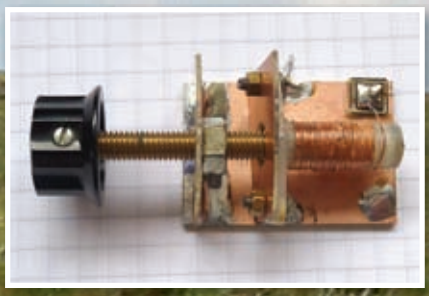
October 2011 £3.50 ISSN 0141-0857

NOW IN ITS 79th YEAR!

Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine

Portable 1.3GHz Dish Antenna



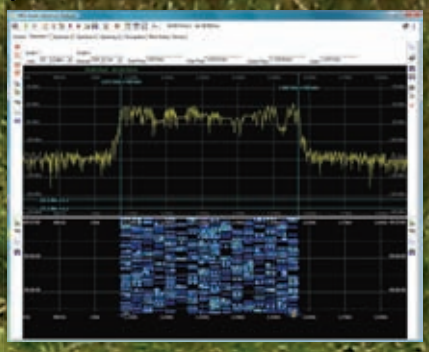
Practical Way

Permeability tuning an oscillator

Antennas

Try a little KISS

Build a 'Plain-Jane' ground plane antenna for 14MHz



Data Modes

Amateur Radio on the keyboard

2011 PW 144MHz Contest Results

How did you do this year?

9 770141 085105 10

WATERS & STANTON

UK's Lowest Prices!

Orderline
01702 206835

Online Catalogue
www.wsplc.com

YouKits HB-1A-MK3

40m & 20m

The Tiny QRP Radio that fits in your brief case or saddle bag!

This compact "DXpedition in your pocket" is amazing. Full VFO, QSK, Elec Keyer and 4 Watts on AA cells!

£199.95 D

JAYCEE OPEN DAY 2011!

Saturday 17th September 10-4pm

W&S Scottish Branch @ Jaycee Electronics, Glenrothes, Fife.

Come & Grab A Bargain At Scotland's Premier Event!

YAESU The FT-DX5000 Package!

The radio that will take you to new levels. Built-in AC PSU all in the box. 200 Watts output for 2-element gain on all bands. TWO totally separate receivers. IP3 +40dBm. 2 or 3 roofing filters (model dependent). 9MHz out for SDR use.

FT-DX5000 - ±0.5ppm TXCO - Included. **£4339.95 D**

FT-DX5000D - ±0.5ppm TXCO - Included + SM-5000 Station Monitor **£4795.95 D**

FT-DX5000MP - ±0.05ppm OCXO – Inc. + SM-5000 Station Monitor & 300 Hz Roofing Filter **£5295.95 D**

The FT-5000 series brings perfection even closer. This radio is designed for the serious DXer. Whether it's weak signals on the border of band noise, or high level crowded band conditions, the FT-DX5000 copes with ease. The DSP brings selectivity & QRM reduction to a new level of performance. Short wires, dipoles, big arrays - no matter what you connect, this radio handles them with ease. You can close in on any signal and with dual receivers, DX chasing is even easier. CW/ Data operators can get right down to 50Hz selectivity, and with the built-in ATU, QSYing is easy and quick. It's the radio that gives you what you have always dreamt of - it's Yaesu of course!

Buy any NEW FT-DX5000 Model from us & get the extra package:

- ***Heil HM-12 Mic + Desk Stand & Lead***
- ***Watson HP-200 Headphones***
- ***15% Antenna Discount Voucher.***
- ***15% ATU Discount Voucher***

ICOM NEW IC-9100 ALL-ROUNDER

HF to 23cms Base Transceiver

The IC-9100 has received rave reviews and is THE radio for those who want everything in one box! Add the 23cms module & D-Star board to expand your hobby even more. A real gem & comes with 2 year warranty. **UX-9100** 23cms **£599**. **UT-121** D-Star board **£129.95**. **FL-430/1** Roofing filters **£52.95.**

HF/6m/2m	100W
70cm	75W
23cm (option)	10W

Satellite Mode Operation: Optional D-Star DV Mode. **£2999 D**

ICOM IC-7410 HF-6m Transcriber

SAVE £300!

- *100W HF-6m all modes.*
- *Receiver +3-dBm IP3 + 15kHz roofing filter*
- *36kHz DSP IF 32 bit razor sharp filter*
- *Internal auto ATU included.*
- *USB interface for PC control and audio out*
- *Large LCD with comprehensive display*
- *Integrates speech synthesizer*

Another winning design from Icom, the "expensive" features introduced a few years ago are migrating down to some of the more affordable radios. ~~£1999.95~~ **£1695.95 D**

YAESU

FT-950 HF & 6m Transceiver

Step up to the FT-950 and you enter the world of advanced £1000 class design. You get 30kHz - 56MHz Rx, Auto ATU, triple conversion Rx with 3 roofing filters, 32 bit floating point DSP, Superb dynamic range, Tx variable bandwidth and Mic EQ adjust, plus CW zero/spot feature, CW message storage etc.

Back In Stock! £1265.95 D

FT-2000 160 - 6m Transceiver

This radio needs no introduction. Covering 160m to 6m, it is the favourite of contesters and DXpeditions. Available as 100 Watt or 200 Watt version.

£1999.95 D

FT-2000D 200W 160 - 6m 230v AC PSU transceiver **£2599.95 D**

ID-E880

2m/70cm 50W Mobile with D-Star & D-Star Repeat Mode. Features GPS compatability, CTCSS & DTCS, Airband Receive. **£439.95 D**

IC-E92D SPECIAL OFFER!

Buy the IC-E92D 2m/70cm handheld and HM-175GPS speaker mic with GPS receive ***together*** and save over £35! **£489 D**

IC-E80D

- *2m/70cm Handheld*
- *D-Star + Repeat Mode*
- *GPS Compatability*
- *CTCSS & DTCS + Airband Receive*
- *1000+ Memories*

FREE software on Icom site

In Stock Now **£329.95 D**

IC-T70E

Dual Band 2m/70cm Handy.

£159.95 D

IC-E90

Triple band 6m, 2m, 70cms.

£244.95 D

IC-E2820

Great dualband mobile.

£499.95 D

Fitted with UT-123 D-Star module. **£699.95 D**

IC-718 Special Offer - SAVE £170!

Great news. We have purchased a quantity of this radio at a silly price. A full 100 Watts HF transceiver base station that offers typical ICOM quality and all the essentials for HF operation. Don't miss out on this one!

~~£599.95~~ **£429 D**

IC-7800	Deluxe HF / 50MHz All-Mode 200W Transceiver	**£8999 D**
IC-7700	1.8-54MHz 200W with built-in PSK-31 + keyboard	**£6239 D**
IC-7200	HF & 6m DSP 0.005-3335MHz wideband receive with USB port	**£839 D**
IC-7000	160m-70cm 100W (hf) Mobile, portable or base station	**£1189 D**
IC-7600	160m-6m 100W transceiver - building on the old IC-756	**£3299 D**

Other Radios

IC-910H	**£1299.95 D**	**IC-R6**	**£179.95 C**	**IC-R8500**	**£1439.95 D**
IC-2200H	**£229.95 D**	**IC-R20**	**£399.95 C**	**IC-R9500**	**£10999.95 D**
IC-R3	**£399.95 C**	**IC-R2500**	**£649.95 C**	**ID-1** 23cm	**£719.95 D**

Two Great Mobiles

FT-2900E

75 Watt 2m mobile with 3W loud audio, CTCSS, DTMF mic and the "WIRES" internet feature.

£139.95 D

FT-7900E

2m/70cms mobile delivers 50/40W with CTCSS, DTMF, "WIRES" internet, 1000 mems and wide rx up to 999MHz.

£239.95 D

FT-450D 3yr Warranty!

NEW

£799.95 D

Now with Auto ATU & Extra filter.

Are you looking for a reliable and feature packed HF transceiver that is affordable, yet can compete with the modern day demands of ham radio and the crowded bands? The take a careful look at what this radio has to offer. And to make it even more attractive, for a limited period we are offering you a 3-Year warranty - **FREE.**

HF Transceivers

FT-DX9000contest	200W HF - 6m "formula one" contest machine	**£4899.95 D**
FT-DX9000D	Deluxe fully loaded base station	**£8199.95 D**
FT- DX9000MP	Amazing 400W "legal limit" radio	**£8995.95 D**
FT-857D	HF to 2m mobile. portable or base - up to 100W	**£679.95 D**
FT-817ND	1.8-440MHz all mode transceiver	**£539.95 D**

VHF Mobiles & Handhelds

FTM-350E	2m/70cm Mobile Bluetooth GPS APRS	**£479.95 D**
FTM-10E	50/40W 2m/70cms stereo FM	**£309.95 D**
FT-8800E	Dualband Mobile 50W / 30W	**£329.95 D**
FT-8900R	10/6/2m & 70cm Mobile	**£369.95 D**
VX-3E	2m / 70cm Handheld Wideband receive	**£159.95 D**
VX-7R	Waterproof dualband handy (silver / black)	**£289.95 C**
VX-6E	2m/70cms handy, 5W Wideband Receive	**£239.95 C**
VX-8DE	Triple Band 6/2m/70cm Upgraded APRS	**£369.95 D**
VX-8GE	Dualband 2m/70cm 5W + GPS Antenna	**£359.95 D**
FT-60E	2m/70cms, 5W handy Wideband Receive	**£129.95 C**

< VX-8DE

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

Head Office & South
Spa House, 22 Main Road,
Hockley, Essex, SS5 4QS.

Enquiries: 01702 204965
Fax: 01702 205843
Email: sales@wsplc.com
Opening Hours:
Mon-Sat 9am-5.30pm

Scottish Store W&S @
Jaycee, 20 Woodside Way,
Glenrothes, Fife, KY7 5DF.

Phone: 0845 5050128
Fax: 01592 610451
Email: jayceecoms@aol.com
Opening Hours: Sat 9am-4pm
Tue-Fri 9.15am-5pm Closed Monday

Fast Same Day Despatch Service!
Orders Received Before 3pm

Buy Now Pay Later Available!

Get The Latest News First
Follow @wsplc on twitter!

Cross Needle Meters

High quality, accurate VSWR meters with large, clear X-needle display.

WCN-200 £69.95 C
* 1.8 - 160MHz * 0 - 30 / 300 / 3000W
* 600W max above 30MHz * 2x SO-239

WCN-400 £69.95 C
* 140 - 525MHz * 0 - 30 / 300 / 600W
* 2x SO-239

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

NEW BLACK-BOX-MKII

Now with Switchable Audio Filter!

The airband monitor that safe to use in the aircraft cabin & can tune to any unknown frequency is back with a switchable audio filter!
* *Non radiating device*
* *Antenna built into earpiece (included)* * *Built-in selectable speaker* * *Squelch control On/Off light* * *12v External power socket* * *Power: 12v car cigar adaptor (supplied) or PP3 battery (not supplied)*

£79.95 D

YouKits FG-01

Antenna Analyser

Graphic Colour Display!

It is what you have been waiting for. A graphic antenna analyser that covers the complete HF spectrum and gives a clear picture of your antenna resonance and performance. Covers 1.8 - 60MHz with adjustable sleep range. Operates from battery and has a COLOUR screen! Available late summer, get your name on the waiting list now as supplies will be limited at first!

£219.95 C

AOR *We are UK Distributors*

AR-MINI

This amazing little radio covers 100kHz - 1.3GHz AM FM & WFM. 1000 memories, over 30 programmable features inc. CTCSS & DCS. Alphanumeric memories give meaningful channels and there is a built-in bar antenna covering 100kHz - 5MHz. Inc. NiMH pack & charger.FREE software database for PC loading via www.aorja.com.

£159.95 D

AR-8200-MKIII

The famous scanner with the quality performance. 530kHz - 3GHz AM FM FMW & SSB. Inc batts, charger + cigar lead. If you are looking for a truly wide-band great performer this is the best in its class!

£469.95 D

AR-8600MKII Base or Portable

The AR-8600MKII is a base or portable station receiver covering 530kHz - 3GHz. All modes AM FM FMW & SSB with standard rotary tuning. Requires external 12V or optional internal batt pack. A great station accessory for general listening or extra receiver.

£669.95 D

QUANSHENG

TG-UV2 2m/70cm Dual Bander

* *3 Power Levels: 5W / 2.5W / 1W*
* *Steps: 5, 6.25, 10, 12.5, 20, 25, 30, 50 & 100kHz*
* *CTCSS, DCS & 1750Hz Tone*
* *Dual Watch*
* *200 Memories Alpha Numeric*
* *2 Deviation Levels*
* *2 Bandwidths*
* *CTCSS & DCS Scan*
* *Built-In LED Torch*
* *Backlit Screen*
* *PTT or VOX*

£81.95 D

Heil
A Great Sounding Name!

NEW Genesis HM-12

The HM-12 Genesis mic from Heil is the latest dynamic design with cleverly sculptured frequency response to suit modern radios. If your radio has an EQ adjustment, then this is the mic to use for that distinctive, crisp, Heil sound. Then look at the price! We also offer the optional K-901 boom mic assembly that makes a true multi-adjustable, hands free system.

HM-12 Dynamic Mic £69.95 C
K-701 Desk stand (above) £14.95 C

The new **K-901** desk mic stand (appox. 30cm high) with telescopic boom. Takes all mic mounts.

£29.95 C

KENWOOD NEW TH-D72E

The very latest handheld from Kenwood is a dual bander with GPS, APRS and TNC capability. The TH-D72 has a built-in SiRF Star III GPS receiver and its antenna, so that you can enjoy various GPS functions with the radio stand-alone. You also can output its GPS data (NMEA-0183) to a PC through the USB port. You can even operate dual receive on the same band.

£426.95 D

HF Transceivers

TS-2000E £1549.95 D

The TS-2000E is the classic all-band, all-mode base station covering HF - 70cms at up to 100W. Includes dual channel receivers & DX-cluster monitor with built-in TNC.

TS-2000X +23cm £1799 D

TS-480HX Ideal for mobile, portable or base station. Gives a massive 200W on HF and 100W on 6m. £879 D

TS-480SAT This model gives 100 Watts on all bands up to 6m, but adds a built-in automatic ATU. £779 D

Handhelds

TH-F7E	2m/70cm 5W (2-pin Kenwood) SMA **+FREE Clip Mic**	£236.95 D
TH-K2E	2m 5W 4-Key Keypad (2-pin Ken) SMA **+FREE Headset**	£163.95 D
TH-K2ET	2m 5W 16-Key Keypad (2-pin Ken) SMA **+FREE Headset**	£172.95 D
TH-K4E	70cm 5W (2-pin Kenwood) SMA **+FREE Headset**	£163.95 D

VHF Mobiles TM-V71E £299.95 D

2m/70cm Dualband Mobile Transceiver. Features;- *Wideband Receive, Built-In Echolink, Simultaneous 2 Frequency Receive, Removeable Control Head, CTCSS Encode / Decode, 1000+ Memories, Supplied with DTMF Mic.*

TM-271E	2m FM 60W mobile. CTCSS, 200 Memories, DTMF Mic	£169.95 D
TM-D710E	2m/70cms 50/50W mobile. APRS +EchoLink, DTMF Mic	£445.95 D

KENWOOD *The Amazing TS-590S!*

160m - 6m with superb receiver inc. dual roofing filters, Auto ATU, 32 bit f/p DSP & USB PC connection.
This is not an updated TS-570, but a completely new design embodying the very best engineering crafted by Kenwood to compete with the very best.

£1369.95 D

Diamond
Compact HF Dipoles

The new range of Multi-Band Dipoles ideal for SMALL gardens yet give BIG performance. Made in Japan. **Peter Waters, G3OJV says** *"these antennas work efficiently and require no external ATU"*

W-8010 5-Bands 62ft Long!

This is a balun fed 1kW 80, 40, 20, 15, 10m dipole that takes up just 19.2m (62ft) or garden. Drop the ends down and you could squeeze it into around 50ft! Yet you get almost full-size performance. No tuned traps to fail or go off-resonance.

£132.95 D

W-735 2-Bands 85ft Long!

This is a balun fed 1kW 80/40 dipole that takes up just 26m (85ft) or garden. Use it as an inverted V and squeeze it into around 70ft! Yet you get almost full-size performance. No tuned traps to fail or go off-resonance.

£89.95 D

Watson
Power Supplies

Power-Mite-NF

Back In Stock! The original Mini 25A PSU. 25A Peak, 22A Cont. with Noise Offset.

£79.95 C

Power-Max-45-NF

38 Amp cont, 45 Amp Peak, Switch Mode PSU with variable voltage, V/A meters, & noise offset.

£129.95 C

Power-Max-65-NF

65 Amp Low Noise PSU. Patented Noise Control that permits you to move any noise away from the operating frequency.

£239.95 D

POWER-MAX-25-NF	22A PSU	£89.95 C
W-5A	5A Analogue fixed 13.8V	£29.95 C
W-10AM	10A Analogue variable	£59.95 D
W-10SM	10A Switched fixed	£49.95 D

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

WATERS & STANTON

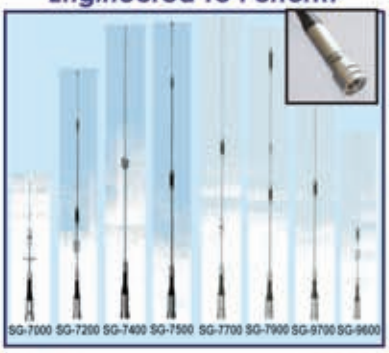
Orderline
01702 206835

Online Catalogue
www.wsplc.com

DIAMOND ANTENNA

Exclusive UK Dealer For Over 30 Years!

