35p
RG58 best quality military spec per metre.....	60p
RGMini 8 best quality military spec per metre.....	70p
RG213 best quality military spec per metre.....	£1.00
H100 best quality military coax cable per metre.....	£1.25
103 best quality military spec per metre.....	£1.45
3-core rotator cable per metre.....	45p
7-core rotator cable per metre.....	£1.00
10 amp red/black cable 10 amp per metre.....	40p
20 amp red/black cable 20 amp per metre.....	75p
30 amp red/black cable 30 amp per metre.....	£1.25

Please phone for special 100 metre discounted price

## Baluns

MB-1 1:1 Balun 400 watts power.....	£24.95
MB-4 4:1 Balun 400 watts power.....	£24.95
MB-6 6:1 Balun 400 watts power.....	£24.95
MB-1X 1:1 Balun 1000 watts power.....	£29.95
MB-4X 4:1 Balun 1000 watts power.....	£29.95
MB-6X 6:1 Balun 1000 watts power.....	£29.95
MB-Y2 Yagi Balun 1.5 to 50MHz 1kW.....	£24.95

## Duplexers & Antenna Switches

DX-720D Duplexer *Port 1: HF + 6 + 2m (1.6-150MHz). *Port 2: 70cm (400-460MHz). *Connection: Fixed 2 x PL259 & 1 x PL259.....	£19.95
MX-72 Duplexer *Same spec as DX-720D but with PL259 fly leads.....	£29.95
MX-627 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz).....	£39.95
CS201 Two-way di-cast antenna switch. Freq: 0-1000MHz max 2,500 watts PL259 fittings.....	£14.95
CS201-N Same spec as CS201 but with N-type fittings.....	£19.95
CS401 Same spec as CS201 but 4-way.....	£39.95
CS401N Same spec as CS401 but with N-type fittings.....	£49.95

## Antenna Rotators

AR-35X Light duty UHFVHF.....	£79.95
AR26 Alignment Bearing for the AR35X.....	£18.95
RC5-1 Heavy duty HF.....	£329.95
RC5-3 Heavy Duty HF inc pre set control box.....	£419.95
RC26 Alignment Bearing for RC5-1/3.....	£49.95
RC5A-3 Serious heavy duty HF.....	£579.95

## Complete Mobile Mounts

All mounts come complete with 4m RG58 coax terminated in PL259 (different fittings available on request).

3.5" Pigmy magnetic 3/8 fitting.....	£7.95
3.5" Pigmy magnetic PL259 fitting.....	£9.95
5" Limpet magnetic 3/8 fitting.....	£9.95
5" Limpet magnetic PL259 fitting.....	£12.95
7" Turbo magnetic 3/8 fitting.....	£12.95
7" Turbo magnetic PL259 fitting.....	£14.95
Tri-Mag magnetic 3 x 5" 3/8 fitting.....	£29.95
Tri-Mag magnetic 3 x 5" PL259 fitting.....	£29.95
HKITHD-38 Heavy duty adjustable 3/8 hatch back mount.....	£29.95
HKITHD-SO Heavy duty adjustable SO hatch back mount.....	£29.95
RKIT-38 Aluminium 3/8 rail mount to suit 1" roof bar or pole.....	£12.95
RKIT-SO Aluminium SO rail mount to suit 1" roof bar or pole.....	£14.95
RKIT-PR Stainless PL259 rail kit to suit 1" roof bar or pole.....	£24.95
PBKIT-SO Right angle PL259 pole kit with 10m cable/PL259 (ideal for mounting mobile antennas to a 1.25" pole).....	£19.95

## Antenna Wire & Ribbon

Enamelled copper wire 16 gauge (50mtrs) ...	£17.95
Hard Drawn copper wire 16 gauge (50mtrs) .....	£24.95
Equipment wire Multi Stranded (50mtrs) .....	£14.95
Flexweave high quality (50mtrs).....	£27.95
PVC Coated Flexweave high quality (50mtrs).....	£37.95
300Ω Ladder Ribbon heavy duty USA imported (20mtrs).....	£14.95
450Ω Ladder Ribbon heavy duty USA imported (20mtrs).....	£14.95

(Other lengths available, please phone for details)

## Miscellaneous Items

CDX Lightning arrester 500 watts.....	£19.95
MDX Lightning arrester 1000 watts.....	£24.95
AKD TV1 filter.....	£9.95
Amalgamating tape (10mtrs).....	£7.50
Desoldering pump.....	£2.99
Alignment 5pc kit.....	£1.99

## Telescopic Masts (aluminium/fibreglass opt)

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

## HF Yagi

HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM  
FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m  
LONGEST ELEMENT:13.00m POWER:1600  
Watts..... **£399.95**

ADEX-3300 3 BAND 3 ELEMENT TRAPPED  
BEAM  
FREQ:10-15-20 Mtrs GAIN:8 dBd  
BOOM:4.42m LONGEST ELE:8.46m  
POWER:2000 Watts..... **£329.95**

ADEX-6400 6 BAND 4 ELEMENT TRAPPED  
BEAM FREQ:10-12-15-17-20-30 Mtrs GAIN:7.5  
dBd BOOM:4.27m LONGEST ELE:10.00m  
POWER:2000 Watts **£599.95**  
40 Mtr RADIAL KIT FOR ABOVE..... **£99.00**

## Trapped Wire Di-Pole Antennas (Hi grade heavy duty Commercial Antennas)

MTD-6 FREQ:40 & 160m LENGTH: 28m POWER:1000 Watts.....	£59.95
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts.....	£49.95
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts.....	£59.95
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts.....	£99.95
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts.....	£49.95
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts.....	£89.95

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

## "NEW" M-100 Professional 24-2300MHz Pre-amplifier



This is brand new M-100 Professional GaAs FET Pre-amplifier uses the most upto date and advanced technology. With variable gain control and band pass filters to minimize interference, just connect between your radio and antenna for amazing results!

### SPECIFICATION:

- Frequency: Band A:225-1500MHz Band B:108-185MHz Band C: 24-2300MHz
- Gain: -10 to +22dB
- Impedance: 50 Ohms ● Weight: 100g
- Size: 100 x 53 x 38mm ● Power: 9v battery (PP3) or 12v DC supply

**Just £69.95**  
plus £5.00p+p

Visit the new look Moonraker  
website @

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### HF Verticals

**VR3000** 3 BAND VERTICAL FREQ: 10-15-20 Mtrs  
GAIN: 3.5dBi HEIGHT: 3.80m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials) .....**£99.95**  
OPTIONAL 10-15-20mtr radial kit.....**£39.95**

**EVX4000** 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs  
GAIN: 3.5dBi HEIGHT: 6.50m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials) .....**£119.95**  
OPTIONAL 10-15-20mtr radial kit.....**£39.95**  
OPTIONAL 40mtr radial kit .....**£14.95**

**EVX5000** 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs  
GAIN: 3.5dBi HEIGHT: 7.30m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials) .....**£169.95**  
OPTIONAL 10-15-20mtr radial kit.....**£39.95**  
OPTIONAL 40mtr radial kit .....**£14.95**  
OPTIONAL 80mtr radial kit .....**£16.95**

**EVX6000** 6 BAND VERTICAL FREQ: 10-15-20-30-40-80 Mtrs  
GAIN: 3.5dBi HEIGHT: 5.00m RADIAL LENGTH: 1.70m(included) POWER: 800 Watts .....**£299.95**

**EVX8000** 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) GAIN: 3.5dBi HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts.....**£319.95**  
80 MTR RADIAL KIT FOR ABOVE.....**£89.00**

(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

### Scanner Discone Antennas

**DISCONE** ★ Type: Ali ★ Freq: 25-1300MHz  
★ Length: 100cm ★ Socket: PL259.....**£29.95**

**SUPER DISCONE** ★ Type: Ali ★ Freq: 25-2000MHz  
★ Length: 140cm ★ Socket: PL259  
★ Gain:3dB.....**£39.95**

**HF DISCONE** ★ Type: Ali ★ Freq: 0.5-2000MHz  
★ Length: 185cm ★ Socket: PL259  
★ Gain: 1.5dB.....**£49.95**

**ROYAL DISCONE 2000** ★ Type: Stainless  
★ Freq: RX: 25-2000MHz Freq: TX 6/2&70cm+ ★ Length: 155cm  
★ Socket: N-Type ★ Gain: 4.5dB.....**£49.95**

**ROYAL DOUBLE DISCONE 2000** ★ Type: Stainless ★ Freq RX: 25-2000MHz Freq: TX 2&70cm ★ Length: 150cm ★ Socket: N-Type  
★ Gain: 5.5dB.....**£59.95**

### Scanner Mobile Antennas

**G.SCAN II** ★ Type: Twin coil ★ Freq: 25-2000MHz  
★ Length: 65cm ★ Base: Magnetic/Cable/BNC .....**£24.95**

**SKYSCAN MOBILE** ★ Type:Multi whip  
★ Freq: 25-2000MHz ★ Length: 65cm  
★ Base: Magnetic/Cable/BNC .....**£19.95**

### Scanner Portable/Indoor Antennas

**SKYSCAN DESKTOP** ★ Type: Discone style  
★ Freq: 25-2000MHz ★ Length: 90cm  
★ Cable: 4m with BNC.....**£49.95**

**Tri-SCAN 3** ★ Type: Triple Coil ★ Freq: 25-2000MHz  
★ Length: 90cm ★ Cable: 4m with BNC.....**£39.95**

### Scanner Hand-held Antennas

Going out? Don't miss out! Get a super Gainer!  
p+p just £2.00

**MRW-100 SUPER GAINER** ★ Freq: 25-1800MHz ★ Length: 40cm ★ Fitting: BNC .....**£19.95**

**MRW-210 SUPER GAINER** ★ Freq: 25-1800MHz ★ Length: 40cm ★ Fitting: SMA .....**£19.95**

### Scanner Fibreglass Vertical Antennas

**SSS-MK1** Freq: 0-2000MHz RX ★ Length: 100cm ★ Socket: PL259 .....**£29.95**  
**SSS-MK2** Freq: 0-2000MHz RX ★ Length: 150cm ★ Socket: PL259  
★ Gain:3dB over SSS-1.....**£39.95**

### Scanner Preamplifier

A great pre-amp at an incredible new low price!

**MRP-2000 Mk2** ★ Active wideband pre-amp  
★ Freq: 25-2000MHz  
★ Gain: 6-20dB ★ Power: 9-15v (battery not included) ★ Lead: 1m with BNC.....**£29.95**  
**M-100** ★ Professional 24-2300MHz pre-amp ★ Freq: Band A:225-1500MHz Band B:108-185MHz Band C: 24-2300MHz ★ Gain: -10 to +22dB ★ Impedance: 50 Ohms.....**£69.95**

### Guy Rope 30 metres

**MGR-3** 3mm (maximum load 250 kgs).....**£6.95**  
**MGR-4** 4mm (maximum load 380 kgs).....**£14.95**  
**MGR-6** 6mm (maximum load 620 kgs).....**£29.95**

### Hand-held VHF/UHF Antennas

Postage on all handies just £2.00

**MRW-300** ★ Type: Helical rubber duck ★ Freq TX: 2&70 RX: 25-1800MHz ★ Power: 10w ★ Length: 21cm  
★ Connection: SMA .....**£12.95**  
**MRW-310** ★ Type: Helical rubber duck ★ Freq TX: 2&70 RX: 25-1800MHz ★ Power: 10w ★ Length: 40cm ★ Connection: BNC Gain: 2.15dBi .....**£14.95**  
**MRW-200** ★ Type: Helical rubber duck ★ Freq TX: 2&70 RX: 25-1800MHz ★ Power: 10w ★ Length: 21cm ★ Connection: SMA .....**£16.95**  
**MRW-205** ★ Type: Helical rubber duck ★ Freq TX: 2&70 RX: 25-1800MHz ★ Power: 10w ★ Length: 40cm ★ Connection: BNC Gain: 2.15dBi .....**£19.95**  
**MRW-222 SUPER ROD** ★ Type: Telescopic whip ★ Freq TX: 2&70 RX: 25-1800MHz ★ Power: 20w ★ Length:23-91cm  
★ Connection: BNC ★ Gain: 2m 3.0dB 70cm 5.5dB  
★ DX Performance .....**£24.95**

### Hand-held HF Antennas

Postage on all handies just £2.00

**MRW-HF6** ★ Type: Telescopic Whip ★ Freq: TX: 6m RX: 6-70cm ★ Power:50 Watts ★ Length: 135cm  
★ Connection: BNC .....**£19.95**  
**MRW-HF10** ★ Type: Telescopic Whip ★ Freq: TX: 10m RX: 10-4m ★ Power: 50 Watts ★ Length: 135cm  
★ Connection: BNC .....**£19.95**  
**MRW-HF15** ★ Type: Telescopic Whip ★ Freq: TX: 15m RX: 15-6m ★ Power:50 Watts ★ Length: 135cm  
★ Connection: BNC .....**£19.95**  
**MRW-HF20** ★ Type: Telescopic Whip ★ Freq TX: 20m RX: 20-6m ★ Power: 50w ★ Length: 135cm ★ Connection: BNC .....**£22.95**  
**MRW-HF40** ★ Type: Telescopic Whip ★ Freq TX: 40m RX: 40-10m ★ Power: 50w ★ Length: 140cm ★ Connection: BNC.....**£22.95**  
**MRW-HF80** ★ Type: Telescopic Whip ★ Freq TX: 20m RX: 80-10m ★ Power: 50w ★ Length: 145cm ★ Connection: BNC.....**£24.95**

### 100m Cable Bargains

**RG58** Standard 6mm coax cable .....**£24.95**  
**RG58M** Military spec 6mm coax cable.....**£39.95**  
**RGMINI8** Military spec 7mm coax cable.....**£54.95**  
**RG213** Military spec 9mm coax cable.....**£84.95**  
**WESTFLEX 103** mil spec 9mm coax cable.....**£84.95**  
**RH100** Military spec 9mm coax cable.....**£99.95**  
**FLEXWEAVE** Original antenna wire.....**£49.95**  
**PVC FLEXWEAVE** Original pvc coated antenna wire.....**£69.95**  
**300** Ribbon cable USA imported .....**£59.95**  
**450Ω** Ribbon cable USA imported.....**£69.95**

### Books

**UKSCAN-B** The 9th Edition UK Scanning Directory A must have publication! .....**£19.50**

**LOGBB-B** Base log book for licensed amateurs .....**£4.95**  
**LOGBM-B** Mobile/Portable log book for licensed amateurs.....**£4.95**

### Patch Leads

#### STANDARD LEADS

**1m RG58** PL259 to PL259 lead .....**£3.95**  
**10m RG58** PL259 to PL259 lead .....**£7.95**  
**30m RG58** PL259 to PL259 lead .....**£14.95**

#### MILITARY SPECIFICATION LEADS

**1m RG58** Mil spec PL259 to PL259 lead .....**£4.95**  
**10m RG58** Mil spec PL259 to PL259 lead.....**£10.95**  
**30m RG58** Mil spec PL259 to PL259 lead.....**£24.95**  
**1m RG213** Mil spec PL259 to PL259 lead.....**£4.95**  
**10m RG213** Mil spec PL259 to PL259 lead .....**£14.95**  
**30m RG213** Mil spec PL259 to PL259 lead .....**£34.95**  
**1m H100** Mil spec PL259 to PL259 lead .....**£5.95**  
**10m H100** Mil spec PL259 to PL259 lead.....**£19.95**  
**30m H100** Mil spec PL259 to PL259 lead.....**£44.95**

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

### ATOM Single Band Mobile Antennas

New low profile, high quality mobiles that really work!

**ATOM-6** ★ Freq: 6m ★ Length: 130cm ★ Power: 200W  
★ Fitting: 3/8.....**£22.95**  
**ATOM-6S** ★ Freq: 6m ★ Length: 130cm ★ Power: 200W  
★ Fitting: PL259.....**£24.95**  
**ATOM-10** ★ Freq: 10m ★ Length: 130cm ★ Power: 200W  
★ Fitting: 3/8.....**£22.95**  
**ATOM-10S** ★ Freq: 10m ★ Length: 130cm ★ Power: 200W  
★ Fitting: PL259 .....**£24.95**  
**ATOM-15** ★ Freq: 15m ★ Length: 130cm ★ Power: 200W  
★ Fitting: 3/8.....**£22.95**  
**ATOM-15S** ★ Freq: 15m ★ Length: 130cm ★ Power: 200W  
★ Fitting: PL259 .....**£24.95**  
**ATOM-20** ★ Freq: 20m ★ Length: 130cm ★ Power: 200W  
★ Fitting: 3/8.....**£22.95**  
**ATOM-20S** ★ Freq:20m ★ Length:130cm ★ Power: 200W  
★ Fitting: PL259 .....**£24.95**  
**ATOM-40** ★ Freq: 40m ★ Length:130cm ★ Power:200W  
★ Fitting: 3/8.....**£24.95**  
**ATOM-40S** ★ Freq: 40m ★ Length: 130cm ★ Power: 200W  
★ Fitting: PL259 .....**£26.95**  
**ATOM-80** ★ Freq: 80m ★ Length: 130cm ★ Power: 200W  
★ Fitting: 3/8.....**£27.95**  
**ATOM-80S** ★ Freq: 80m ★ Length: 130cm ★ Power: 200W  
★ Fitting: PL259 .....**£29.95**

### ATOM Multiband Mobile Antennas

**ATOM-AT4** ★ Freq: 10/6/2/70cm ★ Gain: (2m 1.8dBd) (70cm 3.5dBd) ★ Length: 132cm ★ Power: 200w (2/70cm) 120w (10/6m) ★ Fitting:PL259.....New low price **£49.95**  
**ATOM-AT5** ★ Freq: 40/15/6/2/70cm ★ Gain: (2m 1.5dBd) (70cm 3.5dBd) ★ Length: 129cm ★ Power:200w (2/70cm) 120w (40/6m) ★ Fitting:PL259.....New low price **£59.95**  
**ATOM-AT7** ★ Freq: 40/20/15/10/6/2/70cm (5 bands at once) ★ Gain: (2m 1.8dBd) (70cm 3.5dBd) ★ Length: 200cm ★ Power: 200w (2/70cm) 120w (40/6m) ★ Fitting: PL259 .....New low price **£69.95**

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# The Alinco DJ-V17E Handheld

Richard Newton G0RSN manages to squeeze a review in for *PW* while on holiday as he's so keen!

It's always a pleasure and never a chore to put a rig through its paces for *PW* and it also gives me an opportunity to get on the air a bit more often than I normally manage! The subject this time is the Alinco DJ-V17E and it's a single band Amateur Radio hand-held radio covering the 144MHz band.

The work for *PW* gave me the opportunity – while putting this little rig through the rigours of a review – to get back in touch with old friends who I'd not spoken to in a very long time and rediscover the 'buzz' of this wonderful hobby!

## Uncomplicated Radio

The Alinco DJ-V17E Handheld is an uncomplicated 144MHz hand-held radio, a 'handie talkie' as our American counterparts would say. It covers 144 to 145.995MHz in 5, 10, 12.5, 15, 20, 25 and 30kHz steps. Having said this, the review rig actually covered 130MHz to 173.995MHz with very good performance on Marine Band receive.

On unpacking the 'DJ-V17E I was immediately struck by the comfortable size and after fitting the battery, the weight of the rig! In my rather humble opinion both were a bit like 'Mary Poppins', "Practically Perfect in Every Way." You see, I like a rig that I know I'm holding – one that fits well in a hand and feels like it means business!

The DJ-V17E with the supplied battery pack fitted, weighs in at approximately 280g or (9.9 oz) and it measures 58(W) x 110(H) x 36.4(D)mm (2.28(W)x4.33(H)x1.43(D) inches).

The rig is supplied with a helical antenna with SMA fitting, a belt clip and a wrist strap, it also has a comprehensive user manual. In fact, it was the first Alinco instruction book I've read in some time – and I have to say it's a massive improvement on the Alinco literature I remember from years gone by. It's well laid out and easy-to-read.

The rig offers an impressive 5W output just on its own supplied battery pack, this is a 7.2 V 700mAh Ni-MH pack that constitutes the whole back of the radio! The radio will also run on external power, 7 – 16V d.c. through a small socket on the side of the unit, although I used battery power for the review.

## Maximum Output

The maximum output on the DJ-V17E is 5W although it also has a low power setting that provides 800mW. Having just charged the rig I connected it to my rather old Daiwa twin needle s.w.r/power meter. Using a dummy load, the meter indicated just below 1W on low power and just over 4W on the high power setting. (Considering the age of my power meter this was close enough for me!).

It's very useful to have the flexibility to deliver 5W from a

'handie' but the operator should bear in mind that the current consumption on high power transmit is 1.4A! And as might be expected – I managed to deplete the battery in very short order

when chatting with some old friends during my way to work. However, I was impressed how the rig soldiered on with low power (more about that later).

## What's On Offer?

But, before I tell you about how the rig performed generally, I'll provide readers with a taste of what the DJ-V17E has to offer. To start, it's tempting to say that the transceiver is a 'no frills rig' but to be honest I feel that may be a slight injustice. The rig may not 'shout loud' and may not have shiny buttons and a colour screen – but there's a good collection of features packed inside.

In fact, the 'V17E is very professionally finished in black metal and high impact plastic; it's rugged-looking and has a very ergonomic design – fitting snugly into either the left or the right hand. Reading the book and some of the blurb on the rig it appears that it has a degree of waterproofing, apparently it's compatible to IPX7. Although I'm not certain what standard that is, the book tells me that means the rig could be submerged to a depth of one metre for 30 minutes!

Obviously there's not much point in submerging a radio! But it does give the user some idea of the waterproofing abilities claimed and it would definitely be a bonus when operating out and about in wet conditions, such as (for example) the British summer!

The waterproofing may explain why there's non-standard socket fitted for connection to a speaker-microphone or external equipment such as a terminal node controller (TC). The non-standard socket is on the top of the rig in the form of a single 3.5mm socket, designed to take a jack plug with four connection segments. **Note:** Alinco offer (as an optional extra) a cable with one of the four way jacks on one end and a normal 3.5mm stereo and 2.5mm stereo moulded socket on the other end.

The DJ-V17E has a small display in modern terms, although the characters are large and easy to read. It's an alpha numeric display so memories can be given name tags and it can be





effectively back lit with a green light this also back lights the 16-button dual tone multifrequency (DTMF) keyboard. The keyboard is very convenient for direct entry of frequencies and transmission of the tones for accessing Echo link nodes and the like.

The transceiver also offers full continuous tone controlled squelch system (CTCSS) and digitally controlled squelch (DSC) and repeater access. It also has 1750, 2100, 1000 and 1450kHz tones for repeater access, so all bases are covered here!

The transceiver is controlled by one rotary knob that does several jobs, in conjunction with the **Function** key on the side panel and various front panel keys. The rotary control is well positioned on the top of the rig and the default use for this is tuning through either the **VFO** or **Memories**.

If the operator wants to adjust either the volume or the squelch, they have to press a front panel button and then rotate the knob. This wasn't an issue for me as far as the squelch was concerned – but I found it a real niggle when it came to the volume! I would much rather the volume control to be the primary function and tuning and squelch secondary, as this suits my style of operating. However, I fully accept that other operators may have very different needs. I was hoping to have the flexibility to be able to override this configuration in a set-up menu however this was not possible.

**Note:** The DJ-V17E does have a small menu where the user can configure functions such as battery save, scan resume settings and DTMF settings.

Having mentioned my control preferences, I still think the 'V17E offers a fair package for the price as it offers 200 memories and one call memory, scan facilities on memories and the v.f.o. There are also useful little facilities such as an 'easy' repeater offset function and receive attenuator to help overcome strong adjacent signal interference.

Incidentally, the attenuator function intrigued me! The cynic in G0RSN couldn't help but think it was included because the rig was prone to suffer from near-by interference. However, my rather simple and practical tests to check out whether it was interference prone proved I was wrong!

My tests consisted of tuning the DJ-V17E to 145.2625MHZ, before I then out a call 12.5kHz up the band using my Icom IC-7400 on 100W. Nothing, not a 'dickie bird' was heard on the Alinco! Likewise, when I using the 'V17E while transmitting into



*Complete with batteries, the DJ-V71E feels snug in the hand.*

a dummy load (While monitoring on the Icom) the transmissions were really 'tight' and well within 12.5kHz.

## On The Air

So the time had come to try the DJ-V17E out on the air and see how it fared. I first used it with the helical whip and got favourable reports from my father-in-law, **Terry Wood G7VJJ**, who was on his way over to visit us and he reported the audio sounded good. I was happy with the coverage we'd achieved considering Terry was mobile – about 1.6km (1 mile) away and I was using the rig's the helical antenna

from the house.

I also used the rig to keep in contact with the family while I was out and about in the local area. Even on low power it did very well, receiving favourable reports from my sons, **Tom, M3TJN** and **Oliver M3ORN** and my wife **Diane M3HJN**.

Diane was out mobile in the car on one occasion while I was 'pedestrian' mobile on foot, when I asked for a report. Replying she said, "Brilliant Richard, nice and clear I can understand every word that you are saying" – I just had to record that in the review!

The next step was to see how the transceiver coped on a main antenna and trying to get some contacts outside the family! Well what fun I had! My intention was to have gone on the local repeater and try and pick up a couple of contacts and perhaps get a simplex report as well and I wasn't disappointed!

I connected the transceiver to my Watson W2000 tri-band collinear antenna (my station is about 27m (90ft) above sea level and the antenna is only about 4.5m (15ft) above ground level. The rig was operating just on battery power and at the high power setting and I had no problem opening the GB3SC repeater in the centre of Bournemouth, about 16km (10 miles) away from my Ferndown home.

My first two contacts were with two stations (via the repeater GB3SC), **Martin G4GTH/M** and **John G0VPJ**. I rarely go on the repeater and had not spoken to either of these chaps for ages! In fact, I had not seen or spoken to Martin in over 10 years – so it was great to hook up again and say 'hello'.

Martin was on his way to work heading east along the A31 and onto the M27 and John was at home in Verwood, about 11km (7 miles) away from me. The initial comments on the audio were good from both stations but both Martin and John commented on the received audio being a little 'quiet'.

This, I discovered, was due to the fact I had cobbled together an SMA-to-BNC connector and then a BNC to PL259 connector on a short bit of coaxial cable. Added to this, I was leaning over trying to use the radio at an angle that any self respecting contortionist would have been justifiably proud!

Once I replaced the coaxial cable with a slightly longer length, I was able to hold the radio – and myself – at a far more reasonable angle, thus speaking into the internal microphone at the correct angle and with my voice at full strength!

After the modifications the reports were somewhat

*The non-standard speaker/microphone socket (central) and SMA antenna connector (right).*





improved! Martin said, "Very readable Richard. Sounds good and a lot louder now! My ear will take some time to recover though!" (being mobile Martin had turned his volume up high – anticipating my low audio unaware I had fixed the problem between 'overs', sorry Martin!).

John's comments were equally encouraging, "It's working fine now Richard, very clear, very readable and you are very strong on the repeater input." It was very useful to get this report from John on my simplex signal with him, as this is where I have to mention my other little 'niggle' with DJ-V17E. This came about because I was unable to find anyway to check the input frequency when I was operating in repeater mode. (Again I absolutely accept that this may not be a problem for most operators – but I like being able to easily check the reverse frequency when using an offset.

Encouraged to write by the excellent reports I received on the air, I was just about to close down when I heard **Antoine G/F8CKH/M** call through the repeater. I then had a great chat with Antoine who was on his way to the local Bournemouth International Airport at Hurn to do a flying assessment. Antoine had this to say about the Alinco's audio, "Congratulations Richard, very nice modulation, very clear, no problem."

Antoine was using a Yaesu FT-857D running 5W and a mobile whip. It was during this very enjoyable contact that the battery on the DJ-V17E decided to give up. However, I switched to low power to my amazement there was enough power left in the little rig for me to have a simplex contact with Antoine and after that for me to have two more contacts!

Another old radio friend, **Simon G0FOZ** called me on the simplex frequency I was using, and I was delighted to have made the trip to Simon, because although he is only about 15km (9 miles) away it's not an easy radio path. Simon gave me a 5 and 2 report on low power with a dying battery and said, "nice punchy audio Richard, good signal", I was pleased with that!

The last station to call in was **Derek G0DL** from Poole about 12km (7.4 miles) away from me, again Derek was complimentary about the audio and commented on how pleased he was that I was trying the hand-held out on a main station antenna. As Derek rightly pointed out, some hand-held radios don't cope well with being attached to a higher gain antenna, although from my own tests the DJ-V17E doesn't have this problem and performed extremely well indeed.

## Product information

**Product:** Alinco DJ-V17E 144MHz hand-held transceiver

**Company:** Nevada, Portsmouth (UK Importers & Agents)

**Pros:** Good value for money, nice to handle with excellent performance on the Amateur Band and excellent reception of the Marine Band. A really rugged 'fist full' of rig!

**Cons:** To adjust either the volume or the squelch, a front panel button has to be pressed, followed by rotation of the main control knob. No (apparent) way of listening to repeater inputs.

**Price:** £129.95 + p&p

**Supplier:** My thanks for the loan of the review transceiver go to **Nevada Radio, Unit 1, Fitzherbert Spur, Farlington, Portsmouth PO6 1TT. Tel: 023 9231 - 3090 FAX: 023 9231 3091 E-mail: sales@nevada.co.uk, website: www.nevadaradio.co.uk**



## Marine Frequencies

While I was typing up this review I sat the 'V17E on the table next to me attached to the W2000 antenna and entered some Marine Band frequencies into the memories and set it to scan. It was great to have a listen about while typing this up and I got some excellent results.

The scan speed on the rig is not comparable to a purpose made scanner but it worked well and the receive sensitivity and audio quality, even from the internal speaker, was more than adequate.

In conclusion I have to say that I think that the DJ-V17E is good value for money. It's ergonomic in design, robust and a real 'fist full' of rig. It performs very well indeed and because of the transceiver's rugged and waterproof qualities along with its reliability, I think it would be a great choice on field days, camping trips, biking, walking or RAYNET exercises. I've always found Alinco to be a name that means quality at affordable prices and this rig is no exception to the rule.

### Manufacturer's Specifications

#### General

Frequency range (E) model

Transmit: 144 – 145.995MHz

Receive: 144 – 145.995MHz  
(Plus Marine Band).

Modulation: F3E (FM)

Frequency steps: 5, 10, 12.5, 15, 20, 25, 30kHz

Memory channels: 200 channels, 1 call channel, 1 repeater access function memory.

Antenna impedance: 50Ω unbalanced

Frequency stability: ±5ppm

Microphone impedance: 2kΩ

Supply voltage: d.c. 7- 16V (via ext. d.c. input), Current consumption 14A (typical) at 5W

Temperature range: With external d.c. -10° to +60°C, with battery pack -10° to 45°C

Ground: Negative ground

Dimensions: 58(W) x 110 (H)

Weight: 280g (9.9oz)

DTMF: via 16-button keypad

CTCSS: encoder/decoder

installed (39 tones)

DCS: encoder/decoder

installed (104 codes)

#### Transmitter

Power output: Approx. 5W (with battery), Approx. 5W with ext. d.c. 13.8V), 800mW (low)

Modulation: Variable reactance

Spurious emissions: -60dB or less

Maximum deviation: ±5kHz

Microphone impedance: 2kΩ

#### Receiver

System: double conversion superhet

Sensitivity: 0.2μV or less

Int. freq.: 1st 21.7MHz, 2nd 450kHz

Sensitivity: -6dB at 12kHz or more, -60dB at 26kHz or less

Audio output: 500mW (max.) 400mW (into 8Ω with 10% distortion).



# The Universal Antenna

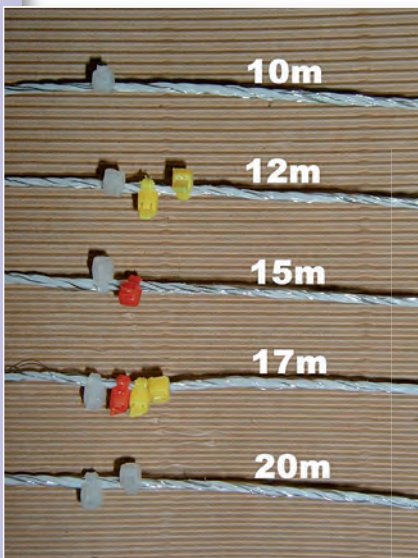
I think that the best antenna in the world is one that's cut (tuned) for the frequency in use. By that reasoning almost every Amateur Radio antenna in the world is to a greater or lesser degree a compromise! The individual Amateur may swear by the G\*\*\* that has been erected in the back yard but, if we were to check it with an antenna analyser and see where it's radiating most efficiently. The results might bring a surprise!

Most of the time we (as Radio Amateurs) 'get away with it' operating with less than perfect antennas. However, the Amateur Radio Licence states that we should be interested in 'self education in radio communication' – so let's think about how it's possible to get the best out of our individual installations.

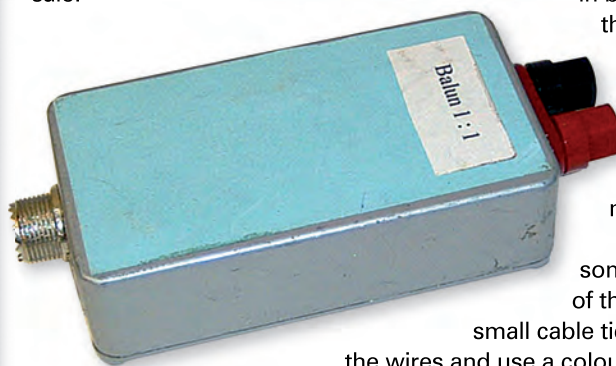
Thinking ahead to this year's portable/mobile operating, with a lot of QRP operation thrown in, I was wondering how to re-vamp and put together a single high frequency (h.f.) antenna systems, which would satisfy all my needs. It would need to be light, as efficient as possible, one person erectable, capable of easy replication on different sites, **and cheap!**

The idea I came up with isn't a new one, indeed the Armed Forces – well perhaps not the Royal Navy, but almost certainly the Royal Marines, the Army and the Royal Air Force – were equipped with something of this nature for years. In fact, I believe that there is,

somewhere on the commercial market, something of this type still available but I have not been able to find one on sale.



**Fig. 1.** Marking the theoretical tuned lengths.



**Fig. 2.** Home-brewed 1:1 balun (Not weather proof)

## The Universal Dipole

I remembered the last time I wanted to shorten a Field Day antenna in order to 'tweak' it onto tune and at the same time not to damage it for the next time out. I didn't cut it off – I simply folded it back on itself a few hundred millimetres and fixed it up with a couple of cable ties or an odd bit of string and I've no doubt there are readers who've carried out the same process.

Think **bigger** is my message! If I require to shorten a 14MHz dipole to make it into a 21MHz antenna then I have to 'lose' something in the region of 1.5m of wire at each end of a dipole. Of course, that's not the sort of length I could merely fold back. So – I wound it up on spool. Job done!

Then, if the antenna does not tune up precisely where I want it, or it doesn't have the lowest standing wave ratio (s.w.r.), I can easily adjust the length of each leg as required. Then I could have a chance of putting out the best signal possible in any location.

## Other Bands

However, what if I also want to carry a set of 7, 10, 18, 21, 24, 28, 50, 70, and 144MHz dipoles with me? (I think that 1.8 and 3.5MHz dipoles are a bit big for portable operation).

Fortunately, the requirement for the multi-band antenna doesn't mean 18 separate elements, it means two. To use it, all I have to do is to simply 'cut' it to the longest length by rolling up the wire until the desired frequency of operation is in tune.

The trick of course is to set up the antenna to be on tune on each of the **nominal** frequencies I am interested in before I set out to operate in the field.

To help those readers who'd like to try the Universal Antenna themselves I suggest the following procedure – it's not at all difficult!

First, mark the frequency in some way or other on both legs of the dipole. I prefer putting a small cable tie as tight as possible around the wires and use a colour code or a reference of some sort to ensure that the same length of wire is on each side of the dipole as it's erected. Try four cable ties for 7MHz, two for 14MHz, one for 28MHz and so on. The

Roy Walker G0TAK/2E1RAF describes his most enjoyable antenna – a dipole 'cut' for the operational frequency.



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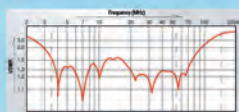
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- Great performance on all bands
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The Comet CHA 250B vertical covers all the way from 80m through to 6m with a VSWR of less than 1.5:1. It's probably the easiest vertical to install, simply mounting on any pole and requiring no radials. If you are restricted for antenna installation space, the CHA-250B could be the perfect answer.

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#### Dummy Loads

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keen constructor can back those up with an additional – but differently coloured – cable ties for the intermediate bands as in **Fig. 1**.

I recommend that constructors use a fishing pole – one of the telescopic fibreglass types – for the centre support of the antenna and that the dipole is fed through a 1:1 balun as in **Fig. 2**. This will cope with any residual imbalance between the antenna and transmitter and allow the use of lightweight coaxial cable feeder such as RG174.

Additionally, erecting a dipole in an inverted 'Vee' formation will reduce the impedance below the nominal 75Ω to somewhere closer to 50Ω. **Note:** Erecting an inverted Vee dipole antenna close to the ground will ensure a nice near vertical incidence skywave (NVIS) pattern of radiation.

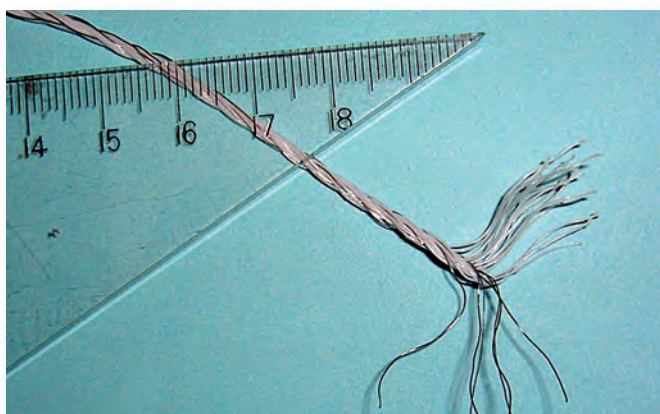
### Strong Cord

Some light – and strong – cord is required to secure the ends of the dipoles and I also use plastic agricultural electric fence poles to ensure that the dipole ends do not get too close to the ground. **Note:** Please use a lightweight stranded wire for the elements in your version of the antenna. A break in a single wire will put the antenna seriously out of kilter and a repair (if you can find the break in the first place) will disturb your carefully calculated  $\lambda/4$  lengths.

To continue on the agricultural theme – I live in the middle of a field\* – I use agricultural electric fence wire for portable antennas. This stuff has some serious advantages and it's incredibly tough – bolt cutters or heavy scissors are required to make a decent cut in it!

The variety of electric fence wire that I've obtained contains six steel wires and about 14 polypropylene cores. It's light, strong and resistant to stretching once it has settled down, **Fig. 3**. Of course it is weather proof.

One big plus of the wire is that it's designed to 'leak' electricity. If you have ever inadvertently leaned against an



**Fig. 3:** Six steel wires and 14 polypropylene stranded electric fence wire.



**Fig. 4:** One end-reel option.

**Table 1:**

Band	Frequency (MHz)	Nominal $\lambda/4$ (metres)
40m	7.000	10.190
	7.200	9.900
30m	10.100	7.007
	10.150	7.003
20m	14.000	5.010
	14.350	5.007
17m	18.068	3.904
	18.168	3.903
15m	21.000	3.400
	21.500	3.300
12m	24.900	2.870
	25.000	2.860
10m	28.000	2.520
	29.600	2.360

active electric fence you will realise what I mean – that is when you come back to earth! In radio terms this means that the wound up surplus antenna wire doesn't form a coil but is effectively a 'ball' of conducting material. It's therefore much less likely to affect the tuning of the element.

A cable tie around the 'active' element and the last turn in the 'ball' of wire will secure the length and a stretch of cord will stand in as an insulator, **Fig. 4**. A word of warning – this stuff has an innate ability to jump off any reel upon which it's wound. Electric fence wire is the stuff that gives wire a bad name.

*\*Editorial comment: Readers – please don't feel too sorry for Roy. His home is in the middle of a field but it's a nicely converted barn! G3XFD.*

### Packing List

So the antenna packing list for your next portable operation is: A fishing rod, three electric fence poles (the third to locate and support the fishing rod), a 1:1 balun, a suitably terminated length of RG147 coaxial cable, lengths of light, strong polypropylene cord, a set of small plastic tent pegs, and duct tape.

I also recommend the use of an automatic antenna tuning unit (a.a.t.u.) or antenna tuning unit (a.t.u.) of your choice. This is because some form of a.t.u. will be needed as soon as the operator strays up or down the band from the previously 'tuned' length.

How well does it work? It's a Dipole and it works as well as any other dipole erected at low height. It will give you a fairly good all round coverage because of its NVIS characteristics.

However, the antenna is not just a dipole – it's a universal dipole! Because of the ability to 'tune' the dipole to the required working frequency, it will give better results than a dipole used 'off frequency'. Individual circumstances and installations will give different results but it does give the user an additional tool to get the best out of their equipment.

To help anyone thinking of making the antenna for themselves, I've calculated the **nominal**  $\lambda/4$  lengths for the top and bottom end of the most popular bands in **Table 1**. This may be of assistance but remember, every time a portable antenna is erected the fine tuning is bound to be different.

Happy hunting for DX!



## New! Flex SDR-5000



FlexRadio Systems introduces the FLEX-5000 family of ultra high performance Software Defined Radio (HPSDR) transceivers. The FLEX-5000 family builds on the very popular FlexRadio SDR-1000, and now integrates all I/Q data and hardware control over a single FireWire® (IEEE-1394) connection to a user provided computer. Sound cards and multiple cables are no longer necessary. Convenience and ease of setup are built right in!

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**£219.95**

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**SPECIAL SUMMER PRICE!** For more information see: [www.FT-950.com](http://www.FT-950.com)

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RRP: £99.95  
**Special Intro Offer: £79.95**



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- SWR: <2:1
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- Current consumption: <0.8A
- Auto tuning time: Approx. 2 seconds (first time tuning) Less than 1 second (return to memory frequency)
- Memory channels: 200
- Weight: 1.8 KG
- Size: 310 x 240 x 72mm (L - W - H)

**As reviewed by Steve White in Radcom**

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**Steve White, Radcom November.**



CG-3000 shown with optional remote switch

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- SWR: <2:1
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- Current consumption: <1.5A
- Memory channels: 800
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- Weight: 1.8 KG
- Size: 365mm x 240mm x 75mm (L - W - H)


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# Building & Using The Elecraft K3 Kit Transceiver Part 1



*After the successful construction phase, Geoff gets ready to work his Elecraft K3 rig on-air (part 2).*

component-level and is reminiscent, "of the old Heathkits", as noted by **Neill Taylor G4HLX** in his 2003 *PW* review. However, assembly of the newer model K3 kit **does not** require any soldering to be done.

The K3 kit will therefore appeal to builders who might not have the time or skills to assemble and align a complex radio with its many surface mount components. However, the basic theory of its operation can be appreciated through building one!

## Extending The K2

Extending the K2 takes some doing – but, as I discovered, Elecraft have done it and moved the design a big step forward in the K3. So, how does it

**T**he new Elecraft transceiver, the K3, was launched at the Visalia DX Convention in the USA on April 2007. It has been about eight years since the last launch of a major rig (the well respected K2) by this company and during this time numerous technical developments have occurred.

The designers of the K2, **Wayne Burdick N6KR** and **Eric Schwartz WA6HHQ**, have been developing the K3 for the last few years and have based the new radio's architecture on that of the older radio.

The designers' aim was to take the K2 into the next generation of high performance high frequency (h.f.) radios in a number of significant ways. As a result, the values quoted for dynamic range and close-in intermodulation performance for the K3 are extremely high, making it attractive for contest, DX and QRP communities alike. (See the Elecraft website [www.elecraft.com/news.htm](http://www.elecraft.com/news.htm) for the full specification).

The K2 was a kit that could be built at the

differ from its predecessor?

While the K2 is a single-conversion radio, the K3 has a double conversion architecture with a first intermediate frequency (i.f.) of 8.215MHz. An active mixer and post-mixer amplifier give a quoted dynamic range greater than 100dB, even for closely spaced signals.

At the first i.f., a crystal filter (which can be as narrow as 200Hz) is inserted in the front end of the chain before mixing down to the 2nd i.f. at 15kHz, where digital signal processing (DSP) is applied.

The filter is there to protect subsequent stages from overload by nearby strong signals. This tandem processing, between filter and DSP, gives the K3 its ability to hear weak signals in the presence of strong nearby signals.

Signal modulation, demodulation and a.g.c. are accomplished by the powerful 32 bit floating-point DSP before converting the signal to audio. On transmit, the audio is converted to a 24 bit digitised signal before being processed by the DSP.

Included in the basic K3 are a number of features that are offered as extras for the K2. These include: the 1.8MHz band, single sideband (s.s.b.), DSP and



*The large carton that arrived caused as much excitement as a birthday!*

Geoff Cottrell G3XGC had to wait a long time to get his K3 transceiver but it was worthwhile!



hardware/software noise blankers (NB). But the K3 also has some new features that include: the 50MHz band, amplitude modulation (a.m.), frequency modulation (f.m.) and data modes (e.g. PSK31, RTTY), c.w. as well as firmware upgrades that can be downloaded to the K3 via the internet. **Note:** The second receiver module is still being developed.

The radio is also physically larger than the K2, with an attractive custom liquid crystal display (l.c.d.) unit. A number of optional extras are available (full details next time). The options I chose were the 100W power amplifier model (KPA3), antenna tuning unit (a.t.u., KAT3), the transverter, receiver antenna input/output, and i.f. output interface (KXV3) and the general coverage (500kHz – 30MHz) receiver (KBP3).

### Six Months Delay!

Having discussed the idea of this article with the Editor **Rob G3XFD**, I ordered my K3 kit in May 2007, with the expectation that shipping would occur in July. However, I didn't receive it until January 2008, a delay of six months!

It turned out that Elecraft had been inundated by orders and had also themselves suffered some delays. But, patience is a virtue and I felt sure that Elecraft would not sacrifice quality for speed. Was I right? Read on to find out!

When the K3 kit did arrive there were boxes and more boxes! The boxes are filled with a large number of pre-assembled and tested boards in electrically protective bags, paper-wrapped casework parts and the user and assembly manuals.

The assembly instructions recommend first checking the inventory, which allows familiarisation with the parts and takes about an hour. This is necessary because there are many types of hardware items, each of which has to be identified and end up in the correct location!

The instructions are very clear about the different types of hardware item and only a few minor parts were missing. An E-mail to the company brought replacements within a week. Excellent service!

### Kit Choice

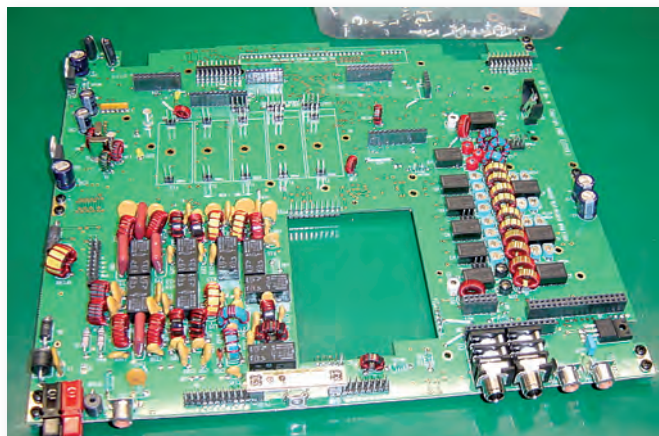
The K3 kit is available either ready-built or as a 'no-soldering' kit and I chose the second version. The kit consists of a number of pre-built and tested boards that plug together and are assembled into a case. Only basic tools are needed for assembly including Philips type screwdrivers and a basic digital multi-meter (DMM). However, good working lighting is also important!

The assembly instructions are

**Starting the assembly by putting the main p.c.b. and the first daughter-board into the case.**



*Emptying the contents of the cardboard box onto the table to begin the task of checking off that everything is there.*



*The main printed circuit board (p.c.b.) is the heart of all the variants of the K3.*

extremely detailed and clear with good colour photographs, with boxes to tick off after completing each step. To assemble the kit an anti-static mat and a wrist strap, grounded to a good earth is essential. Warnings about electrostatic discharge (ESD) hazard whenever sensitive parts are potentially at risk

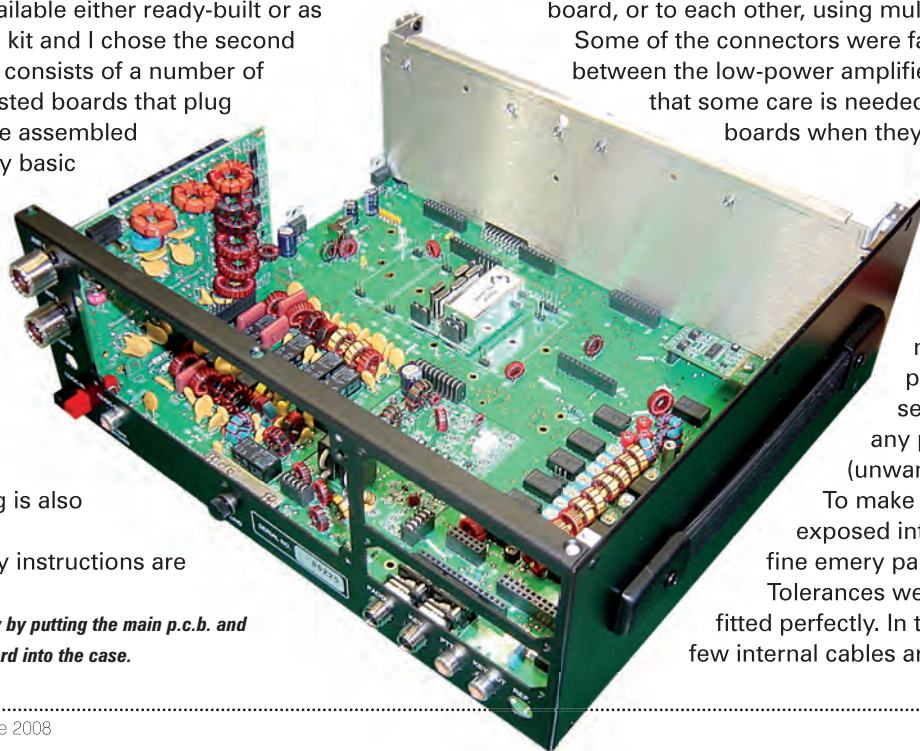
The radio frequency (r.f.) board is the heart of the K3, holding it together mechanically during construction. But, as assembly proceeds, more and more strength is given to the outer case. Other boards simply plug into the r.f. board, or to each other, using multi-pin connectors.

Some of the connectors were fairly tight, particularly between the low-power amplifier and r.f. boards. I found that some care is needed not to bend and stress boards when they're fitted.

The black-painted casework panels have un-painted areas of exposed metal where electrical ground contact is made. The manual emphasises that panels should be bolted securely together to avoid any possibility of 'birdies' (unwanted signals) in the radio.

To make sure, I gently cleaned exposed interior metal surfaces with fine emery paper.

Tolerances were tight but everything fitted perfectly. In the completed rig very few internal cables are needed as most of the





interconnections are of the board-to-board type, creating a very tidy interior!

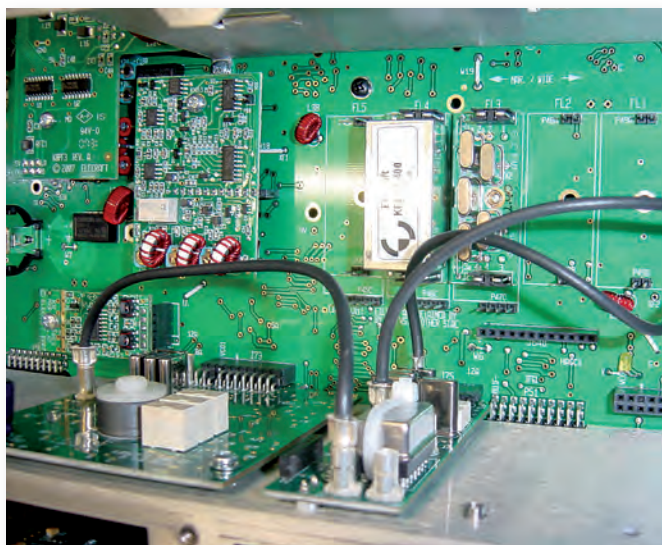
I then used the DMM to check for module grounding, lack of short circuits and basic resistance checks.

### Crystal Filters

There are five slots available for crystal filters and a number of filter options are available covering most needs. A 2.7kHz 5-pole filter is supplied as standard. As I'm mainly a c.w. operator, I also installed the optional 400Hz 8-pole filter. Incidentally, the filter locations, bandwidths and frequency offset values are recorded in the manual for later use.

### The Smoke Test!

No Elecraft kit would be complete without a 'smoke test'! The K3 is no exception. At a certain stage, and having passed a number of basic electrical tests, power is applied. It was very good to see the l.c.d. screen light up for the first time and not to see any smoke emerging!



Some daughter-boards have both plug and socket attachments as well as coaxial flying leads carrying signals directly from point to point.



And in goes the r.f. power amplifier module with its finned heatsink. The two fans on the back panel blow air across the fins.

The next step was to complete the top panel, fitting the loud speaker. I used double-sided sticky tape to keep the grille cloth flat. Then rubber feet were then fitted to the lower panels, before fitting the tilt stand.

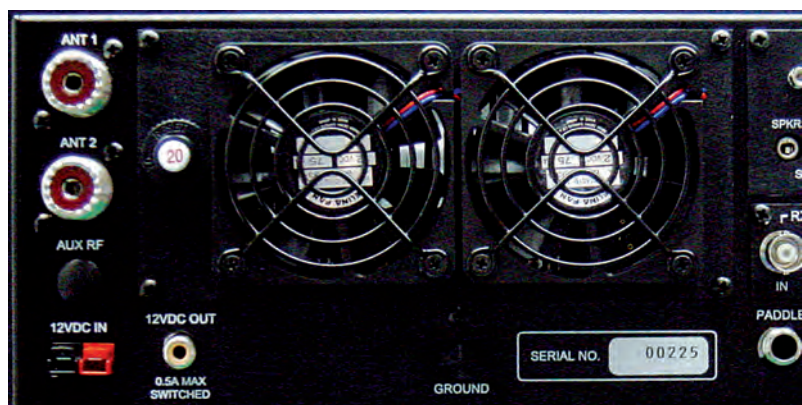
After seven hours of work, liberally interspersed with breaks and photo taking, construction of the basic K3 was complete! Compared with the K2, the build time was much shorter, as this is a 'final assembly' job. Incidentally, I didn't find any major errors in the manual.

### Testing & Calibrating

The basic K3 was then ready for testing and calibration, a set of procedures that took me about an hour. Firstly, following the instructions I used menu commands to initiate the frequency synthesiser's self-calibration. Then, using the crystal filter information, recorded earlier, I programmed it into the K3's memory so that correct filters would be selected when I was operating the rig.

I calibrated the temperature compensated crystal oscillator (TCXO) reference by zero-beating the sidetone with a reference broadcast signal (WWV on 10MHz). This was the first time I had connected an antenna and heard the signal coming in loud and clear and it was a great moment!

Next, by using the variable frequency oscillator (v.f.o.) knob, I adjusted the calibration parameter, until the beat



note was less than 1Hz. Using a dummy load, I set the the transmit gain calibration (at 5W power level). The power output is set to exactly 5W and each band is tested in turn to check that the power reading agrees on the **VFO B** display. I was delighted when all the tests and calibrations went without a hitch!

The next job was to update the firmware using the K3 utility program (available from the Elecraft website) and a standard RS232 serial cable connected to a PC. The utility program automatically downloads the latest main control unit (MCU) and DSP firmware to the PC's hard drive.

Installing firmware to the K3 takes about ten minutes. All files are saved on the PC, so if something goes wrong, earlier versions can be reinstalled.

A 'configuration file' can also be saved





*And here is the K3, switched on and working, ready for some on-air tests!*

for later possible use (I did this, just in case). although everything went smoothly! I think it's very comforting to know that the latest firmware developments (including new DSP filters) can so quickly and easily be installed, long after the hardware has been delivered.

The serial port also works with my computer logbook (*WinLog32*), as if there were a K2 and not a K3 connected.

It was then time to install and test the 100W power amplifier (p.a.) module (KPA3) which interfaces with the r.f. board via the KPAIO3 board. The installation and power tests at the 50W level passed without issue.

### Getting To Know K3

With all tests over, it was then time to for me to get to know the K3. I found that the front panel is well set out, with more knob space than the K2 and that there are many functions available and it takes practice to get used them. I also found it's a good idea to keep the owner's manual at hand as there's much to discover!

All the important controls are within easy reach and the largest of these is the weighted main tuning knob (**VFO A**). The action is smooth and the amount of friction is adjustable, using felt washers on the shaft – a simple and effective technique. The frequency appears at the top of the l.c.d. screen in large numerals, with the **B VFO** display below it.

Both A and B VFO knobs have another function – scrolling through either the main or configuration menus. Most of the push buttons have dual functions (using the 'tap and hold' system, similar to that used in the K2).

The band and mode buttons are located on the top left. Below the power button is a robust 6.3mm stereo headphone jack socket and an 8-pin microphone socket. Immediately to the left of the screen are the menu, display and a.t.u. tune configuration buttons. The often-used audio frequency (a.f.) and r.g. gain knobs are well-placed just below and to the right of these are the filter and DSP controls.

As the DSP bandwidth is varied, appropriate filters are switched in and out automatically with the filter in use being displayed on-screen. The shift control is used to slide

the bandpass response up and down in frequency, while remaining tuned to a station. This feature is effective in removing QRM from nearby stations.