Engineered To Perform



SG-2000 2m/5.2dB 1.59m £92.95
SG-7000 2m/70cm 2.1/3.8dB 0.47m £79.95
SG-7200 2m/70cm 3.2/5.7db 0.96m £94.95
SG-7400 2m/70cm 2/5.5dB 0.99m £84.95
SG-7500 2m/70cm 3.5/6dB 1.06m £93.95
SG-7700 2m/70cm 4.3/6.8dB 1.27m £99.95
SG-7900 2m/70cm 5/7.6dB 1.58m £112.95
SG-9500M 2/70/23cm 3/6/9.7dB 1m £119.95
SG-9600 6/2/70cmdB 0.82m £99.95
SG-9700 6/2/70cm 0/3/5.8dB 1.07m £109.95

Diamond Mounts

K-11 Gutter mount adjustable tilt £39.95 A
K-300 Black gutter mount adjust. tilt £TBA
TRA-II Trunk lip adjust. + 4m cable £TBA
K-600M Trunk lip adjust + cable £76.95 C

K-33 Hatch Mount adjustable £47.95 A
K-400 Heavy Duty Hatch mount £42.95 A
CRM Roof rail / Mirror Mount £15.95 A
K-512 Roof bar mount £49.95 C
ECH 5m cable kit PL-259 £13.95 A

DP-7RH Compact 40/30m Dipole

This is a rigid, telesopic dipole, which has an overall length of approx. 3.5m. It collapses down to pocket size. It can be hung from a tree or clamped to a mast. SO-239 feed.
£139.95 C

HF Verticals

CP-6 80-6m 200W with 1.8m rigid radials. Mast mounted. 4.6m long £389.95 D

CP-8040 80-40m with 1.8m rigid radials. 6.5m long. £459.95 D

KV-5 80-40m ground mounted vertical approx 6.5m long. £399.95 D

SD330
80-6m Remote Tuned Whip

This "screwdriver" design covers all the DX bands (inc WARC0. Continuously tuned with supplied remote control, it will handle 200W and is just 1.85m long. Fitted 3/8" stud mount, it will easily fit onto a 3-way magnetic roof mount.
£449.95 D

Diamond VSWR Meters

SX-100 HF 3kW
1.6 - 60MHz 30/300/3kW FSD. 3W sensitivity for FSD. Single sensor 0.1dB insertion loss. PEP/RMS
£144.95 C

SX-200 1.8 - 200MHz. 5/20/200W FSD. 1W sensitivity for FSD. Single sensor. 0.15dB insertion loss. PEP/RMS £99.95 C

SX-400 140 - 525MHz. 5/20/200W FSD. 4W sensitivity for FSD. Single sensor. 0.2dB insertion loss. PEP/RMS £109.95 C

SX-600 HF-UHF
1.8- 160MHz / 140-525MHz 5/20/200W FSD. 1W/3W sensitivity for FSD. Dual sensors 0.2dB insertion loss. PEP/RMS. £179.95 C

SX-1100 1.8 - 160MHz. / 430-1300MHz 5/20/200W FSD. 1W/4W sensitivity for FSD. Dual sensors. 0.15dB insertion loss. PEP/RMS £259.95 C

Diamond Power Supplies

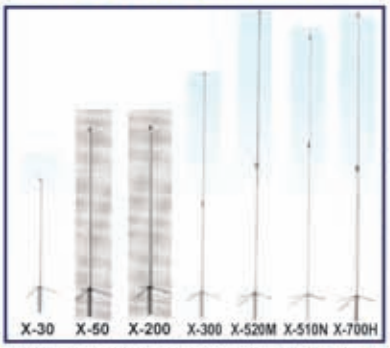
GSV-3000
30 Amps continuous 1 - 15vDC variable 250 x 150 x 2400 mm inc. DC cooling fan, weight 9kg
£199.95 C

GZV-6000 60A **GZV-4000** 40A

GZV-6000 60 Amps continuous 1 - 15vDC variable 210 x 110 x 3300 mm inc. DC cooling fan, weight 5.2kg £389.95 C

GZV-4000 40 Amps continuous 5 - 15vDC variable 210 x 110 x 3300 mm inc. DC cooling fan, weight 3.5kg £229.95 C

Base VHF/UHF Antennas



X-30 2/70cm 3/5.5dB 1.3m 150W £75.95 D
X-50 2/70 4.5/7.2dB 1.7m 200W £82.95 D
X-200N 2/70cm 6/8dB 2.5m 200W £119.95 D
X-300 2/70cm 6.5/9dB 3.1m 200W £144.95 D
X-520M 2/70cm 8.3/11.7dB 2.5m £TBA
X-510N 2/70cm 8.3/11.7dB 5.2m 200W £189.95 D
X-700H 2/70cm 9.3/13dB 7.2m 200W £299.95 D

For More Bargains Visit The W&S eBay Store!
Go to www.wsplc.com then click on the link to our ebay shop.

Watson
Antenna Bargains

Dual Band 2m/70cm

W-300 Base antenna 6.5/9dB 3.1m long £74.95 D
W-50 Base antenna 4/5/7.2dB 1.8m long £54.95 D
W-30 Base antenna 3/6dB 1.15m long £49.95 D

W-627 Triple band 6/2/70cms mobile whip with PL-259 base. 2/4.8/7dB gain. 1.6m long with foldover base. £39.95 C

W-7900
A smart, well constructed 2m/70cms whip with foldover base. 5/7.6dB 1.58m long. £32.95 C

W-3HM Hatch mount for mobile antenna. Fits all car hatch doors and mounts firmly with full angle adjustment. £14.95 A

W-3CK Cable kit 5m long to fit W-3HM. Low loss cable with SO-239 antenna mount & PL-259 to go to radio. £18.95 A

Buddipole
Portable HF Antennas

The most respected portable HF antenna system available. Available as a dipole or vertical system - packs down into a carry pack.

The secret of the system is the hi-q coil assemblies.
www.buddipole.com

W3-BP Dipole 40-2m 250W £219.95 D
W3-BP-DELUXE With mast kit £419.95 D
W3-BS Vertical 40-2m £161.95 D
W3-BS-DELUXE Vertical + clamps £194.95 D
W3-CTA Centre T mast clamp £8.95 A
W3-DKB Buddipole Carry Bag £41.95 C
W3-LBVK Low band vertical kit £199.95 D
W3-MBP Mini Buddipole £239.95 D
W3-MK Mounting Kit £36.95 D
W3-MWA-4 Military whips £102.95 C
W3-RAK Rotate arm kit £39.95 C

Miracle Antennas
Miracle-Whip

A tuneable telescopic whip covering 3.5 to 460MHz. Up to 25 Watts PEP, fiited with PL-259 plug. Great for FT-817 & IC-703 or any other QRP radio.
£129.95 C

2m/70cm/23cm Mobiles

Compact, high quality "N" connector mobile whips with sprung bases.

SGM-803N Triple band 0/2/5.5dB 60W max. 0.37m long £79.95 C

SGM-805N Triple band 0/3.8/7.2dB 60W max 0.57m long £89.95 C

Avair
Power SWR Meters

All models have 12V backlight and include DC Cable.

AV-201 1.8-160MHz, 5/20/200/1kW £49.95 C
AV-400 140-525MHz 5/20/200/400W £49.95 C
AV-601 1.8-160MHz / 140-525MHz £69.95 C
AV-1000 1.8-1300MHz. £79.95 C

Cross Needle Models - Even Lower Prices!

AV-20 30W / 200W, 3.5-150MHz £39.95 C
AV-40 15W, 0-150W, 144-470MHz £39.95 C

Tonna
VHF/UHF Antennas

220505 6m 5 element 10.1dBi £118.95 D
220809 2m 9 element 13.1dBi £79.95 D
220909 70cm 9 element 13dBi £74.95 D
220919 70cm 19 el. 16.2dBi £94.95 D
220623 23cm 23 el. 17.9dBi £77.95 D
220725 13cm 25 el. 18.3dBi £102.95 D

Create
Rotators

RC5-1 Medium Duty Rotator

**Rotating torque: 6kg/m *Braking torque: 80kg/m *Mast size: 48-63mm *Vertical load 400kg *Horizontal load 800kg *Rotation speed: 60-150sec/50Hz *Power: 230V AC 80VA *Weight: 5kg *Cable: 7-core cable (not supplied) *Requires MC-2 lower mast clamp if mounting on pole*
£569.95 D

RC5-3 £719.95 D
Same as above but with preset control.

bhi
DSP Audio

NEW NES10-2MK3

Speaker & programmable DSP unit. Offers dramatic noise reduction.
£112.95 C

NEIM-1031MKII £142.95 C
Noise Eliminating In-Line Module.
NEDSP-1061-KBD £101.95 C
Noise Eliminating DSP module for FT-817
NEDSP-1062-KBD £106.95 C
Noise Eliminating DSP module for speaker.
ANEM-MKII £127.95 C
In-Line "Noise Away" amplified DSP module.
DSPKR £154.95 C
Noise Eliminating DSP Ext. Speaker 10W.
DTNA - NOISE-AWAY £154.95 C
Amplified DSP Noise Cancelling Desk Speaker.
RADIOMATE £89.95 C
Compact keypad for Yaesu FT-817/857/897.
CAT-MATE £50.95 C
Electronic Y Splitter for Yaesu CAT Interface.

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

Practical Wireless October 2011

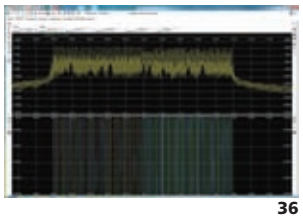
contents

Volume 87. Number 10. Issue 1253. On sale 8th September 2011

Front Cover: The 1.3GHz dish antenna, built by G8MOTI, featured on page 24.

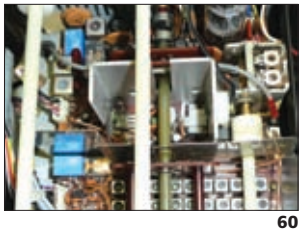

16


24


36


46


50


60

Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979. Printed in England by Holbrooks Printers Ltd., Portsmouth P03 5HX. Distributed by Seymour, 2 East Poultry Avenue, London EC1A 9PT, Tel: 020 7429 4000, Web: http://www.seymour.co.uk. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £38, EUROPE £47, REST OF WORLD £57, payable to *Practical Wireless*, Subscription Department. PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979. *Practical Wireless* is sold subject to the following conditions, namely that it shall not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. Practical Wireless is Published monthly for $50 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, Royal Mail International, c/o Yellowstone International, 87 Burlews Court, Hackensack, NJ 07601. UK Second Class Postage paid at South Hackensack. Send USA address changes to Royal Mail International, c/o Yellowstone International, 2375 Pratt Boulevard, Elk Grove Village, IL 60007-5937. The USPS (United States Postal Service) number for Practical Wireless is: 007075.

Rob Mannion G3XFD/EI5IW's

Keylines

Rob G3XFD remembers his radio component recyling days again – this time for modern reasons!

One of the most poignant memories I have of my early days in the radio hobby involves the local dump at Woolston in Southampton, where I would sit, snip, and recover components from scrapped TV and radios. And from the comments I get during club visits – I know I wasn't the only youngster with the same initiative in those days!

In the late 1950s access to landfill sites was much more relaxed and the gatekeeper let me ride my bike in and allowed me to recover components from equipment awaiting burial under tons of rubbish. The site now forms a park overlooking the old Supermarine factory (home of the *Spitfire*) office buildings, alongside the River *Itchen*.

Regular readers may wonder – as I've often discussed the recycling topic before in *Keylines* or *Topical Talk* – why I'm returning to the subject yet again. In answering the obvious question – I'm doing so because I feel a sense of urgency that we (radio constructional hobbyists) will soon lose the chance of recycling radio and electronic equipment entirely. This is because very soon **all such scrap** will be exported to Africa and Asia.

I have no doubt that I'm not alone in being very dismayed after watching the TV documentaries showing the huge recycling dumps in Africa and Asia where local people (including school age children), burn, slice and use the crudest techniques to extract the copper, tin and other metals. Obviously, we know the methods they use, and the odious chemical by-products generated, can cause great harm to their health – but they don't!

Terrible Conditions

Obviously, I realise that the people undertaking the recovery work from electronic scrap are trying to earn a living – but why should they do so in such terrible conditions? I often wonder why it seems that none of the charitable organisations are involved in setting up or helping local people to operate efficient, non-hazardous and profitable recycling centres. (If anyone knows of such an initiative – I would like to hear of it please).

It's obvious that the huge demand for scrap electronics and metallic scrap in general isn't likely to decrease in the near future. Any *PW* reader who has been fortunate enough to enjoy a cruise starting from Southampton will no doubt have seen the large pile of scrap metal – often up to 30m (100ft high) – next to the old King *George V* graving dock (formerly used for the *RMS Queen Mary* and *Queen Elizabeth* liners). This is mostly exported to India and China.

The reason why I'm concerned enough to alert *PW* readers again is that my local (Council owned) 'Recycling Centre' seems to export all scrap consumer electronics. However, in fairness to the operators this is seemingly standard practice within the 'Recycling' industry (as shown in recent TV documentaries).

It's not usually possible to buy scrapped/non-working electronic equipment from recycling centres nowadays. 'Health & Safety' regulations are often quoted – and I've been left wondering if we're just exporting the suggested 'safety' problems! Before long the the salvageable components from analogue equipment will soon disappear – because more modern systems aren't using the discrete components we need.

The Future For Constructors

The future for constructors – or perhaps – 'for constructors of the future', we should all do our very best to keep as many wire-ended discrete components available for constructors. Unwanted radio/electronics equipment from jumble sales, etc., used to be a good source but nowadays 'safety' regulations have led to us losing this source.

I think it's time for individuals, clubs and organisations to help ensure we have a good flow and stock of usable components. Some of these could – surely – be from the sources I've mentioned. Personally, I'd like to see regulations changed – especially because the type of equipment we're interested in (old analogue radio receivers, TV, hi-fi., audio amplifiers, etc.) isn't so attractive to the commercial recycling companies.

Building your own equipment – however simple it is – is most satisfying and encouraging. Anyone who has seen constructors working away at one of **Steve Hartley G0FUW**'s internationally known 'Buildathon' events would certainly agree! So, let's ensure a future for constructors by keeping a stock of traditional wire ended components available to help beginners launch themselves into our hobby.

Rob Mannion G3XFD/EI5IW

Practical Wireless
PW Publishing Limited
Arrowsmith Court
Station Approach
BROADSTONE
Dorset BH18 8PW

Tel: 0845 803 1979
Fax: 01202 659950

Editor
Rob Mannion G3XFD/EI5IW
rob@pwpublishing.ltd.uk

Technical Editor
NG (Tex) Swann G1TEX/M3NGS
tex@pwpublishing.ltd.uk

Art Editor
Stephen Hunt
steve@pwpublishing.ltd.uk

Advertising Typesetting/Admin
Peter Eldrett
peter@pwpublishing.ltd.uk

Advertisement Sales
Roger Hall G4TNT
roger@pwpublishing.ltd.uk

Finance Manager
Alan Burgess
alan@pwpublishing.ltd.uk

Book Orders
bookstore@pwpublishing.ltd.uk

PW Publishing Website
www.pwpublishing.ltd.uk

Our 0845 numbers are charged at the BT Standard local Rate. Callers with an appropriate BT inclusive call package can call this number free!

Directors: Stephen Hunt & Roger Hall

Subscription Administration
Webscribe
Practical Wireless Subscriptions
Unit 8, The Old Silk Mill
Brook Street
Tring
Hertfordshire HP23 5EF
pw@webscribe.co.uk
www.mysubcare.com
☎ 01442 820580
Fax: 01442 827912

Subscriptions
Subscriptions are available at £38 per annum to UK addresses, £47 Europe Airmail and £57 RoW Airmail. See the Subscriptions page for full details.

Components For PW Projects
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.

Photocopies & Back Issues
We have a selection of back issues, covering the past three years of PW. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. See the Book Store page for details.

Placing An Order
Orders for back numbers, binders and items from our Book Store should be sent to: PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone 0845 803 1979. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone 01202 659950.
The E-mail address is bookstore@pwpublishing.ltd.uk

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

Send your letters to:

Rob Mannion, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW

E-mail: pwletters@pwpublishing.ltd.uk

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

Please note that the opinions expressed in any letter published in *PW* are those of the named correspondent whose letter has been published and they don't necessarily reflect the opinions of the Editorial staff or PW Publishing Ltd. **Editor**.

£20 Star Letter

Progression To Full Licence Via The Foundation Licence

Dear Rob

Recent letters have expressed a wide range of views about the lack of progress to the Full Licence via the Foundation, Intermediate and Advanced exams. Whilst everyone is entitled to their opinion there are a number of key facts that have been missed, misrepresented or maybe just misunderstood. Hopefully my letter will close off on a positive and factually correct note.

First of all, there seems to be some idea that 'we' (presumably Radio Amateurs) moved away from the well-respected and valued City & Guilds of London Institute as our examination provider. This is not the case, C&G served notice that they would cease to provide the RAE and Novice RAE exams as they were no longer cost effective. The numbers taking the exam had fallen such that for one sitting there were more questions on the paper than there were candidates sitting it. For the benefit of newcomers, in those days there were only a small number of fixed exam dates throughout the year. So, the current exam system was put in place by the Regulator, now OfCom, to fill the gap left by the C&G leaving 'us'.

Secondly, and related to the above, after an absolute boom time in the 1980s, the numbers coming into the hobby in the 1990s fell dramatically. The 1980s saw an unprecedented increase in Amateur Radio activity entirely as a result of the fashion for Citizens' Band radio – and I was one of those that has CB to thank for bringing Amateur Radio to my attention. So, there is no point comparing todays numbers with 1980s as they were exceptional, a welcome blip that is unlikely to ever return. If you look further back, entry into the hobby was really slow; the 'G3 + 3 letters' callsign series was being issued for 25 years before it ran out. We therefore need to be very careful when we do historical comparisons.

Some letter proclaim that "The newcomers do not operate properly. However, the facts do not support that view. A recent exercise to look at operating practices reported that bad habits were observed across a whole range of callsigns. You can forgive a newcomer making a mistake, but older hands should know better.

Next I'll mention the old chestnut about qualified engineers having to waste time doing simple courses in the classroom. Let's be very clear, **they do not**. The current examinations do not require any classroom time at all, the only pre-requisite is to demonstrate competence by completing a few practical assessments. Any suitably qualified and experienced person will breeze through the technical aspects of those assessments and the ones that I have assessed are always grateful for the operational practicals as that aspect is something they are generally not familiar with.

I recently had a 'newcomer' ask me if he needed to build a simple project to 'tick the box' and explained that he had, in the past, built his own oscilloscope. I suggested that would be just fine to demonstrate his competence, providing that he talked me through the construction process.

So, should there be a single exam for a small number of special cases? Maybe, but the administrative burden might make it too expensive. Can they sit all three exams in a day? **Yes they can**, on six occasions every year this is possible. However, I don't know of anyone that has requested it. (Although I do know of a few that have done them over two days at the RSGB Convention, but they are few and far between).

The current three tier system has been a huge success and we have seen thousands, rather than hundreds, trying out Amateur Radio for the first time. Some are leaving and some are sticking at the lower levels, but that does not mean they will never return or progress. I took a couple of years moving from the old Class B to Class A and I see a couple of years at each stage as a great opportunity to learn. Compelling progression is an option but I would rather see more activity from M6s and 2E0s than see radio amateurs become an extinct species. The simple fact is that there were more newcomers in 2010 than there were in 1999 and that has to be good for the hobby.

Why are they not progressing? My experience shows that it is a lack of flexible training options. Weekly classes they cannot make, or classes cancelled due to lack of numbers are common stories. Our Advanced classes in Bath have rarely had more than a handful of students but this year we have helped over 90 Intermediate Candidates in their desire to progress. How? By offering distance learning we have opened doors that looked closed to so many. Rather than having a go at those that do not progress, how about offering to help them? If you hold a Full Licence you must have the knowledge to help someone else increase theirs.

My letter has taken a bit longer than I expected Rob – but I hope it adds some context and fact to the debate.73.

Steve Hartley G0FUW
Bath
Somerset

Editor's comment:
Thank you Steve – I'm a great admirer of your 'Buildathons'. Keep up the good work!

A Non-transmitting Amateur's Opinion – Surely it's Up To The Individual?

Dear Rob
I feel I must add my small input to the letters that appeared in Aug *PW* regarding the Amateur Radio licence debate. Surely, it's up to the individual as to what level, over the whole spectrum of Amateur Radio, that they take it to? Everyone is an individual whatever facet their interest in radio. To make a blanket statement, that the path to be followed is to transmit and the ultimate goal is to gain a 'full' licence, is simply an opinion. I was first interested in the hobby almost 50 years ago, and like many others started with crystal set construction followed on by one-valved sets.

I returned to the hobby around 10 years ago as I was getting a little too old for motorbikes; also heart problems had set in. It soon occurred to me that the magic of building a radio had never left me. Since then, I have built quite a few regenerative detector sets. The point I am trying to convey here, is this is probably as far as I wish to take things' Similarly if anyone attains the basic Amateur Radio licence – it's up to the individual if they want to proceed further or not.

If I was ever to qualify for that status it will be up to me to decide if I wish to 'embrace 'anything further. Of course not everyone (me included) may have the 'grey matter' to study and commit to memory the required amount of information to pass an advanced test! Yes we are all aware it is a technical hobby, however I am happy repairing, building radio sets and other associated kit as many others are. Simply because I don't have a transmitting licence is no mar on my or many like-minded others' capabilities.

Radio is not restricted to a special 'few'. To take time out to attend a residential course if one is available locally, is again not an option financially and otherwise for many. I don't wish to appear over negative but these facts have gone unmentioned. I can assure John Pumford-Green that I do take the hobby seriously, but it is just that, a hobby, which I enjoy. It is not a way of life, or a continual contest.