Below the controls I've mentioned are those for the microphone gain, compression and transmitter output power (variable from 200 mW – 100 W). Monitor audio levels are also set here. (The K3 has a 'non-transmit' mode, a feature that's very useful for optimising audio settings without actually transmitting).

At the top right of the screen are three buttons for swapping between VFOs and operating with frequency split. The rest of the buttons in this group have multiple functions, for example to input frequencies directly, or access such features as the noise blanker (**NB**), the noise reduction (**NR**), notch filter (**NTCH**) or the automatic gain control (**AGC**).

Noise blanking is done both in the DSP and the i.f. and both can be used. To the upper right of the front panel there is a circular group of buttons that perform several functions including memory store and recall. For example, allowing you to store and recall the frequency and mode settings per band. Short, pre-recorded, often-used c.w. messages can be stored and accessed here.

There are also 100 general purpose memories. Finally, the frequently used **RIT/XIT** knob is located conveniently at the lower right. The rear panel sockets provided include those for a push-to-talk (p.t.t.) foot switch, c.w. key and c.w. paddles. There also are line-level isolated stereo TX/RX audio jacks for interfacing to a PC sound card and RS232 and ACC sockets are also present. An external linear amplifier can be conventionally switched via the RCA ('phono' type) 'key out' socket.

### Successfully Tested

I successfully tested the interface with my Acom 1000 linear amplifier using an RCA audio cable and a PL259 cable. With the KXV3 option, there are BNC sockets for a separate RX antenna, transverter input/output and an 8.215MHz i.f. output for use with a bandscope. There's also a handy 12V 500mA output, for accessories.

So, with everything ready – the next step was to switch on and enjoy using the rig. Join me next month as I share the pleasure of my K3 experiences on the air!





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Heavy duty rotator for HF beams, etc.  
Supplied with circular display control box  
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OUR PRICE **£299.99**

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Quality rotator for VHF/UHF. Superb for most  
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2m/5 element	No tuning required.....	£29.99
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## DIAMOND V-2000 COLINEAR

6m + 2m + 70cm (2.15/6.2/8.4dB).  
2 section (2.5m long) PL-259 fitting.  
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Superb quality Now **£84.99**

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Del £12.50

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A superb TDK 'snap fix' ferrite clamp for use  
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Simply close shut over cables and notice the  
difference! Will fit cables up to 13mm diameter. Ideal on

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**2 for £10.00 or 6 for £25.00 (P&P £3.50)**

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Fits most  
handies. Alinco,  
Kenwood, Yaesu.



**MS-107K**  
Fits Kenwood  
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**£14.99 P&P £3.00** **£14.99 P&P £3.00**

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2" mast-floor base plate.....	£13.50
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18" T & K brackets (pair).....	£22.99
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2" extra long U-bolt/clamp.....	£4.50
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## Q-TEK PENETRATOR

"We've sold 100s all over Europe"

★ 1.8 - 60MHz HF vertical ★ 15 foot high ★ No ATU or  
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SEND SAE FOR LEAFLET

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A superb (diamond quality) 6 band trap verticle  
antenna with trap radials - "rotary" trap system  
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Amazing performance. Twin folded dipole. 2-  
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80-10m & only 19.2m long! (Up to  
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Superb Japanese quality antenna  
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## LOW LOSS PATCH LEADS

£3.50 P&P



Connectors	Length	Price
PL-259 - PL-259	0.6m	£6.99
PL-259 - PL-259	1m	£7.99
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A superb quality ferrite ring with incredible  
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True military spec real UK coax

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1m 1 1/4" £10.50	2" £12.50	Longer lengths available - phone
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New extra heavy duty 2" mast set. 4 sections x 5 1/2 foot slot  
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A heavy duty-sleeved, mast set that will tightly slot together. 4  
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approx).

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20 foot mast.  
1 1/2" - 4 x 5 foot sections.  
(Swaged)

**£39.99**

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(Swaged)

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## NEW CAR BOOT MAST SET

Superb 18 foot (6 x 3 foot sections) that slot together.  
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**£34.99**

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A simple to fit but very handy mast pulley  
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Pulley will hang freely and take most rope up to  
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Wall bracket, screws not supplied. Simply screw to outside  
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SO-239 fitting. **£24.99** P&P £3.00



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Over the ear  
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**£9.95**  
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## DB-770H (BNC)

2m/70cm Tx + wide Rx.

High gain up to 5.5dB.

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P&P £4.00





# miffed by smith?

In Part 2, Ray Fautley G3ASG rounds off the Smith Chart introduction – hoping readers will find it a useful tool!

In Part 2, as promised, I'm looking at complex impedances. Nearly all practical impedances are neither pure resistance nor pure reactance and they're usually a combination of both. This is where the complications begin! (Hence complex impedances).

Take as an example a load which has been measured as  $72\Omega$  resistance and  $20\Omega$  capacitive reactance ( $72 - j20\Omega$ ) at the operating frequency. The feeder to be connected to it has a  $Z_0$  of  $50\Omega$ . How can the load impedance be entered on the chart?

Let's have a try together!

**1:** First we must normalise the values:  $(72 \div 50) = 1.44\Omega$  resistance, and  $(-20 \div 50) = -0.40\Omega$  reactance (i.e.  $1.44 - j0.40\Omega$ ).

**2:** Look at Fig. 11 and find the circle for a resistance of  $1.44\Omega$ . It's not actually drawn, so we will have to interpolate.

**3:** The circles for  $1.4\Omega$  and  $1.6\Omega$  are drawn, so we have to interpolate (that means have a good guess) to find where to draw the circle for  $1.44$ .

**4:** Next find the arc for a reactance of  $-0.40\Omega$

**5:** On Fig. 11 the arc for  $-0.40\Omega$  is shown

**6:** On Fig. 11 find the point where the circle for  $1.44\Omega$  resistance intersects the arc for  $-0.40\Omega$  reactance. Marked as 'E' on the chart.

What does this tell us? Well, in answering it immediately tells us that a load of  $72\Omega$  resistance and  $20\Omega$  capacitive reactance connected to a  $50\Omega$  coaxial cable will result in an s.w.r. of about 1.65. But how did it immediately tell us that the s.w.r. would be about 1.65? To find out how, take a look at the vertical scale which goes from top to bottom of the whole chart. Notice that above the centre, values on the s.w.r. circles are all fractions between 0.05 and 1.0.

Below the centre the scale has numbers above unity from 1.0 to 20. These numbers (which we also used for resistance values) also represent s.w.r. values. If circles, **all of which are centred at the centre point of the whole chart** are drawn, each circle represents a value of constant s.w.r.

In our example (Fig. 11) the s.w.r. circle (shown dotted) that crosses point 'E' intersects the vertical line at readings of 1.65 (below centre) and 0.6 (above centre). Thus it gives the s.w.r. as 1.65 (or 0.6 if you prefer it!).

## Another Example

Here's another example: A load is measured as  $33\Omega$  resistance and  $105\Omega$  inductive reactance ( $33 + j105$ ) at the frequency of operation. It is to be connected to a  $50\Omega$  coaxial cable. What value of s.w.r. would result?

**1:** Normalise the values:

$(33 \div 50) = 0.66\Omega$  resistance and  $(+105 \div 50) = +2.1\Omega$  reactance.

**2:** Look at Fig. 11 and find the circle for a resistance of  $0.66\Omega$ .

**3:** The circles for  $0.5\Omega$  and  $1\Omega$  are drawn, so we have to interpolate to find where to draw the circle for  $0.66\Omega$ .

**4:** Next find the arc for a reactance of  $+2.1\Omega$ .

**5:** On Fig. 11 the arcs for  $+2.0\Omega$  and  $+2.2\Omega$  are shown, so we need to interpolate between them for  $+2.1\Omega$ .

**6:** On Fig. 11 find the point where the circle for  $0.66\Omega$  resistance intersects the arc for  $+2.1\Omega$  reactance. Marked as 'F'.

**7:** With a compass point at the very centre of the chart, draw a circle having the distance to point 'F' as radius. That circle intersects the vertical line through the chart at between 0.1 and 0.15 at the top of the chart, and 5 and 10 at the bottom. So, the s.w.r. is about 0.11 or about 9.0. Both mean the same, but as in the previous example we'll use the 'above unity' value of about 9.0. (Actually

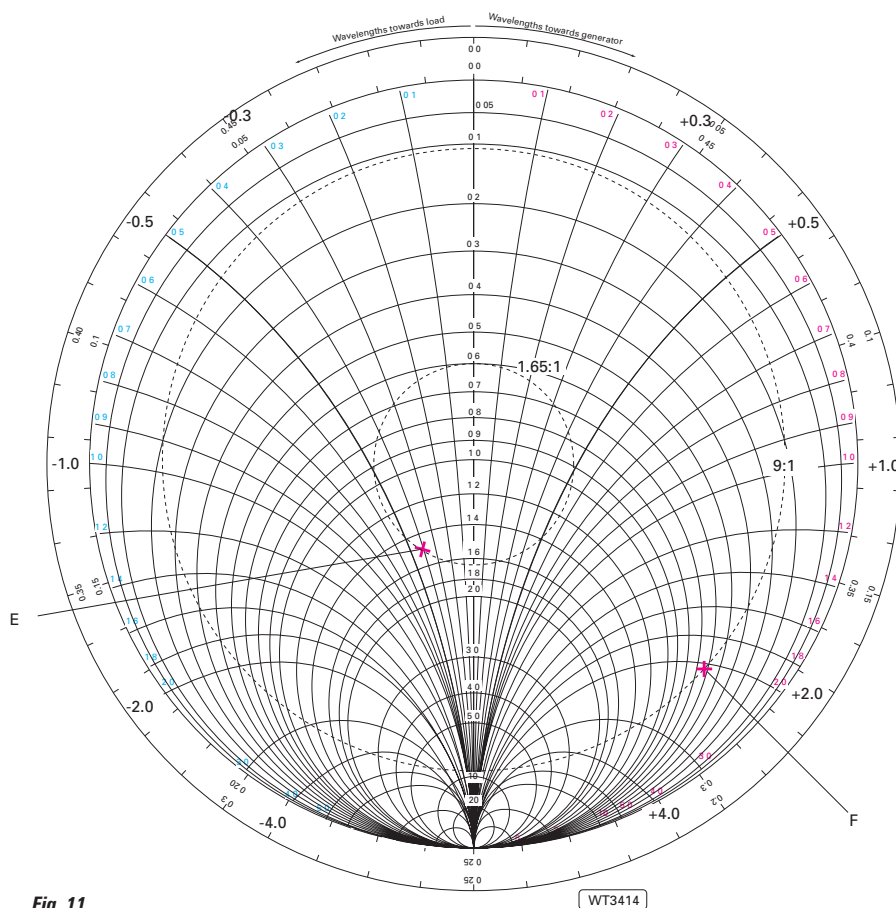


Fig. 11.



the value is 9.51 for those needing more precise results.) This tells us that a load of  $(33 + j105)\Omega$  connected to a  $50\Omega$  coaxial cable will result in an s.w.r. of about 9.0. Not a very good match!

To get used to this type of plotting, find the points representing:

- a)  $(10 - j4)\Omega$
- b)  $(100 + j73)\Omega$
- c)  $(55 + j23)\Omega$  and
- d)  $(24 - j200)\Omega$  yourself on the chart. Go on, you can do it! But don't forget to normalise the values first. Having plotted the points, determine the s.w.r. for each of them if the cable  $Z_0$  is  $50\Omega$ .

Answers:

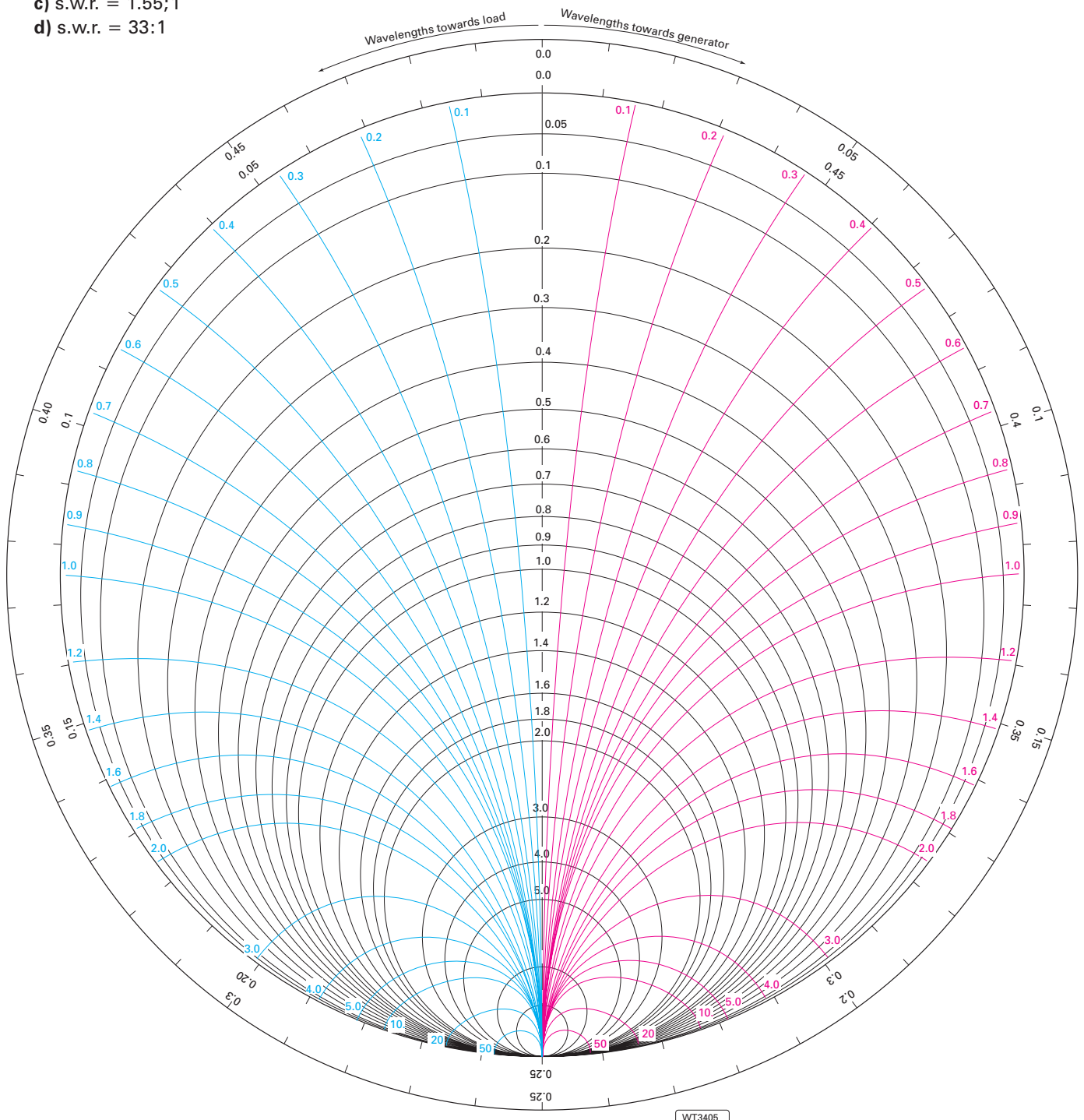
- a) s.w.r. = 5.0:1
- b) s.w.r. = 3.2:1
- c) s.w.r. = 1.55:1
- d) s.w.r. = 33:1

## Answers Are Approximations

Naturally all these answers are approximations and depend on the accuracy of interpolation and plotting. As long as you get answers within say  $\pm 5\%$  they should be good enough for practical use.

By now, plotting complex impedances on the chart should be possible – **if you have followed the rules!** (That's assuming you wanted to have a go in the first place!).

So, after all this effort all we've managed to do is to actually plot complex impedance values on the Smith Chart and discover the resulting s.w.r. when the complex impedance is connected to a cable (or feeder) of known  $Z_0$ . There must be more to it than that! Yes, there is, however – that's another story – for another article! ●





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**IC-7000** click on-line for 'Special Offers' on this rig @ **£899.00**

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# The 25th Annual Practical Wireless G4HLX 144MHz QRP Contest

## A special welcome to the new Adjudicator

As Editor of *PW* It's my very great pleasure to welcome **Colin Redwood G6MXL** as the new Adjudicator for our long established contest. The contest has been re-named the *Practical Wireless* G4HLX 144MHz QRP Contest to pay tribute to our great friend **Dr. Neill Taylor G4HLX**'s almost a quarter of a century dedication to the contest he originated. Incidentally, as everyone who has met him will know, Neill isn't one to 'blow his own trumpet' and it was only with some reluctance he agreed to allow me to rename the contest to honour him. Personally, I feel it's the most fitting tribute we can offer a man who has done so much to encourage a rather special Amateur Radio activity. Everyone associated with the contest was very sorry to see Neill depart from the contest because of his work in France. However, in typical fashion and reflecting his dedicated service to the contest, Neill has helped Colin to take up the reins and I'm sure everyone would like to see Colin settled in for many years himself! Finally, I wish everyone the best of luck in what must be the most enjoyable contest of the year! **Rob G3XFD.**

**T**he 25th Annual *Practical Wireless* G4HLX 144MHz QRP contest takes place on Sunday 8th June 2008 from 0900 to 1600UTC. The format is simple, designed to maximise participation from newcomers and keen contesters alike, whilst keeping it a friendly and fun event to take part in.

For those new to Amateur Radio contests, the *Practical Wireless* G4HLX 144MHz QRP contest is a perfect introduction! Every year Amateurs new to contests try their hands for the first time. In fact, some radio clubs use it as an opportunity to introduce their members to the joys of Amateur Radio contests. (This month's *What Next?* article includes a checklist for portable operation which new entrants may find useful).

Anyone who is new to contesting in general, or v.h.f. contests in particular, should be prepared to be welcomed. Everyone worked by the new contester will be pleased to make a contact with you. In fact, new contesters may find it easier to get together with a group of Amateur Radio friends, as it takes a lot of concentration to operate continuously for seven hours!

Even if the individual operator is limited to operating from home for just a short time, I ask that you (Please!) come on the air and join in the fun of the contest.

So on Sunday 8th June 2008, why not find a location with a good take-off and operate for a few hours with no more than 3W on the 144 MHz band? June is a time of the year when – hopefully! – the weather might be reasonably kind, when we might be lucky with some good propagation on the 144MHz band and there'll certainly be plenty of other *PW* readers on the air, eagerly wanting to work other contesters!

## Equipment Needed?

In terms of equipment needed, all that's needed is a 144MHz transceiver and a suitable antenna. The next question might be, 'What mode should be used?', and in replying I can confirm that while most activity will take place on upper side band (u.s.b.) 'phone, there will also be some contacts on c.w. (Morse) and narrow band frequency modulation (n.b.f.m.).

If you are an operator who hasn't tried operating from

Colin Redwood G6MXL, our new adjudicator.







*Did you enter last year? If so, try and improve your position! If you're entering for the first time we're sure you'll enjoy the contest.*

a local hill-top, you may be surprised just how far 3W can go! Sometimes the contest is blessed with some Sporadic-E propagation, when just about any where in Europe might be worked – with just 3W on the 144MHz band!

### Horizontally Polarised Antennas

For operation on u.s.b. and c.w. most stations use a horizontally polarised antenna. New contesters will almost certainly have a better chance of working longer distances if they also use a horizontally polarised antenna.

### Power Reduction

If a transceiver with an output power of greater than 3W is to be used, it will need to the power output set to 3W or below. With a number of modern transceivers – such as the popular Yaesu FT-817ND for example – power can be reduced by using a menu setting.

**Contest timesaving tip:** If setting the power is an adjustment that's not normally performed, it's best to refer to the operating manual in advance of the contest!

### Submitting Entry

After joining in the contest I ask that everyone to (please!) submit an entry! Joining the thousands of Radio Amateurs who have participated over the years in this popular contest will ensure that everyone has the most fun!

Although I prefer electronic entries via E-mail, the computer 'phobics' amongst us will no doubt be pleased to know that an entry can be submitted without going anywhere near a computer if they wish!

### Change Of Adjudicator

As regular participants will know, **Neill Taylor G4HLX** has stepped down as the adjudicator of the contest after 24 years. As an occasional participant over the years, I would like to thank Neill for devising the contest, for keeping the rules simple so that it's easy for anyone to enter, and for liaising with the **RSGB VHF Contest Committee**, so that participants in the series of RSGB 144MHz 'Backpackers Contests' can easily join in the *PW* contest and vice versa.

### Rule Changes

When I was approached by *PW* Editor **Rob Mannion G3XFD**, to take over the adjudication of the contest, I was pleased to accept the invitation and did so knowing how much I've enjoyed taking part in it over the years myself.

Therefore, the rules this year are very much in line with what has worked so well for many years.

There are a few changes to the rules mainly necessitated by the change of Adjudicator. These are almost all associated with arrangements for submitting entries.

All entrants should please note that:

**a:** The Contest web site has moved to

**[www.pwcontest.org.uk](http://www.pwcontest.org.uk)**

**b:** E-mailed entries should be sent to

**[contest@pwpublishing.ltd.uk](mailto:contest@pwpublishing.ltd.uk)**

**c:** Postal entries should be sent to **Colin Redwood G6MXL, 53 Woodepecker Drive, Poole, Dorset BH17 7SB.**

**d:** No matter how you submit your entry, please note that it must be received by **30th June 2008**. Late entries will not be accepted. If you are entering by post, you are recommended to use first class post. Entrants wanting confirmation of receipt of postal entries should enclose a stamped addressed envelope or International Reply Coupon (IRC).

### Entering From Abroad

If you are entering the contest from abroad, please note that in order for your entry to be tabulated in the main adjudicated results table at least one of your contacts must be with a station located in the United Kingdom and Northern Ireland (including the Channel Islands, Isle of Man) or Eire. Other overseas entries are welcome and a separate certificate will be provided to the overseas station with the highest score.

So make a note in your diary now, the 25th Annual *Practical Wireless* G4HLX 144MHz QRP contest takes place on Sunday 8th June 2008. Don't forget to charge any batteries a day or two before and make a note in the diary as a reminder to submit an entry on time! Let's hope for some good propagation on the day so that we can all have a really enjoyable time!

*Don't miss it!*

**0900-1600UTC, 8th June 2008**



# The 25th Annual Practical Wireless G4HLX 144MHz QRP Contest Rules

**1: General.** The contest is open to all licensed Radio Amateurs, fixed stations or portable, using s.s.b., c.w., a.m. or f.m. in the 144MHz (2m) band. Entries may be from individuals or from groups, clubs, etc. The duration will be from 0900 to 1600 UTC on Sunday 8th June 2008.

All stations must operate within the terms of their Licence. Entrants must observe the band plan and must keep clear of normal calling frequencies (144.300MHz and 145.500) even for 'CQ' calls.

Avoid frequencies used by GB2RS during the morning (144.250MHz and 145.525MHz) and any other frequency that is obviously in use for non-contest purposes.

Contest stations must allow other users of the band to carry out their activities without hindrance. In particular this year please be aware that there is likely to be some Microwave talk back activity during the contest, as there is also a 1.3, 2.3 and 3.4 GHz contest taking place.

The station must use the same callsign throughout the contest and may not change its location. Special event callsigns may not be used.

**2: Contacts.** Contacts will consist of the exchange of the following minimum information:

- (i) callsigns of both stations
- (ii) signal report, standard RS(T) system
- (iii) serial number: a 3-digit number incremented by one for each contact starting at 001 for the first contact.

(iv) locator (i.e. full 6-character IARU Universal Location for the location of the station).

Information must be sent to, and received from, each station individually, and contacts may not be established with more than one station at a time. Simultaneous operation on more than one frequency is not permitted.

If a non-competing station is worked and is unable to send his full universal locator, their location may be logged instead. However, for a square to count as a multiplier (see rule 4), a full 6-character locator must have been received in at least one contact with a station in the square.

Contacts via repeaters or satellites or using digital modes (including DSTAR) are not permitted.

**3: Power.** The output power of the transmitter final stage shall not exceed 3W p.e.p. If the equipment in use is usually capable of a higher power, the power shall be reduced and measured by satisfactory means.

The simplest way is often to apply a (variable) negative voltage to the transmitter a.l.c. line reached via the accessory socket.

With a number of modern transceivers such as the popular FT-817ND for

example, power can be reduced by using a menu setting.

The output power can be accurately measured using the simple circuit of **Fig. 1**. Connect this to the 50Ω output of the transmitter and adjust the power so that the voltmeter does not exceed 16.7V on a 'good whistle' into the microphone.

**4: Scoring.** Each contact will score one point. The total number of points gained in the seven-hour period will then be multiplied by the number of different locator squares in which contacts were made (a 'square' here is the area defined by the first four characters of the universal locator). Example: 52 stations worked in IO81, IO90, IO91, IO92 and JO01 squares; final score =  $52 \times 5 = 260$ .

Only one contact with a given station will count as a scoring contact, even if it has changed its location, e.g. gone /M or /P. If a duplicate contact is inadvertently made, it must still be recorded in the log, and clearly marked as a duplicate (not necessary in computer logs submitted by E-mail).

**5: The Log.** Logs may be submitted by E-mail or by post. In either case the log must contain the following information for each contact:

- (i) time (GMT)
- (ii) callsign of the station worked
- (iii) report and serial number sent
- (iii) report and serial number received
- (iv) locator received (or location)

The preferred form of a log is a computer file sent by E-mail. This may be a file generated by logging software, provided it contains all the information listed above, or a file in any other suitable format (plain text is fine). Give the file a name including the station call sign (e.g. **g6mxl.log**), and send as a standard E-mail attachment to **contest@pwpublishing.ltd.uk**

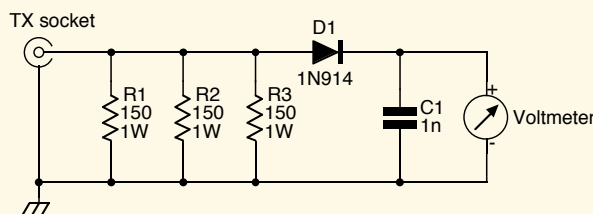
Most formats of log are acceptable and if there is any problem with your entry you will be contacted by E-mail.

If a computer log file is not available, a paper log may be sent by post. This must be clearly written on one side of A4 sized paper only, ruled into columns for each of the items listed above. Underline or highlight the first contact of the locator squares worked. At the top of each sheet, write:

- (a) callsign of your station
- (b) your locator as sent
- (c) sheet number and total number of sheets (e.g. 'Sheet no. 3 of 5')

Log sheets and covering-information sheets which may be used for paper-based entries are available for downloading from the contest Web site **www.pwcontest.org.uk**

**6: Entries.** The covering information listed below



**Fig. 1.**



must be provided with each entry. The preferred method of submitting this is by the use of the online facility on the web site **www.pwcontest.org.uk**

Alternatively, the information may be written in the E-mail message to which the log file is attached. For entries sent by post, it should be written on a separate sheet of A4-sized paper.

The information required for every entry is:

- (a) name of the entrant (or of a club etc. in a group entry as it is to appear in the results table and on the certificate)
- (b) callsign used during the contest including any suffix (e.g. G6MXL/P)
- (c) name and address for correspondence
- (d) location of the station during the contest
- (e) locator as sent during the contest
- (f) whether single or multi-operator (a single-operator is an individual who received no assistance from any person in operating the stations, which is either his/her permanent home station or a portable station established solely by him/her); if multi-operator include a list of operators' names callsigns
- (g) total number of contacts and locator squares worked (not required for a log sent as a computer file)
- (h) list of locator squares worked (not required for a log sent as a computer file)
- (i) a full description of the equipment used including transmitted p.e.p. output power
- (j) if the transmitting equipment is capable of more than 3W p.e.p. output, a description of the methods used (i) to reduce and (ii) measure the output power
- (k) antenna used and the approximate station height in metres above sea level (a.s.l.).



Contest participants will be presented with a special certificates.

Failure to supply the required information may lead to loss of points or disqualification. The following declaration must be included in the E-mail text or written and signed by the entrant: 'I confirm that the station was operated within the rules and spirit of the event, and that the information provided is correct'.

#### Entries & Other Information

Entries by E-mail must be sent to **contest@pwpublishing.ltd.uk**. Paper entries should be sent to: **Practical Wireless Contest, c/o Colin Redwood G6MXL, 53 Woodpecker Drive, Poole, Dorset BH17 7SB.**

Entries must be received not later than **Monday 30th June 2008**. Late entries will be disallowed.

Any other general comments about the station, the contest and conditions during it are welcome, written on a separate piece of paper, (written in a separate sheet of paper in the case of entries sent by post).

Photographs of the station are also invited. Please note photographs cannot be returned and may be used for publication in *Practical Wireless* or on the **www.pwcontest.org.uk** website.

If these are not available by the time the entry is submitted they may be sent later, by E-mail or post, to arrive by 11th August 2008.

A summary of the results will be published later this year in *Practical Wireless*. The full detailed results will be available on the contest web site after publication in *PW*. If you would like to receive this list by post, please send a large s.a.s.e. to the contest address given above.

For 2008, a special 25th Anniversary Certificate will be sent to every entrant who submits a log or report (see main article). Please supply a large self-addressed envelope with suitable postage or International Reply Coupon (IRC) if you require a certificate.

**7: Miscellaneous.** When operating portable, obtain permission from the owner of the land before using the site. In particular observe any restrictions on access associated with Bird Flue, Blue Tongue, Foot & Mouth etc. Always leave the site

clean and tidy, removing all litter. Observe the Country Code.

Take reasonable precautions to avoid choosing a site, which another group is also planning to use. (It's wise to have an alternative site available in case this problem does arise).

Make sure that your transmitter is properly adjusted and is not radiating a broad or poor quality signal, e.g. by over-driving or excessive speech compression. On the other hand, be aware that your receiver may experience problems due to the numerous strong signals it will have to handle, and that this may lead you to believe that another station is radiating a poor signal.

Before reaching this conclusion, try heavy attenuation at the received input. The use of a high-gain r.f. pre-amplifier is likely to worsen strong-signal problems, so if you do use one, it is best to be able to switch it off when necessary.

**8: Adjudication.** Points will be deducted for errors in the information sent or received as shown by the logs. Unmarked duplicate contacts in paper-based logs will carry a heavy points penalty. Failure to supply the complete information required in rule 6 may also lead to deduction of points. A breach of these rules may lead to disqualification. In the case of any dispute, the decision of the adjudicator will be final.

*Don't miss it!*  
**0900-1600UTC, 8th June 2008**



# Practical Wireless G4HLX 144MHz QRP Contest 2008

Date: 8th June 2008	Callsign:	Locator:	Sheet No.      of
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[illegible]

**\* Highlight the first contact in each locator square**



**The Rev. George Dobb's**

# carrying on the practical way

Rev. George Dobbs G3RJV looks into methods of tuning without using variable capacitors and ends up playing with a lipstick case!

*"In the long history of humankind (and animal kind, too) those who learned to collaborate and improvise most effectively have prevailed."*

**Charles Darwin**

I'm a great fan of **Wendell Berry** the American poet and philosopher farmer. The author of more than 30 books of poetry, fiction, and essays, and a former professor of English at the University of Kentucky, he continues to farm the land along the Kentucky River that his family has worked for two centuries.

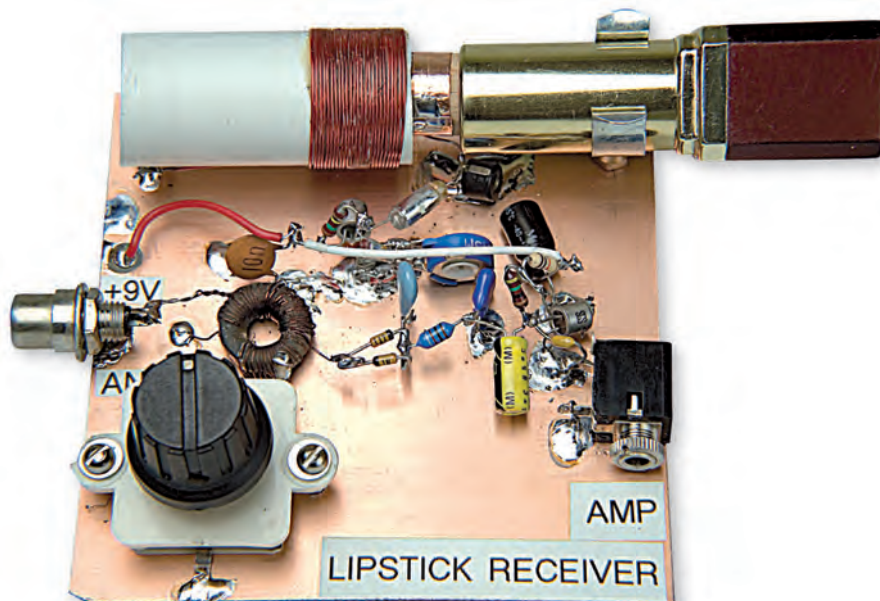
Wendell Berry championed ecology and sustainability long before they became fashionable concepts. One of my favourite quotations comes from Wendell Berry's *The Mad Farmer Liberation Front* of 1973.

*"When they want you to buy something they will call you. When they want you to die for profit they will let you know.  
So, friends, every day do something that won't compute. Love the Lord. Love the world. Work for nothing. Take all that you have and be poor. Love someone who does not deserve it.  
.... Be like the fox who makes more tracks than necessary, some in the wrong direction."*

## Most Satisfying

One of the most satisfying aspects of any hobby is that we've chosen to do what we're doing. Not only that, we don't have to do it the way someone else wants us to do it! This can lead to interesting digression and novelty.

The true hobbyist can "do something that won't compute" and even "make more tracks than necessary, some in the wrong direction" solely for their own amusement and edification. I'm inspired by the ingenuity of Amateur Radio constructors, often going down their own track!



**Onno Hoekstra PA2OHH**, produced a delightfully novel and simple receiver for 7 and 14MHz with an interesting method of tuning. He decided that variable capacitors were expensive. Onno then saw the 'Tin Ear Receiver' by **Wayne McFee NB6M**, that uses a form of permeability tuning in which a brass screw forms a core moving in and out of the variable frequency oscillator (v.f.o.) coil.

Onno then attempted a version using a wooden stick holding a single shorted turn that can be moved in relation to the v.f.o. coil. As the shorted turn moves nearer or further away from the coil, it changes the frequency of the tuned circuit. This makes a simple method of frequency tuning without the need for an expensive variable capacitor. Combined with a mixer and audio amplifier, Onno's v.f.o. forms the heart of a simple and novel direct conversion (DC) receiver.

## The G3RJV Version

Inspired by Onno's unusual method of tuning, I decide to try it for myself. The principle is simple – build a stable fixed frequency v.f.o. and vary the frequency by moving a single shorted turn of wire towards, or away from, the v.f.o. tuning coil. The wooden

stick bearing the PA2OHH shorted turn operated as a simple lever; a kind of wand moving the shorted turn in relation to the coil.

My experimentation took another direction in that I wanted to move the shorted turn gradually towards and away from the coil by turning a control knob. As I pondered various mechanical systems, my eyes alighted upon a lipstick belong to my wife **Jo**. It was ideal! Turn the end of the lipstick case and the 'business end' of the case moves gradually in and out.

So, all I had to do was to find a lipstick that was 'out-of-favour' with my wife and adapt the mechanism to tune the v.f.o! However, although finding an out-of-favour lipstick was easy; converting it to my purpose was a little more messy and painstaking!

The first stage was to remove the business end of the lipstick, the greasy firm gel that enhances the lips. I simply dug it out with a pocket knife and attempted to clear out the residue. A nailbrush and hot soapy water managed to clear most of the gunge out. Further soapy water and pieces of kitchen towel completed the rescue of the mechanism!

The lipstick gel was held in place within a stick holder-cup that moves in and out of an outer tubular sleeve.



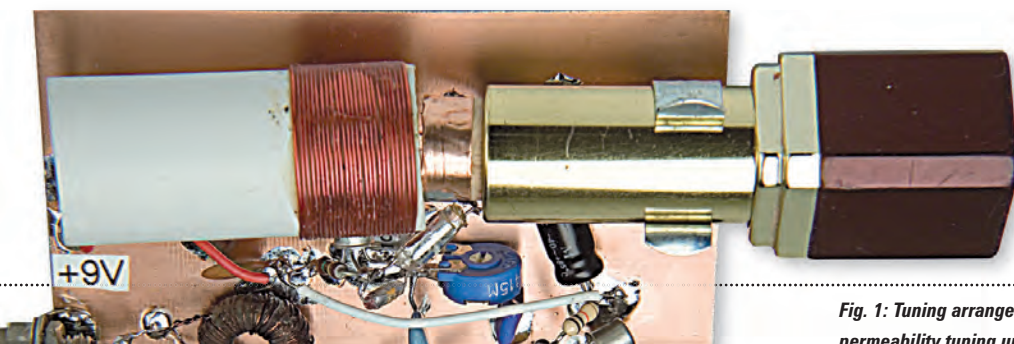


Fig. 1: Tuning arrangement using a surplus lipstick holder as a permeability tuning unit.

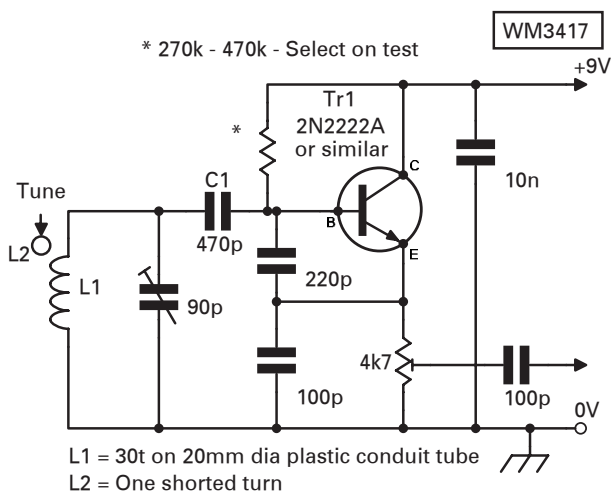


Fig. 2: A v.f.o. using the permeability unit fabricated from the lipstick holder.

I decided to replace the gel with a piece of wooden dowel rod and by chance I had some 12mm diameter wooden dowel. Reducing the diameter a little at one end of the rod, with sandpaper, made it a snug fit in the holder-cup.

Rather than glue it in place, I used a little p.v.c. tape to hold it securely to the plastic cup. The result was a short piece of wooden dowel, about 25mm long, which moves gently to-and-fro with the rotation of the lipstick handle.

### The Tuning Arrangement

The tuning arrangement is shown in Fig. 1. The v.f.o. can be built 'ugly' style, so the mechanics are mounted on a scrap of printed circuit board (p.c.b.) material.

The lipstick case is held in place using a spring tool clip (or Terry Clip) held off the board by a stand-off pillar. The wooden insert has a shorted turn attached to the end and this could be a single turn (ring) or stout copper wire fastened to the rod.

In my case I used narrow self-adhesive type copper ribbon. This is 6mm copper foil tape designed for doll's house lighting. It's commonly available from dolls house accessory suppliers or hobby shops – it's a very useful material that I'll describe and

use more fully in a future column. I then applied one over-lapping turn to the end of the wooden rod, the joint being bridged by solder.

The coil former is a small length (about 45mm) of 20mm diameter plastic electrical conduit tube. A small hole drilled at the end nearest the lipstick case is used to anchor the end of the wire and this forms the non-grounded end of the coil. Like the lipstick case, the coil is held above the p.c.b. material base with a stand-off pillar.

It so happened that the lipstick case and coil aligned well with the same sized stand-off pillars. However, some adjustment may be required to roughly line up the centres of the coil former and the lipstick case.

### Practical VFO

Having got the mechanics in place, the next task was to apply the tuning mechanism to a practical v.f.o. I decided to build a 3.5MHz v.f.o. as this is a reasonable frequency to obtain stability and, as I will describe below, it can be used for a simple 7MHz band receiver. It required a little experimentation and the resultant v.f.o. circuit is shown in Fig. 2.

Readers will recognise the v.f.o. circuit as a Colpitt's oscillator. The

feedback to maintain oscillation is from the emitter to the base of the transistor, via the 220pF and 100pF capacitive divider.

The capacitor, C1, which couples the base of the transistor to the tuned circuit proved to be rather critical. The given value, 470pF, worked well for me but readers may like to experiment if the v.f.o. is not as stable as they would wish.

The tuned circuit is formed by L1 (the coil on the former) and a trimmer capacitor. The inductor L1 is formed from 30 turns of 26 s.w.g. enamelled copper wire, close wound on the former. I held the end of the winding in place with sticky tape and then ran a thin layer of beeswax over the winding to hold it in place. The beeswax can be melted with a soldering iron and the residue soon burns off. **Note:** L2 on the circuit diagram represents the shorted turn.

My v.f.o. was built 'ugly' style using the copper surface of the board as a groundplane. The capacitors associated with the tuned circuit (470pF, 220pF and 100pF) should be temperature stable n.p.o. types or polystyrene capacitors. The 2N2222A transistor could be replaced with almost any generic npn type.

A 4.7kΩ pre-set resistor forms the emitter load as this enables voltage control of the v.f.o. output to set the optimum level of signal injection for the receiver mixer. **Note:** Before adjusting the trimmer capacitor to obtain a 3.5MHz output, turn the lipstick tuning control so that the shorted turn is just about to enter the coil former. This should enable the tuning mechanism to give a reasonable rotation to frequency shift ratio.

The resultant v.f.o. was surprisingly stable! I ran it for several hours into a frequency counter. After some initial short-term drift, it soon settled down and was certainly stable enough to use for a simple receiver. (My 3.5MHz v.f.o. was used with a Polyakov mixer

to make a basic 7MHz band receiver).

## Polyakov Mixer

Regular readers will remember that I've used the Polyakov technique several times in this column and **Fig. 3** shows the circuit. It uses a two-diode, mixer-doubler circuit from an original idea by **Vladimir Polyakov RA3AAE**.

The RA3AAE mixer circuit first appeared in the December 1976 issue in the Soviet magazine *Radio*. In this circuit the diodes not only act as a product detector (mixer) for the input and oscillator signals, but also as a doubler for the local oscillator signal.

The RA3AAE method of product detection has several advantages. The oscillator operates at half the desired signal frequency so the receiver input circuit does not tend to 'pull' the oscillator. It is also easier to generate a stable signal at lower frequencies.

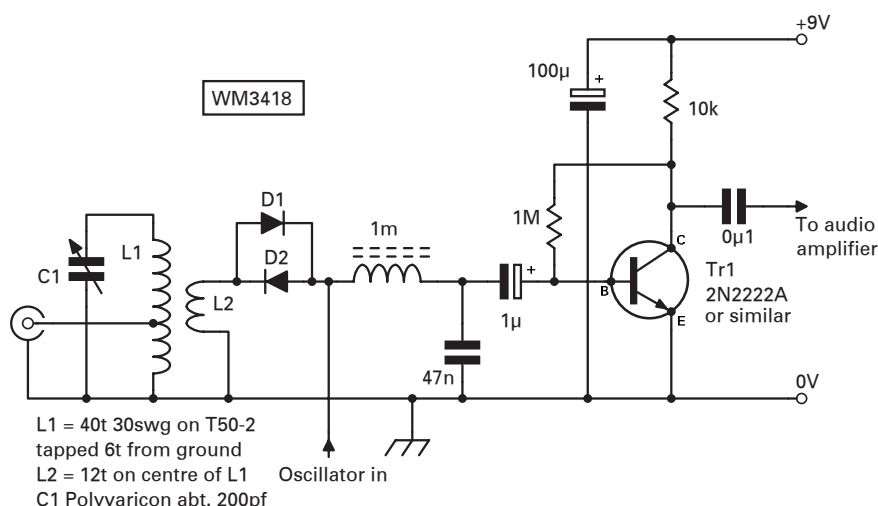
The diagram, **Fig. 3**, shows the basis for a DC receiver and the inductor L1 and the capacitor C1 form a single input tuning stage. The inductor L1 is tapped to accept a low impedance antenna and a coupling winding, L2, matches the signal to the diode mixer.

The inductor L1 is formed from 40 turns of 30s.w.g. enamelled wire on a T50-2 core. Cut about 80mm of wire to wind L1 and L2 is wound over the centre of L1. I used a surplus a.m./f.m. radio polyvaricon type variable capacitor for C1.

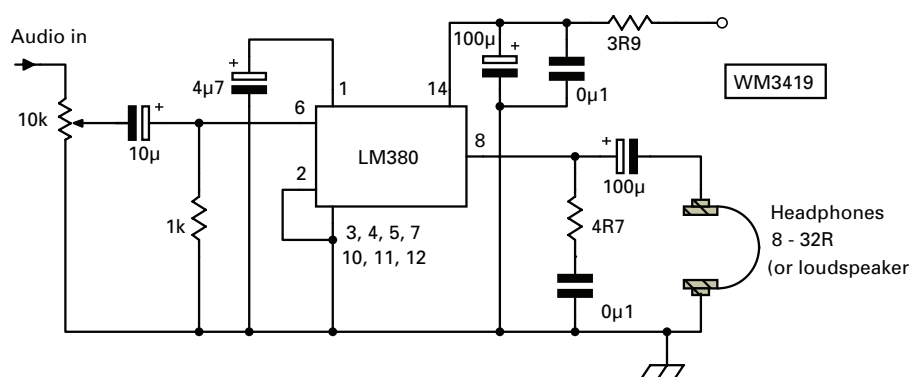
A low value variable capacitor is fine as the 7MHz band should peak with about 65 to 70pF of capacitance. Try to keep the wiring compact around the tuned circuit and the mixer as simple DC receivers tend to easily pick up strong local broadcast signals.

The v.f.o. signal enters the mixer directly to the diodes, which should be mounted in opposing polarity. A 1mH choke and a 47nF capacitor offer some

**Fig. 3: The basic lay-out of a suitable DC receiver.**



**Fig. 4: The amplifier suggested by G3RJV.**



basic r.f. decoupling and the resultant audio signals are coupled to an audio pre-amplifier. Again, I have used the 2N2222A for the pre-amplifier as I have lots of them! Although most similar devices would do the job.

The preamplifier has enough gain to drive a variety of audio amplifiers. I used my test bench audio amplifier but it might be worth trying computer-type amplified loudspeakers.

## Dedicated Amplifier

For those who want to add a dedicated amplifier for the receiver, I suggest the simple amplifier in **Fig. 4**. It's just the standard LM380 audio amplifier that I've often used in this column. This would be enough for adequate headphone reception of the 7MHz Amateur band signals using this receiver.

The receiver is very basic but it

picked up plenty of Amateur signals on the 7MHz band! An audio filter would have certainly helped the selectivity but it's what it is; a simple receiver with a novel and inexpensive method of tuning.

## Things To Try!

There are other things to try out and I just wonder how the lipstick v.f.o. would perform driving a QRP transmitter! It would certainly need plenty of buffering between the oscillator and the output stages. The placement of the shorted turn in relation to the coil is worthy of experiment. Mounting it further away from the coil should give a wider tuning rate per rotation.

All things are worth trying that make. "more tracks than necessary, some in the wrong direction."



# ALINCO

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**Tony Nailer's**

# technical for the terrified

Tony Nailer G4CFY aims to dispel the terror, myths and mysteries lurking inside phase locked loop synthesiser circuitry.

**T**here are three main reasons to use a phase locked loop synthesiser (p.l.l.). The first is to control a high frequency (h.f.), or very high frequency (v.h.f.) oscillator, to the same stability as that of a low frequency oscillator.

The second reason is to arrange for an h.f. or v.h.f. oscillator to be tuned in distinct frequency steps. The third is to allow an h.f. or v.h.f. oscillator to be modulated to produce frequency modulation (f.m.).

## The Linear Mixer Loop

The block diagram of a p.l.l. circuit is shown in **Fig. 1**. But don't panic! It's just like a superhet receiver, only that the detector output (Mixer 2) is fed via a low pass filter to a voltage controlled oscillator (v.c.o.), which is then fed back to provide the input signal.

The v.c.o. is simply a variable frequency oscillator (v.f.o.), which is tuned using a varicap diode and a control voltage. The v.c.o. and the v.f.o. should both be built to be as stable as possible as this will help reduce phase noise on the output signal. The low-

pass filter (l.p.f.) is used to remove any alternating voltage products of mixing and allow d.c. to pass on to the varicap diode in the v.c.o.

If f.m. is to be generated, the v.c.o. will usually have two varicap diodes, one for the control voltage and the other for audio. In this case the low pass filter needs to roll-off well below normal voice frequencies. In Amateur Radio service – where the audio range should be 300 to 2700Hz – the cut-off frequency of the l.p.f. would be in the region 3-10Hz.

Mixer 1 can be any sort, integrated circuit (i.c.), m.o.s.f.e.t., or diode ring. Mixer 2 has to be type that will also produce an output at d.c., as it's considered to be a phase detector. A two diode bridge or the four diode ring mixer are ideally suited to this work.

## Linear Synthesiser For 70MHz

Let's now look at providing suitable frequencies to use in a p.l.l. local oscillator for a 70MHz (4 metre) transceiver with a 10.7MHz intermediate frequency (i.f.). To cover

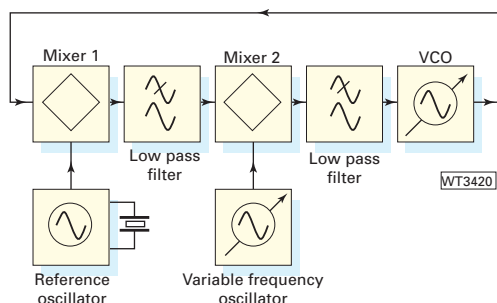
the band 70 to 70.50MHz, subtracting the i.f. of 10.7MHz gives 59.3 to 59.8MHz as the required frequency range of the v.c.o.

I've determined previously that a good v.f.o. frequency range – that doesn't produce unwanted harmonics in the either the local oscillator range or the 70MHz band – is 7.9 to 8.4MHz. What we then need to do is subtract the 7.9 from 59.3MHz, which gives 51.4MHz. This is the frequency of the crystal oscillator, and it is recommended to use a third overtone crystal at that frequency and not use the multiplier. (This avoids further spurious signals).

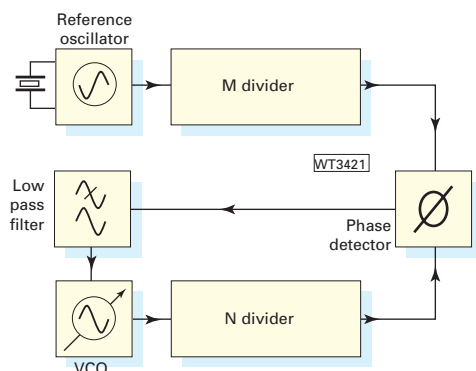
So, now let's see how it works. At switch on, let's also say the v.f.o. happens to be set to 8.2MHz. The v.c.o. will come on below 59.3MHz, (let us say 59MHz). This signal, when mixed with the 51.4MHz in Mixer 1, will produce an i.f. signal of 7.6MHz. This signal, in turn, mixes with the v.f.o. in Mixer 2, the phase detector and the output of which will contain some d.c. and a frequency of 0.6MHz.

The l.p.f. doesn't respond to the rapid changes of the 0.6MHz signal but does allow any d.c. component (or slow rising d.c.) to pass to the varicap diode. This will reduce the varicap diode's capacitance, causing the v.c.o. to rise in frequency. This continues until the v.c.o. reaches a point where the difference alternating frequency coming out of the phase detector has dropped to zero. Thereafter, there'll be no further rise in the d.c. level and a condition of 'lock' has been achieved.

If the v.c.o. tries to drift – either due to temperature or loading – the control voltage will alter and compensate. In practice, if we monitor the control voltage of a p.l.l. synthesiser and heat up or cool down the v.c.o., the frequency will not change **but the control voltage will**. (Clever isn't it?). So, if the v.f.o. is tuned, the control voltage will 'force' the v.c.o. to follow the changes exactly, hence tuning 7.9 to 8.4MHz will cause the v.c.o. to tune 59.3 to 59.8MHz.

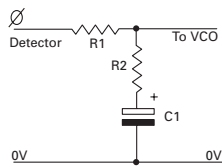


**Fig. 1: The linear phase locked loop, gives low-frequency stability to the higher frequency oscillator.**



**Fig. 2: The voltage controlled oscillator can give discrete output frequencies. The reference oscillator and the M divider control the frequency 'step', and the N-counter the main frequency itself.**





**Fig. 3: A low-pass filter with two roll-off points to the frequency response.**

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## The Digital Synthesiser

A block for a digital p.l.l. synthesiser is shown in **Fig. 2**. Although it looks simpler than the linear loop, it only does because the dividers are grouped into single blocks. These may be digital decade or dual decade counters, or they may be integrated into a single synthesiser i.c.(or 'chip').

There are usually two sets of dividers, one for the v.c.o. and one for the reference crystal oscillator. It's usual practice in transceivers to use a 10.24MHz reference crystal, which can also be used to convert from a first i.f. of 10.695MHz to a second i.f. of 455KHz. This is used in the synthesiser together with the M divider ratio of 1024, to give a signal at the phase detector of 10kHz.

The signal from the v.c.o. is divided down by the N divider until it's close to 10kHz. Then the resultant error signal passing through the l.p.f. 'controls' the v.c.o. to move it to a frequency where the divided signal is exactly 10kHz. (Just like the linear loop).

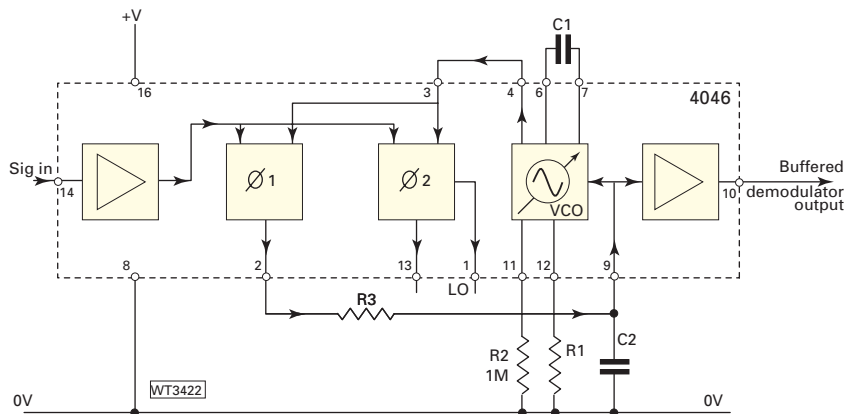
If the N divider ratio is changed the v.c.o. will then be tuned to a new frequency which again results in 10kHz at the phase detector. So, this synthesiser will then produce frequencies with 10kHz channel stepping.

## Jitter Free Operation

The secret to good 'jitter free' operation of digital loops is the phase detector, which is often based on the exclusive OR function and also the design of the low-pass filter. The low-pass filter is much more critical in a digital loop than the one for a linear loop.

Often, an arrangement as shown in **Fig. 3**, is used to provide two roll-off points. The first point allows fast lock, the second is used to hold the loop at the correct response rate. (Otherwise the control voltage will tend to oscillate wildly before settling down).

In order to understand and be able to create equations to solve loop filter component values, it was necessary



**Fig. 4: A look at the functional layout of the c.m.o.s. '4046' phase-lock loop i.c.**

for me to return to my university and study degree level maths and honours level electronic signal processing. I was then enabled to use Laplace transforms to derive the design equations. Who would have thought that three components would require so much effort? (But I'm not going to bother readers with them now!).

## Useful Chip

A really useful c.m.o.s. type of i.c. is the 4046, which contains two types of phase detector as well as a low frequency v.c.o. and buffer. It contains all the parts to be used as a 'stand alone' low frequency (l.f.) phase locked loop.

With the addition of dividers from the v.c.o., the i.c. will operate at higher harmonically related frequencies. Usually though, the phase detectors are used and the other parts ignored. A diagram of the 4046 showing connections and components for full use is shown in **Fig. 4**.

One of the phase comparators is an exclusive OR gate which maintains the v.c.o. and reference signals 90° apart. It requires that both signals have a 1:1 mark-to-space ratio, i.e. like a perfect sine wave or square wave. The other phase comparator maintains the v.c.o. in phase with the reference signal. It operates from leading edge sensing, so it's not concerned with duty cycle or wave shape.

Motorola developed a number of digital synthesiser i.c.s incorporating N and M divider chains, crystal oscillator and a phase detector in CB radios the 1970s. The N divider was limited to about 3.5MHz as its maximum input frequency, so they had to also use some clever tricks to mix the v.c.o. down to below that frequency before dividing it further. The strange thing was that the reference crystal oscillator could be used to about 12MHz so they were capable of producing fast dividers!

These i.c.s were available as MC145104, MC145106, MC145107, MC145109, and MC145112. Diagrams showing the functions within the MC145106 and MC145109 are shown in **Fig. 5**, (as extracted from a very old Motorola Data Book. The MC145109 was also branded as PLL02A and used extensively in all the Cybernet range of rigs.

The Uniden multimode rigs like the Cobra 148GTL DX and related types used the MC145106. A derivative of 148GTL DX, the Superstar 3900 is still in production and uses the MC145106 together with binary adders at the N divider inputs to achieve six bands of 40 channels each.

## Variable Ratio Divider

More recently Motorola have produced another series of synthesiser ICs with a variable ratio

divider known as dual modulo N, which could allow apparently partial division. But I won't explain this further for fear of over complicating the issue! Nevertheless a version of this series, the MC145151 works much like the MC145106 but has a much higher N divide counter and an input frequency usable to about 18MHz. It also has an M divider with choices of divide ratio 256, 512, and 1024.

I use the MC145151 with a reference crystal of 8.53333MHz crystal and a divide ratio of 1024 to give 8.3333kHz at the phase detector. I also use a v.c.o. at just under 17MHz, so with steps of 8.3333kHz, this when tripled, gives around 50MHz with a 25kHz channel spacing.