On the subject of radio building, I too built the radio from the article by **Mike Redman**. I built mine around a year ago and instantly recognised the circuit. Yes, I too spotted the mistake of the 270kΩ resistor in the diagram going to negative. I used a DL92 output valve, as I had a few of these valves in stock, instead of the DL91 and after making the small mod.

The tip Mike mentioned of using a highlighter on the schematic is good. I also use this method but I laminate the diagram first. Then you just need to wipe the marks off and it's as good as new. That's if you have access to a laminator of course. I built another radio, albeit one–valved set from a circuit that can be obtained from the same website if you have access to a computer; Vintage circuit archive **http://vintageradio.me.uk/radconnav/valvetrf/**

This one was by a **J. D Pearson** and I used an FIL2 valve. It performs quite well. And what about the Lissen shortwave three a 1930s design I rebuilt a few years ago? Now that's another story! I'll tell you about it if asked. Yes I am **very** interested in radio!

73 from an unlicensed Amateur.
Kind regards.
Denis Speirs
Arbroath
Angus
Scotland

Slow Lane To Amateur Radio Can Be By-Passed

Dear Rob,
I read with interest the letter "Slow Lane to Amateur Radio" by **Gordon Hudson** in the September issue of *PW* and felt compelled to correct what seems to be a major misunderstanding on his part.

It is **no**t a requirement for those wishing to take the exams that they attend a course. That ended years ago. I know it did, I was the person who got the (they were then the regulatory authority) Radiocommunications Agency (RA) to change the rules. The former head of the relevant section in the RA at the time and I still joke about what a pain in the rear I was until it was changed!

Candidates can do all three exams in quick succession, completing the practicals in advance. In fact, I've had candidates do all the practicals and all the exams at the RSGB Convention. More commonly, I get candidates to complete practicals with a local instructor and just do the exams at the RSGB Convention.

Incidentally, the demand for a quick route is not that high. Calls for it come more from those in the hobby than those wishing to join it. Why? Well, those wishing to join recognise that the Foundation practicals, while straight forward, are largely operating based and are not covered in the content of a engineering degree, or similar qualification, (and I do have an engineering degree and 25 years in engineering to enable me to comment). For those with an engineering background, the Intermediate practicals can be completed quickly and are little more than a formality.

I am afraid that this myth that newcomers must attend training courses is maintained by those who are not prepared to find out the facts. Those wishing to do so can self-study, complete the required practical assessments, and examinations without having to attend a course. A number of people have done so, in as little as two days at the RSGB Convention.

Should anyone have difficulty finding a location to sit the required examinations, they are welcome to contact me for assistance. 73.

Brian Reay G8OSN
Falcon Lodge
Spekes Road
Hempstead
Gillingham
Kent ME7 3RT
E-mail: **brian.reay@virgin.net**
Website: **www.g8osn.net**
Director ARDC/Education & Training
Radio Society of Great Britain

Editor's comment: *As both Brian and Steve Hartley G0FUW have made the exam possibilities for 'fast tracking' abundantly clear – correspondence is now closed on this specific topic.*

Dangerous Mains Leads From China

Dear Rob,
I have a word of warning for *PW* readers about dangerous mains

The Earthing Debate

Dear Rob,
Your choice of earthing as a subject of debate should keep us all going on about it for quite a while! – but I doubt if we will get a final answer that fits every situation. I have different solutions for my different needs. I totally disconnect my antennas if lightening is likely.

If I am using dipoles I do not use and earth. If I am mobile then I cannot but I accept that my car is one half of a capacitor to ground. And if I am working against earth then I need it so I use either a group of ground rods or a ground plane. If I am using a Faraday screen of any sort then I connect that to my earth rods by way of a bus bar round the room. My earth connection to the a.t.u. goes on and off to match the need.

Finally, I use a bit of common sense. If I get some interference I try an earth and if that cures it I leave well alone. I'll bet you do much the same! Best wishes.
Alan Green GM4FLX
Lochwinnoch
Renfrewshire, Scotland

Editor's comment: *Thanks for your letter Alan. Please join me on the* Topical Talk *page for further discussion.*

Earthing Theme Again

Dear Rob,
I have just been reading the September issue of *PW* and the earthing theme pops up again. Your Chartered Engineer was right – when radio frequency comes into the picture it becomes 'iffy'.

Your comments on the isolating transformer does not hold water, as my earth-free negative (on a transformer type power supply) becomes earthed when I connect it to some external gear (see later). I also run two switch-mode p.s.u.s and a transformer p.s.u. in the shack. On the external switch-mode the 13.8V negative terminal is connected to the earthed case of the p.s.u.

In my Icom IC-7700 the incoming earth pin is connected to the case of the rig. Thus, any PL259s running coaxial cable to antenna systems carry the mains earth all the way to the antenna. My Microset transformer 13.8V d.c. p.s.u. has an earth free negative terminal but when I connect an Icom CT17 data interface the multi-pin serial connector to the PC introduces a mains earth from the case of the PC, so the negative becomes earthed.

Comments such as "don't connect r.f. earths to mains earths" go up in smoke in my opinion. Multiple earthing is a good thing but it was banned until the 1960s/1970s when the water supply companies started using plastic pipes – so the rising water main earth was lost. Then gas was also supplied in plastic pipes and the lead sheathed mains cables became plastic with only a live and neutral.

So, what can we do about Earthing? At our local sub-stations the transformers feeding our houses produces 415V between the three phases but the transformer secondary winding is 'Star' wound and where the common point of the three phases are connected together we connect an earth. So, each house gets one phase and the Star point earth/neutral (which is about 230V a.c.). There's a safety weakness in this system but more later.

My thoughts on what to do: If you run dipoles/doublets or beams as they're Hartley type balanced antennas they don't rely on earths. Thus, there's no need for an r.f. earth. If you run un-balanced verticals and end-fed antennas they are Marconi type antennas and you **do** need a ground plane or an r.f. earth.

After many tests I have found the ground plane radial systems just run along the ground are simple and most reliable. Mixing earth rods and ground plane wires can cause current loops and matching becomes a problem. So It's keep it simple stupid (KISS) with me every time Hi!

My background is a working lifetime in the Mining and Electrical industry. Sometimes testing the surface earth systems at coal mines, sometimes testing the earth continuity of explosives magazines lightning conductors. Sometimes, testing the earthing systems around 500MW alternator systems and switchgear capable of safe operation when a dead short occurs. I have other reasons for liking the modern multiple earthing rules.

However, now for that safety weakness. If you have an r.f. earth for use with a vertical antenna and the earth wire from the r.f. earth is connected to (let's say your a.t.u. and let's also say it works well). Now, just suppose your mains neutral wire gets cut or disconnected in some way during mains work in the road outside. It means you have no power in your house. But you do have a **live** at 230V and you also have an r.f. earth in your shack. All the so called 'earthed metal' in your house will then have 230V a.c. on it and a hand on a shack radiator or transmitter case and an a.t.u. will complete a circuit and you may get a shock. Lots of houses don't have residual current circuit breakers (RCBs) fitted – and some Amateurs can't use RCBs as they trip with even a 'wiff'' of r.f. So, if you haven't fallen asleep by now go back to the start. Earthing is 'Iffy'. I wonder how much vitriol will come from this. 73
Albert Heyes G3ZHE
Penketh, Warrington

Editor's comments: *Nice to hear from you again Albert. Please join me on the* Topical Talk *page for further discussion.*

leads now coming in from China and being supplied in the UK. I recently purchased a piece of equipment from a UK company. It was a SATA hard drive enclosure for backing up the PC I use for my radio software.

The item arrived and whilst clearly being manufactured in China, on first sight it appeared to be very good. However, having been in the electronics industry my entire life meant that I was more than slightly concerned about the mains cable that came with the unit. On first glance it was the normal sort of thing: 1.5 metres long with a standard computer style IEC plug at one end and what was supposed to be a standard 13A mains plug at the other.

However, that the only thing the attached mains plug shared with a normal mains plug was the shape and positioning of the 3 squarish pins to go into the socket on the wall. By law a 13A UK mains plug must conform to BS1363. This dictate includes, amongst various things, the physical size, the intended maximum current rating and that the plug must have a replaceable fuse link.

The device I was looking at (see attached picture) was a moulded affair, stamped CE, stamped L and N, and stamped maximum current 10A but with no replaceable fuse.

Now the CE mark, for those of you who don't know, comes in two flavours.

The first is the genuine "Conformité Européenne" ("European Conformity") symbol. This ensures the buyer that this item is tested and acceptable for sale in the EU. The second version is the "China Export" version which means sweet nothing at all.

And guess what? The markings can look absolutely identical. If you do a search on the web you can find articles detailing the positional differences but, when the letters are badly moulded into rubber it's a bit 'iffy' anyway.

Since there was no replaceable fuse this plug was instantly a 'no-no' legally. Any fault on the equipment it was powering and the only thing that could happen (possibly) would be for the cable to melt as there was no fuse to blow.

And melt the cable surely would as, on removing some of the sheath, marked as being 18A capability, I was not surprised to find 3 cores of cable, which I suspect wouldn't have carried even 5A too happily without noticeably heating. Then I decided the meter out the cable and discovered that the live and neutral wires on the plug were actually reversed between the mains plug and the IEC connector.

Now this meant, that combined with a lack of any fusing, this cable was a death and destruction sentence just waiting to happen. I contacted the supplier who eventually replied but simply refunded half my purchase cost so I could buy a new lead and showed no further interest. I also tried to contact the local Trading standards and that is an entirely different story but suffice it to say they had no interest whatsoever even when contacted by Consumer Direct.

So my advice is take a good look at the picture of the plug shown with this letter. If you've got anything like that with no replaceable fuse – **remove it at once**. You could send it to your local trading standards but I suggest, from my experience you might as well just bin it as trading standards in my area appears to be a misnomer. All the best.

Dale Haines G4IPZ
Biggin Hill
Kent

Photo of Dale G4IPZ's dangerous mains plug from China.

Letter from Gordon Hunter G8WWD

Dear Rob,
I have to say that I agree with **Gordon Hunter G8WWD's** (September *PW*) sentiment that those people who are clearly capable of holding a full licence should have a simple way to achieve Full licence status. There is, its called doing the Foundation and Intermediate back to back and immediately prior to taking the Advanced. I am informed there are a couple of occasions each year at certain events where this service is provided. There is a reason why all three parts should be done and that whilst there are some people who are extremely technically able, these people also need to understand the regulations that apply to our hobby. These are 'tested' in the exams.

No one could dispute that the technical requirements for the Foundation and Intermediate could best described as elementary, but those parts of the overall requirement are necessary. Some clubs only offer the tuition in the form of a course and requires completion of the course, but as in my case, with the help of RSGB area representatives, approved examiners can be found who are able to assist. I went the self-teach way as I work away from home so attending a course was totally out of the question, but with the help of certain **Cambridge University ARC** members, I was able to do the two required practicals and the three exams without any requirement to attend a course, in a way that suited me.

I work as an HGV Driver and I now have to do 35 hours of 'training' over five years which I have to pay for, or some horrible little 'jobs-worth' will be able to throw me out of my truck and stop me working. After 32 years in the industry it's very much a case of trying to teach me to suck eggs. I am sorry but that is the way of the world (well the British world at least) the box has to be ticked, it matters nothing if you understand what the box ticking indicates, but just remember the box must be ticked. it applies in the world of work and increasingly in hobbies.

Sorry ladies and gentlemen but until the masses stand up and tell the administrators of this world to stop checking tick boxes and actually do something constructive, the situation will continue to worsen. Thats my rant over with for another 12 months. Keep up the good work with *PW*. kind regards.

Jon Hirst M0OVL
March
Cambridgeshire

*Editor's comment: Thank you John. I think the letter from **Brian Reay G8OSN** (this issue)should prove of interest to you.*

Student With 50 Years Experience – But Time Wasn't Wasted!

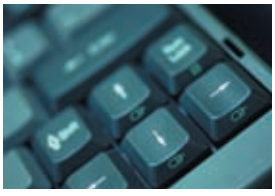
Dear Rob,
I too found myself in the same situation when I decided that with 50 years experience in electronics in both design and manufacture it was time to get an Amateur Radio licence. The dropping of Morse was an important factor in my decision.

At the local club the pathway to a licence was explained to me. I went through the Foundation and Intermediate courses, but far from finding it onerous I think I was able to contribute to the teaching of some of the other members.

The few hours of my time it took **I didn't feel were at all wasted**. When the time came to sit the final exam, an hour or so with the course material to get back to speed was all it took.

I would recommend anyone qualified in radio/electronics not to be put off by the seeming 'low level' requirements of the Foundation and Intermediate course work. I'm sure you'll find (as I received) grateful thanks from those teaching the courses for another pair of capable hands.

Tim Loker M0GPE
Hemel Hempstead
Hertfordshire



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**

News & Products

Send your info to:

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

The Anytone AT-588 144MHz Mobile Arrives At Nevada

Nevada Radio in Portsmouth contacted *Newsdesk* with news of their latest news transceiver to arrive from the Chinese People's Republic. The press release states, "The new Anytone 144MHz mobile radio Model AT-588 is now available.

"The new Anytone AT-588 2m mobile radio adds to the formidable range of transceivers, now available from this Chinese manufacturer. The AT-588 has quite an array of functions for such a competitively priced unit, including CTCSS, compander noise reduction, 100 memories, theft alarm. It is supplied as standard with a DTMF microphone, Mounting bracket and power cable and will sell for just £149.95."

More information at: **www.nevadaradio.co.uk/amateur-radio/transceivers/mobile-transceivers/anytone-at588#ixzz1VJ2oh1CO** and

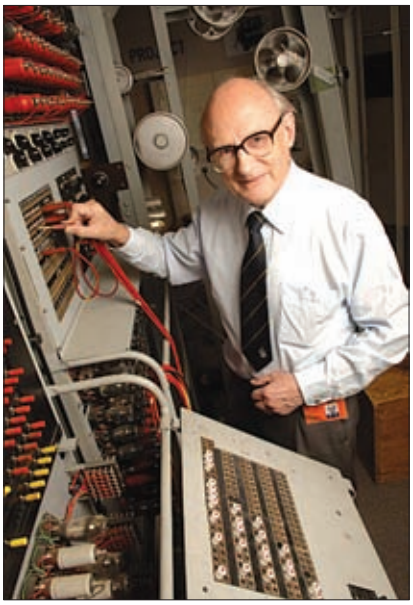
Nevada Radio
Unit 1 Fitzherbert Spur
Farlington
Portsmouth
Hampshire PO6 1TT
Tel: **023 9231 3090**
E-mail: **sales@nevada.co.uk**
Website: **www.nevadaradio.co.uk**

Worcester RAA Winners & Colussus!

Rich Moles 2E0MOL writes;"Worcester Radio Amateurs Association, have congratulated their latest candidates who passed their Foundation Examination and also congratulations to one successful Intermediate Examination pass. Tutored by **Pete Badham G0WXJ** the Club chairman and Head Tutor and assisted by a group of volunteers, the class enjoyed a relaxed and informative weekend. Five out of the six candidates on the Foundation Course passed and one candidate – who travelled over 50 miles sat and passed the intermediate exam. The successful candidates were **Andrew White**, **Richard Strong** (Intermediate Exam candidate), **Lee Duffy**, **Richard Povey**, **Fred Cornes** and **Stephen Tyler**. Everyone In the WRAS look forward to hearing the shiny new call signs up and down the bands!

"Special Club Talk: On Tuesday September 13th **Mike Ferriday G1NQW** will be giving a talk on the world famous Colussus computer used at Bletchley Park. Everyone welcome and refreshments will be served".

Club Diary: September 27th Construction night/high altitude balloon construction talk. September 30th, Club trip to the National Hamfest at Newark. October 11th, Equipment and rig tune-up night. October 14th to 16th, our JOTA station will be at the Kinver Scout and Guide camp ground.
October 25th, WRAA birthday meeting. Club nights start at 7.30pm.



Photos of the modern Colussus replica, with its builder Tony Sale.

Rich Moles 2E0MOL
Secretary
Worcester Radio Amateurs Association
3rd Worcester Scout HQ
Rainbow Rise, off Vicar Street
Rainbow Hill, Worcester WR3 8EU
Email: **secretary@m0zoo.co.uk** Website: **www.wraa.co.uk/**

Castle & Stately Homes On The Air UK & Ireland

Keen Young Lady activator **Bobby Wadey MI0RYL** has some Castles & Stately Homes (CASHOTA) dates for our diaries: Bobby writes, "CASHOTA will be holding a UK & Ireland Heritage event over the month of September 2011 to coincide with the European Heritage Month. This is an opportunity to access locations which may previously have been closed to the public or inaccessible. The different regions have set different dates, so for more information on regional dates and opening go to **www.cashota.co.uk** where information links and dates are available in the calender. If you wish to activate a site then please complete the activation form on the website.

The dates have been set for CASHOTA's annual Castles weekend in 2012. The event will be held over two weekends on **May 18th/19th 2012** and the **May 25th/26th 2012**. We would like to invite last year's participants and any new persons to apply to be an award station. The award is open to any individual, groups or clubs who wish to chase castles or activate them. More details can be found on the website or by contacting **Chris Darlington M0DOL** on **07720 580968**."
If you need any other information please contact:
Bobby Wadey MI0RYL
E-mail: **lamph121@btinternet.com**

Low Power Earth-Moon-Earth Contact

Justin Johnson G0KSC of **InnovAntennas Ltd**. writes; "This summer **Spiros Chimarios SV8CS** managed a low power Earth-Moon-Earth contact with **Lance Collister W7GJ** in Frenchtown, Montana USA. What makes this contact special is that in addition to just 150W being used by SV8CS, this station is entirely power by **green energy**.

"Both wind and solar power keep the 12V batteries topped up within the SV8CS shack powering the TE-Systems 150W amplifier, which is fed into a 7-element WOS LFA Yagi by InnovAntennas.

"Spiros said of the contact 'This is my first EME contact with my green station which coincides with the installation of my new antenna."

Further information from:
Justin Johnson G0KSC
InnovAntennas Ltd.
InnovAntennas America LLC
Tel: (0800) 0124205 (UK)
Tel: : (00 1 888) 9988541 (USA)
E-mail: **justin@innovantennas.com**
Website: **www.InnovAntennas.com**

Spiros SV8CS finalising the installation of his 50MHz 7-element WOS LFA Yagi at his eco-friendly station.

Nevada Announce New Alinco Power Supply

Mike Deveruex G3SED Managing Director of Portsmouth-based **Nevada Radio** contacted *Newsdesk*. "I'm pleased to tell you that Alinco have just released a new 35A(peak) transformer power supply the DM340-MW. This beautifully made unit will serve as the main power supply for any shack, easily powering a standard 100W h.f./v.h.f. radio and being a transformer-equipped supply, there are no switching noise interference problems. It has two meters, a 10A car cigar adaptor output, variable output voltage and full protection. Priced at £149 I feel sure it will be very popular with your readers. Best Regards.
Mike Devereux G3SED

Full specifications DM340MW

Operating voltage:	230V a.c. 50Hz.
Output voltage:	1-15V d.c. regulated.
Output current:	30A constant 13.8 V, 35A short period (50% duty cycle of 1 min interval).
Output voltage regulation:	>2%.
Ripple voltage:	>10mV p-p.
Meter indicators:	Two analogue meters for separate display of voltage and current.
Controls:	On/Off Switch and l.e.d. power indicator.
Power sockets:	Cigar lighter style power socket on the front (max. 10A) Terminal block (up to 6A) on the front panel. Main connector (up to 35A) on the front panel.
Voltage control:	Variable output voltage.
Protection:	Automatic protection switching (to load <35A).
Fuses:	Integrated 8A fuse.
Forced air cooling:	Temperature-controlled fan.
Ground connection:	On the rear panel.
Dimensions:	235 x 153 x 280mm WHD (including protrusions).
Weight:	9.5kg

Further details from:
Nevada Radio
Unit 1
Fitzherbert Spur
Farlington
Portsmouth
Hampshire PO6 1TT
Tel: **(023 9231) 2090**
E-mail: **sales@nevada.co.uk**
Website: **www.nevadaradio.co.uk**

Tennamast Trophy Presentation At Cockenzie & Port Seton Club

Bob Glasgow GM4UYZ reports: "I've enclosed a photo taken at the **Cockenzie & Port Seton ARC**'s Junk/Mini-Rally Night on Friday August 12th 2011, of the presentation of Tennamast Trophy to the Leading Scottish Group in the *Practical Wireless* QRP 144MHz Contest.