### Off Air Standard

The phase locked loop frequency synthesiser can be put to good use in deriving a stable signal from the Droitwich long Wave transmitter working on 198kHz. This has incredible stability, of the order of two parts in 100,000,000,000. The purpose of such a piece of equipment is as a reference to calibrate frequency counters, or to provide marker pips for v.f.o. controlled receivers and transceivers, which do not have frequency counters.

In an article in *PW* March 2001, **Dave Allen G8XRS** used an LM567 i.c., which has an onboard v.c.o that can run at the transmitter's frequency. The 198kHz signal feeds one port of the phase detector and the v.c.o. the other port. The error signal passes through an external low-pass filter and back to the v.c.o. to lock it to the Droitwich transmitter.

The thing about the G8XRS circuit is that the low pass filter effectively removes the audio modulation and passes only the d.c. to the v.c.o. The output then is a clean signal, devoid

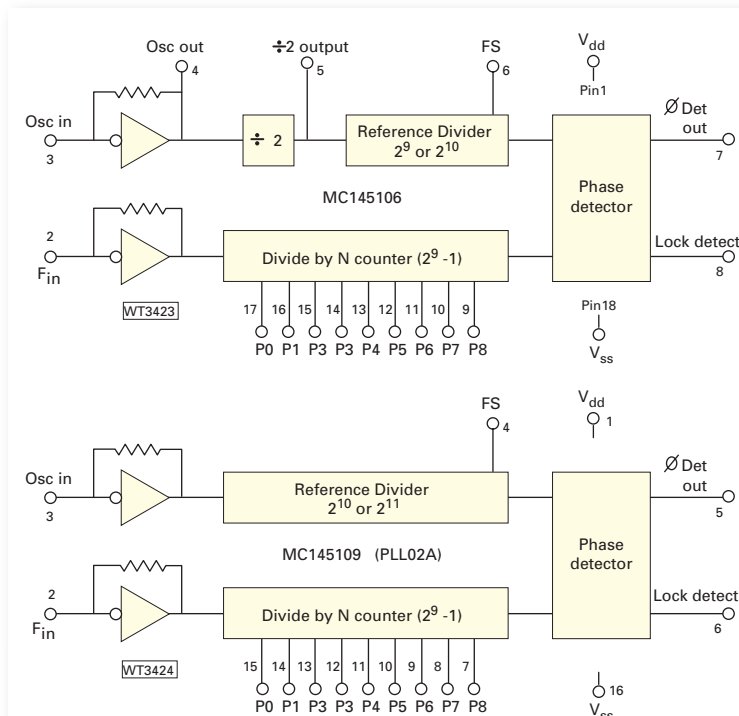


Fig. 5: The functional diagrams of two Motorola phase locked loop synthesisers that appeared in many early CB sets.

of modulation. **Note:** The 4046 IC detailed earlier could be configured like the LM567 as a phase locked 198kHz source.

To lock to other higher frequencies requires a bit of ingenuity. The block diagram, **Fig. 6**, is that of *The Off-Air Frequency Standard* by **Stefan Niewiadomski** from the November 2006 issue of *PW*. In Stefan's design a 10MHz voltage controlled crystal oscillator (VCXO) is divided down a number of times, to produce 200kHz and 2kHz.

The 200kHz is mixed with the inbound 198kHz, giving a 2kHz difference signal plus a whole load of modulation products. This composite signal is heavily filtered and fed to a 4046 using phase detector 1 to be mixed with the 2kHz derived from the VCXO. The error signal is low pass

filtered and used to control the VCXO. This achieves phase locked signals on 10MHz, 1MHz, 100kHz, 2kHz, and even 1kHz by use of an additional divide-by-2 and filter board.

### Combination Circuit

I've not tried either the 2001 design, nor the 2006 design of off-air standard. Nevertheless, it would seem that a combination of the two might give good results. First use the 4046 phase locked to the 198kHz signal. The output from this can then drive the phase detector mixer 2 of the 2006 design and do away with all the audio filtering.

Such a design is beyond the scope of T4T but might be worth pursuing as a stand-alone project article or included in *Doing It By Design*. Cheerio until next time!

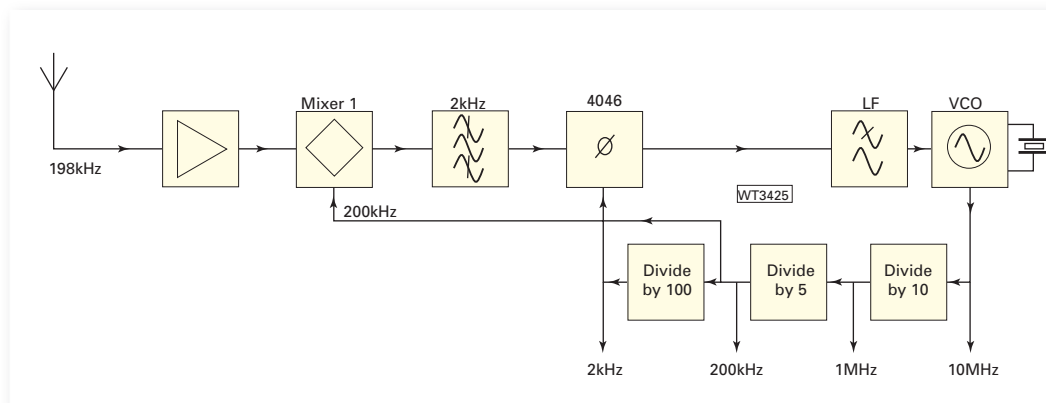


Fig. 6: This is the functional diagram of a multiple output off-air frequency generator, that's phase-locked to the Droitwich longwave signal for stability.





**Phil Cadman's**

# valve & vintage

Phil Cadman G4JCP dons his brown dust coat and amongst the valves there's some transistors too!

**H**ello and welcome to the Valve and Vintage 'shop' once again! Looking around, you may notice that there are no glowing valves on show this time but there are lots of little three legged devices scattered over the shop counter. "Why?" (you may ask). I shall reveal all later!

Last time I mentioned both the lack of commercial coils suitable for use in valved receivers, and household items that could be used as screening cans for home-made coils. This prompted a letter from **Bruno Sirignano G4FZG**, who told me of his intention to build a general coverage valved receiver.

To ease the design and construction of the radio frequency (r.f.) 'front end', such receivers would typically use a commercial coil pack. That's a sub-assembly consisting of several sets of antenna and oscillator coils, padder capacitors and associated switching. Sometimes, tuning capacitors would also be included in the assembly.

Neither I nor G4FZG know of any commercial coils packs manufactured today, and new, old stock examples are extremely rare at radio rallies and junk sales. It is, of course, possible to make your own coil pack, but with no commercial coils currently available, the whole assembly has to be made from scratch, including each individual coil.

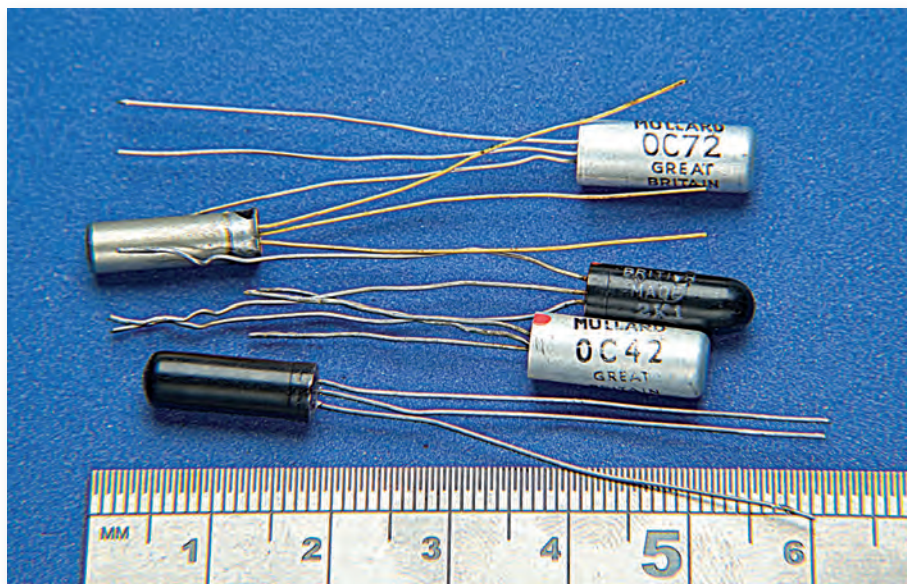
So, on behalf of G4FZG, can I ask if any reader has a proven design for a four band (500kHz to 30MHz) coil pack?

## Home Brew Screening

Still on the subject of coils and the lack of suitable screening cans, **Colin Higgins G3NRQ** sent me some suggestions, which he's kindly asked me to share. First there's copper pipe, which can easily be cut to length and fitted with an end cap.

Square section tube is also suitable but is harder to come by. Next, plastic containers can be used if covered with aluminium foil. Actually, has anybody had success with metallic screening paint instead of foil?

Thin copper and brass in roll or



*Metal and glass encapsulated Germanium transistors of the 1960s. The paint spot (often red) denoted the collector connection.*

sheet form is another possibility and is usually stocked by hobby shops, which provide materials for model makers. Finally, there's printed circuit board (p.c.b.) off-cuts, which are often used to make small chassis parts but can be soldered to make screening cans. Thanks for your suggestions, Colin!

## Three Legged Thing?

Right, so what are all these three legged things doing in the Valve and Vintage shop? Well, the 30th of June 2008 marks the 60th anniversary of the announcement of the Point Contact Transistor by Bell Laboratories. Also, it was around 50 years ago this year that radio magazines like *Practical Wireless* and *The Radio Constructor*, began to feature regular transistor projects. In fact, throughout 1958, *PW* ran a series of articles – entitled *Transistors In Practice* – which explained how the novel devices could be used by radio and electronics enthusiasts.

And coincidentally, it was exactly 40 years ago that I bought my first radio magazine; the June 1968 issue of *The Radio Constructor*. Sorry it wasn't *PW*, Mr. Editor, but I **did** buy the August 1968 issue of *PW*! Significantly, that

June *Radio Constructor* provided me with the circuit of the first transistor class B audio amplifier I ever built.

What with all these transistor related anniversaries, I thought it would be entirely appropriate to devote a few Valve and Vintage pages to those early germanium devices. In my next V&V column, I'm going to feature what I believe to be the first transistor project to appear in *PW* and I shall talk about the practicalities of using germanium junction transistors.

Throughout, I'll be concentrating on the Mullard 'OC' series of transistors, as these were some of the first branded devices to become generally available in the UK. In addition, Mullard produced several very useful books and pamphlets about these transistors, specifically intended for the home constructor and experimenter.

One of the first booklets - issued in August 1955 - was called *Junction Transistors For The Home Constructor*. This was followed by *Transistors For The Experimenter*, the third reprint of which was issued in April 1957. Well, that's what it says in my copy!

Then, in 1960, Mullard published a 300 page, A5 size book entitled

### Reference Manual Of Transistor

*Circuits*. This is an excellent book and it shows just how far transistor circuit design had progressed since the introduction of the OC70, 71, 72 range in 1954.

### The Germanium Transistor

The device which Bell Labs announced on 30th June 1958 was the point contact germanium transistor, which at the time was often referred to as a germanium triode or 'crystal valve'. Following the announcement, it transpired that working examples of the transistor had been produced just before Christmas the previous year, but Bell Labs had decided to keep the news to themselves until they had done further work and had applied for a patent.

At the time, the invention was credited to **Walter Brattain** and **John Bardeen**, who were working for **William Shockley**, the theorist who was leading the research. It's sometimes said that the point contact transistor was discovered by accident, a notion which may well have some truth!

Although Bell Labs were indeed trying to produce a solid state alternative to the thermionic valve, the first point contact transistor may have been made 'accidentally' while investigating surface states around a point contact.

There's also a debate as to whether Bardeen and Brattain did actually make the world's first transistor, because there is anecdotal evidence that several crude transistors had been

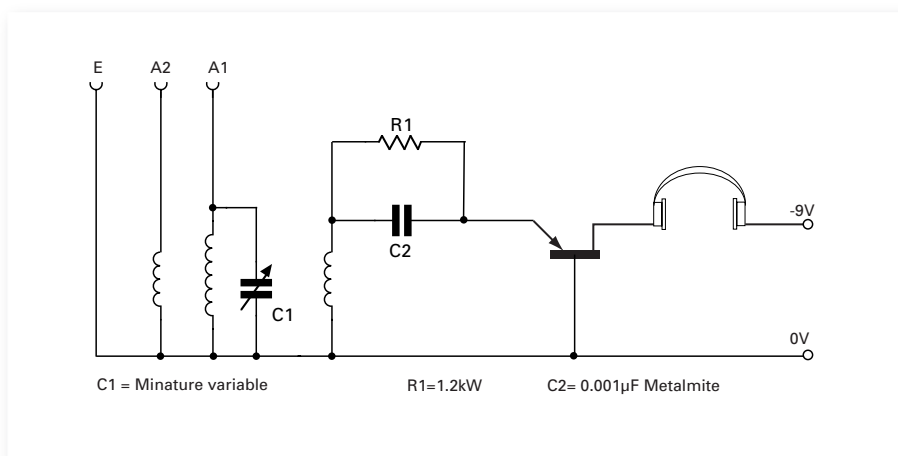


Fig 1: The February 1955 issue of *The Radio Constructor*, uses an OC51, manufactured by Mullard in 1952.

constructed well before 1947. Also, there's an article in the November 2005 issue of *IEEE Spectrum* magazine which describes how two German physicists working in Paris, claimed to have produced a very similar device – which they called the Transistron (or Transistron, take your pick) – early in 1948.

### Different Types

Before I venture further, I'd like to explain a little about *n*-type and *p*-type semiconductors. I'll start with the two well known semiconductor materials are silicon and germanium, and just as the name implies, their characteristics lie somewhere between a conductor and an insulator. And if a tiny amount of an element (such as arsenic) introduced into pure germanium, the resulting material gains an excess of electrons and its conductivity greatly increases. This is called *n*-type germanium.

The *p*-type germanium is made by adding an element – such as Indium – to the pure semiconductor. This time the resulting material ends up with a deficiency of electrons, yet once more, conductivity increases, but not to the same degree as in *n*-type germanium. Rather than say

that a *p*-type semiconductor has a deficiency of electrons, it's often said to have an excess of 'holes'. A hole being where there's a missing electron. (Just remember that an increase in conductivity can be due to an excess of electrons or an excess of holes).

All well and good so far, but something very interesting happens if you bang a piece of *n*-type germanium up against a piece of *p*-type germanium? Do it in right fashion (as in a single crystal) and a *pn* junction is formed and it possesses a very useful property. If a voltage is applied to the junction, with the *p*-type germanium connected to the negative terminal and the *n*-type connected to the positive terminal, nothing much happens.

The excess electrons in the *n*-type material whiz towards the positive potential and the holes gracefully drift towards the negative potential. No current carriers are left near the *pn* junction and so there's no current flow. However, if the the applied voltage is reversed, both the excess holes and the excess electrons are attracted **across** the *pn* junction, and a substantial current flows. Bingo, a diode has been formed!

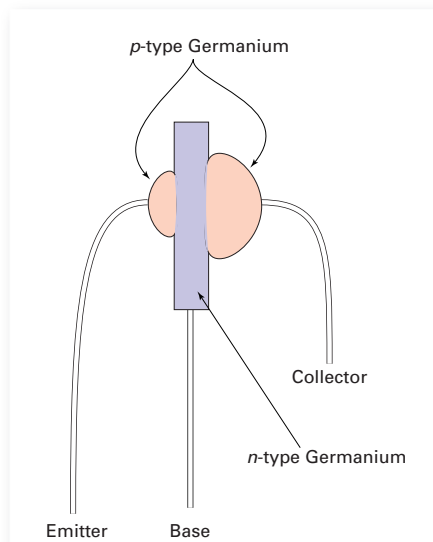
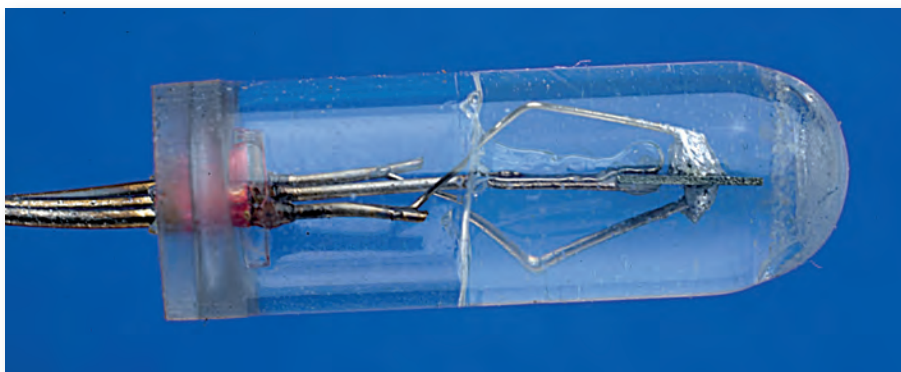
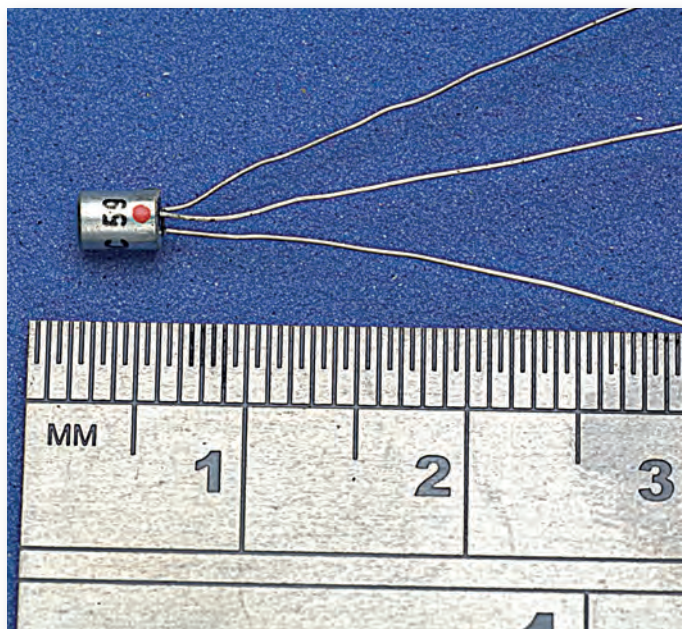


Fig. 2: Showing the internal construction of the OC70, 71 and 72 transistors.



Compare this unpainted glass encapsulated transistor with the drawing of Fig. 2. The filling surrounding the junctions is an inert grease. The collector is the larger, upper 'blob'.





*An early 'miniature' metal-cased transistor. Modern techniques would put many millions of transistor in the same space.*

## Phil Cadman G4CJP

21 Scotts Green Close,

Scotts Green,

Dudley,

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E-mail: phil@g4cjp.freemove.co.uk

### Germanium Wafer

Back to the plot! The point contact transistor uses a wafer of *n*-type germanium as a base, into which are pushed two fine phosphor-bronze wires. These wires, which are positioned very close together, are then fused into the germanium by briefly passing a high current through the junctions. This also causes a small amount of phosphorus to diffuse into the germanium creating small *p*-type regions around the point contacts and (if all goes well!) the process ends up with a *pnp* structure, which exhibits transistor action.

It may seem strange to us now but in the beginning, when comparing the point contact transistor to a triode valve, the transistor's emitter was associated with the triode's grid, and the base was associated with the cathode. In other words, the first circuits used the transistor in what is now termed 'common base' mode.

An example circuit appeared in the February 1955 issue of *The Radio Constructor*, see Fig. 1. This little radio uses an OC51, one of two point contact transistor types (the other was the OC50) that were manufactured by Mullard in 1952. Note that there's no forward bias on the emitter-base junction, a characteristic of many early circuits.

The article from which the circuit is taken is attributed to one **B. H. Jay**. Which is rather curious, because a certain **O. J. Russell G3BHJ** was a regular contributor to *The Radio Constructor* (and also had designs published in *PW*). Knowing that regular contributors sometimes used pen names, particularly when writing

*Yearbook*, so finding out may be difficult. Can anyone confirm or allay my suspicions?

However, while the common-base configuration is best for operation at higher frequencies, it does have a very low input impedance and a high output impedance. Consequently, coupling one stage into the next can be problematical; some kind of impedance transformation is necessary. This is not too much of a problem at radio frequencies, as the tuned circuits between stages can be arranged to provide the required impedance transformation 'free of charge'. However, audio and wideband amplifiers present more of a challenge, requiring some deliberate form of transformer coupling.

### Point Contacts Eclipsed

Point-contact transistors were only manufactured for a few years, being completely eclipsed by the junction transistor once manufacturing techniques improved. They were never mass produced and were never seriously considered for use in consumer electronics. Hence they're now very rare and are quite valuable!

Ironically, the point-contact diode, which predated the point-contact transistor, is still very much in use today. It possesses characteristics which make it very useful – even irreplaceable – in certain applications.

Despite the excitement within Bell Labs over the point-contact transistor, William Shockley effectively ignored the device. And early in 1948, he conceived a transistor that had a layer of one type of semiconductor sandwiched between two layers of the

other type of semiconductor. Over the following months Shockley developed his idea and finally, with the help of others, produced a working junction transistor.

The new type of transistor possessed certain advantages over the point-contact transistor as the theory of its operation was much better understood, it was easier to manufacture and it had more stable characteristics. Here, at last, was a viable solid state alternative to the thermionic valve.

### The Junction Unveiled

The junction transistor was unveiled by Bell Labs in July 1951, and in September of that year, announced that they would licence the technology for both types of transistor to anyone who paid a fee of US\$25,000. Which, as it has turned out, was pretty generous of them!

Mullard – amongst other UK valve manufacturers – paid the fee and began to produce their own transistors. Mullard's first junction transistors – made in 1953 – were the OC10, OC11 and OC12. Unfortunately, their plastic encapsulation was not hermetically sealed and moisture quickly ruined the transistor junctions.

In 1954, Mullard introduced the OC70, OC71 and OC72 audio frequency transistors in a new all glass encapsulation. This solved the moisture problem and even early examples are still viable today (Fig. 2 shows the construction of these transistors).

Next time I'll talk more about the OC series of transistors and show you a couple of circuits which can still be built today. So, until then, get rummaging in your junk boxes for old transistors and if you have any stories about your early exploits with transistors – particularly with point contact types – please let me know.

You can contact me either via E-mail to: [phil@g4cjp.freemove.co.uk](mailto:phil@g4cjp.freemove.co.uk), or by mail to: **21, Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX**. 73 and happy rummaging and hunting!



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Kenwood TS-790E Base / Mobile	£799.00
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Kenwood TS-850S HF	£550.00
Kenwood VFO-120	£89.00
Kenwood YK-88C-1 500Hz CW Filter	£40.00
Kenwood/Trio TR-2300 portapack	£99.00
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LDG AT-1000 Autotuner	£299.00
Lowe HF-225 HF receiver	£275.00
M/Mods 144/100	£119.00
Magellan GPS 315 Receiver	£129.00
Maldol Mr-2000 SWR Power meter	£40.00
Maplin YN48C Dip Meter	£49.00
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MB-62 Bracket (Main) for IC-706, IC-£12.72	
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MFJ-382	£30.00
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MFJ-921 VHF 200 Watt ATU	£50.00
MFJ-989 ATU	£120.00
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PSR-282 GRE Handheld Scanner	£76.55
PT-1012 Microset 12A 13.5 PSU	£93.57
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Realistic DX394 HF Receiver	£119.00
Realistic Pro-2006 Scanner	£129.00
Realistic Pro-43 Scanner	£89.00
Rexon RL-501 Dual Band Handy	£89.00

**\*\*Yaesu FT DX9000 D Transceiver only - £5495.00 \*\***



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at **radioworld\_UK.**







# club news

Please remember to include full details of your club, E-mail and telephone contact details and the postcode of your meeting venue – it helps potential visitors to find you!

## Send all your club info to

PW Publishing Ltd.,  
Arrowsmith Court,  
Station Approach,  
Broadstone,  
Dorset BH18 8PW  
E-mail: pwnews@pwpublishing.ltd.uk

### BEDFORDSHIRE

**Shefford & DARS**  
David Lloyd. Tel: (01234) 742757  
www.sdars.org.uk

The Shefford and District Amateur Radio Society meets every Thursday at the Community Hall, Amptill Road, Shefford, SG17 5BD (next to the Chip shop). May 22nd is a DF Hunt Mobile. On September 25th, they will be holding their 60th anniversary celebrations and would like to hear from any past members of the club (see web site for full programme). June 5th is ADS-B: What is it? by Don G4LOO, 12th DF Hunt Afoot in Shefford Town, 19th is the Club barbeque and 26th is VHF NFD Planning.

### BERKSHIRE

**Reading & DARC**  
Pete Milton. Tel: (01189) 695697  
www.radarc.org

The Reading & District Amateur Radio Club meets on the second and fourth Thursday of the month at Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Berkshire RG5 4LY. May 22nd is Top Band Direction Finding by Bill Pechey and Brian Bristow, June 12th Leslie McMichael, the man, the ham, the firm and the RSGB, G3NGX, G4JNU and 26th is Amateur Radio goes to the Movies with Paul Whotton.

### CHESHIRE

**Chester & DRS**  
Graham. Tel: (07930) 655 121  
E-mail: info@chesterdars.org.uk  
www.chesterdars.org.uk

The Chester & District Radio Society meets on Tuesday evenings at the Burley Memorial Hall, Common Lane, Waverton, Chester CH3 7QT.

### Halton RC

Sam. Tel: (01928) 714231  
http://g7wfs.sytes.net/hrc/index.htm  
The Halton Radio Club meets in The Play Centre, Norton Hill, Windmill Hill, Runcombe WA7 6LJ every Thursday from 7.30 to 9.30pm. There's plenty of parking and full disabled access. June 12th is discussions to any changes to the constitution and 26th is a video night.

### Macclesfield & DRS

Ray King. Tel: (01260) 278431  
www.gx4mws.com  
The Macclesfield & District Radio Society meets every Monday at the Pack Horse Bowling Club, Westminster Road, Macclesfield SK10 3AT at 8pm.

### Stockport RS

David Simcock. Tel: 0161 456 7832  
www.stockportradiosociety.co.uk  
The Stockport Radio Society meets on the first and third Tuesdays at the Bramhall Air Scouts HQ, Leewood Hall, Benja Fold off Ack Lane East, Bramhall, Stockport SK7 2BX. May 20th is a photographic slide show featuring the travels of Gerry Jarvis G0WUJ. June 3rd is a Practical Evening Including Antenna Building and 17th is an outdoor evening at Woodford Recreation Centre.

### Warrington Amateur Radio Club

Paul Carter. E-mail: g7odj@warc.org.uk  
www.warc.org.uk  
The Warrington Amateur Radio Club meets every Tuesday at 8pm at the Grappenhall Youth and Community Centre, Bellhouse Lane, Grappenhall, Warrington WA4 2SG.

### CORNWALL

**Cornish RAC**  
Ian Williams. Tel: (01872) 561058  
E-mail: ianporsche964@aol.com  
www.cornishradioamateurclub.org.uk  
The Cornish Radio Amateur Club meets at the Church Hall, Church Road, Perranarworthal, Truro TR3 7QE on the first Wednesday of every month at 7.30pm. There is also a Computer Section that meets at the same venue and time on the second Monday of every month, except December. June 9th is Scanning Slides and Negatives by Peter G4VWP.

### Poldhu ARC

Keith Matthew. Tel: (01326) 574441  
E-mail: g0wys@yahoo.co.uk  
www.gb2gm.org  
The Poldhu Amateur Radio Club meets at The Marconi Centre, Poldhu Cove, Nr Mullion, Cornwall TR12 7JB. Tel: 01326 241656. June 10th is Time – One second in a million years by George G3AHX.

### COUNTY DOWN

**Bangor and District ARS**  
Mike. Tel: 028 4277 2383  
http://www.bdars.com

The Bangor and District Amateur Radio Society meets on the first Thursday of every month in 'The Boathouse', Harbour Car Park, Groomsport BT19 6JP at 8pm. Visitors and new members are most welcome. June 5th is the annual barbeque at the scout campsite at Crawfordson Country Park BT19 1LD. June 5th is the annual barbeque (TBC).

### COUNTY DURHAM

**Bishop Auckland RAC**  
Mark Hill. Tel: (01388) 745353  
http://barac.m0php.net/

The Bishop Auckland Radio Amateur Club meets every Thursday at 8pm in the Village Community Centre, Stanley Crook, Co. Durham DL15 9SN. Tuition for Foundation, Intermediate and Advanced licences is available. The club is registered as an RSGB exam centre.

### Great Lumley AR&ES

David Barclay. Tel: 0191 3888113  
E-mail: m0bpm@btinternet.com  
The Great Lumley Amateur Radio & Electronics Society meets in the Community Centre, Front Street, Great Lumley, Chester-le-Street, Co. Durham DH3 4JD on Wednesday nights from 7 to 9pm.

### DERBYSHIRE

**South Normanton Alfreton and District ARC**  
A J Highton. Tel: (01773) 783658  
E-mail: snadarc@btinternet.com  
www.snadarc.me.uk/  
The South Normanton Alfreton and District Amateur Radio Club meets in the Village Hall, Community Centre, Market Street, South Normanton, Derbyshire DE55 2EJ. May 19th is a Junk Sale, 21st is a Committee Meeting and 26th is an Inter Club Quiz night.

### DEVON

**Exeter ARS**  
Paul Cheshire. Tel: 01392 660246  
E-mail: pchesh-29@hotmail.co.uk  
The Exeter Amateur Radio Society meets on the 2nd and the 4th Monday at 7.30pm in the Moose Centre, Spinning Path Lane, Blackboy Road, Exeter EX2 5RP. Tuition for Foundation, Intermediate and Advanced licence is available. The club is registered as an RSGB examination centre.

### Torbay ARS

Dave Helliwell.  
E-mail: g6fsp@tars.org.uk  
www.tars.org.uk  
The Torbay Amateur Radio Society meets Fridays at 7.30pm in the Teignbridge District Scout Headquarters, Wolborough Street, Newton Abbot, Devon TQ12 1JR. June 6th & 20th are Operating Nights, 13th is a Natter Night and 27th is a visit and talk by Tim Walford of Walford Electronics demonstrating his range of Somerset Kits.

### DORSET

**Bournemouth RS**  
John. Tel: 07719 700 771  
www.brswebsite.org.uk  
The Bournemouth Radio Society meets on the first and third Friday of each month at the Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH. Meetings take place in Room 5 at 8pm and members assemble in the bar from 7.30pm. Visitors are always welcome.

### EAST SUSSEX

**Brighton RC**  
Reg Moores. Tel: (01273) 503869  
The Brighton Radio Club meets on the second and fourth Tuesdays of each month at the Vallance Community Centre, Conway Court, Sackville Road, Hove BN2 3WR at 7.30pm. Anyone wishing to know more are welcome to come along to a meeting, entrance is free.

### Hastings E&RC

Gordon Sweet. Tel: (01424) 431909  
E-mail: gordon@gsweet.fsnet.co.uk  
www.herc.uk.net or  
http://g4cus.mysite.wanadoo-members.co.uk/  
The Hastings Electronics & Radio Club meets on the third Wednesday at the Taplin Centre, Upper Maze Hill, St Leonards on Sea TN38 0LQ at 7pm. June 18th is an Outdoor Barbecue.

### ESSEX

**Braintree & DARC**  
Keith. Tel: (01376) 329279  
www.bdars.org.uk  
The Braintree & District Amateur Radio Society meets on

the first and third Monday of the month in The Clubhouse, Braintree Hockey Club, Church Street, Bocking CM7 5LJ. May 19th is the AGM and June 6th is the Club barbeque.

### Colchester RA

David Chambers. Tel: 07766 543784  
www.g3co.ccom.co.uk  
The Colchester Radio Amateurs meets at 7.30pm on alternate Thursdays at St Helena School and The Colchester Institute, Sheepen Road, Colchester, Essex CO3 3LE. Members and non-members welcome.

### Chelmsford ARS

Martyn Medcalf. Tel: (01245) 469008  
E-mail: info2007@g0mwrt.org.uk  
www.g0mwrt.org.uk  
The Chelmsford Amateur Radio Society meets on the first Tuesday of each month in the Marconi Sports & Social Centre, Beehive Lane, Great Baddow, Chelmsford CM2 9RX at 7.30pm. June 3rd is a Table Top Sale.

### Loughton & Epping Forest ARS

Marc Litchman. Tel: 020 8502 1645  
E-mail: info@lefars.org.uk  
www.lefars.org.uk  
The Loughton & Epping Forest ARS meet Friday fortnightly at All Saints House, Romford Road, Chigwell Row, Essex IG7 4QD between 7.45 and 10pm. All visitors will be made most welcome. May 23rd is a Bring & Buy Table-Top Sale, June 6th is a VHF Night-on-the-Air, 20th is a Video Night, 'North Weald Airfield', 21st/22nd is GB2NWA (International Museums Weekend) at North Weald Airfield.

### HAMPSHIRE

**Fareham & District ARC**  
Ken Sapsed. Tel: 023 9279 7240  
E-mail: secretary@fareham-darc.co.uk  
www.fareham-darc.co.uk/  
The Fareham & District Amateur Radio Club meets on Wednesday evenings from 7.30pm in the Portchester Community Centre, Westlands Grove, Portchester, Fareham PO16 9AD. May 21st is My 2 Metre Rigby Dave G8UJ, 28th is PICs by Derek G4JLP. June 11th is a 2m DF Hunt, 18th an evening with John G8BHB and 25th is out portable on Portsdown Hill.

### Hordean & District ARC

Stuart Swain. Tel: (02392) 472846  
E-mail: g0fpx@msn.com  
www.hdarc.co.uk  
The Hordean & District Amateur Radio Club meets on the first and fourth Tuesdays each month in the Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants PO8 9SF at 7.30pm. Visitors are always very welcome. May 27th is a visit by the RSGB President and club member Colin Thomas G3PSM, he will be giving a talk 'What has the RSGB ever done for me?', June 3rd is a Natter night/social evening, 14th/15th is a special event radio station at The Royal Marines Museum, Eastney, Portsmouth, 24th is a talk by Graham Aiken JP 'Magistrates in the community' and 29th is a coach trip to Greenwich.

### HUMBERSIDE

**Hull & District ARS**  
Raymond Penny. Tel: (01482) 504618  
E-mail: sirraymond@sirraymond.karoo.co.uk  
The Hull & District Amateur Radio Society meets every Friday at the Walton Leisure Centre, Walton Street, off Anlaby Road, Hull HU3 6JB.

### KENT

**Bredhurst ARS**  
www.the-brats.co.uk  
The Bredhurst Radio Amateur & Transmitting Society meets on Thursdays at the Parkwood Community Centre, Rainham, Gillingham, Kent ME8 9PN at 8.30pm. If you are interested in joining the club, write to: Membership, The BRATS c/o The Club Room, The Parkwood Community Centre, Long Catlis Road, Rainham, Gillingham, Kent, ME8 9PN. June 29th is a Top Band Operating Day.

### Bromley & DARS

Graham  
E-mail: bdars@grahamc.net  
www.bdars.org  
The Bromley & District Amateur Radio Society meets in The Victory Social Club, Kechill Gardens, Hayes, Kent BR2 7NH (off B265, Hayes Lane, Bromley) on the third Tuesday of the month at 7.30pm. May 20th is SSTV with Martin G3OQD.

### LANCASHIRE

**Oldham RC**  
Christopher Cunliffe. Tel: 07749347142  
E-mail: secretaryoarc@btinternet.com

### www.oarc.org.uk

The Oldham Radio Club meets on Thursdays at Royton Air Training Corps, Hillside Avenue, Royton, Oldham OL2 6RF at 7.30pm. May 29th is a committee meeting, June 8th is the 144MHz 2nd backpackers and PW QRP Contest (from Moss Moor) and 22nd is 50MHz backpackers.

### Ellenroad RC

David. Tel: (01706) 358650  
E-mail: info@ellenroadradioclub.org.uk  
http://www.ellenroadradioclub.org.uk/info.htm  
The Ellenroad Radio Club (ERC) meets every Monday evening from 7 to 9pm at the Ellenroad Steam Museum, Elizabethan Way, Newhey, Rochdale OL16 4LG. The museum houses the UK's only fully-working cotton mill engine, complete with its original steam raising plant and 220ft high chimney. Newcomers are always welcome and made to feel at home.

### LINCOLNSHIRE

**Eagle RG**  
Eddie Lingard. Tel: 01507 472695  
E-mail: e.f.lingard@btinternet.com  
www.eagleradiogroup.com  
The Eagle Radio Group meets at The Eagle Hotel, Victoria Road, Mablethorpe LN12 2AJ on the second Tuesday of each month, meetings start at 8pm. The group operates an open policy so, if you are in the area, pop in. June 10th is a talk by Brod about the Mighty Avro Vulcan Bomber and 14th is a Campout at Westend Farm.

### Spalding & DARS

Graham Boor. Tel: 07947764481  
E-mail: secretary@sdars.org.uk  
www.sdars.org.uk  
The Spalding & District Amateur Radio Society meets at the Castle Sports Swimming Complex, Spalding PE11 1QF on Fridays at 7.30pm. June 1st is the Spalding Rally.

### CRAY

**Cray Valley Radio Society**  
Bob Treacher. Tel: 020 8265 7735  
www.cvr.org  
The Cray Valley Radio Society meets on the first and third Thursdays of the month at the Progress Hall, Admiral Seymour Road, Eltham, London SE9 1SL at 7.30pm for 8pm.

### Southgate ARC

Donald F Berry. Tel: 020 8360 3614  
E-mail: dfberry@eggsconnect.net  
www.southgatearc.org  
The Southgate Amateur Radio Club meets on the second Thursday of the month at Winchmore Hill Cricket Club, The Paulin Ground, Firs Lane, Winchmore Hill, London N21 3ER at 7.30pm.

### Wimbleton and District ARS

Jim Bell. Tel: 020 8874 7456  
E-mail: james@bell5.wanadoo.co.uk  
www.gx3wim.org.uk  
The Wimbleton & District Amateur Radio Society meets on the second and 4th Friday of the month at Martin Way Methodist Church, Buckleigh Avenue, Merton Park, London SW19 9JZ. Visitors are welcome whether they are licensed or not. May 30th is an Urban Fox Hunt from 8pm to 10pm, June 13th is Loops and other 'impossible' small antennas by Dr M J Underhill G3LHZ and 27th is an Air On and Summer Camp discussion.

### THE LOTHIAN

**Cockenzie & Port Seton ARC**  
Bob Glasgow. Tel: (01875) 811723  
E-mail: gm4uyz@cpsarc.com  
www.cpsarc.com/news.php  
The Cockenzie & Port Seton Amateur Radio Club meets in the Thorntree Inn (Lounge Bar), High Street, Cockenzie, East Lothian EH32 0HP from 7pm till late. Organised talks are held in the Port Seton Community Centre, South Seton Park, Port Seton, East Lothian EH32 0EE. June 8th is the PW 144MHz QRP Contest, 14th/15th is Museums on the Air Weekend GB2MOF and 18th is a 20m Activity Night.

### Lothians Radio Society

Tony Sigoun. Tel: 07739742367  
E-mail: enquiries@lothiansradiosociety.com  
www.lothiansradiosociety.com  
The Lothians Radio Society meets on the second and fourth Mondays of the month in the Royal Ettrick Hotel, 13 Ettrick Road, Edinburgh EH10 6BJ from 7pm. Membership costs £12 per year and includes a free BBQ every June! May 28th DF Hunt by GM4DTH, June 11th is the AGM and 25th the annual barbeque.



## MERSEYSIDE

### Wirral & District ARC

Tom. Tel: 07050 291850

E-mail: [secretary@wadrac.com](mailto:secretary@wadrac.com)  
[www.wadrac.com](http://www.wadrac.com)

The Wirral & District Amateur Radio Club meets at the Irby Cricket Club, Mill Lane, Irby CH61 4XQ on the second and fourth Wednesdays of each month. Other Wednesdays are informal (D&W) meetings at a local hostelry. May 21st is a D&W at The Green Lodge Hoyleak and 28th is a Practice DF.

## NORFOLK

### King's Lynn ARC

Ray Dowsett, MBE. Tel: (01553) 671307

E-mail: [ray-g3rsv@supanet.com](mailto:ray-g3rsv@supanet.com)

<http://www.klarc.org.uk>

The King's Lynn Amateur Radio Club meets every Thursday at the Scout HQ, Chequers Lane, West Winch, King's Lynn, PE33 0NY off the A10 at West Winch at 7.30pm.

### Norfolk ARC

Mark Taylor. Tel: (01362) 691099

E-mail: [narc@g0lgj.co.uk](mailto:narc@g0lgj.co.uk)

[www.norfolkamateurradio.org](http://www.norfolkamateurradio.org)

The Norfolk Amateur Radio Club meets every Wednesday at the Happy Landings, Norwich Aviation Centre, Norwich Airport NR6 6JA at 7.30pm. June 4th is a Friendly DF Hunt, 18th is the Prep for the Barford Radio Rally and 25th is Bright Sparks/Informal.

### North Norfolk ARC

Tony Smith. Tel: (01263) 821936.

E-mail: [g4fai@btinternet.com](mailto:g4fai@btinternet.com)

[www.radioclubs.net/nnarg/](http://www.radioclubs.net/nnarg/)

The North Norfolk Amateur Radio Group meets in the Radio Hut at the Muckleburgh Collection Military Museum, Weybourne, North Norfolk NR25 7EG on Wednesdays and Thursdays from 10am to 4pm and some Sundays from 1 to 4pm. New members always welcome.

## NORTHAMPTONSHIRE

### Kettering & District Radio Society

Lorna Froggatt.

Tel: 0153 676 2523

E-mail: [LornaSteveLorna@aol.com](mailto:LornaSteveLorna@aol.com)

The Kettering & District Radio Society meets each Tuesday from 7 to 9pm in the winter at The Lilacs Pub, Church Street, Isham, Northants NN14 1HD and in the summer at the Carpetbagger Aviation Museum, Sunnysvale Farm Nursery, Harrington NN6 9PF. Foundation, Intermediate and Advanced courses are held regularly.

## SHROPSHIRE

### Salop ARS

Richard Golding. Tel: 01743 356195

The Salop Amateur Radio Society meets in The Telepost Club, Railway Lane, Abbey Foregate, Shrewsbury SY26BT on Thursday between 8 and 10.30pm. May 22nd is Members Talk Night, round the Table out of the Hat and 29th is a Quiz Night at the Powys Club HQ.

### Telford & District ARS

Mike Street. Tel: (01952) 299677

E-mail: [mjstreetg3j@blueyonder.co.uk](mailto:mjstreetg3j@blueyonder.co.uk)

[www.tdars.org](http://www.tdars.org)

The Telford & District Amateur Radio Society meets on Wednesdays at the Little Wenlock Village Hall, Malthouse Bank, Little Wenlock. Telford TF6 5BG at 8pm. May 27th is a Bring and sell auction with G8UGL. June 11th is VHF NFD Planning, 14th/15th is Museums on the Air weekend and 25th + 30th is the Friedrichshafen trip. June 4 is an open house at the Huntsman, and 18th is local 144MHz foxhunt at Little Wenlock starting 7.30pm.

## SOMERSET

### South Bristol ARC

Len Baker. Tel: (01275) 834282

E-mail: [g4rzy@msn.com](mailto:g4rzy@msn.com)

[www.sbarc.co.uk](http://www.sbarc.co.uk)

The South Bristol Amateur Radio Club meets at the Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol BS14 0LN. May 21st is a Summer Table Top Sale and 28th is an On the Air Evening. June 4th is a Technical Matters Forum. 11th is a QSL Card Evening, 18th is the club barbecue and 25th is an On the Air Evening.

### Yeovil ARC

Gary. E-mail: [g.swain@tesco.net](mailto:g.swain@tesco.net)

[www.yeovil-arc.com/](http://www.yeovil-arc.com/)

The Yeovil Amateur Radio Club meets at the Red Cross Centre, Grove Avenue, Yeovil BA20 2BE (on the corner where Grove Avenue meets Preston Road). May 22nd is a Video Evening, June 5th is the O-V-1 with G3MYM, 12th is My time so far in amateur radio with 2E0TAW and 19th is BYLARA with 2E1RBH.

## SOUTH GLOUCESTERSHIRE

### Thornbury and South Gloucestershire ARC

Tony. Tel: (01454) 417048

E-mail: [tonytsrgarc@beeb.net](mailto:tonytsrgarc@beeb.net)

[http://jma-databases.co.uk/tsrgarc/index.php/Thornbury\\_%26\\_South\\_Gloucestershire\\_Amateur\\_Radio\\_Club](http://jma-databases.co.uk/tsrgarc/index.php/Thornbury_%26_South_Gloucestershire_Amateur_Radio_Club)

The Thornbury and South Gloucestershire Amateur Radio Club meets in the United Reformed Church Hall, on the corner of Chapel Street and Rock Street, Thornbury BS35 2BA at 7.30 - 9.30pm. May 28th are On Air Nights and 21st is a video night. June 4th is Mobile Direction Finding.

## SOUTH WALES

### Barry ARS

Glyn Jones. Tel: (01446) 774522

E-mail: [glyndxis@talktalk.net](mailto:glyndxis@talktalk.net)

[www.bars.btik.com](http://www.bars.btik.com)

The Barry Amateur Radio Society meets on Tuesdays from 7.30 to 10.30pm in the Sully Sports & Social Club, South Road, Sully CF64 9TG. May 27th is a Top Band talk.

## SOUTH YORKSHIRE

### Axholme Radio Club

John Fennell. Tel: (01427) 872522

E-mail: [g4hoy@tiscali.co.uk](mailto:g4hoy@tiscali.co.uk)

The Axholme Radio Club meets at Hollytree Farm, Westend Road, Sandtoft, Epworth DN9 1LB on Wednesdays at 10am to 4pm, Thursdays at 7 - 9pm and Saturdays from 10am - 4pm (other times by arrangement).

### Sheffield ARC

[www.sheffieldarc.org.uk](http://www.sheffieldarc.org.uk)

The Sheffield Amateur Radio Club meets at the SYPT Social Club, Greenhill Main Road, Sheffield S8 7RH every Monday at 7.15pm. They hold all three types of classes for the Foundation, Intermediate and Advance levels of licensing. June 2nd is an HF night, 9th is a Used Equipment Sale, 16th is a talk by M1ERS, 23rd is a Postcode Competition and 30th is a Foxhunt

## STAFFORDSHIRE

### Tamworth Amateur Radio Society

Colin Marks. Tel: (01827) 700893

E-mail: [colin.marks2@ntlworld.com](mailto:colin.marks2@ntlworld.com)

The Tamworth Amateur Radio Society meets every Thursday at 7.30pm at St Francis Church, Masefield Road, Leyfields, Tamworth B77 8JB.

## SURREY

### Sutton & Cheam RS

John Puttock. Tel: 020 8644 9945

E-mail: [info@scrs.org.uk](mailto:info@scrs.org.uk)

[www.scrs.org.uk](http://www.scrs.org.uk)

The Sutton & Cheam Radio Society meets on the third Thursday of the month at 7.30pm in Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey SM1 2EY. In addition to monthly meetings, licence training courses are held at regular intervals in Banstead Surrey. June 5th is a Natter Night and 19th is Aircraft Radio Systems and the SBS-1 by Evan Duffield.

## TYNE & WEAR

### Angel of the North RARC

Nancy Bone. Tel: 0191 477 0036

E-mail: [nancybe2001@yahoo.co.uk](mailto:nancybe2001@yahoo.co.uk)

[www.anarc.net](http://www.anarc.net)

The Angel of the North Radio Amateur Radio Club meets every Monday 7 to 9pm at Whitehall Road Methodist Church Hall at the corner of Whitehall Road and Coatsworth Road, Bensham, Gateshead NE8 4LH. The entrance to radio club room is through door at the side of building next to the car park. The car park entrance is on Whitehall Road.

### Tynemouth ARC

Tony Regnart. Tel: 0191 280 1981

E-mail: [tony.regnart@gmail.com](mailto:tony.regnart@gmail.com)

[www.gx0nwm.co.uk](http://www.gx0nwm.co.uk)

The Tynemouth Amateur Radio Club meets each Friday from 7 to 9pm at St. Hilda's Church, Stanton Rd, North Shields, Tyne & Wear NE29 9QB. It's known locally as 'the church near the fire station'.

## WEST MIDLANDS

### Aldridge & Barr Beacon ARC

Roy Horton. Tel: (01922) 691646

E-mail: [leslie137@btinternet.com](mailto:leslie137@btinternet.com)

[www.g0neq.co.uk](http://www.g0neq.co.uk)

The Aldridge & Barr Beacon Amateur Radio Club is a daytime club and meets at the Aldridge Community Centre, Middlemore Lane, Aldridge, Walsall WS9 8AN on the first and third Monday of every month at 2pm to 4pm. They have a long wire and a 2 metre antenna for radio operation using the club call sign G0NEQ. June 2nd are final arrangements for contest, 8th is PW 144MHz QRP contest and 16th is the Contest Wash-up.

### Midland AX25 Packet Radio Users Group

Miles. Tel: 01384 254199

[www.maxpak.org.uk](http://www.maxpak.org.uk)

The Midland AX25 Packet Radio Users Group, MaxPak, meets on the first Monday of the month at The Sir Robert Peel, 104 Bell Lane, Bloxwich, Walsall WS3 2JS.

### Stourbridge and District ARS

John. Tel: (01562) 700513

[www.g6oi.org.uk](http://www.g6oi.org.uk)

The Stourbridge and District Amateur Radio Society meets on Monday evenings, except for Bank Holidays at The Radio Shack, Old Swinford Hospital School, Heath Lane, Stourbridge, West Midlands DY8 1QX at 8pm. May 26th, June 9th, 23rd & 30th is an Open Shack Night, June 2nd is an On the Air Night, 16th is an Open General Meeting.

### Sutton Coldfield RS

Andy Sherman. Tel: (01827) 875155

E-mail: [peugeotnut@hotmail.com](mailto:peugeotnut@hotmail.com)

[www.hamradio.pico.com](http://www.hamradio.pico.com)

The Sutton Coldfield Radio Society Meets on the second and fourth Monday of the month at 7.30pm (no meeting on bank holiday Mondays) in the Sutton Coldfield

Rugby Club, 160 Walmley Road, Sutton Coldfield, West Midlands B762QA.

### Wythall Radio Club

Chris Pettitt. Tel: (07710) 412 819

E-mail: [g0eyo@wythallradioclub.co.uk](mailto:g0eyo@wythallradioclub.co.uk)

[www.wythallradioclub.co.uk](http://www.wythallradioclub.co.uk)

The Wythall Radio Club is based at Wythall House, Silver Street, Wythall, near Birmingham B47 6LZ. They meet every Tuesday at 8pm and meetings are informal and friendly.

## WEST SUSSEX

### Horsham ARC

Andrew Vine. Tel: (01483) 272456

<http://www.harc.org.uk/>

The Horsham Amateur Radio Club meets on the first Thursday of the month at The Guide Hall, Denne Road, Horsham, West Sussex. May 22nd is 80m CW Club Championship 7 - 8.30pm and 29th is a 2m DF Hunt. June 20th is a social at The Dragon, Dragon's Green.

### Worthing & DARC

Roy or Joyce. Tel: (01903) 753893

[www.wadarc.org.uk](http://www.wadarc.org.uk)

The Worthing & District Amateur Radio Club meets every Wednesday at 8pm in the Lancing Parish Hall, South Street, Lancing, BN15 8AJ. There's a free car park at the rear and full disabled access. Visitors are always welcome. June 1st is a Sunday Breakfast at Carats and 4th is Cost Effective Antennas for the DF Contest.

## WEST YORKSHIRE

### Pontefract & District Radio Club

Colin. Tel: (01977) 677006

E-mail: [info@pontefractradioclub.org](mailto:info@pontefractradioclub.org)

[www.pdars.com](http://www.pdars.com)

The Pontefract & District Radio Club meets every Tuesday from 7pm and Thursday from 8pm at the Carleton Centre, Carleton Grange, Carleton Road, Pontefract, West Yorkshire WF8 3RJ.

## WILTSHIRE

### Trowbridge & District ARC

Ian Carter. Tel: (01225) 864698

E-mail: [ian.i.carter@btinternet.com](mailto:ian.i.carter@btinternet.com)

<http://uk.geocities.com/tdarc@btinternet.com>

The Trowbridge & District Amateur Radio Club meets at Southwick Village Hall, Southwick (nearest postcode is BA14 9QN). June 4th is an Introduction to 80m DFing with G3Z01, 18th is a Natter Night and 28th is GX2BQY at the Southwick & North Bradley Scout Fete.

## WORCESTERSHIRE

### Worcester RAA

Martin Carter. Tel: 07976 917987

E-mail: [secretary@m2000.co.uk](mailto:secretary@m2000.co.uk)

[www.wraa.co.uk](http://www.wraa.co.uk)

The Worcester Radio Amateurs Association meets on the second and fourth Tuesday at the Hallow Scout HQ, off Main Road, Hallow, Worcester WR2 6PP. Visitors, as always, will find a warm welcome at the new clubhouse, as will potential new members.

## Club Secretaries

Please remember to include full details of your club, E-mail and telephone contact details and the postcode of your meeting venue - it helps potential visitors to find you!



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Colin Redwood's

# what next?

Colin Redwood G6MXL has advice for anyone new to portable operating – come rain or shine!

**W**ith the warmer months upon us, and the *Practical Wireless* G4HLX 144 MHz QRP Contest rules published this month, I've put together checklists for those *What Next?* (WN?) readers planning to operate away from home this summer. You never know we might get a few nice sunny days!

The checklists I've provided, apply for just about any band or mode of operation. It's so easy to forget a small but vital part of a station when operating away from home. I've found these checklists work well for me and I hope that WN? readers will find them equally helpful.

## Planning Activities

In planning an outdoor activity I like

to think about things systematically and consider the various parts of an Amateur Radio station separately. Over the years I have found it's useful to prepare checklists to make sure that I don't forget a key item when operating away from home!

In addition I've found it useful to use these checklists to assemble my station in the back garden or a local park – just to prove that I have everything that I need to take with me. If I'm planning to operate on multiple bands, with separate antennas I simply duplicate some of the checklists for each band. A classic example here would be where I am taking a 144MHz (2m) talk-back station alongside a microwave station.

The weekend before the planned operation, I dig out the checklists

and check that I have everything. Please don't be put off by the size of the checklists, I've tried to cover all aspects of the hobby and I think most Amateurs will find that a subset of the lists will apply to their own activities.

## Remember Batteries!

Many people will use batteries for operating their portable equipment. Personally, I like the rechargeable gel cells available in various sizes and capacities. So, don't forget to charge them in advance.

## Antenna System

I prefer to start my own check lists with the antenna system. By this I mean everything needed to assemble and erect the antenna and all the connectors, feeders, etc., right back to the transceiver. Over the years I have found that there are two things I tend to forget: The brackets to attach antennas to masts and having the right type and sex of connectors on the end of every piece of feeder being used – so easy to forget and very frustrating to discover that I have forgotten them when I've arrived at my /P site!

For multi-element antennas – where I have to remove the elements for transportation – I use colour-coded insulation tape. Each element has a different number of strips of tape on it, as does the multi section boom. This helps to ensure that the boom is assembled in the correct manner and that the correct elements go into their respective holes on the boom.

Each antenna has a different colour of insulation tape. This technique allows me to quickly spot if I'm trying to put one of the 70MHz antenna elements onto the 50MHz boom (Yes, it can happen!).

**Tip:** I find that the covers designed for rotary clothes lines are quite effective for storing and transporting antenna poles, booms and elements of most reasonably sized v.h.f. and u.h.f. antennas. One cover will easily store four or five poles and the elements and boom for at least one antenna.



*This is not the time to find that you've left some of the gazebo poles at home!*



*Many check lists were needed for this successful demonstration station by members of Poole Radio Society.*



## HF Antenna System

(Wire dipole / longwire)  
Centre support pole(s)  
End support poles  
Antenna support line  
Support stay lines for poles  
Tethering pegs  
Mallet / hammer

Wire elements  
Feed-point adapter  
Balun  
Main coaxial cable  
Power/SWR meter  
Antenna tuning unit  
Patch leads (all checked)  
Cable adapters (if needed)  
Earth/ground Spike

Spare antenna wire  
'Choc-block' connectors  
Insulating tape  
Hazard warning tape  
Wire cutters  
Pliers  
Screwdrivers  
other tools (as needed)

## VHF/UHF Antenna System

Antenna - 1 (50MHz)  
Driven element (checked)  
Reflector element (checked)  
Director(s) (checked)  
Element clamps (all there)  
Boom (checked)

Boom clamps  
Bolts/washers/nuts  
Centre support pole  
Support stay lines for poles  
Tethering pegs  
Mallet / hammer

Feed-point adapter  
Coaxial Balun (if needed)  
Main coaxial cable  
Power/SWR meter  
Antenna tuning unit  
Patch leads (all checked)  
Cable adapters (if needed)  
Earth/ground Spike  
Repeat the above for each antenna needed

'Choc-block' connectors  
Insulating tape  
Hazard warning tape  
Adjustable spanners (2 off)  
Wire cutters  
Pliers  
Screwdrivers  
other tools (as needed)



*A nice big generator and plenty of fuel for the day's operating and spanners to fit every nut and bolt that's used.*



I try to keep a separate bag per band, so that I know that everything I need for one band is all together.

Once the bag opening is tied up, the cover will strap to a car roof rack quite easily with small rubber 'bungee' type straps with the plastic hooks on either end. I've also tried re-usable cable ties but I don't think they are as effective as the bungee straps.