Bob continues, "As neither **Rose and Norrie Brown** (the originators of the Trophy) were available I offered to do the presentation to the winners – the **Galashiels & District Amateur Radio Society** on behalf of **Tennamast (Scotland) Ltd**. and the pictures are the results. As the trophy was presented to them I congratulated the lucky winners for representing Scotland so well in the annual QRP Contest."
Regards.
Bob Glasgow GM4UYZ, **Secretary Cockenzie & Port Seton Amateur Radio Club**
E-mail**: bob.gm4uyz@talktalk.net** Website: **www.cpsarc.com**

From Left to Right: Dave Smith GM0KCN, Jim Keddie GM7LUN and Colin Stuart MM1APS of the Galashiels Amateur Radio Society being presented with the Trophy by Bob Glasgow GM4UYZ.

Martin Lynch Announces New Mydel 50A Power Supply

Martin Lynch G4HKS contacted *Newsdesk*; "ML&S are pleased to announce yet another shack power supply to their range, the New MyDEL MP-50SW111.

"Probably one of the lightest 50A d.c. power supplies available today, the new MP-50SW111 weighs in at only 2.2kg (4.85lbs). Unbelievably compact measuring a mere 940mm wide (7.625in) x 950mm deep (11.5in) including chunky rear terminals and front panel knobs and only 90mm high (3.5in).

"This is the second member of the 'SW' family adding to the already best selling MP-30SW111 30A version which has been available for two years from ML&S. This shack supply is styled along the lines of an s.w.r. meter with back lit display. It has a variable voltage (9-15V d.c.) control with a fixed position 13.8V output. It's also fitted with a 'noise-offset' control for the removal of any r.f. 'birdies' that maybe present within band and a large easy to tie-in d.c. rear terminals and a switchable Voltage/Amps meter.

"The current price is £169.95 but is on a special introductory offer of £149.95 including VAT. Its baby brother, the MP-30SW111 30A version is still available for £86.75. Martin G4HKS.

... and Launches Into Space (Radio) With A Dongle!

After months of negotiation, Martin Lynch & Sons have finally been appointment as distributor for the famous **FUNcube Dongle Pro**, 64MHz-1.7GHz SDR receiver.

Martin writes; "The remarkable memory stick sized device was conceived, designed, built and bought to market in a lightning-fast period of time by **Howard Long G6LVB**.

"Many thousands have been sold worldwide and was originally produced as part of AMSAT-UK's FUNcube satellite project. The FUNcube Dongle is the 'ground segment', or a radio receiver designed to allow anyone to try their hand at reception of satellites such as FUNcube anywhere on Earth as part of a global educational collaboration project, collecting information from space. However, with a continuous coverage of 64MHz through to 1700MHz the FUNcube Dongle has found many alternative applications".

The new FUNcube Dongle Pro is available now for only £99 plus VAT plus postage and may be ordered from ML&S. For more information and images see: **http://www.funcubedongle.com**

Martin Lynch
ML&S Martin Lynch & Sons Ltd. *Outline House*, 73 Guildford Street, Chertsey Surrey, United Kingdom KT16 9AS
Tel: **0345 2300 599**
FAX: (**01932**) **567222**E
E-mail: **Martin@MLandS.co.uk**
Web: **www.MLandS.co.uk**

Sanderly Jeronimo – Martin Lynch's Customer Technical Support Manager is shown holding a FUNcube a dongle.

David Searle ZL3DWS Honoured In Australia

David Searle ZL3DWS – a regular *PW* contributor and supporter contacted *Newsdesk* saying: "Attached is a possible news item for inclusion in *Practical Wireless*. I thought I'd send it, in recognition of the wonderful support received from the **Waverley Amateur Radio Society** in Australia, Sydney's oldest radio club. They are a wonderful lot.

"I left Christchurch, New Zealand with my wife and family in rather a rush in March, because they just couldn't stand the earthquakes anymore. All my Amateur Radio gear was given away as we couldn't afford to ship it. Upon arriving at WARS I was made very welcome by everyone and **Raffy Shammy VK2RF** arranged for the club to lend me equipment to get on the air. I was quite overwhelmed, having arrived in Sydney pretty shell-shocked.

"It really illustrates just how universal our hobby is and how welcoming Amateurs are everywhere. I am so lucky to be part of a great fraternity. Thank you everyone!"

David Searle ZL3DWS (now **VK2DWS).**
Tel: (00 61) 0406 886 470
E-mail: **dwsearle@telstra.com**
Website: **https://www.sites.google.com/site/vk2dws/**

David VK2DWS operating the Waverley Amateur Radio Society's club station VK2BV.

MOONRAKER

Manufacturers of radio communication antennas and associated products

We now accept PayPal payments online

SALES LINE 01908 281705

E-mail: sales@moonraker.eu

Web: www.moonraker.eu

KENWOOD

Authorised dealer

Hand-helds

TH-D72E Dual band 2/70cm with GPS & APRS **£429.95**
TH-F7E Dual band 2/70cm RX 0.1-1300MHz **£239.95**
TH-K2ET Single band 2m with 16 button keypad **£169.95**
TH-K2E Single band 2m **£164.95**
TH-K4E Single band 70cm **£164.95**

Mobiles

TM-D710E Dual band 2/70cm with APRS RX 118-524MHz & 800-1300MHz, 50 Watts **£444.95**
TM-V71E Dual band 2/70cm with EchoLink RX 118-524MHz & 800-1300MHz, 50 Watts **£299.95**
TM-271E Single band 2m, 60 Watts **£169.95**

Base

TS-590S HF & 6m 100W all mode transceiver **£1,369.95**
TS-2000X All mode transceiver HF/50/144/430/1200MHz 100 Watts All mode transceiver **£1,799.95**
TS-2000E All mode transceiver HF/50/144/430MHz 100 Watts All mode transceiver **£1,549.95**
TS-480HX HF/6m 200 Watts Transceiver **£879.95**
TS-480SAT HF/6m 100 Watts Transceiver **£779.95**

Accessories

PS-60 25amp power supply unit ideal for the new TS-590S **£329.95**
SP-23 External speaker **£74.95**
SP-50B Mobile speaker **£29.95**
MC-90 Deluxe desk microphone suitable for DSP transceivers **£204.95**
MC-60A Desk microphone with pre-amplifier **£129.95**
HS-5 Deluxe headphones **£56.95**

WOUXUN

Authorised dealer

Handhelds

KG-UVD1P Great value dual band 2/70cm **£92.95**
KG-679E Superb single band 2m **£59.95**
KG-UVD1PL New fab dual band 4m/70cm handie just **£99.95**

Accessories

WO/ELO-001 Battery eliminator **£10.95**
WO/CCO-001 12v Car charger **£10.49**
WO/SMO-001 Speaker microphone **£15.95**
WO/PSO-110 Programming software **£20.49**
WO/CASE Leather case **£10.49**

TYT

TYT-800 2m 144-146MHz 5 watts 199 channels amazing **£49.95**
TYT TH-UVF1 2/70 5 watts 128 channels **£99.95**

Accessories

TYT-BE Battery eliminator **£14.95**
TYT-SP Speaker microphone **£14.95**
TYT-EP Ear piece **£7.95**

MOONRAKER

HT-90E 2m single band transceiver with full 5 watts output just **£59.95**
The HT-90E is a brilliant compact radio, perfect for beginners to the hobby. Comes complete with battery, belt clip, antenna, and rapid charger all for under £60 quid! Everything you need to get on air is in the box!

ICOM

Authorised dealer

Hand-helds

IC-E80D D-Star dual band 2/70cm handheld with wideband RX 0.495-999.99MHz **£329.95**
IC-E92D Dual band 2/70cm RX 0.495-999.9MHz with built in DSTAR **£389.95**
IC-E90 Tri band 6/2/70cm RX 0.495-999.9MHz **£239.95**
IC-T70E dual band 2/70cm handheld with 5W Tx & 700mW loud audio **£159.95**
IC-V80E single band 2m handheld with 5.5W Tx & 750mW loud audio **£104.95**

Mobiles

IC-7000 All mode HF/VHF/UHF 1.8-50MHz, 100 Watts output **£1,189.95**
ID-1 Single band 23cm 1240-1300MHz digital and analogue DSTAR transceiver **£719.95**
IC-E2820 + UT123 Dual band 2/70cm with DSTAR fitted, 50 Watts output **£699.95**
IC-E2820 Dual band 2/70cm DSTAR compatable, 50 Watts output **£499.95**
ID-E880 D-Star ready dual band with wide band RX 0.495-999.99MHz **£439.95**
IC-2200H Single band 2m 65 watts **£229.95**

Base

IC-9100 HF/VHF/UHF All in one transceiver to 23cm (optional) – amazing! In stock NOW **£2,999.95**
IC-7800 HF/6m All mode 200 Watts Icom flagship radio **£8,999.99**
IC-7700 HF/6m 200 Watts with auto ATU transceiver **£6,349.95**
IC-7600 HF/6m 100 Watts successor to the IC-756 ..... **£3,399.99**
IC-7410 HF to 6m 100W all-mode **£1,695.95**
IC-7200 HF/VHF 1.8-50MHz RX 0.030-60MHz, 100 Watts output (40w AM) **£839.95**
IC-718 HF 1.8-30MHz RX 300kHz-29.999MHz, 100 Watt output (40w AM) ..... PRICE SLASH ~~£599.95~~ **£429.95** while stocks last
IC-910H dual band with optional 23cm, 100 Watts output **£1,299.95**

AnyTone

Authorised dealer

AT-588 2m 60W mobile RX 136-174 MHz **£149.95**
AT-5189 4m 25W mobile RX 66-88 MHz **£149.95**
AT-5555N 10m 12W mobile RX 25-30 MHz **£149.95**
AT-5189PC programming software and lead for AT-5189 ..... **£14.95**
AT-5555PC programming software and lead for AT-5555N **£14.95**

QUANSHENG

TG-UV2 dual band 2/70cm 5 Watts with 200 memories ..... **Only £81.95**

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

YAESU

Authorised dealer

Hand-helds

VX-8DE Triband same spec as VX-8E but with enhanced APRS **£369.95**
VX-8GE Dual band with built-in GPS antenna and wideband 100-999.90MHz Rx **£359.95**
VX-7R Tri band 50/144/430MHz RX 0.5-900MHz, 5 Watts outut **£299.95**
VX-6E Dual band 2/70cm RX 1.8-222/420-998MHz, 5 Watts output **£239.95**
FT-60E Special offer ~~£179.95~~ ..... now **£129.95** massive £50.00 saving
VX-3E Dual band 2/70cm RX 0.5-999MHz, 3 Watts output **£159.95**
VX-170E Last few at this price **£99.95**
FT-270E Single band 2m, 144-146MHz, 137-174MHz Rx **£104.95**

Mobiles

FT-857D All mode HF/VHF/UHF 1.8-430MHz, 100 Watts output **£679.95**
FTM-350 Dual band with Bluetooth, GPS & APRS **£479.95**
FT-8900R Quad band 10/6/2/70cm 28-430MHz, 50 Watts output **£369.95**
FT-8800E Dual band 2/70cm RX 10-999MHz, 50 Watts output **£329.95**
FTM-10E Dual band 2/70cm, 50 Watts output **£309.95**
FT-7900E Dual band 2/70cm 50/40 Watts with wideband RX **£239.95**
FT-2900E Single band 2m 75 Watt heavy duty transceiver **£139.95**
FT-1900E Single band 2m 55 Watt high performance transceiver **£129.95**

Portable

FT-897D HF/VHF/UHF Base/Portable transceiver 1.8-430MHz 100 Watts HF+6, 50 Watts 2M, 20 Watts 70cm **£789.95**
FT-817ND HF/VHF/UHF Backpack Transceiver RX 100kHz – 56MHz 76-154MHz 420-470MHz 5 Watts **£539.95**

Base

FT-DX5000MP Deluxe HF/6m all mode 200W transceiver with 300Hz roofing filter & SM-500 station monitor **£5,295.95**
FT-DX5000D Deluxe HF/6m all mode 200W transceiver with SM-500 station monitor **£4,795.95**
FT-DX5000 HF/6m all mode 200W transceiver **£4,349.95**
FT-2000D HF/6m All mode 200 Watts transceiver RX: 30kHz – 60MHz **£2,799.95**
FT-2000 HF/6m All mode 100 Watts transceiver RX: 30kHz – 60MHz **£2,249.95**
FT-950 HF/6m 100 watt transceiver with DSP & ATU RX 30kHz – 56MHz **£1,299.95**
FT-450 Compact transceiver with IF DSP, HF+6m 1.8-54MHz, 100 Watts output **£649.95**
FT-450D "New" model compact transceiver with built-in ATU **£829.95**

Accessories

MD-200A8X Ultra high fidelity desktop mic **£239.95**
MD-100A8X Deluxe desktop microphone **£124.95**
FP-1030A 25amp continuous power supply unit **£199.95**
SP-9000 external dual speaker **£309.95**
MLS-100 High power mobile speaker **£29.95**
MLS-200 Compact mobile speaker **£26.95**
ATAS-120A Active tuning antenna system **£299.95**

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

Yagi Antennas

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

YG27-4 Dual band 2/70 4 Element (Boom 42") (Gain 6.0dBd) **£59.95**
YG4-2C 2 metre 4 Element (Boom 48") (Gain 7dBd) **£29.95**
YG5-2 2 metre 5 Element (Boom 63") (Gain 10dBd) **£59.95**
YG8-2 2 metre 8 Element (Boom 125") (Gain 12dBd) **£79.95**
YG11-2 2 metre 11 Element (Boom 185") (Gain 13dBd) **£119.95**
YG3-4 4 metre 3 Element (Boom 45") (Gain 8dBd) **£69.95**
YG5-4 4 metre 5 Element (Boom 104") (Gain 10dBd) **£79.95**
YG3-6 6 metre 3 Element (Boom 72") (Gain 7.5dBd) **£69.95**
YG5-6 6 metre 5 Element (Boom 142") (Gain 9.5dBd) **£89.95**
YG13-70 70 cm 13 Element (Boom 76") (Gain 12.5dBd) **£54.95**

ZL Special Yagi Antennas

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

ZL5-2 2 Metre 5 Ele, Boom 95cm, Gain 9.5dBd **£59.95**
ZL7-2 2 Metre 7 Ele, Boom 150cm, Gain 11.5dBd **£69.95**
ZL12-2 2 Metre 12 Ele, Boom 315cm, Gain 14dBd **£99.95**
ZL7-70 70cm 7 Ele, Boom 70cm, Gain 11.5dBd **£39.95**
ZL12-70 70cm 12 Ele, Boom 120cm, Gain 14dBd **£49.95**

HB9CV

Brilliant 2 element beams ... ideal for portable use

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

Halo Loops

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

HLP-2 2 metre (size approx 300mm square) **£24.95**
HLP-4 4 metre (size approx 600mm square) **£34.95**
HLP-6 6 metre (size approx 800mm square) **£39.95**

G5RV Wire Antennas

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

G5RV-HSS Standard Half Size Enamelled Version, 51ft Long, 10-40 Metres **£24.95**
G5RV-FSS Standard Full Size Enamelled Version, 102ft Long, 10-80 Metres **£29.95**
G5RV-DSS Standard Double Size Enamelled Version, 204ft Long, 10-160 Metres **£54.95**
G5RV-HSH Half Size Hard Drawn Version, pre-stretched, 51ft Long, 10-40 Metres **£29.95**
G5RV-FSH Full Size Hard Drawn Version, pre-stretched, 102ft Long, 10-80 Metres **£34.95**
G5RV-HSF Half Size Original High Quality Flexweave Version, 51ft Long, 10-40 Metres **£34.95**
G5RV-FSF Full Size Original High Quality Flexweave Version, 102ft Long, 10-80 Metres **£39.95**
G5RV-HSP Half Size Original PVC Coated Flexweave Version, 51ft Long, 10-40 Metres **£39.95**
G5RV-FSP Full Size Original PVC Coated Flexweave Version, 102ft Long, 10-80 Metres **£44.95**
G5RV-HSX Half Size Deluxe Version with 450 Ohm ladder, 51ft Long, 10-40 Metres **£49.95**
G5RV-FSX Full Size Deluxe Version with 450 Ohm ladder, 102ft Long, 10-80 Metres **£54.95**

Accessories

G5RV-IND Convert any half size G5RV to full with these great inductors, adds 8ft on each leg **£24.95**
MB-9 Choke Balun for G5RV to reduce RF Feedback **£39.95**
TSS-1 Pair of stainless steel springs to take the tension out of a G5RV or similar **£19.95**

Trapped Wire Dipole Antennas

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

MDT-6 FREQ:40 & 160m LENGTH: 28m POWER: 1000 Watts **£79.95**
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts **£69.95**
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts **£79.95**
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts **£129.95**
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts **£69.95**
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts **£119.95**

(MTD-5 is a crossed dipole with 4 legs)

Multiband Mobile

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

SPX-100 9 Band plug n' go portable, 6/10/12/15/17/20/30/40/80m, Length 165cm retracted just 0.5m, Power 50W complete with 38th PL259 or BNC fitting to suit all applications, mobile portable or base ... brilliant! **£44.95**
SPX-200 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, 3/8th fitting **£39.95**
SPX-200S 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting **£44.95**
SPX-300 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, 3/8th fitting **£54.95**
SPX-300S 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W,PL259 fitting **£59.95**
AMPRO-MB6 6 Band mobile 6/10/15/20/40/80m, length 220cm, 200W, 3/8th fitting, (great for static use or even home base – can tune on four bands at once) **£74.95**
ATOM-AT4 10/6/2/70cm Gain 2m 2.8dBd 70cm 5.5dBd, Length 132cm, PL259 fitting (perfect for FT-8900R). **£59.95**
ATOM-AT5 5 Band mobile 40/15/6/2/70cm, Length just 130cm, 200W (2/70) 120W (40-6M) PL259 fitting, (great antenna, great price and no band changing, one antenna, five bands) **£69.95**
ATOM-AT7 7 Band mobile 40/20/15/10/6/2/70cm, Length just 200cm, 200W (2/70) 120W (40-6M) PL259 fitting, (Brilliant antenna HF to UHF with changeable coils) **£79.95**

Yagi Antennas

Diamond performance from the superb Diamond factory

A502HBR 6m 2 Elements, Power 400W, Gain 6.3dBi, Radial Length 3m **£99.95**
A144S10R 2m 10 Elements, Power 50W, Gain 11.6dBi, Boom Length 2.13m **£94.95**
A144S5R 2m 5 Elements, Power 50W, Gain 9.1dBi, Boom Length 95cm **£49.95**
A430S15R 70cm 15 Elements, Power 50W, Gain 14.8dBi, Boom Length 224cm **£74.95**
A430S10R 70cm 10 Elements, Power 50W, Gain 13.1dBi, Boom length 119cm. **£59.95**

HF Mobiles

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

AMPRO-10 28MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-12 24MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-15 21MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-17 18MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-20 14MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-30 10MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-40 7.0MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-80 3.5MHz, Length 220cm, 38th fitting (slimline design) **£24.95**
AMPRO-160 1.8MHz, Length 220cm, 38th fitting (heavy duty design) ... **£59.95**
ATOM-20S 14MHz, Length 130cm, PL259 fitting (compact design) **£24.95**
ATOM-40S 7.0MHz, Length 165cm, PL259 fitting (compact design) ... **£26.95**
ATOM-80S 14MHz, Length 165cm, PL259 fitting (compact design) **£29.95**

Ground Plane Free Colinear Verticals

We have always wanted antennas without radials without the compromise of performance – well now you can.