For wire antennas, I label each of

the feed points with the band

that the antenna is cut for. This simple idea can save a great deal of time 'in the field'.

### Adjustable Spanners

Readers will note (on the separate check list) that I've listed adjustable spanners, rather than individual

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spanners. This is because I prefer to be certain that I can tackle **any** nut and bolt combination, so I prefer to take a pair of adjustable spanners.

To minimise the need for spanners, I tend to replace most traditional nuts with wing or butterfly nuts. I find these are quite adequate for securing smaller antennas for a few hours operating and save taking spanners in most cases.

I limit the size of the antenna system to one that I can erect safely by myself. If you are proposing to use something bigger, then you'll also need to ensure that you have enough people to erect the antenna safely.

### Checklist For Antennas

I check that I have the antenna itself (wire, traps, dipole centre, boom, elements and means to attach them, baluns radials and earth stakes) and anything else that's needed to assemble the antenna. For example: brackets, nuts, bolts, tools, string/rope, insulators, gin-pole (for lifting the mast), adjustable spanners, wire cutters, knife, screwdrivers, mallet, hammer. Support for the antenna (e.g. poles, car roof, tripod, string) a method of holding up the antenna support (e.g. guys or cable ties).

You'll also require brackets – or whatever is needed to attach the antenna to the support system. Don't forget the mast-head pre-amplifiers and their associated r.f. and d.c. connectors and leads or the feeder (with connectors). Connectors will be needed from the feeder to antenna (which may also need adaptors) and cable ties to attach the feeder to the antenna and pole (insulating tape can also be used). I also recommend that a roll of the versatile self-amalgamating tape should be included in the toolbox, as it's ideal for waterproofing connectors and removable box lids.

Next on the list are a suitable antenna tuning unit (a.t.u.) and standing wave ratio (s.w.r.) meter, together with all the necessary cables, connectors and adapters. Also recommended (If you own one)

is an antenna analyser unit – with fully charged batteries and all the necessary plugs, cables and all-too-essential adapters.

### The Transceiver

When I'm considering the transceiver and what else to take, I also include the inputs to the transceiver such as the power supply, microphones and Morse keys. If you are taking multiple transceivers, you'll need to use the checklist for each transceiver and remember that the microphone connections may not be compatible between different manufacturers' transceivers.

One experience I remember is having to complete one microwave QSO using the p.t.t. switch as a Morse key! So, to avoid the same problem – make sure you carry compatible microphones!

Checklist for Transceivers: The rig itself, power supply lead, power source (together with fuel and funnel if you're planning to use a generator). Connectors from the supply lead to source of power. Signal Source (e.g. microphone, Morse key, TV camera, computer with leads and connectors// adaptors and power supplies) and headphones and loudspeakers (with connectors/adaptors).

### Transverters & Equipment

For some bands such as 70MHz (4m) the use of transverters is far more

common than on other bands and it's easy to forget connecting leads or power supply leads for them on an 'outing'! I tend to leave them connected at the transverter end when I pack them away, so that I'm less likely to forget them on the next occasion. The same comments also apply to linear amplifiers and pre-amplifiers.

Check list for each transverter/ linear amplifier /pre-amplifier: The transverter itself/ Linear / Pre-Amp Power supply lead(s). The source of power (with fuel and if using a generator) and the connectors from supply lead to source of power.

Also important are the leads from rig to transverter/linear/pre-amplifier (with correct connectors/adaptors at each end). Don't forget the connection from antenna feeder to transverter/ linear/pre-amplifier with adaptors and the sequencer and/or p.t.t. lead (with correct connectors at each end!).

### Exposed Location?

If I'm planning to operate from an exposed location such as a hilltop, then I consider special clothing essential for each and every visit to hilltops as they are almost always colder than lower down and 'wind chill' can be a problem. Once outside, there's no shelter from even the slightest breeze, and of course any clouds, mist, fog, etc., always seem to congregate on the chosen hill top!

When sitting down operating for several hours, I'm not doing anything to keep warm. So, I always make a point of taking at least two additional layers of clothing above what I would wear outside at my starting altitude. I frequently find I need them both and more!

I don't normally operate out of doors in inclement weather, but if you intend to do so, then you will need to consider a lot more than I have discussed here. The rule, "Always be prepared for the worst" should always be followed

### Accommodation & Logistics

If I'm assembling a tent or gazebo on-site, I find it a good idea to practice before-hand! (Tents can be so complicated!). I also use colour coded insulating tape to identify which poles join together. Some of the items on this list are vitally important.

Checklist for accommodation, domestics and logistics: Accommodation (e.g. tent, gazebo, caravan, toilet arrangements). A table to put gear on and seating for operators (see below), clothing food and drink and log books and pens (or computer if you prefer).

Reference materials (e.g. licence, contest rules, prefix lists, locator, locator maps, bearing lists, beacon lists, hand-outs, publicity materials, GPS). Clock or watch set to GMT (UTC) to log the correct time of each contact.

Safety materials (e.g. risk assessment, hazard warning signs, first aid kit). Transport to and from site (make sure it is big enough for antennas!). Boxes, trolleys, to put gear in for transport to/from site.

Mobile 'phone, 'phone numbers and any other contact details that might be needed

If you meeting up with other operators, make sure they know what the event is, the date, where it is, the on-site time, start and end times and how to get there. A detailed local map can be very useful as not everyone has a SatNav unit!

### Operating & Public Arena

Whenever I've been setting up a station in a place where the public has access, I've found it useful to go through a formal risk assessment to consider all the things that might go wrong and to document how



*Have you got all the patch leads that will be needed?*



these might be prevented or at least minimised. These days, the organisers of public events, such as summer shows, will expect to see the risk assessment and require public liability insurance.

### Patio Table

If you're planning to operate outdoors where no other accommodation is available, a table to put the rig on, along with the log book and other necessities makes operating a lot easier. I've found the small white plastic patio tables that can easily be dismantled for transporting are quite effective. I have even replaced the centre pole used to support a sun-umbrella with an antenna support!

### Antenna Support

I use four x 1m 1.25in swaged aluminium mast sections to support a small v.h.f. or u.h.f. antenna. I replace the umbrella pole that goes through the centre of the table with my antenna pole. I fill the umbrella holder's plastic base (this provides the ballast weight) with water and close the filler cap. I make sure that it's tightly closed (they can easily leak all over logs books!) before carrying it to the car and laying it carefully in the boot for transportation to the site.

Once on site, I assemble the table and place the water container under the centre of the table. To reduce the risk of any damage from the pole rotating – and potentially piercing the water container – I cut up an old yoghurt pot and insert it in the bottom



*Is the microphone connected to this plug the correct one for the rig? If not, it could ruin a day's operating.*



*Lay out all the elements and fittings for the antennas before checking them off the list.*

of the water container hole. I find that the arrangement provides an excellent support for the antenna even in a gentle breeze. The water container then provides a comfortable foot-rest whilst operating!

The transceiver and various batteries are kept on the table to provide additional weight and stability as well as keeping log sheets from blowing away in the breeze! The arrangement means that I can also minimise the length of feeder needed – something that makes this approach particularly suitable to those event operating at u.h.f. and the lower microwave bands.

Incidentally, since using the patio table as a support in the field I've also found it a useful support whilst

evaluating and tuning antennas in my back garden at home. Although I wouldn't recommend this approach for higher or bigger antennas or if there's a strong wind – plastic tables have their limitations, especially when exposed to high levels of UV light – but I found this approach worked well for me. Used within its limits, I found the table was a welcome alternative to guying the mast in an area where the public have access as it also provided both a support for the antenna mast and an operating table.

Hopefully *What Next?* readers will find the checklists and other ideas presented here helpful and use them to make the best of the summer weather that we should all be enjoying soon!



*Food and water may be essential if you're going to be out for more than a few hours.*

### Colin's waiting to hear from You!

I like to solve problems with anything to do with Amateur Radio! I can answer questions and publish my findings here for the benefit of all PW readers.

**Remember** the mains supply is potentially lethal. Unless you really know what you are doing, always pull the mains plug out, do not just switch off at the wall socket, when working on equipment.



**David Butler's**

# v hf d xer

Share your news, views and reports with fellow readers. Reports to David by the last Saturday of each month please.

This month David Butler G4ASR has details of how to catch Sporadic-E openings on the v.h.f. bands.

**P**ropagation during March was hardly worth reporting about, but I'm going to try my best anyway! There was a very brief Sporadic-E opening to Hungary (HA) on March 1st but G-stations only reported hearing the HG1BVB (50.007MHz JN87) and HG8BVB (50.021MHz KN06) beacons.

An IARU Region 1 contest took place over the weekend of March 1st and 2nd – although tropo conditions were not particularly good. However, a few operators in southern England did report making s.s.b. contacts on the 144MHz band with the stations of EA1QS/P (Spain IN52), EA1TO/1 (IN83), EB1DNA/P (IN63), HB9G/P (Switzerland JN36) and OL7C (Czech Republic JO60).

Also on March 1st and 2nd a few stations active on the 70MHz band reported making meteor scatter contacts with stations in the Czech Republic that included OK1COM (JN79), OK1DO (JO60) and OK1KT (JO70).

Incidentally, keep a look out on the 70MHz band for the station of **Klaus Dreckshage DL3YEE**, who has recently obtained permission to use the spot frequency of 69.950MHz. His permit allows an output power of 10W e.i.r.p. and is valid from May 1st to August 31st. Klaus will be active using c.w., s.s.b. and JT6M digital modulation.

**Gus Young M0IKB** (Yorkshire IO94) reports that on March 9th he made an FSK441 meteor scatter contact on the 144MHz band. Running only 25W into an indoor 7-element Yagi he contacted the station of YT3I (Serbia KN05) over a path length of 1770km.

An auroral back-scatter opening was reported at 1720UTC on March 26th that lasted for about one hour. The station of **Clive O'Hennessy GM4VVX** (Highland Region IO78) mentioned making a number of c.w. contacts on the 144MHz band that included the stations of DG9YIH (Germany JO32),

LA4YGA (Norway JO48) and PE1AHX (Netherlands JO21).

The aurora reappeared at 1750UTC on March 27th with the station of **David Gillies MM0AMW** (Argyll IO75) hearing the Faroe Island beacon OY6BEC (50.035MHz IP62) that was peaking 53A. The 'A' by the way indicates that the signal had an auroral tone.

## Something Extraordinary Brewing!

Although v.h.f. propagation was very poor in March it is amazing just how quickly conditions can significantly improve. Right now, as you are reading this, something extraordinary is brewing in the ionosphere!

In normal circumstances a signal in the v.h.f. range travels through the troposphere and unless an enhancement occurs that gives rise to a tropo 'lift', the signal will weaken and disappear at some point beyond the radio horizon. Large proportions of the signal will also pass completely through the troposphere and enter the ionosphere.

The lower layer of the ionosphere is the D-region and as this is virtually transparent at v.h.f. the propagated signal will easily pass through this region. The next layer that the signal encounters is the E-region, located approximately 90-130km above the surface of the Earth.

Under normal circumstances the level of ionisation is insufficient to reflect a v.h.f. signal but on occasions some thin, dense layers of ionisation may be formed that are sufficient to reflect a v.h.f. signal back down to earth. This intense and yet intermittent ionisation in the E-layer is termed Sporadic-E (Sp-E) and this is what all v.h.f. DXers get excited about!

In my opinion it's very important to know by which propagation mode you are hearing v.h.f. signals. Identifying what you're listening to and

understanding its characteristics will enable you to work far more DX than someone who doesn't know what's going on.

So how do we recognise Sp-E enhanced signals? In common with all propagation modes that occur in the ionosphere there are external forces that have influence, in general terms, when any particular mode will occur.

Most if not all ionospheric modes are solar driven and data from many years of Sp-E studies show that it's primarily a midsummer phenomenon. Openings are very common on the 50MHz and 70MHz bands but fairly rare on the 144MHz band.

As an approximation, for every ten days of openings on the 50MHz band there may be only one day on which an opening at 144MHz might occur. Some keen DXers have reported seeing television signals on Band III (around 190MHz) and on a few occasions contacts have even been made within North America on the 220MHz band.

Sporadic-E openings on the 50MHz band are often observed during the last week of April and will gradually build up into daily openings throughout May, June and July before petering out sometime in September. Openings on the 70MHz band often commence around the middle of May and if Sp-E conditions seem particularly good you may expect a 144MHz event during the last week of May. The peak month for openings on this band is in June with a similar number being reported during July.

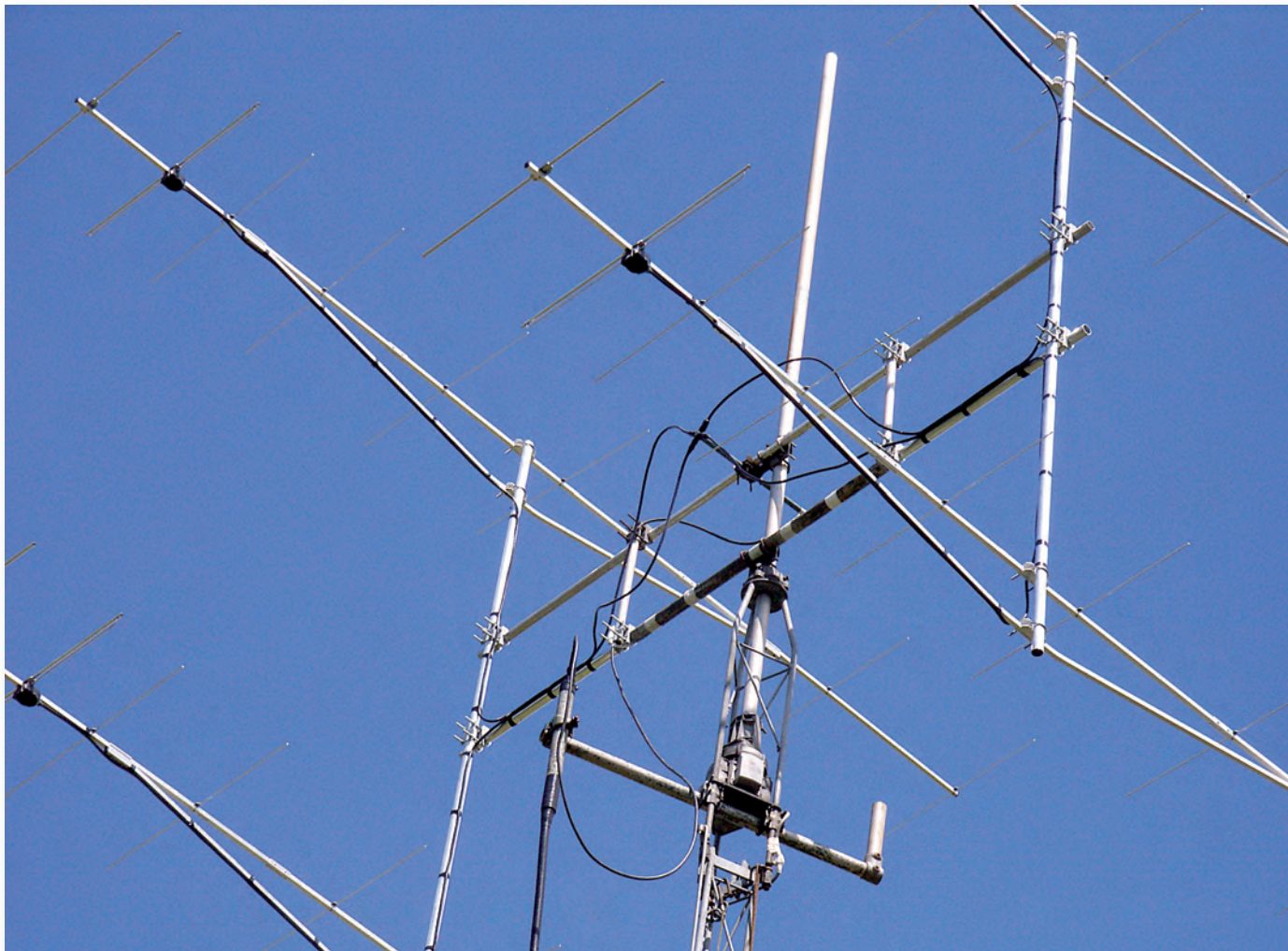
## Determining The Mode

To help to determine the propagation mode by which signals are arriving at your QTH, simply take a look at the location of the station you're receiving. Tropo enhancements on the 50MHz and 70MHz bands are never spectacular and if the received signal is over 800km away it's more than



## David Butler G4ASR

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**Fig. 1: Ready for the 144MHz Sporadic-E season. The four 9-element Vargarda Yagis at the QTH of David Butler G4ASR**

likely to be via the E-layer.

However, on the 144MHz band tropospheric ducting can extend up to 3000km and even further on occasions during the summer. So, if you hear an EA8 station (Canary Islands) on the 144MHz band it doesn't necessarily mean it's via Sp-E! But there are a few more clues to look for.

Signals propagated via single-hop Sp-E will generally be very strong and perhaps exhibit rapid fading, particularly signals on the 144MHz band. Unlike auroral propagation (where the signal is roughened by doppler shift), a Sp-E signal exhibits no distortion. Signals are often present for minutes or hours at a time – unlike meteor scatter where signals are only heard in intermittent bursts.

In practice Sp-E is quite a spectacular mode of propagation. A previously 'dead' v.h.f. band can suddenly become alive with a multitude of stations. On the 50MHz band distances range from 500km to well over 8000km on occasions. That puts your 'Six Metre' signals all over Europe, into Africa, Asia and North America.

Contacts on the 70MHz band are mainly restricted to those European countries that have permission to use the band. Cross-band contacts, typically using both 70MHz and 50MHz, may be made considerably further away. As witness the 4612 kilometre c.w. contact made last summer between the stations of G7CNF and VE9AA.

On the 144MHz band contacts between 1000 to 3000km can often be made. As a generalisation, a single-hop distance of around 1500 to 2000km is normally encountered on this band.

When an opening is in progress one-hop signals can be extremely strong. And it's actually possible to tune through a DX signal thinking it's a local station as many operators are only used to listening for signals propagated via the troposphere.

Tropo signals on a 'normal' day are at the mercy of the prevailing weather and are therefore relatively weak. The Sp-E propagated signals on the other hand could almost be compared to a free-space path with little loss between stations. Although this isn't

exactly true, it almost appears to be so at times.

One characteristic of Sp-E is its extreme geographical selectivity and it's quite common to work stations with S9 signals all in one or two locator squares. At the same time a local operator a few kilometres away may hear nothing at all. This can be extremely frustrating when the 50MHz band opens up to the Caribbean area and other parts of North America.

However, for many operators the onset of the Sp-E season is a godsend because received signals can be so strong it becomes a great leveller of station equipment. Several watts and a dipole antenna will produce many good and interesting contacts on the 50MHz band.

On higher frequencies, such as 144MHz, the geographical selectivity can mean that 3W and a 4-element Yagi may give better results than that 400W station with four 9-element Yagis on the other side of town. (You can see my four 9-element Vargarda Yagis in **Fig.1**).

### Sideband & Morse

My advice to readers wanting to work consistent DX on the v.h.f. bands (via any propagation mode) is that it's universally accepted that it's accomplished by using single-sideband (s.s.b.) or Morse (c.w.). I'm not saying frequency modulation (f.m.) or other communication techniques can't or won't allow you to work long distances, it's just that narrow-band modes are that more efficient. Of course there are always exceptions to this and it's possible to often find considerable f.m. activity on the 70MHz band during Sp-E openings.

Because of the characteristics of Sp-E, especially on the 50MHz band, the use of QRP powers and small antennas works very well. Keen readers will be able to make contacts all over Europe and sometimes – considerably further.

I can't say it's particularly easy with low power but every contact made will be very special. It's the same regarding the 144MHz band, although I would recommend that some form of directional antenna be used. This is because if there's only a few watts to play with, it's always best to concentrate all of it in one particular direction.

One of the easiest ways of catching

an opening on the 144MHz band is to keep a receiver tuned to 144.300MHz, the s.s.b. calling frequency. When the band does finally open up it'll be possible to either immediately hear DX stations or hear someone else working the DX stations.

If it's the latter then don't worry, as I've already mentioned Sp-E can be very geographically selective. So all that's needed to do is sit tight and wait for propagation to enter your area and more often than not it eventually will.

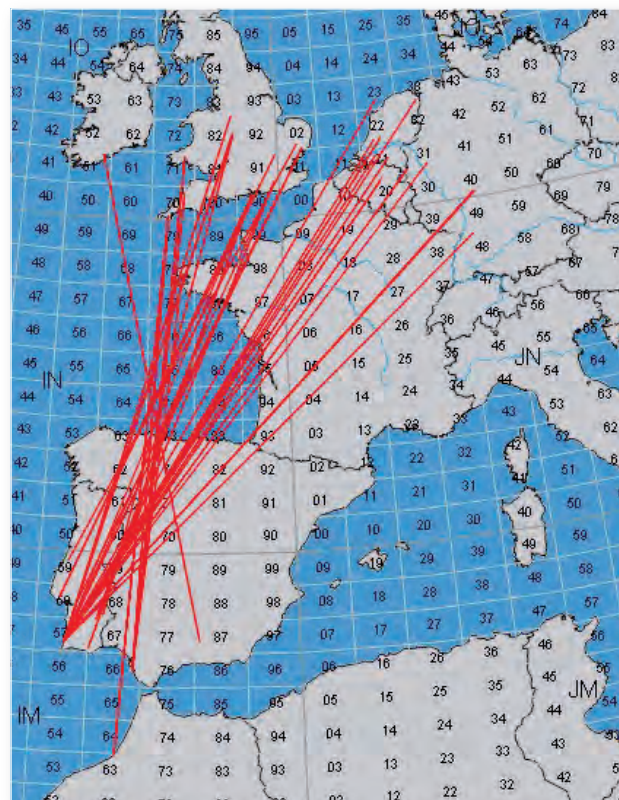
I always find it useful to be prepared before the event when it comes to log keeping. I've made up special 'scribble' sheets with columns for time, frequency, callsign, reports and locator. During intense openings I can be working up to three stations a minute for as long as the opening lasts. In this way I can get down the information very quickly and then at my leisure transcribe the contacts into my station log book. It's also very useful to have a tape recorder running to pick up on mistakes and to brag about later!

### A Specific Day?

There are some DXers, myself included, who try to predict a specific day when an opening on the 144MHz band will occur. None of these predictions stand up to any form scientific analysis but I feel I should let you in on my secret!

I always reckon that the Tuesday after the first weekend in June is always a good bet. On this 'magic' date last year the 50MHz band was open between 1200-2115UTC to stations in the Azores (CU), Canary Islands (EA8), Ceuta (EA9), Gibraltar (ZB), Greece (SV), Morocco (CN), Portugal (CT) and Spain (EA).

The 70MHz band was open around 1330UTC to Gibraltar and Portugal whereas the 144MHz band was open between 1740-1820UTC to stations in Morocco, Portugal and Spain, as shown in the diagram, **Fig. 2**. So this



**Fig. 2: The 144MHz Sporadic-E opening on Tuesday 5 June 2007. Diagram by Dave Edwards G7RAU.**

year, take a listen to the v.h.f. bands on Tuesday June 3rd but as Sp-E openings can be as changeable as the British weather please don't blame me if you hear nothing!

On the other hand the v.h.f. bands could be wide open, so now is the time to make sure your v.h.f. station is working correctly. If you have any doubts about the integrity of your antenna or coaxial cables attend to them now.

What about that intermittent fault you have on the microphone cable or the flat battery in your Morse keyer? Get them fixed now! Then you can relax in the knowledge that when you do encounter your first Sp-E opening everything should be working correctly.

### Deadlines & Advice

That's it for this month. Keep a look out for Sporadic-E openings on all the v.h.f. bands. You won't be able to miss them!

And don't forget that the 144MHz tropo path to the Canary Islands (EA8), Cape Verde (D44) and Madeira Island (CT3) may well be open during May and June. Please send your reports or any news to me before the last Saturday of the month.

73 David G4ASR



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**Carl Mason's**

# hf highlights

Share your news, views and reports with fellow readers. Reports to Carl by the 15th of each month please.

**T**he hospitality of Radio Amateurs world wide is well known, so it was good to hear that some members of the **Farnborough and District Radio Society**, chaired by **John Hardy G3KND** were able to extend a warm welcome to visiting American **Bob Blumberg K4RB** from Athens, Georgia.

Bob was on his travels once again but had taken time out to visit his long time friend **Tom Hutton G0HUT**. Several members of the society were able to join Bob for an evening's drink and long chat before he departed to Heathrow to catch his flight to the former Soviet State of Georgia where he will operate as 4L6X.

will be uploaded to LoTW. The QSLs for A52TL and Torben's other calls 8Q7TL, A15TL and ON/OZ1TL via OZ1TL through the bureau, or direct to **Fjordbakken 5, St.Karlsminde, Lynaes, 3390 Hundested, Denmark**.

Mayotte AF-027 is an island located at the northern end of the Mozambique Channel in the Indian Ocean between northern Madagascar and Mozambique. **Georg Knoss DK7LX** will be operating here 'holiday style' as **FH/DK7LX** from the 11th to the 23rd of June using c.w. on all bands, although preference will be given to 3.5, 7 and 10MHz using vertical arrays and a

list lies Marion Island AF-021. The **ZS8T** callsign is to be used by **Petrus Kritzinger ZS6GCM** (3Y0E) during his one year stay there as expedition leader for the South African National Antarctic Program.

With the help of various sponsors the radio equipment will be better than that used during the 3Y0E operation and include an IC-7000 radio with Signalink USB digital interface for



Back row left to right Bob 4L6X, John G3KND, Tom G0HUT. Front row left to right Phil G1LKJ, Dereck G3HEJ and Dereck G3OFA.

## The DX News

On to this months DX news now and to Bhutan, one of the most isolated and least developed nations in the world, a landlocked nation state in the Himalayan Mountains, sandwiched between India and Tibet. It's from here that **Torben Lovenhoj OZ1TL** will be active as **A52TL** until the 23rd of May. He plans to operate almost exclusively c.w. on all bands and logs

dipole antenna. A QSL is good via Georg's home call through the bureau or direct to **Am Weiderweg 12, 35510 Kirch-Göns/Butzbach, Germany**. Further information is available at **www.dk7lx.mayotte.2008.ms/** and there will be an online log if internet facilities are available on Mayotte Island.

In the Southern Indian Ocean and No. 6 on the DXCC's Most Wanted



The F6KVP Radio-Club de Paris QSL Card.

RTTY and PSK operations, possibly a first for the island. Petrus will also use an Ameritron AL80B amplifier together with a Spiderbeam antenna for 14, 18, 21, 24 and 28MHz and a SteppIR III vertical with 3.5MHz coil for lower band operations.

Petrus will be active on 1.8, 3.5, 7, 10, 14, 18, 21 and 28MHz using s.s.b., c.w. and RTTY and is expected to be airing ZS8T by the time the *PW* June issue is published, although it will depend on his workload. All QSLs should be via the bureau or direct to **Emil Stoikov LZ3HI, PO Box 8, 6000 Stara Zagora, Bulgaria** and logbooks will be uploaded to LoTW on completion of the operation. More information is available at **http://zs8t.net/** and for anyone interested, there's a nice collection of ZS8 QSL cards to be found at **http://lesnouvellesdx.fr** and then clicking on 'Galerie de QSL'.

Upon independence in 1960, the former French region of Middle Congo became the Republic of the Congo. A brief civil war in 1997 restored former Marxist President Denis Sassau-





## Carl Mason GW0VSW

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*The VA7AAW QSL – worked by Owen  
G0PHY on 14MHz s.s.b.*

worked any of the other calls TM1R, TM2I, TM2R, TM4A, TM7S, TM8AR, TM8P and, of course, F6KVP (on the aired since early January), it's possible that they may be eligible for an award. Information on this can be found on the clubs website at <http://arp75.free.fr/>

In Italy members of the **Vecio Piave Team** and **ARI Treviso** will activate special station **I13PIAV** on all bands and modes until August 31st to commemorate the 90th anniversary of the end of the First World War. A certificate will be available 'free of charge' by working the station on four different bands and a QSL is good if sent to **Gabriele Gentile IK3GES, Via Barratta Vecchia, 240, 31022 Preganziol (TV), Italy.**

Finally, **Michael Wells G7VJR** from Madingly, Cambridgeshire will be active as **JX/G7VJR** from Jan Mayen EU-022, a volcanic island located in the north Atlantic ocean between the 27th June and the 4th July. He will operate using 100W with vertical antennas, based in a tent, with power supplied by a generator and expects to use the 10/14MHz bands and higher – if conditions allow. Further details can be found at [www.jx08.eu/](http://www.jx08.eu/) and a QSL is good via Michael's home call.

## Your Reports

Your reports this month begin with the 1.8MHz log of **Eric Masters G0KRT** in Worcester Park, Surrey who used his Kenwood TS-570DG and 100W s.s.b. into a modified W3EDP antenna with a counterpoise to log LN9Z (Norway) 1944, OK1DOL (Czech Republic) 2008, DK1MM (Germany) and ON8DM (Belgium) at 2228UTC.