SQBM110P 2/70cm, Gain 3/6dBd, RX:25-2000MHz, Length 100cm, SO239 fitting **£54.95**
SQBM1010P 6/2/70cm, Gain 1.5/2.0/5.0dBd, RX25-2000MHz, Length 140cm, SO239 fitting **£84.95**
SQBM1010N 6/2/70cm, Gain 1.5/2.0/5.0dBd, RX25-2000MHz, Length 140cm, N-Type fitting **£89.95**
SQBM225P 2/70/23cm, Gain 2.5/5.0/8.5dBd, RX25-2000MHz, Length 130cm, SO239 fitting **£79.95**
SQBM225N 2/70/23cm, Gain 2.5/5.0/8.5dBd, RX25-2000MHz, Length 130cm, N-Type fitting **£84.95**

VHF/UHF Mobiles

GF151	Glass Mount 2/70cm, Gain 2.9/4.3dBd, Length 78cm complete with 4m cable and PL259	**£29.95**
MRM-100	MICRO MAG 2/70cm, Gain 0.5/3.0dBd, Length 55cm, 1" magnetic base with 4m coax and BNC	**£19.95**
MR700	2/70cm, Gain 0/3.0dBd, Length 50cm, 3/8 fitting	**£9.95**
MR777	2/70cm, Gain 2.8/4.8dBd, Length 150cm, 3/8 fitting	**£19.95**
MRQ525	2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality)	**£19.95**
MRQ500	2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality)	**£26.95**
MRQ750	2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality)	**£36.95**
MR2 POWER ROD	2/70cm, Gain 3.5/6.5dBd, Length 50cm, PL259 fitting (fibreglass colinear)	**£26.95**
MR3 POWER ROD	2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass colinear)	**£32.95**
MRQ800	6/2/70cm Gain 3.0dBi/5.0/7.5dBdBd, Length 150cm, PL259 fitting (high quality)	**£39.95**
MRQ273	2/70/23cm Gain 3.5/5.5/7.5dBdBd, Length 85cm, PL259 fitting (high quality)	**£49.95**

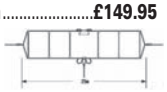
Dual and Triband Colinear Verticals

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

SQBM200P 2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239 ..... **£54.95**
SQBM200N 2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, N-Type **£59.95**
SQBM500P 2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, SO239 ..... **£74.95**
SQBM500N 2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, N-Type **£79.95**
SQBM800N 2/70cm, Gain 8.5/12.5dBd, RX 25-2000MHz, Length 520cm, N-Type **£139.95**
SQBM1000P 6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239 ..... **£84.95**
SQBM1000N 6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, N-Type **£89.95**
SQBM223N 2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type **£74.95**

MTD-300 2-30M

MTD-300 2-30M Broadband wire dipole antenna **£149.95**



The MTD-300 broadband dipole antenna is designed to provide optimum performance over a wide frequency range and is very easy to assemble and use.

● Frequency 2-30MHz ● Radiator length: 25m (82ft) ● Type: Terminated Folded Dipole ● Radiation: directional ● Feedline: 50 Ohm coax (30m) ● Connector: SO239 ● SWR: <2.0:1 to <3.0:1 depending on factors ● No transmatch required ● Power: 150W (PEP) ● Spreaders: 46cm (18in) ● Weight 3.1kg.

CHAMELEON ANTENNA

The CHAMELEON V1 HF/VHF/UHF Multiband AntennaTM is a revolutionary antenna that stands at a mere 8.5 feet tall and contains a unique trap coil design. This antenna is ideally designed for mobile, portable or base station purposes were limited space is a concern.

Frequency Range: 80/60/40/30/20/17/15/12/11/10/6M + 2M/1.25M/70cm (144MHz - 500MHz) + USAF MARS/CAP (3.3MHz, 4.5MHz & 7.6MHz) **£249.95**

GP2500

All Band HF Vertical

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

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

All at an amazing £229.95!

NEW GP2500F fibreglass version now in stock **£279.95**

HUSTLER

HF Verticals

Brilliant HF antennas that can be ground mounted if required which in todays limited space is a popular option. Also extra trap tuning is also available to get that perfect match if required.

Hustler 4-BTV 4 Bands 40-10m 1000W Length 6.52m Weight 6.8kg **£189.95**
Hustler 5-BTV 5 Bands 80-10m 1000W Length 7.64m Weight 7.7kg **£229.95**
Hustler 6-BTV 6 Bands 80-10m 1000W Length 7.30m Weight 7.5kg **£269.95**

Moonraker Retail Shop & Mail Order
Cranfield Road, Woburn Sands,
Bucks MK17 8UR
Tel: 01908 281705
Open Mon-Fri 9-5:30pm

Moonraker Satellite Shop
@ M5 Communications
Moto Services Area, Junction 30 M5 South
Exeter EX2 7HF. Tel: 01392 367097
Open Mon-Thur 9-6pm Fri 9-4pm

Our keen and totally dedicated adjudicator (Thanks for your hard work Colin) Colin Redwood G6MXL presents the results of the 2011 2m low power contest. And despite the horrendous weather experienced by many entrants – they weren't deterred!

How well did you do this year? (Despite the weather!)

The 2011 *PW* 144MHz QRP Contest Results

The 62 entrants to the 28th *Practical Wireless* 144MHz QRP contest on Sunday June 12th 2011 made a total of 2822 valid contacts with stations in 46 different squares (Fig. 1). The weather certainly played its part in reducing participation. All three figures are down on 2010, almost certainly due to the weather, which this year was some of the worst ever encountered on a *PW* contest day!

Radio conditions were variable. Some entrants worked some good distances whilst others reported heavy QSB on some paths.

The 2011 Winners

The overall winner, winning team and leading foreign station is the **UBA TRA-OSB Contest Team TM7T**, operating from JO00UV.

In second place overall and leading English Station is the **Warrington Amateur Radio Club G0WRS/P**, operating from IO83PC.

The leading Fixed Station is the **Chesham and District Amateur Radio Society G3MEH**, operating from IO91QS.

The leading Single operator and Welsh station is **Dave Hewitt GW8ZRE/P**, who operated from IO83JA.

The leading Isle of Man station is **John Dowling GD0TFG/P**, operating from IO74PC.

The leading Scottish station is the **Galashiels and District Amateur Radio Society GM4YEQ/P**, operating from IO85MM.

There were no entries this year from EI/GI stations.

Full details of the results can be found in the tables in this article. As usual certificates will be sent to all the leading stations and the leaders in each square. No check-logs were received this year.

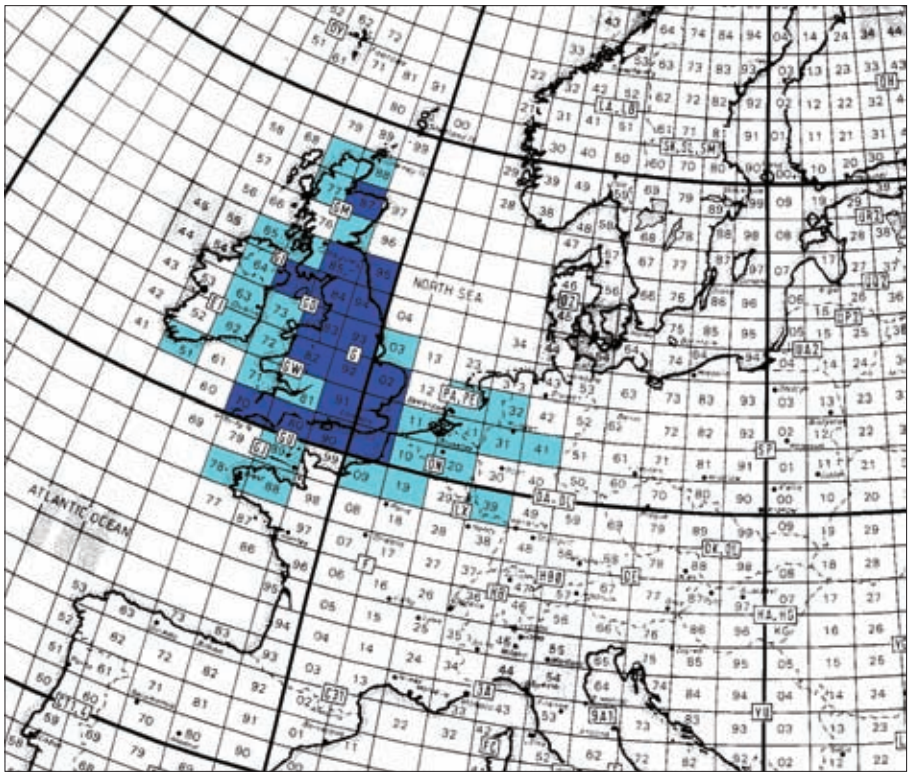


Fig. 1: Map showing locator squares of stations that entered (in dark blue) and other stations worked (light blue).

Winning Station

Jean-Jacques DeRey ON7EQ, who submitted the winning entry on behalf of the UBA TRA-OSB Contest Team said, "We participated with much pleasure again (4th time) in this contest, which is the only one to our knowledge where stations from the continent are ranked equally as UK resident stations. We operated again with a special French contest call sign TM7T issued for this activity.

"Last year we ended up in the 3rd place and were very happy to see our 'contest shack' on the cover of the magazine (June issue)!

"Unfortunately, this year the conditions (propagation) didn't seem to be very good, and the weather in south west England was very rainy and windy – therefore, we had the impression that there were somewhat less participants (especially backpackers) than other years. The overall result is somewhat less QSOs and squares than last year.

"Our best DX in the UK direction was GM0ULK/P with 774km, thanks to the 17-element Yagi (**Fig. 2**) and a good pre-amplifier, but no contacts with EI this year. "While looking out for stations on the continent, we could work some DLs and several friends from ON. A couple of them seized the opportunity to test their antennas in the direction of UK and gave away points to several other stations participating."

That Dreadful Weather!

The weather this year was particularly bad over most of the British Isles, with strong winds and torrential rain deterring many stations from even leaving home. Only the northern parts of Britain seemed to get off reasonably lightly. Unsurprisingly, the weather was the main topic in the comments received this year, and it certainly had a significant impact on activity and propagation.

Howard Palmer G6RC submitted the **Crawley Amateur Radio Club's** entry. "We were under a large low pressure weather system all day – the two foreign contacts

were made before the cold front reached them and the Belfast one as the warm front arrived. We had heard virtually nothing from the north all day and yet he had made 77 contacts – all the activity must have been in the north where the pressure was higher!"

Rhys Thomas GW4RWR/P was surprised and happy to receive a certificate last year for the highest placed GW entry. This year, he says "I suffered in the rain and wind under a tarpaulin sheet!"

Dave Hewitt GW8ZRE/P reports that, "The summit of Cyrn-y-Brain was shrouded in mist and rain plus gale force winds the whole time – the worst weather conditions I have ever experienced for a *PW* QRP contest. The outside temp was between 4°C and 5°C (39°F to 41°F). Finished early, visibility down to five metres at times and safety comes before anything else. On lowering the mast which was full of water it squirted out and I was even wetter!"

The weather didn't spoil the fun for everyone. **Dave King G6KWA**, submitted the **Cambridge & District Amateur Radio Club G2XV/P** entry and said "We really enjoyed it despite the conditions and the wet weather."

Graeme Stoker M0EUK/P commented, "Thanks again for running the event. As always we had a fantastic day despite it being freezing cold and very wet and windy! Fingers crossed for sun in 2012."

Bad weather was not enough to put off many regular participants. **Iain Groom G0FCA/P** commented, "As ever, very enjoyable, hampered somewhat by the heavy rain and strong winds that arrived at midday."

Abandoned Stations!

Tony Wilson G3MAE abandoned his station at 13:20 due to gale force winds and heavy rain. And **Richard Page G4KKR/P** operated for less than an hour on the open moor in IO93CH, before heavy rain forced a retreat.

Callington Amateur Radio Society G1XIC/P (**Fig. 3**) battled to get their tent up on Kit Hill in Cornwall, "in monsoon rain and howling gales", before they "came to their senses, packed away and adjourned to the local cafe for tea and bacon sandwiches." They asked "Can you organise better weather for next year? After two successive years of bad weather, we must surely be due a good day in 2012!"

Water Ingress

I expect many stations don't bother to seal their antenna feed-point for a short duration contest like the *PW* 144MHz QRP Contest! **The Anglesey/Ynys Mon LFBG MW1DOU/P** group certainly learned a lesson this year. "Thank you for an enjoyable day, even if we did get soaked and our antennas failed an hour before contest end due to rain ingress."

Fig. 2: The antenna system of the winning UBA TRA-OSB Contest Team TM7T.

Fig. 3: The Callington Amateur Radio Society G1XIC/P, battled to get their tent up on Kit Hill in Cornwall.

Good Weather!

Whilst the weather was very inclement in the most of the British Isles, northern Scotland seemed to be the exception. **Jim Nicol MM0SMD/P** reported, "A brilliant climb up Ben Rinnes. There was not a breath of wind even at the summit. I could see many of the local wind farms in the area from the top of the hill and not one of them were turning at the start of the contest!

"Warm pleasant conditions not a soul to be seen until about 11am then droves of hill climbers appeared. Unfortunately, missed a couple of openings due to explaining what was happening. I must remember to take ear bud headphones next time as another hill-climbing family made a lot of noise just as I was trying to listen to a weak signal – but all part of the challenge I suppose!"

Even in northern Scotland, the weather started to deteriorate as Jim continues, "I watched a couple of rain showers pass either side of the hill during the morning then early afternoon a very cold wind and rain appeared, making operating impossible. I put everything in a waterproof box and hid in the shelter of rocks till it passed. I found it difficult to operate radio with cold hands and also difficult changing frequency with gloves. I managed to stick it out till about 1415UTC then headed back home."

Returning Stations

Besides many regulars, it is always pleasing to welcome back stations to the contest. For **Craig Costford M0BUL/P** it was his "first contest on 2m for over 10 years and the first in England!"

First Birthday

Roger Thawley G0BSU commented, "Last year we were still manufacturing the antenna at contest start time and didn't get on the air until half way through. This year, with the same antenna celebrating its first birthday, we were on the air from start time. Activity seemed down on last year's contest and the contact rate dropped to a trickle after 1400 – perhaps something to do with the awful weather, which drenched us during station strip-down!"

First Timers

As usual, the *Practical Wireless* 144MHz QRP Contest provides a welcome introduction to contesting. **Alan Copperwite** submitted the **Dengie Hundred ARS** entry. "This is the first entry by the Dengie Hundred ARS. Despite heavy rain, wind and rain again, we heard and worked some surprising distances from Essex with our 3W. It gave club members a bit of experience at contesting as well."

For the **Crawley Amateur Radio Club G6RC**, it was their first attempt at a contest. "We enjoyed the learning process if not the inactivity during the afternoon! Hope for better conditions in September."

Outlying Squares

Steve Gould GM0ULK/P in IO87RJ, operated from Tillimorgan Hill (Aberdeenshire). Steve says that he "experienced some rapid QSB causing slow stations (many) not to complete. Due to the QSB, I heard a good few contest stations come out of the noise but they decided to have long QSO exchanges and soon disappeared back into the noise, therefore they weren't not worked. Very frustrating. My location IO87RJ was reasonable and could work all stations that beamed North, I could hear many but stations were not beaming North for much of the time.

"Long uphill walk, 3 miles from nearest vehicle access point, glad the rain did not make it but could see clouds on the horizon. The 'Heath Robinson' type rotator, worked very well. Lesson learned... Must get a voice keyer!!"

The importance of turning beams to the outlying squares was again highlighted by contest regular Dave Hewitt GW8ZRE/P, who was forced by the wind to beam "North much more (mainly due to the gale) and work a few GMs especially GM4JOJ in IO97 – I have never worked that QRA before. And IO70 from **M0HJO/P** was another catch when the beam managed to stay pointing to the South West".

Jim Nicols MM0SMD/P, in IO87JJ sends his thanks, "to G0UWK away down in IO83 who was very strong to me but he had difficulty hearing my pip-squeak signals. It took many 'overs' until he eventually copied all my information. I also caught a brilliant opening to IO95 easy copy both ways with G4AAX/P and I heard G0BBB from time to time – but he was either in QSO or not hearing me".

Table 1: Leading stations

Placing	Name/Team	Callsign
Overall Winner	UBA TRA-OSB Contest Team	TM7T
Runner Up	Warrington ARC	G0WRS/P
Leading Fixed Station	Chesham & DARS	G3MEH
Leading Single Operator	Dave Hewitt	GW8ZRE/P
Leading Multi-Operator	UBA TRA-OSB Contest Team	TM7T
Leading English Station	Warrington ARC	G0WRS/P
Leading Welsh Station	Rhys Thomas	GW4RWR/P
Leading Scottish Station	G.A.D.A.R.S.	GM4YEQ/P
Leading Overseas	UBA TRA-OSB Contest Team	TM7T

Most Logs E-Mailed

This year most of the logs were sent in by E-mail. The contest spreadsheet introduced for the first time in 2009 was again used by many participants. Other entrants used a variety of contest logging software, with the REG1 format being popular.

The submission of logs by E-mail was reasonably smooth, although a few stations' E-mails seemed to be caught up with a 'SORBS' database problem resulting in some E-mails not being received. Those stations that included a contact E-mail address on their cover sheet information received a confirmation E-mail or an E-mail to advise them that their logs had not been received.

Every entrant that had entered their cover sheet details on the contest web site at **www.pwcontest.org.uk** also sent in a log.

Cover Sheets

One station entered a wrong locator on their cover sheet. This became apparent when cross checking identified each of the contacts with them recorded by other stations had the neighbouring locator and was speedily corrected. The station in question had previously operated only in the adjacent locator.

There were far fewer problems with cover sheets this year in comparison with previous years, with most entrants describing not only how they reduced their power to 3W or below but also how they measured it. However, one station claimed that using 20m of feeder is an acceptable way of meeting the 3W power limit. The rules are quite clear on this, and the station in question has lost some points as a result.

Problem Logs

Where an entry has a systematic error affecting most or all contacts, such as incorrect formatting of data, I usually try to correct this.

Logging standards were generally higher this year. There were few systematic errors that I was unable to correct such as missing information.

Where errors affect an individual contact, then the extent of the loss of points varies. Incorrect callsigns (including missing /P) or incorrect locators result in the contact not getting any credit at all. The latter can also impact the multipliers if this is the only contact in the square.

Stroke P

Missing or inconsistent /P on the end of callsigns continues to be one of the most enduring problems with logs, although this was less prevalent than in previous years. One station lost nearly a third of their points due to inconsistencies due, I suspect, to not using /P with **every** contact throughout the contest.

My impression is that this is a particularly common error made by newcomers to contesting. The *PW* contest is a great introduction to contesting, and I would strongly urge those guiding newcomers to remind them how important it is to correctly log the call sign and not to forget to send /P and to log /P.

The Morse Mode

For a low power contest, it is surprising that almost no use was made of the c.w.(Morse) mode this year. **Steve Gould GM0ULK/P** in IO87RJ says he, "only completed with 12 stations but heard at least 30 stations who could have been worked on s.s.b. but on c.w. I could have worked more. I frequently called using c.w. but no response. I suspect these skills have long evaporated amongst participants which is a real shame."

Transcription Errors

Several stations lost points and multipliers as a result of mis-keyed locators. For example, one station mis-keyed IO83 as 1083, etc. Soggy paper log sheets didn't help this year!

Other station mis-keyed JO00 as JOOO and others as J000. Use of well established contest logging programs should prevent this from happening.

Other stations slipped up with an occasional contact, one even claimed to have worked a G station in IO43 square in Eire!

There were a number of examples of apparent errors in transcribing from the original log to the finally submitted log (in whichever format). Some would appear to be a result of misreading, such as the letters U and V, D and O (very common), A and H, I and J, N and M, T and C, W and N, V and W, M and V.

Long Callsigns

One station had a UK station with a 4-character suffix!

Poor Signals

There were a few cases of poor signals reported. In most cases these were resolved promptly when the stations in question were made aware of the problem. Changing battery or tightening connections cured most.

There were one or two other complaints of poor signals with no supporting details. Without details such as the **callsigns** involved, and descriptions of attempts to resolve matters **during** the contest, there is nothing the adjudicator can do.

Australian Entry!

When I received the entry from **Doug Friend VK4OE** I wondered how he had managed to work stations in the British Isles! Upon reading the log it immediately became apparent that he operated as M/VK4OE in England.

Doug commented, "I participated in this event to have some fun – and fun I had, despite the showers, wind and cold temperatures. Several times I could easily hear more distant stations but they apparently could not hear me." Doug was also active on 10GHz during his stay.

Date for Your Diary

The date for the 2012 *PW* 144MHZ QRP Contest is **Sunday June 12th**. As usual the event will be arranged to run alongside the RSGB 144MHz Backpackers contest for the benefit of entrants to both contests.

Next summer will see a number of major non-radio events (Queen's Diamond

Table 2: Overall results Table, Practical Wireless 144MHz QRP Contest 2011.

Pos	Call	Name	QSOs	Squares	Score	Locator
1	TM7T	UBA TRA-O aSB Contest Team	114	24	2736	JO00UV
2	G0WRS/P	Warrington ARC	124	21	2604	IO83PC
3	G3NFC/P	Burton-upon-Trent ARC	122	20	2440	IO93BA
4	G4RLF/P	SADGITS	98	22	2156	IO80WX
5	G0BWC/P	Bolton Wireless Club	108	19	2052	IO83RO
6	GW8ZRE/P	Dave Hewitt	104	19	1976	IO83JA
7	G4ARI/P	Tim Raven	105	18	1890	IO92IQ
8	GW4RWR/P	Rhys THOMAS	100	17	1700	IO82HV
9	G0XAZ/P	Bill And Malcolm	91	17	1547	IO91GI
10	M0YJT/P	Dangerous DX Group	89	15	1335	IO92EN
11	M0GVG/P	Roger Bell (M0GMG) & Roger Thawley (G0BSU)	94	13	1222	IO83XG
12	G8HXE/P	Keith Haywood	89	12	1068	IO83RP
13	G3MEH	Chesham & DARS	60	16	960	IO91QS
14	M0BUL/P	Craig Costford	67	14	938	IO82NG
15	M0REG/P	Worthing Radio Events Group	65	14	910	IO90TV
16	MX0BCQ/P	Craven Radio Amateur Group	60	15	900	IO94AC
17	M0MDG/P	Middlesex DX Group	60	14	840	IO91MP
18	G2AS/P	Sheffield ARC	57	14	798	IO93FL
19	G7HFS/P	Ian Harling	48	16	768	JO00DS
20	G8MKC/P	Milton Keynes ARS	46	16	736	IO92NB
21	G5RV/P	Mid Sussex ARS	52	14	728	JO00BT
22	G4AAX/P	Northumbria ARC	44	16	704	IO95CI
23	G1WOR/P	Worthing & DARC	71	9	639	IO90SV
24	M0HJO/P	Cousin Jacks Contest Group	52	12	624	IO70PP
25	G4ZOI/P	Dene Hunsdale	46	13	598	IO84TF
26	MX0ECR/P	East Cheshire Radio Group	59	10	590	IO93AJ
27	G0FCA/P	Iain Groom	39	15	585	IO83VS
28	M0YCG/P	Yorkshire Dales Contest Group	43	12	516	IO84VF
29	MW1DOU/P	Anglesey & Ynys Mon LFBG	41	12	492	IO73WH
30	G4XKC/P	Andy Sieroslawski	44	11	484	IO93AO
31	G0NWT/P	North Norfolk ARG	25	19	475	JO02NW
32	M0EUK/P	"Graeme Stoker, Keith Morrison & Jonathan Taylor"	30	15	450	IO84VG
33	G1IOK/P	Shaun Coles	36	11	396	IO81RF
34	GD0TFG/P	John Dowling	28	14	392	IO74PC
35	G2XV/P	Cambridge & District ARC	31	12	372	JO02AD
36	G0OVA/P	Tony Crake	33	11	363	IO91QI
37	M6OXO/P	"Brian Jones, Bolton Wireless Club"	33	10	330	IO93AD
38	G4BZI/P	Roger Bracey	30	10	300	IO93AD
39	G0VFW	Terry Thirlwell/Chesham & District ARS.	33	9	297	IO91RR
40	G4TJE/P	Halstead Contest Group	42	7	294	JO01BH
41	G4BEE/P	Ray Banister	38	7	266	IO83SO
42	G0UTT/P	Dengie Hundred ARS	21	11	231	JO01KQ
43	G6RC	Crawley ARC	23	9	207	IO91VC
44	G3POM/P	Guy Morgan	24	6	144	IO92HD
45	G3MAE/P	Hambleton A.R.S.	15	9	135	IO94IJ
46	M0SCG/P	Sands Contest Group	15	8	120	IO84PA
47	G4GBP/P	Colin	13	9	117	IO90DW
48	G8ITB/P	G8ITB & M0KSJ	19	6	114	JO01AH
49	M/VK4OE/P	Doug Friend	13	7	91	IO92XA
50	M0JMO/P	Joshua Murray	17	5	85	IO93FJ
51	GM4YEQ/P	G.A.D.A.R.S.	12	7	84	IO85MM
52	M0ZAV/P	Rick Amos & Joe Hobbs	13	6	78	IO92QN
53	MM0SMD/P	Jim Nicol	12	6	72	IO87JJ
54	GM8OTI/P	John Cooke	10	6	60	IO74UU
54	2E0KST	Stewart Turner	10	6	60	IO83SO
56	GT1IOM	Isle Of Man ARS	9	6	54	IO74TI
57	GM0ULK/P	Steve Gould	5	10	50	IO87RJ
58	G6KOB	Jan Zenon Sobanski	16	3	48	IO93GN
59	G4KKR/P	Richard J Page	9	5	45	IO93CH
60	G8NWC	Graham Boor	8	5	40	IO92WS
61	M0GXZ	Malcolm Richardson	4	3	12	IO92PA
62	M6KFC	David Aldred	3	1	3	IO83TN

Table 3: Leading multi-operators

Pos	Call	Name	QSOs	Squares	Score	Locator
1	TM7T	UBA TRA-OSB Contest Team	114	24	2736	JO00UV
2	G0WRS/P	Warrington ARC	124	21	2604	IO83PC
3	G3NFC/P	Burton-upon-Trent ARC	122	20	2440	IO93BA
4	G4RLF/P	SADGITS	98	22	2156	IO80WX
5	G0BWC/P	Bolton Wireless Club	108	19	2052	IO83RO
9	G0XAZ/P	Bill And Malcolm	91	17	1547	IO91GI
10	M0YJT/P	Dangerous DX Group	89	15	1335	IO92EN
11	M0GVG/P	Roger Bell (M0GMG) & Roger Thawley (G0BSU)	94	13	1222	IO83XG
15	M0REG/P	Worthing Radio Events Group	65	14	910	IO90TV
16	MX0BCQ/P	Craven Radio Amateur Group	60	15	900	IO94AC
17	M0MDG/P	Middlesex DX Group	60	14	840	IO91MP
18	G2AS/P	Sheffield ARC	57	14	798	IO93FL

Table 4: Leading single operators

Pos	Call	Name	QSOs	Squares	Score	Locator
6	GW8ZRE/P	Dave Hewitt	104	19	1976	IO83JA
7	G4ARI/P	Tim Raven	105	18	1890	IO92IQ
8	GW4RWR/P	Rhys THOMAS	100	17	1700	IO82HV
12	G8HXE/P	Keith Haywood	89	12	1068	IO83RP
13	G3MEH	Chesham & DARS	60	16	960	IO91QS
14	M0BUL/P	Craig Costford	67	14	938	IO82NG
19	G7HFS/P	Ian Harling	48	16	768	JO00DS
25	G4ZOI/P	Dene Hunsdale	46	13	598	IO84TF
27	G0FCA/P	Iain Groom	39	15	585	IO83VS
30	G4XKC/P	Andy Sieroslawski	44	11	484	IO93AO
33	G1IOK/P	Shaun Coles	36	11	396	IO81RF
34	GD0TFG/P	John Dowling	28	14	392	IO74PC

Table 5: Square Winners

Square	Name	Call	No. Entries
IO70	Cousin Jacks Contest Group	M0HJO/P	1
IO73	Anglesey & Ynys Mon LFBG	MW1DOU/P	1
IO74	John Dowling	GD0TFG/P	3
IO80	SADGITS	G4RLF/P	1
IO81	Shaun Coles	G1IOK/P	1
IO82	Rhys THOMAS	GW4RWR/P	2
IO83	Warrington ARC	G0WRS/P	9
IO84	Dene Hunsdale	G4ZOI/P	4
IO85	G.A.D.A.R.S.	GM4YEQ/P	1
IO87	Jim Nicol	MM0SMD/P	2
IO90	Worthing Radio Events Group	M0REG/P	3
IO91	Bill And Malcolm	G0XAZ/P	6
IO92	Tim Raven	G4ARI/P	8
IO93	Burton-upon-Trent ARC	G3NFC/P	9
IO94	Craven Radio Amateur Group	MX0BCQ/P	2
IO95	Northumbria ARC	G4AAX/P	1
JO00	UBA TRA-OSB Contest Team	TM7T	3
JO01	Halstead Contest Group	G4TJE/P	3
JO02	North Norfolk ARG	G0NWT/P	2

Stormy skies over the Weavers.

Stuart MW0GCT operating and Barry MW1DOU logging. Note the extremely important kettle – on the boil for a brew!

Jubilee, Olympics and Para-Olympics) in the UK which may result in changes to the 'normal' contest calendar. Keep an eye on *Practical Wireless* and the *PW* Contest web site at **http://www.pwcontest.org.uk/**

Thanks Everyone

As usual, many entrants expressed thanks to the other stations taking part or giving points away, particularly this year with the wet weather in many parts. I would also encourage stations that perhaps packed up early or did not operate due to the weather in 2011, not to be discouraged from trying again in 2012. Surely the contest must be due some good weather after a couple of bad years?

Finally, I must take this opportunity to thank all the entrants in 2011 and **Dr. Neill Taylor G4HLX**, for devising what is without doubt one of the most widely supported single-band contests in the v.h.f. calendar. ●

Ray Howes G4OWY's Antenna Workshop
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-Mail: antennas@pwpublishing.ltd.uk

Try a Little KISS

The Plain Jane Ground Plane For 20m

Ray Howes G4OWY is in love with his Plain–Jane vertical for the 14MHz band. Let him explain why!

There are probably many thousands of other like–minded souls who, like me, spend countless hours happily in the great outdoors (usually the back–garden) dreaming up or better still erecting what we hope is the launch–pad of our very own big signals. Once the antenna's up, we race indoors, excitedly plug the antenna feed–line into the antenna tuning unit (a.t.u.) – automatic or otherwise, cross our fingers and await the 5&9 reports to come rolling in.

If only it were that easy? So, over the past several months I've been busy as usual constructing loops, parallel dipoles, helically shortened dipoles, even, a portable inverted V antenna (put together with a few odd bits and pieces of plumbing pipe, etc., I found hidden in my garden shed).

Embracing KISS

Anyway, I really wanted something that embraced the Keep It Simple Stupid (KISS) approach. So, many antennas – especially those of the advanced type, either required a lot more space than I have or, involve winding coils for traps and so on. Besides, traps are invariably lossy and I didn't want my precious radio frequency (r.f.) warming up the traps instead of being propelled out into the great big blue yonder.

I decided to quickly skim through a few antenna related articles – both old and new. In doing so, it soon became apparent that there's little to suit the small modern garden so I came to the conclusion that the KISS approach would do just fine.

Besides, I wanted my antenna up and running as soon as possible! What I didn't want, are all the hassles that might accrue from cutting 'miles' of wire to the nearest inch and fabricating several traps. No, this antenna had to be without traps and not need 'miles' of wire running about all over the place.

Sore Thumb

The antenna also mustn't stick out like a proverbial sore thumb either. More importantly, I didn't want my neighbours who're overly curious (nosey) at the best of times, to latch on to the fact that yet another 'aerial' had miraculously sprouted–up overnight. Which, brings me neatly to the antenna described here – the vertically mounted 'Plain Jane Ground Plane'.

Some Radio Amateurs might conclude – perhaps rightly, that a vertical antenna radiates poorly in every conceivable direction, including ip!. However, you may be in for a surprise if you have not used one before. Because, not only does a vertical antenna radiate at low angles as opposed to a dipole for example, which radiates at a relatively high angle, it outperforms my 20m dipole (currently up at 15 metres) any day of the week!

In fact the other day, I overheard one W4 station telling another W station, that he'd not bothered to "re–assemble his 2–element Yagi as his ground–plane vertical works just as well and is far less visible." I hasten to add, that this particular vertical he described was commercially manufactured. But I did switch antennas whilst this QSO was in progress, if only to convince myself that my next antenna construction project was viable.

Anyway, on my 20m dipole the W4 station was S4 peaking to S6 – and on my vertical, S6 to S9. Quite a difference. Not surprisingly then, I got the tools out and began to bring together what would be necessary to construct my next antenna project – a vertical ground–plane.

Schools Of Thought

There are two schools of thought so far as the actual construction of antennas are concerned. The first one, is to build it in such a way that even if a seismological event of six on the Richter is unlikely to dislodge it from its anchoring point!

The second method is to build it in such a way that if it is needed to be taken down in a hurry. You may also wish to move it to some other part of your property, or a semi–portable version is preferable. Even if built in this way, it does present a fairly rigid structure to most outdoor elements – including the odd gale–force wind. And being portable, it can of course be taken down – just in case!

For the radiating portion – the important bit – I used a length of copper tubing that was at one time the other half of another dipole. This was cut to 5.2 metres long (165in) using the standard formula 295/f(MHz).

The radials – acting as the other half of what is essentially a vertical half-wave dipole, were each cut using the same formula. I used just three radials. And, of course, each

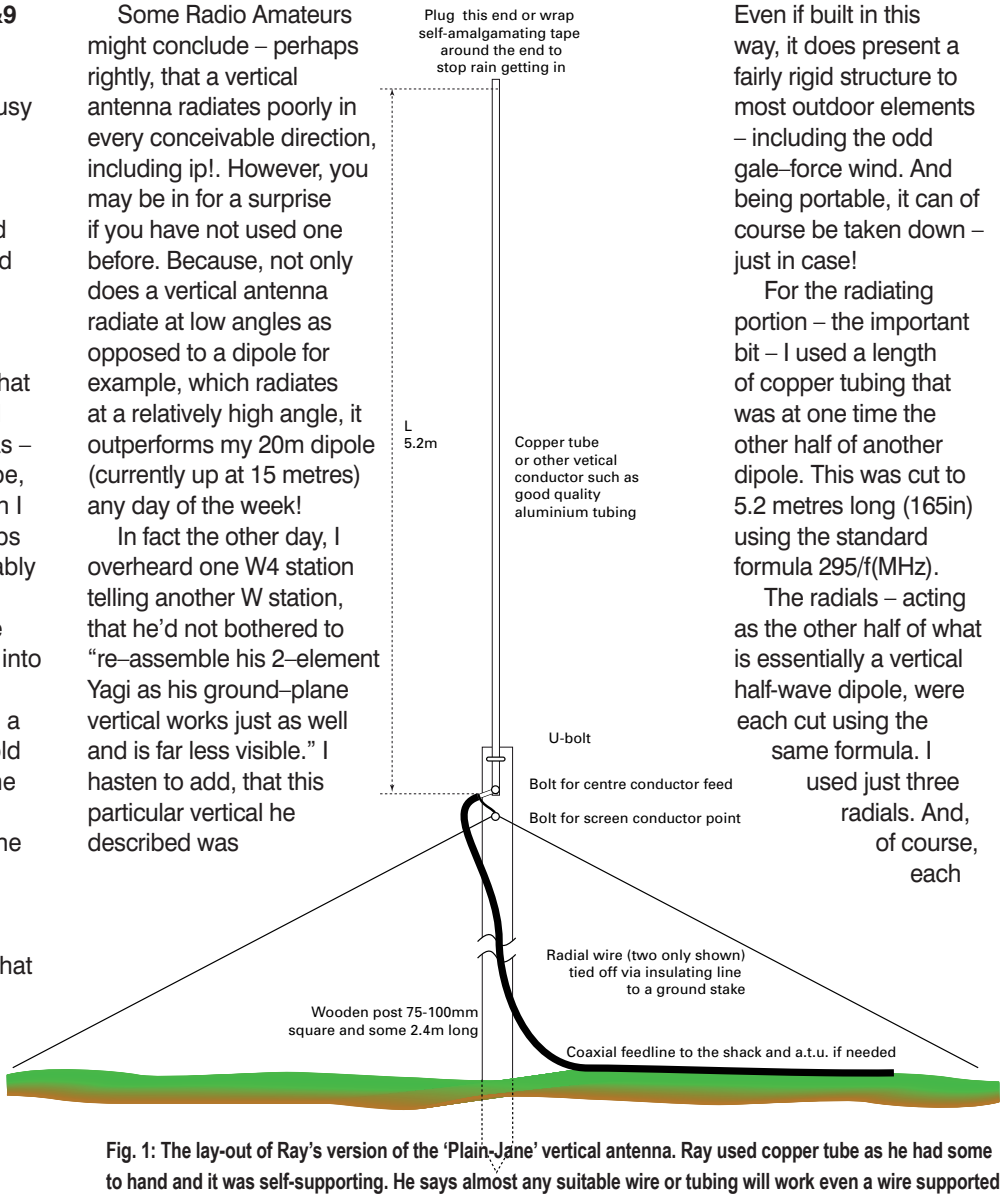


Fig. 1: The lay-out of Ray's version of the 'Plain-Jane' vertical antenna. Ray used copper tube as he had some to hand and it was self-supporting. He says almost any suitable wire or tubing will work even a wire supported by a suitable length fishing rod.

one measured 5.2 metres long. Yes, four radials would be better. At my QTH, three radials worked fine. So I didn't add more.

Mechanical Rigidity

Next, what sort of support to use? Not only must this provide a degree of mechanical rigidity for the copper radiator – or perhaps a length of aluminium tubing if you choose to use this instead, it must also be weatherproof and insulate the metal radiator from the support section. So the obvious choice mainly because I prefer it, is a 2.44m long wooden stake 40mm x 40mm of the type used for supporting young trees, etc.

These stakes usually come conveniently pressure treated so should last a considerable time deep in the ground. Most garden centres stock them at a cost of several pounds each. There again, you could as I did for a different antenna project, use one of those 20 foot (6m) scaffolding poles, however my ever-suffering partner completely disagrees.