Also on the 1.8MHz band was **Ted Trowell G2HKU** on the Isle of Sheppy who worked c.w. stations TF4M (Iceland) EU-021, T77C (San Marino) and K1LZ (USA) in Natick, Massachusetts after 2200UTC using a Ten Tec OMNI V and 70W to a G5RV.

Український Державний центр радіочастот - ЦЕНТР "Укрчастотнагляд"

**EM10U**  
Український державний центр радіочастот -  
Центр "Укрчастотнагляд"  
The Ukrainian State Centre of Radio Frequencies -  
Centre "Ukrchastotnaglyad"

Спеціальні позивні, які використовувалися у зв'язку з 10-ю Річницею від дня створення Українського Державного центру радіочастот - Центру «Укрчастотнагляд» (УДЦР)

Special event callsigns to celebrate the 10th Anniversary of the Ukrainian State Centre of Radio Frequencies - Centre "Ukrchastotnaglyad"

**UKRAINIAN STATE CENTER OF RADIO FREQUENCIES**

*The EM10U QSL card – worked by Martin 2E0MCA on 14MHz s.s.b.*

Nguesso to power and there followed a period of ethnic and political unrest. In early 2003 Southern-based rebel groups agreed to peace but the situation remains delicate and refugees continue to present a huge humanitarian problem there. **Thorbjorn Carlsson SM7RME** has been working in the Republic since late last year and has finally received his licence to operate as **9Q/SM7RME**. Activity will have to be in his spare time, so it will be necessary to keep an eye on the DX clusters to work him. Except for **9Q0AR** and **9Q0HQ** (Radio-Club Kinshasa) there are only two other Amateurs that have an official individual licence to operate, **Georges Schleger 9Q1EK** and **Philippe Trottet 9Q1TB**.

In Antwerp Belgium, **Radio Club**

**OSA** will be active on the h.f. bands as **ON70REDSTAR** until the end of the year. This callsign commemorates the **Red Star Line** which was a shipping company that operated between Belgium and North America from 1873 until 1934, which during its life moved more than 3,000,000 people to both America and Canada. If you would like to read more on the Red Star Line then look up [www.redstarlinememorial.be/](http://www.redstarlinememorial.be/) and anyone who works the special event station can QSL ON4OSA via the bureau or direct to **Clubstation OSA-Antwerp, PA. J. Cuyversstr.44, 2610 Wilrijk, Antwerp, Belgium.**

The French Department Ville de Paris was created on 1st January 1968 and to celebrate this 40th anniversary, the **Radio-Club de Paris F6KVP** have been active using five special event callsigns. The last of these will be **TM7S** which will run from the 24th May until 7th June. Anyone who has

On 3.5MHz Eric G0KRT used c.w. at 5W QRP and was please to work F6GEO (France) at 1639 and KT1V (USA) in Durham, New Hampshire later at 2209 and many UK calls using 30W amplitude modulation (a.m.) including G3XGW 1619, G0RAW 1623, GW3TMP 1640, G0PGY 1707 and G0IBI 1720UTC

### The 7, 10 & 14MHz Bands

On to 7MHz now where **Owen Williams G0PHY** in Biggleswade, Bedfordshire used a Yaesu FT-747 and s.s.b. at 100W to a quarter wave inverted 'L' antenna to find EA9IE (Ceuta & Melilla) 2101 and VO1MP (Canada) at 2106 for his first contact with the North American mainland on this band.

Ted G2HKU found condition "fairly good" on 7MHz, working VK7GK (Australia) QSL via DL8NU at 0800 followed later by VQ5XF (Turks & Caicos Islands) NA-002 a special call for the 2008 Commonwealth Contest operated by **Nigel Cawthorne G3TXF**, VE9DX (Canada), ZS6AA (South Africa), J7DX (Dominica) NA-101, ZC4LI (U.K. Sovereign Bases on Cyprus) AS-004, TF3YH (Iceland) and DL2RVL/HI9 (Dominican Republic) NA-096 between 2200 and 2359UTC while 10MHz was "good" around 1700UTC as A45XR (Oman), 9M2TO (West Malaysia) – QSL via JA0DMV – and DL2RVL/HI8 (Dominican Republic) all made the log.

The 14MHz band provided a good number of s.s.b. contacts for **Martin Addison 2E0MCA** in East Finchley, North London. These included SV3AQR (Greece) 0621, EW1MM (Belarus) 0845, LY2D (Lithuania) 0909, Z35M (Macedonia) 0935, I19CAR (Italy) 1043, S50O (Slovenia) 1055, T90T (Bosnia-Herzegovina), SY2V (Greece) 1132, OH1FDW (Finland) 1141, YO2MHD (Romania) 1213, UN6LN (Kazakhstan) 1233. Also logged was ES90G (Estonia) a special call for 90 years of the Estonian Republic at 1251, then came LZ2LP (Bulgaria) 1307, and AO7TAL (Spain) a special call for the Intercontinental Chess Championships at 1456, KG2RG (USA) in Albany, New York at 1502, 7X4AN (Algeria) 1516, A92HB (Bahrain) 1520 and TF3AO (Iceland) at 1616. All contacts were made using a Yaesu FT-2000 and up to 50W output to a half-size G5RV.

In Scotland **Colin Topping GM6HGW** had a short spell on the

band aboard his yacht *Boyztoyz* (a Hurley 20) which was in the St. Andrews Sailing Club yard being prepared for the new sailing season. Colin says, "I thought I'd try out my SGC-2020 just to make sure everything was working well in preparation for my yacht going back into the water. The antenna consisted of a Watson whip lashed to the jack staff and for the ground plane I used a wire connected to the bilge keels. When she's afloat the steel keels give an excellent ground to the antenna. My first test was at 1130UTC and I was more than pleased to reach both **Lewis N3RRR** in Laurel, Delaware and shortly after **John W1FDY** in Topping, Virginia"! (Rather appropriate that Colin – another one out of your Magician's hat?).

**Editorial note:** Readers should be warned that if they ever meet up with Colin Topping GM6HGW, they're in for a magical time with endless conjuring tricks and entertainment! Colin kept the GB75PW team at the Kilmarnock & Loudon Club – in October 2007 – enthralled during his visit. Thanks Colin! **Rob G3XFD**.

Back in Biggleswade Owen G0PHY also tried 14MHz working VA7AAW (Canada) a special call to mark Antarctic Activity Week at 1715UTC.

Eric G0KRT listed c.w. stations K1XM (USA) in Hudson, Massachusetts at 1719, VE2CWT (Canada) at 2032 while s.s.b. found VY2ZM (Canada) 1547, ET9XTP (Ethiopia) 1604 and a string of American calls including K3LR in West Middlesex, Pennsylvania at 1722 and K1FWE in Londonderry, New Hampshire at 2125UTC, all made using 100W.

The c.w. of Ted G2HKU reached ET3JA (Ethiopia) QSL via OK3AA, 5H1HD (Tanzania), VP8NO (Falkland Islands) SA-022 and PJ2/W8AV (Netherlands Antilles) SA-066 between 1700 and 1830UTC.

### The 18, 21 & 28MHz Bands

The 18MHz band provided just a few contacts for all our reporters. Ted managed PY2WC (Brazil) and KR5V (U.S.A.) in Fairview, Texas around 1715. Owen used s.s.b. once again to work VP6DX (Pitcairn Islands) OC-044 at 1636 while

Martin had 'phone QSOs with Z37Z (Macedonia) at 1016 followed by HB10DX (Switzerland) at 1116, UT4UO (Ukraine) 1505 and IH9YMC (Italy) on Pantelleria Island AF-018 at 1520UTC.

Despite some poor conditions on the higher bands there were still some activity. Ted worked c.w. calls 5B4AGC and P3J (Cyprus) at 1100 while the s.s.b. from Owen G0PHY reached J28JA (Djibouti) at 1450UTC (QSL via F5JFU) on 21MHz and there was just one contact reported on 28MHz and that was by Eric G0KRT who worked F6EQA (France) using 100W s.s.b.

### Signing Off

Well that's just about it for this month. I did receive an email from reader **John Wakefield M0XIG** in West Wellow, Romsey in Hampshire informing me of a special event station **GB2BST** (Bramshaw Shutter Station) based in the New Forest which ran earlier this month. The station was to commemorate over 200 years of the Admiralty's signalling telegraph built at Bramshaw, one of a number operated during the Napoleonic wars as a communication link for the Admiralty between London and Plymouth. Activity was confined to 7 and 14MHz and I am sure a good time was had by all three operators **John Hart G4POF**, **Tony Hamilton 2E0SBS** (M3UZZ) and of course John M0XIG.

As usual my thanks must go to all our reporters for their logs and also to **Mauro Pregliasco I1JQJ/KB2TJM** editor of the *425 DX Newsletter* for all the DX information. Until next time I wish you all good DX.  
73, Carl GW0VSW

**AS USUAL, INFORMATION, REPORTS AND PHOTOGRAPHS TO ME PLEASE BY THE 15th OF EACH MONTH.**



**GB2BST QSL operated by John G4POF, Tony 2E0SBS and John M0XIG.**



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Harry Leeming's

# in the shop

Harry G3LLL chats about tackling valve heater switching problems and oscillators – mechanical and electronic!

**H**eater Switches, 'make do and mend'! As I mentioned last month, the heater switches on the FT-101 the '901 and the '902 take quite a load, and they can eventually become intermittent and are difficult to replace.

Fortunately, the switch is of the double pole type. The other half of the switch doesn't carry much load and when the heater section is worn out, the second half of the switch is probably almost as good as new.

On all models of the FT-101s from the MK1 until the FT-101E, the second half of the switch is only used to switch the c.w. sidetone when the rig is in the d.c. mode. Unless you normally operate c.w. mobile you're unlikely to need it and so a faulty d.c. switch is soon cured! Remove the thin sidetone wires from the switch, solder them together and insulate them. Then strap the two sections of the switch across.

On the FT-901 and the '902 the lightly loaded side of the switch is used to reduce noise by killing the cooling fan when the heaters are off. If you can put up with the noise of the fan when you're not transmitting, simply remove the thin fan leads from the switch, connect them together and insulate them, then strap the two sections of the switch across.

Alternatively, if the switch is not too bad try cleaning it. Then simply swap the connections over, as the worn section of the switch may well be good enough to handle the small current the fan takes.

## Frequency Drift & Accuracy

If there's one problem that I get asked about more than any other it's drift, and the associated problem of frequency accuracy. Producing a stable oscillator that will stay on frequency during changes of environment is not easy!

The accuracy, or drift of an oscillator is usually referred to in parts per million (PPM) and its practical effect depends on the frequency. If for instance a transmitter is 20PPM low in frequency at 1MHz, it will be

within 20Hz off the correct frequency, to all intents 'spot on'. If however, it's operating at 10,000MHz the same 20PPM error would put it 200kHz off frequency.

Frequency measurements can cause arguments, as people tend to take readings on rigs and frequency counters as correct, when in fact they depend on the accuracy of the associated reference crystal! Some counters give vague claims of accuracy such as simply '1PPM', but actually mean that they can be set against an external standard to approximately this accuracy.

I once purchased a very nice sounding low priced frequency counter that claimed an accuracy of 1PPM, only to find that over an hour the cheap crystal it used drifted by 17PPM! Typically about  $\pm 1$ PPM is the practical limit of the accuracy of frequency measuring equipment if it relies only on a good quality internal crystal that is not temperature controlled.

Even if equipment is temperature controlled, it will still need checking and re-calibration occasionally if it's to be kept closer than this in accuracy. For this reason laboratories tend to use master oscillators that are locked to standard frequency transmissions and then feed this signal to their test equipment when high precision measurements need to be made.

When I consider the difficulties we have in generating really accurate and stable frequencies, I'm absolutely amazed by the achievement of a self-educated joiner and clock maker, who almost 300 years ago did what the world's leading scientist said was impossible and managed to construct an 'oscillator' accurate to better than 1PPM! Of course, at that time the only frequency standard that was available to him were the stars, coupled with some complicated mathematics. Even more amazing was the fact that his later clocks would maintain this kind of accuracy even in the greatly varying temperatures and humidity of a ship at sea.

## Harrison Oscillators

Last year I went to the Royal Observatory at Greenwich to see an exhibition of **John Harrison's** 'oscillators'. His clocks and watches whilst they were mechanical, predicted and demonstrated what's required of an accurate stable electronic oscillator.

'The Resonator' was Harrison's first land-based clock and used a pendulum as a resonator. Like most pendulums this would normally expanded in warm weather making the clock run slow, but John Harrison applied a compensating negative temperature coefficient.

Brass expands more than steel and so Harrison designed and applied a grid of brass bars in the centre of the

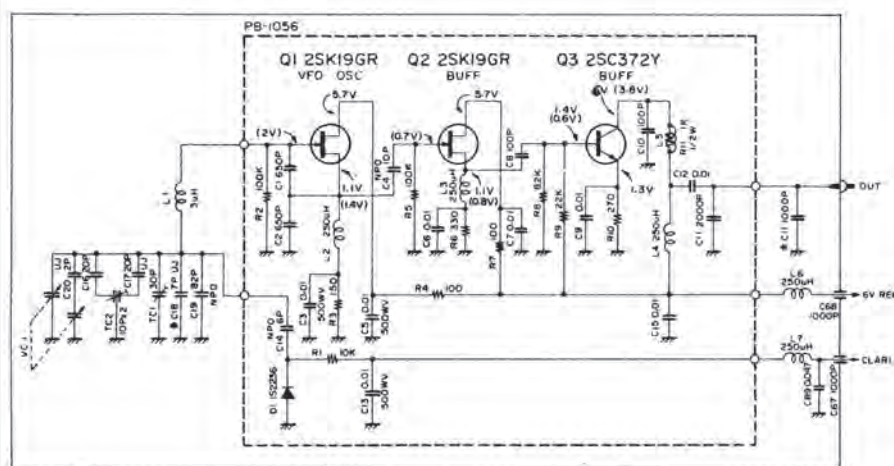
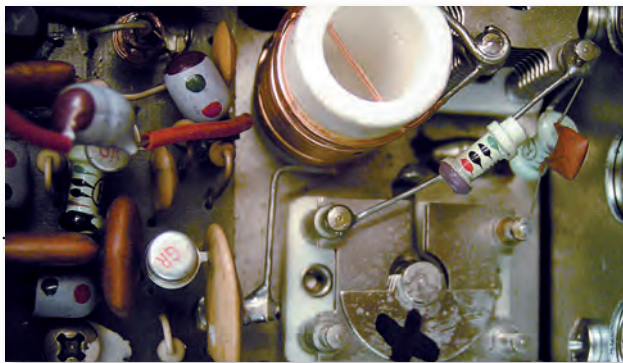


Fig 1: The v.f.o. circuitry as used in the FT-101E.



**Fig. 2: A look at some of the physical components of the oscillator of the FT-101E.**



pendulum mechanically arranged to expand upwards, so that it cancelled out the tendency for the pendulum to increase in length with temperature. (If you look at a good quality 'Grand Father' clock, you'll see Harrison's bars in a grid half way down the pendulum)

As with an electronic circuit the resonator (the balance wheel or pendulum in a clock) requires a means of receiving energy and a means of feeding it out. The more friction-free the pendulum and its escapement are, the less energy they need and the less external forces will affect the frequency. Harrison was careful to see that these had as little effect on the pendulums resonant frequency as possible. He designed his own escapement, and avoided the use of oil. Most clocks need oil to reduce friction and this becomes thicker in cold weather – so Harrison's earliest clocks used wooden gears that needed no lubrication.

Modern thermostats use bi-metal strips to regulate temperature, a device invented by John Harrison in his quest to automatically regulate a portable clock or watch so it would keep accurate time with varying temperatures.

Harrison went on to develop caged ball bearings, a jewelled movement and a main spring that gave equal thrust throughout 24 hours. It was the first 'stabilised' power supply! He used these innovations to enable him to make the first clocks and watches that could keep accurate time at sea and so enable navigators to plot their position.

Harrison spent most of his life working on the navigation problems and in old age was eventually awarded the equivalent of over a million pounds as a prize for solving the difficulties

of finding a ship's position at sea. His is a fascinating story, graphically portrayed in the American writer **Dava Sobel's** book *Longitude*. I highly recommended her book if you like a good 'David versus Goliath' story!

And so back to radio! However, the principles developed by Harrison to keep the mechanical 'oscillator' in a clock accurate, apply equally to the electronic equivalent.

### **Electronic Oscillator**

An electronic oscillator needs a resonator, such as a tuned circuit or a crystal and some means to feed energy in and out of the device. An oscillator based on a good quality crystal should be inherently stable to within a few PPM but oscillators based on other devices tend to vary greatly with temperature.

A variable frequency oscillator (v.f.o.), such as used in a rig, often employs a coil and a capacitor as a resonator. These get warm and expand and so make the oscillator run slower. Fortunately, this reduction of frequency can be cancelled out by adding negative temperature coefficient (NTC) components to the circuit.

The electronic equivalent of friction is loss and so a circuit using a low loss coil and capacitor, (i.e. of high *Q*) will need less energy feeding into it and will be less susceptible to being effected by the loading of the valve or solid state device that's associated with it. To see how these principles are put into practice I'll now ask you to look at the circuit of a typical v.f.o. as used in the FT-101E (Figs. 1 and 2).

First of all the circuit is enclosed in a separate substantial metal box to

### **Harry Leeming G3LLL**

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Morecambe LA3 2PQ  
Tel: (07901) 932763  
E-mail: G3LLL@talktalk.net

isolate it from external mechanical and electronic influences. Secondly, the variable capacitor, VC1, is a good quality tuning capacitor, is used together with a substantial coil that is tightly wound on a ceramic former, L1, as the resonant circuit.

It's impossible to stop the field effect transistors (f.e.t.s) and transistors in a v.f.o. altering in capacity as they warm up. So they are be coupled as lightly as possible to the tuned circuit, being tapped across only part of it. The capacitors C1 and 2 besides providing the 'tap' (The electrical equivalent of a tap on the coil) are also made as large as possible to swamp out the internal capacity of transistor Q1.

However well the circuit is designed and constructed there's still the problem of the capacitors and coil increasing in value as they warm up. This is cancelled out by the addition of NTC components C17, 18 and 20. These capacitor are made of a ceramic material whose dielectric constant reduces with temperature, hence their capacity falls as they get warm. You may come across such capacitors stamped something on the lines of 'N 750', which means that the capacitor decreases in value by 750 parts per million for every degree of temperature increase.

In the FT-101, exactly how much compensation is introduced into the circuit is determined by the setting of TC2. This compensating capacitor is in the bottom middle and marked 'X' in the photograph Fig. 2, and is a split stator capacitor. If you look you can see that C17 the NTC capacitor connected at one end, and a normal positive temperature coefficient capacitor C16, wired to the other end. Next month I'm planning to look further into v.f.o. stability.

Cheerio until then. ●

### **Problems? Harry's waiting to hear from You!**

I like to hear about problems with older equipment, particularly pre 1990 Yaesu rigs. Please E-mail me, (add some radio related term in the subject heading, to differentiate against spam), or write and enclose a stamped addressed envelope. Remember that electricity is dangerous, if you are not familiar with safety precautions you must never work on your equipment whilst it is plugged into the mains. (Switching off at the wall socket does not necessarily make equipment safe)

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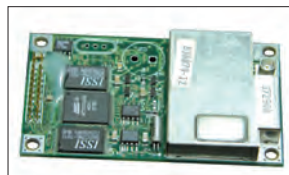
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## Graham Hankin's in vision

Graham Hankins G8EMX turns his lens and looks into the ATV scene.

### Graham Hankins G8EMX

84 Shirley Road  
Acocks Green  
Birmingham B27 7NA  
E-mail: g8emx@tiscali.co.uk

**T**he 'streaming' of Amateur TV repeater outputs over the internet has been around for several years. There are limitations to using some of the present 'streaming' service providers, as **British Amateur Television Club (BATC)** chairman **Trevor Brown** explains, "As you may know, some repeater groups are already doing this via existing commercial providers. Whilst these companies provide non-commercial streaming services free of charge (for the time being) they impose serious restrictions on use and have technical issues which make their service non-optimal for ATV repeater use, the biggest being the delay, typically 40 seconds or so."

So the BATC committee has agreed a rather pioneering idea and Trevor continues, "For some time now **Chris Smith G1FEF**, **Peter Blakeborough G3PYB**, **Dave Mann** and myself have been working on a plan to introduce streaming ATV repeaters onto the internet. Our idea is to provide a streaming video service aimed at the needs of ATV repeaters, without the restrictions associated with the commercial services.

Using the right choice of streaming technology along with a dedicated server housed on a high speed network, we believe we can offer a far superior service and help promote ATV activity, not just in the UK but around the globe."

Trevor continues: "We have made a start and as a 'proof of concept', we've installed Adobe's Flash Media Server version 3 on a spare server in a member's installation. The *FMS3* software is installed in its 'development' mode, which Adobe provide free of charge - it has the same functionality as the paid for version, but is restricted to 10 simultaneous connections."

To make it work with unlimited connections, the BATC committee has agreed that the club will fund a dedicated server plus the running costs associated with having it permanently connected to a gigabit backbone.

Trevor concludes. "ATV is moving into the 21st Century, we need to be a part of this move to keep up and it is our belief



Now that's what I call a camcorder! A JVC Professional, sold via the BATC web site.



Digital ATV transmitter, courtesy Art G3XNE.

that this is an ideal opportunity to do just that."

Thanks Trevor!

Back 'down to earth' - in Devon and Cornwall to be exact where **Art G3XNE** sent an E-mail from the South West: "Enjoyed reading your 'out and about' expedition (*In Vision*, April). Hope you enjoyed the fresh air hi! The piece about GB3WV (Caradon Hill - Cornwall) was especially noted as this is my local repeater at around 25 miles over a very obstructed path from Bude in North Cornwall."

"Just to let you know that there is some life on ATV locally in Bude. **Frank 2E0FWC**, **Graham G8ULJ**, **Dave G4NLH** and myself, **G3XNE**, have been active on analogue ATV simplex and via the repeater. Unfortunately our path to the repeater is difficult and we usually resort to simplex activity to do our experiments. I have built up a digital ATV system based on the *Dvb-s* protocol using some German made *MPEG* encoders and demodulators.

"Running around 10mW r.f. out on 23cms - 1.2GHz - I have been sending some experimental pictures across the area. Frank has received some good

pictures over about a mile with - once again - a severely obstructed path. The on-board error correction seems to cope with the transmitted power levels and give P5 pictures - we were achieving 87% quality with around 21% signal strength - absolutely superb in every way."

Thanks Art, looks as though you're busy down there!

### The BATC Website

It's a good idea to take a look at the BATC's web site (<http://www.batc.org.uk>) occasionally. The home page now sports banner images which are not only actually relevant to ATV but even change occasionally and a Members' Forum has been added recently. This is an on-line 'chat room' created by the BATC's editor of *CQ-TV*, **Chris Smith G1FEF** and is to be found at <http://www.g1fef.co.uk/forums/>

There are several topic areas and Chris has provided one area for comments on each of the ATV repeaters. At the moment, most of the posting counters sit at zero, then I spotted that GB3UT was listed and with a few messages too!

Now GB3UT is in Bath but, as an amplitude modulated (a.m.) ATV repeater, it was a bit of an anomaly among its kind - but not any more, it seems, as **Richard G8BYL** posts to the forum, "It used to be an a.m. 24cm ATV repeater but it was modified to f.m. several years ago using G1MFG modules. Also, at that time we changed its receive frequency from 1276.5 MHz to the current 1249 MHz, with its output frequency remaining unchanged at 1311.5 MHz. Power is 25W EIRP." (EIRP, Equivalent Isotropically Radiated Power. **Editor**).

But Richard's last paragraph is very telling and probably applies to many ATV repeaters: "The really important thing we lack at the moment, is users for this repeater, so if anyone would like to try accessing it, you would be most welcome."

Well Richard, if we manage to hold the BATC BGM at Bath, watch out for some ATV traffic!

Good video everyone! Graham. ●

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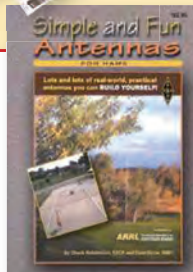


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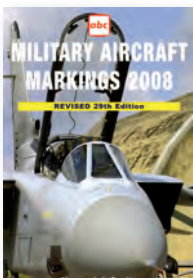


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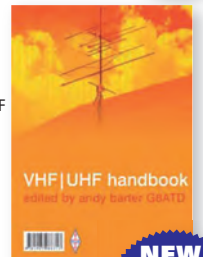
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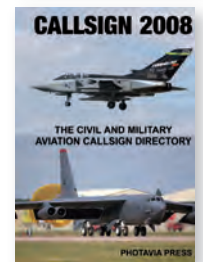


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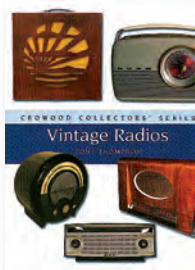
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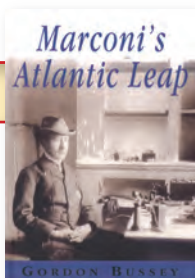
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**Rob Mannion's**

# topical talk

Last month's Keylines, a letter discussing callsign use and another praising the 'true' spirit of Amateur Radio.

**T**he letter from **Peter Leybourne MM5PSL** (Letters this month) highlights the problems associated with the Internet and copyright. Since I wrote the May *Keylines* I have heard from several Amateurs who have – much to their dismay – found that material from their own website have been taken and used by third parties. Both the website owners who contacted me to discuss their problems knew nothing about the re-use of their material on other websites until enquiries came in from (totally innocent) Amateurs who were trying to track down the authors of articles.

It seems to me that some informal sort of code of practice should be followed regarding websites and the material to be used on them. Obviously, problems that arise outside the country that a website is based in could be difficult to overcome. However, Radio Amateurs are basically a good and honest bunch of people and I'm sure that (as I wrote last month) many of the copyright and 'help yourself to it – it's free' problems are not a result of malice or monetary based greed.

The sharing of information on the Internet doesn't need to be a problem, especially if we all adopt a common sense approach. All that's required is for intending publishers to just check to see if, 'Is it all right to use your article please?' And I'm sure that in most cases (especially if it's a non-commercial, non-profit making website) the authors involved will be pleased to co-operate with club magazines and website publishers.

## Two Letters Only?

Correspondent **Mike Baker G3TMB** (Letters this month) is obviously very concerned about the modern trend for Radio Amateurs to use two letters of their callsign, especially when chasing DX. It also seems that Mike has felt frustrated at the – seemingly apparent lack of interest – from both Ofcom and the RSGB on the matter.

I have to admit Mike, that on some occasions I've only used the last two letters of my own callsign when trying to work DXpeditions. So, I've also broken

the regulations! However, I don't make a habit of it and as most of my operating (especially for DX) is on c.w., I don't find it necessary.

Speaking personally, I think that both the anonymous persons in the RSGB and Ofcom aren't particularly concerned about **the initial use of only two letters of a callsign** because it is so widespread. Indeed I think it's such a common practice that most people don't realise it's against the regulations.

I've also noticed in recent years that some Amateurs append 'QRP' on their callsigns when calling 'CQ' on s.s.b. and c.w. This is also illegal for UK Radio Amateurs – however, I have no problem when a low power station identifies itself in this fashion.

Provided that Radio Amateurs ensure that they are identified correctly with their full callsign as a QSO starts, it's my opinion that the use of two letters only as a purely initial identifier should cause no problems. On the other hand I think that those Amateurs – whether they are on 3.5MHz in the small hours or on the DX bands who sit chatting for hours and never use callsigns – aren't 'playing the game'!

So, I'm sure that provided we use our callsigns correctly during an actual QSO, we won't be bringing our wonderful hobby into disrepute. But Mike can be sure – as I fully respect his opinion and stance – if I call him on the bands that I'll do so with my full callsign.

## The True Spirit!

I was absolutely delighted to hear from (Letters this month) from **Pete Torrance G4HAK** on the subject of what he regards as, 'The true spirit of Amateur Radio'. Pete is one of many who has discovered that there's an underlying kind and generous fraternal spirit within our hobby.

That spirit is there all the time! It only needs a call for help (Readers may remember the time my car broke down on the way to the Telford Club!) and Radio Amateurs are ready and willing. I salute you all!

**Rob Mannion G3XFD/EI5IW**

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## INDEX TO ADVERTISERS

bhi Ltd.....	69
Birkett, J.....	69
Bowood Electronics.....	69
Friedrichshafen .....	65
G3RCQ .....	61
Haydon Communications .....	30, 31

Icom (UK) Ltd .....	83
Kit Radio Company.....	53
LAM Communications.....	34
Martin Lynch & Sons.....	23, 24, 25
Moonraker.....	14, 15, 16
Nevada.....	21, 43
Practical Wireless.....	81
Radioworld .....	50, 51

RadioUser.....	70
Spectrum Communications .....	61, 69
Sycom.....	53
Tetra Communications .....	65, 69
The Shortwave Shop.....	65
Waters & Stanton.....	2, 3, 4
Yaesu UK Ltd .....	84

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