My chosen antenna support (the wooden one) was driven 610mm (2 feet) into the ground. This wooden pole will also be used to secure the three radial wires (Or four if you really have to). For these I used bell–wire.

The copper tubing was affixed to the wooden support using a couple of U-bolts. It's not really necessary to use any insulation between the juncture of the U-bolts and the wooden mast as the r.f. voltage here will be extremely low.

However, if you use a metal support however this will, of course, have to be insulated from the metal radiator. And if you're using an untreated wooden pole it will need a liberal coat of varnish.

Weather Conditions

Depending on where you live and the prevailing weather conditions, you could use the radial wires as guys – if only to allay the fear that in a very exposed area, the whole antenna might end up decorating your next door neighbour's garden. If so, one end of each strain insulator can be attached to a stake and the other to the radial wire. This will give added insurance should severe gale force winds at your QTH be forecast.

After the vertical radiator has been securely attached to the wooden pole via the two U-bolts, drill a small hole at the bottom of it to which an appropriate sized nut and bolt (using two metal washers) can fit through the hole. The coaxial feed–line centre conductor is tinned and soldered to a metal lug which slips between one of the washers and then the nut is securely tightened at the bottom of the tubing. When all three radials have been cut to size, twist all the ends together at one end and just like the feed-line, tin them along with the coaxial cable braid.

Next, drill a hole in the wooden pole about one inch or so below the metal tubing. The radial ends and the coaxial braid, which nows forms one whole, are bolted together in exactly the same manner as for the vertical section.

What needs to be done then, is to simply tie off all three radials at about a 45° angle via the insulators and the ground stakes. I say about 45°, simply because the actual radiation resistance of a typical textbook ground-plane is somewhere around 30Ω.

As the feedline I used is 50Ω, allowing the radials to droop a bit changes the radiation resistance to match the impedance of my 50Ω feedline. But it also helps to reduce the standing wave ratio (s.w.r.), more importantly, maximum 'smoke' should then be transferred to the antenna – and hopefully, radiated out to all points of the compass and beyond.

Lastly, both connections – the radials and the feed–line itself – will eventually have to be waterproofed. I say eventually, because you will want to make sure everything is working okay before you seal up both soldered ends. In my haste, I got carried away and didn't do this, before actually making sure it worked.

So, I had the job of removing all the weatherproof sealant I'd lovingly applied and had to redo it all over again. Oh, and don't forget to plug up the hole at the top of the vertical radiator!

The dimensions given for the vertical section cover the whole 14MHz band. The s.w.r. is about 1.5:1 to 1.8:1 from one end of the band to the other. To be absolutely honest though, I do have to bring in reinforcements occasionally, by way of my auto–tuner at the top end of the band.

As far as the DX potential of this antenna is concerned, it works as is. With a few stations expressing surprise that that my r.f. output is only ever around 5 to 10W.

Extremely Helpful

Obviously, a good ground system is extremely helpful – especially, if you're using a vertical antenna like the one described here. But I've found that even using many times as many radials seems to make no significant improvement on reports received. Not even a few buckets of salt water sloshed about makes any real difference.

I guess what might be the reason for this, is that the reflections off the ground – those producing the all-important low-angle of radiation, happen a long way off from the actual antenna site. One way to off-set this problem, could be to provide a huge mat of better than average conductivity surrounding the circumference of the antenna stretching out several hundred metres or more! Not an undertaking I wish to contemplate. After all, this project is meant to be quick and easy.

In case you are wondering, the vertical I used for comparison tests earlier with the W4 station, was just a very quick lash–up just for receiving purposes – using another length of copper tubing I strapped to my dipole support pole.

Does It Work?

The answer to the question "does it work?" – is a resounding yes! I've worked HB9AON, EA3AYQ, SP1PEA, F5UJG, PF16SDT, OZ7X, S58MU and CQ00DX, plus all the other usual suspects who 'roam' about on 14MHz. With the exception of the Pacific area, most stations are raised by a first or second call, all things being equal. In comparison with my 20m dipole, with the Plane-Jane vertical I can work many more stations which were marginal on the dipole. But I'm still using only a maximum of 10W.

Simple antennas always work. And if they are resonant solely for a specific band of choice and as high as you can get them, I recommend them wholeheartedly as I always prefer simple antenna to almost anything else.

However, the strange thing is, barring the odd exception, most of the antennas we use now are really no better than they were decades ago. The 'openness' we had then gave more space for phased arrays and 'small' rhombics instead of trapped dipoles, end-feds and miniaturised beams, etc.

Now you've read my article perhaps you'll realise the need for the type of antenna I've described. Slim and unobtrusive it shouldn't take more than a couple of hours to assemble if, of course, you have all the required bits to hand. And with propagation permitting, you could be working more DX than you'd expect!

Multi-Band Version

Finally, because the vertical worked so well, my next project (I'm working on it right now) is a multi-band version for 14, 21 and 28MHz (20, 15 and 10m) – all on the same pole, but with a few extra radials. Or maybe, 18, 21 or 24MHz (17m, 15m, and 12m)?

So instead of using the copper tubing, I could use three separate lengths of bell wire or whatever for the actual radiators? Much lighter and much cheaper. Should work a treat. We'll see and I'll let you know in another article. ●

Haydon Communications

LOCAL TO GLOBAL

SHOWROOM & MAIL ORDER:
Unit 1, Purfleet Industrial Estate, Off Juliette Way, Aveley RM15 4YA

TEL: 01708 862524
FAX: 01708 868441

Mail Order & showroom open:
Mon-Thurs: 10.00am - 4.00pm
Friday: 10.00am - 3.00pm.
Our showroom is 5 mins from "Dartford River Crossing"

E&OE (next day delivery available)

★ WANTED: USED EQUIPMENT FOR CASH OR PART EXCHANGE ★

TO ORDER ON-LINE SEE www.haydon.info

To contact our sales dept. E-mail:- admin_@haydon.info

PayPal SWITCH VISA

HF TRANCEIVERS

FT-450

Amazing Rx front end performance. (IF DSP). HF + 6m (100W)
£629.99
or FT-450AT (+ ATU) £725.99
One customer claimed, "this is the best kept secret of the communications industry".

NEW FT-450D

This is the latest IF DSP marvel from Yaesu. HF + 6m (500/300 CW filters as standard). New design + ATU.
THE DSP ON THIS RECEIVER IS AMAZING!
£789.99

FT-857D DSP

HF + 6m + 2m + 70cm.
OUR PRICE
£659.99
OR FT-857 + MS-1228
£719.99

FT-897D
Includes DSP

OUR PRICE **£759.99**
OR FT-897 + MS-1228
£819.99

FT-950
HF + 6m IF DSP

Superb "I.F." DSP Rx
OUR PRICE
£1199.99

FT-2000D

FT-2000D (200W) £2699.99
FT-2000D + SP-2000 ..... £2849.99
MD-100A8 + FT-2000D £2799.99

FT-2000

FT-2000 (100W HF + 6m) £2199.99

FT-817 ND

HF + 6m + 2m + 70cms. Incl's battery/charger + antennas. Optional case £22. Extra spare battery £49.99.
OUR PRICE **£519.99**
STAR BUY - FT-817ND + extra battery + case £579.99

WONDER WAND

1.8-450MHz BNC. Whip supplied. Ideal for FT-817
£124.99

JUPITER 538B

£1539.00
With ATU fitted £1835.00
This model accepts standard keyboard

TEN-TEC EAGLE 599

£1730.00
With ATU fitted £1935.00

ATAS-120A

Military spec mobile antenna – superbly made. Covers HF + 6m + 2m + 70cm. *Fully automatic. (*certain Yaesu radios).
OUR PRICE
£325.00

LDG PRODUCTS

YT-847	£225.00
AT-1000 PRO II	£184.99
AT-200 PRO II	£209.99
AT-1000 PRO	£499.99
AT-897 plus	£179.95
YT-100	£177.95
Z-817	£119.95
Z-100 plus	£134.95
Z-11 PRO II	£159.95
FT-Meter	£44.95
FTL-Meter	£79.95

TS-590S

HF + 6m
AMAZING RX PERFORMANCE
USUAL KENWOOD QUALITY
£1359.99
Second hand TS-2000E (immaculate) .£1099.99

PSUs

NISSEI PS-300

Features: ★ Over voltage protection ★ Short circuit current limited ★ Twin illuminated meters ★ Variable voltage (3-15V) latches 13.8V ★ Additional "push clip" DC power sockets at rear. Dim'ns: 256(W) x 135(H) x 280(D)mm.
A truly professionally made unit built to outlast most PSUs.
30 AMP/12 VOLT PSU
The goliath of PSUs
TRUE 'LINEAR' PSU
OUR PRICE **£169.99**

NISSEI MS-1228

28A at 13.8V yet under 2kgs. (H 57mm, W 174mm, D 200mm approx). Fully voltage protected. Cigar socket & extra sockets at front/rear. Ultra slim.
NISSEI HAVE BECOME RENOWNED FOR PUTTING QUALITY FIRST, YET MAINTAINING A GOOD PRICING STRUCTURE. A TRULY SUPERB POWER SUPPLY UNIT
'Smallest version to date' now with cigar socket.
QUALITY MADE PRODUCT **£89.99**

DIAMOND GZV-4000

Includes built-in extention speaker
40AMP/13.8V P.S.U.
SALE **£179.99**
GZV-2500 25 amp version of above. Sale price £129.99

DIAMOND GSV-3000

"Linear power supply". 30A @ 13.8V. 1-15V variable. Diamond quality PSU
OUR PRICE £179.99

WATSON PSU


Power-Mite NF 22amp	£69.95
Power max (25A)	£89.95
Power max (45)	£125.00
Power max (65)	£225.00
W-10A 25A (10A linear)	£59.95
W-25AM (25A linear)	£99.99

VHF/UHF TX

YAESU FTM-350

2m/70cm Tcvr with APRS & dual Rx (50W O/P). Includes wideband Rx. Includes DTMF mic.
INCLS FREE GPS ANTENNA UNIT WORTH £70
£449.99

ML-5189

Compact FM mobile. 4m/25W
Incl's DTMF mic **£149.99**

NEW ML-5555

10m/12W mobile. Incl's mic.
£149.99

YAESU FT-8900 R

10m + 6m + 2m + 70cm. (up to 50W).
INCLUDES WIDEBAND RECEIVE AS STANDARD (PLUS DUAL RECEIVE)
INCLUDES REMOTE DTMF MIC WITH REMOTE FREQ/FUNCTION CONTROL.
£339.99

YAESU FT-7900 R/E

2m + 70cm + wide Rx. (Incl's free kit).
£239.99

SALE: FT-2900 R/E
THE GOLIATH OF MOBILES

2m FM (75W). (Incl's remote control mic)
£139.99

YAESU VX-7R

6m/2m70cm + wide RX. An amazing 6W water proof hand-held. Case £19.99. Spk mic £32.99. Cigar lead £24.99. BNC adapter £6.00.
Silver **£249.99**

YAESU VX-8E

6m/2m/70cm. "APRS" with Rx:- 0.5-1GHz. Incl's battery & chgr.
SPECIAL VX-8 + EXTRA BATTERY £319.99
£299.99

YAESU FT-60

2m + 70cm + wideband Rx. Includes battery/charger. ~~£179.99~~ **£129.99**

ACCS

MFJ-993B INTELLITUNER

Fully automatic (1.8-30MHz). 300W SSB.
£249.00
Easy to use ATU.

MFJ-949E

£179.99
● 1.8-30MHz 300W ATU ● Large cross needle meter ● 30/300W PEP power meter ● VSWR ● 3-way antenna selector ● Internal balun + dummy load.

MFJ-259B ANALYSER

1.8-170MHz
£259.99
Case 259B £29.99 Dip Coils 259/269£29.99

MFJ-269 ANALYSER

1.8-170MHz + 70cm
OUR PRICE **£339.99**
Case 269B £29.99

MFJ-269 pro version	£369.99
MFJ-260C 300W dummy load	£49.99
MFJ-901B ATU	£109.99
MFJ-969 Rollercoaster ATU (300W)	£219.99
MFJ-962D 1.5kW (metered) antenna tuner	our price £279.99
MFJ-994B (600W) intelli tuner	£319.99

SGC


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

YOU KITS

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

ANTENNAS

DIAMOND CP-6

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

DIAMOND V-2000

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

NEW INTRUDER III

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

INTRUDER II

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

DIAMOND SD-330

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

GIZMOS

NEW SANGEAN ATS-909X

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

W-8681 PROFESSIONAL WEATHER STATION

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

QUANSHENG TG-UV2

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

ALINCO DJ-596E

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

D-72

2m/70cm + APRS
NEW
£425.00

WOUXUN HANDIES
all include battery, charger and antenna

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

LIMITED STOCK

10m PNEUMATIC MAST

We have a small quantity of "military spec" pump-up masts (part of a Government order). All brand new in a crate and supplied with cover (close HT ≈ 6 foot). Anodised green finish.
40m guy kit pack £49.99
Ground fixing spikes (3-off) £35.00
2 foot all ground fixing kit..... £99.99
(Can be hand operated or by compressor/foot pump)

Del £40 10m MAST, ONLY **£1199.99**

HEAVY DUTY 24ft SWAGED MAST SET

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

SPECIAL BUY

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

NEW SWAGED MAST SETS

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

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

H/DUTY CAR BOOT MAST SET

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

£49.99 each.

TWO FOR £79.99 DEL £13.00

NEW CAR BOOT MAST SET

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

£39.99

2 for £74.99 del £13.00

NEW NOISE FILTER!

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

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

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

MAST HEAD PULLEY

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

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

NEW EASY FIT WALL PULLEY

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

£13.99 + P&P £4.50

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

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

HANGING PULLEY

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

£24.99

BARGAIN WINCH

500kg brake winch. BARGAIN PRICE

£89.99 Del £10.00

(Now includes cable grip)

Winch wall bracket..... £22.99

BUTTERNUT VERTICALS

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

TONNA YAGIS

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

LOW LOSS PATCH LEADS

£4.50 P&P

Connectors	Length	Price
PL-259 - PL-259	0.6m	£11.99
PL-259 - PL-259	1m	£14.99
PL-259 - PL-259	4m	£19.99
PL-259 - PL-259	20m	£49.99
BNC - BNC	1m	£12.99

MT-3302

Heavy duty universal mount.
Includes 5m cable **£34.99**

MT-6601

Adjustable roof rack/window bar mount
£19.99

NEW DIAMOND WD-330

Amazing performance. Twin folded dipole. 2-30MHz – and it really works. No ATU required (25mts long). Supplied with 30 mtr PL-259 feeder – ready to go. If you want great transmission, look no where else. Japanees quality made product WOW **£229.99**

NEW DIAMOND BB6W

2-30MHz (250W) 6.4m long. End-fed wire antenna. Icludes matching balun. Sling up & away you go.

£199.99

CUSHCRAFT BARGAINS

Delivery £15.00

MA5B	Mini beam 10, 12, 15, 17, 20m.....	WOW £519.99
A4S	4 ele beam (10 - 20m).....	£675
A3S	3 ele beam (10-20m).....	WOW £599.99
R-8E	Vertical (40 - 6m) "special".....	SPECIAL £525

Q-TEK PENETRATOR

"We've sold 100s all over Europe"

★ 1.8 - 60MHz HF vertical ★ 15 foot high ★ No ATU or ground radials required ★ (200W PEP).

SEND SAE FOR LEAFLET

£219.99

NEW Wire Penetrator 50ft long (1.8-70MHz)..... £189.99

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end)..... £34.99 P&P £4.00 (a pair)

TRAPS BACK IN STOCK

BALUNS & TRAPS (1kW)

Baluns 1:1 or 4:1 or 6:1..... £39.99 each P&P £4
Traps 80m or 40m or 20m or 15m..... £39.99 pair P&P £5

Standard & Deluxe G5RV

P&P on either full/half size £7.50

Half size 51ft (now includes heavy duty 300Ω ribbon)..... £28.99
Full size - 102ft (now includes heavy duty 300Ω ribbon)..... £33.99
Half size (Deluxe) - 51ft (40-10m) £39.99
Full size (Deluxe)- 102ft (80-10m) £48.99
In-line choke balun for G5RV, etc..... £39.99

CAROLINA WINDOM

CW-160S	(160-10m) 40m long.....	£159.99 P&P £10.00
CW-160	(160-10m) 80m long.....	£164.99 P&P £10.00
CW-80	(80-10m) 40m long.....	£134.99 P&P £10.00
CW-80S	(80-10m) 20m long.....	£152.99 P&P £10.00
CW-40	(40-10m) 20m long.....	£121.99 P&P £10.00
G5-RV	(80-10m) + balum.....	£74.99

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W) ..... £79.95 P&P £6.50
RS-102 1.8-150MHz (200W) ..... £59.95 P&P £6.50
RS-402 125-525MHz (200W) ..... £59.95 P&P £6.50
TM-3000 1.8-60MHz (3kW) Incls mod meter ..... £69.95 P&P £6.50
RS-40 144/430MHz Pocket PWR/SWR..... £34.99 P&P £5
DL-30 diamond dummy load (100W max) ..... £29.99 P&P £5

D-308B DELUXE DESK MIC

(with up/down). Many amateurs (over 4000) have been pleased with it's performance. Includes 8-pin round Yaesu mic lead. Icom/Kenwood & other leads available. Phone (£19.99 each). Replacement foam windshield £3.00 + P&P.

Back in stock – 8-pin modular 8-pin round Yaesu adapter £19.99

£79.99

GENUINE COAX SWITCHES

(P&P £6.00)

2 way CX-201 (0-1GHz) SO239..... £24.99
2 way CX-201 'N' (0-1GHz) 'N' £29.99
4 way CX-401 (0-500MHz) SO239..... £79.95
4 way CX-401 'N' (0-500MHz) 'N' £89.95

WATSON COAX SWITCHES

(POST £4.00)

CX-SW4N DC-1.5GHz (5xN)..... £59.99
CX-SW4PL DC-800MHz (5 x SO-239)..... £56.95
CX-SW3N DC-1.5GHz (4 x N) £49.95
CX-SW3PL DC-800MHz (4 x SO-239)..... £41.95
CX-SW2N DC-3GHz (3 x N) £32.95
CX-SW2PL DC-1GHz (3 x SO-239) £26.95

REPLACEMENT POWER LEADS

DC-1 Standard 6-pin/20A fits most HF ..... £22.00 P&P £3
DC-2 Standard 2-pin/15A fits most VHF/UHF .... £10.00 P&P £3
DC-3 Fits Yaesu FT-7800/8800/8900, etc ..... £17.50 P&P £3

COAX BARGAINS

True military spec real UK coax

RG-58 Military spec x 100m.
£69.99 or 2 for £100.00
Coax stripping tool (for RG-58).....£8.99

RG-213 Military spec x 100m (10mm dia).
£199.99/100m or 2 for £300.00

Q-TEK TRI-MAGMOUNT

Very heavy duty. Available:- SO-259 or 3/8 – specify. **£44.99**

YAESU G-450C

Heavy duty rotator for HF beams, etc. Supplied with circular display control box

WOW **£329.99** or £389.99 with 25m cable/plugs

G-650C extra heavy duty rotator..... £369.99 or £429.99 with cable
G-1000DXC extra heavy duty rotator..... £479.99 or £539.99 with cable
G-2800DXC The goliath of rotators..... £845.99
GS-065 thrust bearing £59.99
GC-038 lower mast clamps £35.99

AR300XL

Quality rotator for VHF/UHF. Superb for most VHF-UHF Yagis, 3-core cable required. 3-core cable £1 per mtr.
GS-050 stay bearing £39.99 OUR PRICE **£99.99**

DIAMOND YAGIS

No tuning required

2m/5 element No tuning required SO-239 feed..... £47.99
2m/10 element No tuning required SO-239 feed..... £84.99
70cms/10 element No tuning required SO-239 feed..... £54.99
70cms/15 element No tuning required SO-239 feed..... £69.99
6m/2 element No tuning required SO-239 feed..... £89.99

Q-TEK COLLINEARS (VHF/UHF)

Del £10.00

X-30 GF 144/70, 3/6dB (1.1m)..... £44.99
X-50 GF 144/70, 4.5/7.2dB (1.7m)..... £59.99
X-300 GF 144/70,6.5/9dB (3m)..... £79.99
X-510H GF 144/70, 8.5/11dB (5.4m) £139.99
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m)..... £89.99

DUPLEXERS & TRIPLEXERS

MX-2000 50/144/430MHz Triplexer £84.99
TSA-6011 144/430/1200MHz Triplexer..... £84.99
MX-72 144/430MHz..... £39.99
MX-72 "N" 144/430..... £42.99
MX-62M (1.8-56MHz + 76-470MHz) £79.99
MX-610 1.8-30MHz + 49-470MHz (S-239 conn's) £99.99

MOBILE ANTENNAS

Del £10.00

DB-7900 2m/70cm (5.5/7.2dB) 1.6m (PL-259)..... £44.99
DB-770M 2m/70cm (3.5/5.5dB) 1m (PL-259)..... £24.99
Diamond CR-8900 10/6/2m/70cm (1.26m) £99.99
Diamond AZ-506 2m/70cm – only 0.67m long..... £39.99
PL-62M 6m/2m (1.4m) PL-259 ..... £23.99
PL-627 6m/2m/70cm (1.7m) PL-259..... £44.99

ALUMINIUM POLES

20 foot (collection only) 2"..... £69.99
10 foot (collection only) 2"..... £34.99
2.4m (2") Ally pole..... £32.99
5 foot x 2" pole..... £17.99

EP-300

Over the ear earpiece.
£9.95
P&P £4.00

RH-770H (BNC)

2m/70cm Tx + wide Rx. High gain up to 5.5dB.

£59.99
P&P £5.00

TWIN FEEDER/ LADDER LINE

300Ω Twin Feeder £1/mtr £70/roll
450Ω Ladder £1/mtr £70/roll (100m)

EARPIECE/BOOM MIC

Over ear earpiece + boom mic. Available in Kenwood version or Yaesu/Alinco/Icom.

£24.99 P&P £4.00

DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/ OD35mm. 6 for £16.99 P&P £4.00
12 for £26.99 P&P £5.00
20 for £40.00 P&P £10.00

COPPER ANTENNA WIRE ETC

Hard drawn (50m roll)..... £40.00 P&P £7.50
New: 50m roll, stranded antenna wire..... £16.99 P&P £7.50
Flexweave (H/duty 50 mtrs) ..... £44.99 P&P £7.50
Flexweave H/duty (18 mtrs) ..... £21.99 P&P £7.50
Flexweave (PVC coated 18 mtrs)..... £24.99 P&P £7.50
Flexweave (PVC coated 50 mtrs)..... £59.99 P&P £7.50
Special 200mtr roll PVC coated flexweave..... £180.00 P&P £10.00
Copper plated earth rod (4ft) + wire clamp..... £16.99 P&P £8.00
Copper plated earth rod (4ft) as above + wire ..... £27.99 P&P £8.00
New RF grounding wire (10m pack) PVC coated..... £14.99 P&P £5

METALWORK & BITS

(Del Phone)

2" mast-floor base plate..... £16.99
6" stand off brackets (no U-bolts).. ..... £8.99
9" stand off brackets (no U-bolts).. ..... £10.99
12" T & K brackets (pair) £19.99
18" T & K brackets (pair) £24.99
24" T & K brackets (pair) £29.99
U-bolts (1.5" or 2") each £2.00

All our brackets are of high quality, British made and galvanised.

8mm screw bolt wall fixings £1.70
8-nut universal clamp (2" to 2")..... £9.99
2" extra long U-bolt/clamp £7.49
2" crossover plate with U-bolts £18.99
15" long (2") sleeve joiner (1.5" also available) £18.99
3-way guy ring £8.99
4-way guy ring £10.99
Heavy duty guy kit (wire clamp, etc.) £49.99
Set of 3 heavy duty fixing spikes (~0.7m long)..... £29.99
30m pack (4.4m) 480kg B/F nylon guy £15.00
Roll of self-amalgamating tape 25mm x 10mtr..... £8.99
Special offer:- Self-amalgamating 3 rolls..... £20.00

A Portable 1.3GHz Dish Antenna

Continuing his fascinating introduction series on microwave operation – John Cooke GM8OTI describes a dish antenna for 1.3GHz and (eventually) 2.3GHz.

Welcome to my continuing series as I share the enjoyment I'm discovering as I progress on the microwave bands – and this time I'm concentrating on antennas. There's a lot of fun to be had experimenting with different forms of antenna, a key part of any radio system.

However, as wavelengths get shorter in the ever higher frequency bands, it becomes harder to make an antenna to the necessary physical accuracy. Even at 1.3GHz the elements for a Yagi antenna need to be cut to an accuracy of about one millimetre!

Another problem is that to make a significant increase in the gain of a single Yagi antenna, it needs to be made a lot longer. Roughly, to double the gain the length must be more than doubled. Alternatively, two Yagis could be stacked over one another, but then there is the additional problem of balancing the feeds from a single source.

The gain of an antenna is defined either relative to a theoretical isotropic source (which doesn't really exist for radio systems – as all have some directionality) or relative to a dipole. The gain figure is usually expressed in decibels with the units dBi or dBd respectively. An antenna is considered to have gain over a dipole if the radiation pattern it produces is more directional than that of a dipole.

Mirror Physics

Before retirement I was an Astronomer, and so I'm familiar with the physics of mirrors used to collect radiation – whether at X-ray, ultraviolet, visible, infrared or radio wavelengths – Astronomers use mirrors. Mirrors are nice and simple – a mirror collects the radiation over its area, and (if built properly) concentrates the radiation at the detector. If the diameter of a circular mirror is doubled, it collects four times as much radiation.

The mirror needs to be big enough – preferably many wavelengths across. At a frequency of 1.3GHz the wavelength is 230mm, so a 2m dish is nearly nine wavelengths across – rather low, but enough for it to work, although the beam width is about 8°. In comparison, at visible wavelengths a 100mm mirror is about 200,000 wavelengths across, with a beam width of about 0.00035°!

The radiation beam width for a mirror describes how directional the mirror is. In other words how concentrated the radiation is into a particular direction. The beam width decreases linearly as the mirror diameter increases, and also as the wavelength decreases. So, for a given size of dish the gain increases as the wavelength gets shorter.

Of course, everything depends on the dish being constructed accurately enough. For it to work well, deviations from the desired parabolic shape should be no more than about a tenth of a wavelength (λ/10) for the frequency in use. This means that the surface of a dish intended for use at 1.3GHz (23cm wavelength) should be accurate to 23mm, and preferably better. In radio terms, a dish antenna is simply a curved mirror for radio waves.

Portable Dish Design

Most of my operating is portable (/P) as I cannot set up a permanent large antenna at home. So any dish I build has to be portable – which, for 1.3GHz, means a dish that can be dismantled.

There is an excellent design in the *International Microwave Handbook* (second edition, page 76) by **Michael Kohla DL1YMK** which is well engineered.

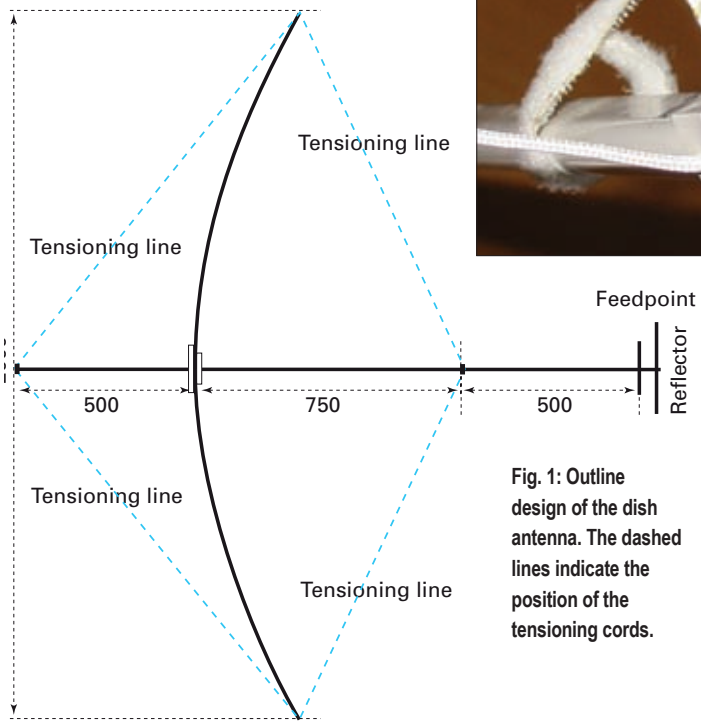


Fig. 1: Outline design of the dish antenna. The dashed lines indicate the position of the tensioning cords.

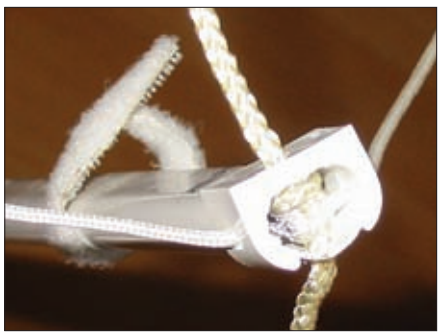


Fig. 2: The tensioning (thicker) and circumferential (thinner) cords are located in the end of the oval conduit using 'figure of eight' stopper knots. One of the Velcro tapes for attaching the dish panels is also visible.

But I needed to build something simpler which did not require metal working facilities. My home-brew Yagi antenna structures use plastic water pipe and electrical conduit, so I decided to try a design using more of these items.

The outline design in shown in **Fig. 1**. This dish is quite shallow, which makes a reasonably accurate shape easier to achieve with bent ribs, rather like an umbrella.

The shape of the paraboloid section is described by the parabola $y = 0.2\,x^2$ where y is the distance along the axis from the hub, and x is the perpendicular distance out from the axis to the dish surface, both in metres. Clearly at $x =$ 1 (the dish radius, 1m), $y = 0.2$ so the depth of the dish from the rim is 0.2m (200mm). The focus of this paraboloid is a distance of 1.25m along the axis from the hub, so the feed is designed to be adjustable around that distance for the best signal.

I calculated the difference between the shape of a dish formed from bent ribs and the ideal paraboloid; for the dish described here, the error is no greater than ±7mm. This means that a perfectly constructed dish will only have errors of up to about 1/20 wavelength even at 2.3GHz. Of course, constructional errors (or setting up errors for a portable dish) are very likely to be somewhat worse than this, but the dish should still perform well.

The reflector does not have to be made from sheet material – it can have holes that are small compared with the wavelength of the radiation being reflected. Clearly once the wavelength gets small enough then it goes through the holes – you can see through wire mesh! A good rule of thumb is that a mesh size of no larger than a tenth of a wavelength will reflect practically all the radiation falling on it.

At 1.3GHz, this antenna should have about the same gain as four 44-element, 4m long Yagis in a single array!

The Components

The components used for the dish (listed in **Table 1**) are all easily available from a do-it-yourself store like B&Q, or a more general builder's merchant. The plywood hub pieces and the aluminium cord attachment plates have centred holes cut to take the 21.5mm pipe. The two plywood pieces are glued and screwed together with the holes accurately located. The front and rear aluminium plates each have 12 holes drilled to take the end of the cords.

The tip of each rib has a conduit clip fitted, then holes are drilled to thread the cords through. These holes are across the rib short axis (to take the tensioning cords) and across the long axis (to take the cord threaded around the circumference of the dish).

The 12 oval conduit clips are spaced equally and screwed around the circumference of the larger plywood disc. The ribs then clip into these, the inner ends in contact with the smaller disc.

The front tensioning cords are set up first. Thread a cord through the holes in the tip of a rib, with a stopper knot inside the rib (**Fig. 2**). A figure of eight knot is best since it can be adjusted along the cord fairly easily.

Using an additional reference cord held taut from the tip of one rib to the tip of its opposite across the dish, the distance along the dish axis from the hub (the dish depth) can be measured. The rib tensioning cords are all adjusted to the same length, so that the dish depth is 200mm. The cords are tied off at the front attachment plate again using a figure of eight knot to act as a stopper.

The procedure is repeated for all six pairs of ribs. Once the ribs are all tensioned correctly, the cord joining the rib tips around the circumference of the dish can be added; it should be knotted inside each rib tip so that they are held an equal distance apart.

The rear tensioning cords can now be added; they act to stop the dish being pushed out of shape from behind. In the prototype I used just four rear cords, spaced equally around the dish, though I intend to increase this to six or even the full set of 12.

The mesh panel shape is shown in **Fig. 3**. This was designed so that panels can be cut from a 900mm wide roll of mesh. The panels are bent slightly to fit the dish then fastened to the ribs using *Velcro*® hook and loop tape (visible in Fig. 2., and **Fig. 4**.) taken around the rib and through holes in the mesh, using three fastenings on each rib.

Feed Construction

For the feed I decided to use a 'bi-

Table 1

Components for 2m dish
(excludes a tripod and the fittings to mount it on the tripod).

Ribs: four 3m lengths of 16mm oval wiring conduit, cut to twelve 1m lengths.
Reflector: one roll 6m by 0.9m of galvanised wire mesh, 13mm square mesh size.
Reflector fixing: about 2m of Velcro hook and 5m of Velcro loop are needed to make three attachment points on each rib.
Hub: two circles of 9mm plywood, 75mm and 135mm diameter
Rib fittings: 24 16mm oval conduit clips (12 for hub, 12 to attach cord at free ends); 12 screws to attach hub fittings.
Feed and tension cord support pole: overflow pipe 21.5mm; round electrical conduit 25mm.
Cord attachments: two circular aluminium plates 50mm diameter (preferably about 3mm thick but thinner would do), with 12 holes around the circumference to take the cords.
Cord: about 45m of 3mm or 4mm artificial fibre cord (nylon is okay, less stretchy materials are better, though the tension is not high).

Components for feed
Quad elements and stub: 3mm brass rod or tubing (DIY store or model shop)
Feed coaxial cable: semi-rigid, about 3.5mm diameter, 50Ω (RS components)
Feed connector: SMA 50Ω solder fitting for semi-rigid co-axial cable.

Fig. 3: Outline of a single dish panel – there are twelve of these, cut from 13mm square mesh.

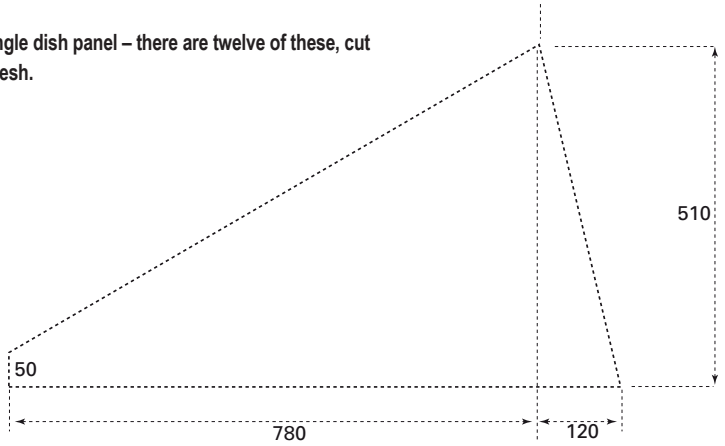


Fig. 4: Rear view of the hub of the dish with the panels assembled.

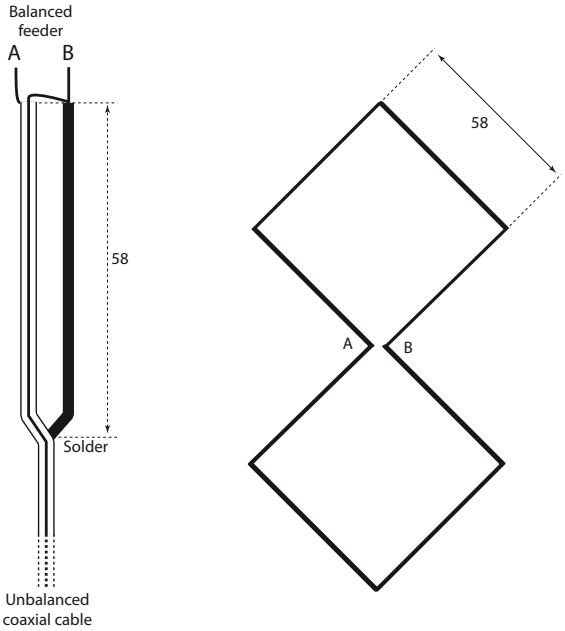


Fig. 5: Design of the 'bi-quad' or 'bow-tie' feed element and its matching balun transformer.

quad' or 'bow-tie' driven element with a removable reflector – since this has a wide enough beam width to illuminate the dish fully. There are many articles on the internet giving designs for this type of antenna, especially for use with WiFi at 2.4GHz.

The dimensions of a bi-quad for 1.3GHz are shown in **Fig. 5**, along with the balun ('balanced to unbalanced') matching arrangement. Each side of the quad sections is a quarter wavelength long, as is the balun stub (also known as a 'Pawsey stub'). The quad element and the solid stub are made from 3mm brass tube; the feed coaxial cable is semi-rigid (about 3.5mm diameter) so that the stub can be soldered to the outer of the coaxial cable at the feed end (**Fig. 6**).

Fig. 6: The 'bi-quad' as constructed.

Fig. 7: The feed with a mesh reflector – the reflector is removable, which adds a wide but low sensitivity beam, with an associated loss in sensitivity to the main beam.

The reflector is made from the same mesh as the dish panels, and is about 200mm by 240mm in size. The reflector is spaced from the bi-quad element using 21.5mm plastic pipe and a pipe connector (**Fig. 7**).

The feed end of the semi-rigid coaxial cable has a soldered SMA connector fitted. I obtained this short length of cable with the connector attached at a rally, but semi-rigid coaxial cable is available in short (1m) lengths from RS Components, it's rather expensive though.

Setting Up

I found that putting the dish together took around half an hour; with practice it will be quicker! The centre support tube has a core of 21.5mm pipe, with two pieces of 25mm conduit (a sliding fit) over it to act as spacers between the plywood hub assembly and the front and rear cord attachment plates.

My dish is mounted using a metal plate on a small tripod; 25mm electrical conduit clips attach the support tube to the plate. The means of attaching the plate depend on the tripod available. A

counterweight is needed to balance the weight of the feed; mine is a plastic bag containing old snooker balls that hangs from the rear end of the centre support tube! (**Fig. 8**).

The feeder cable is pushed through the centre support tube and attached to the bi-quad feed and reflector assembly. Measurements of the match to the feed using my home brew reflected power meter suggested that the optimum spacing between the bi-quad and reflector is about 70mm.

The exact point to place the feed along the dish axis will depend on the exact shape of the dish. If built to plan, the position should be approximately as shown in Fig. 1, and I found this to work well for my first QSO. However, I would like to do further experiments to optimise the focus position for best gain; this is easy to do since the support tube for the feed slides inside the support tube between the hub and the front cord attachment.

The bi-quad feed is set up for horizontal polarisation using the orientation shown in Fig. 5.

Field Day

Does it work? Of course it does! I eventually used the dish (**Fig. 9**) during the **Radio Society of Great Britain** (RSGB) VHF National Field Day in July 2011, at a site with a reasonable take-off to the south. I only managed one contact on 1.3GHz. It was set-up with the **Lincoln Short Wave Club G5FZ** contest group north of Lincoln in a 432MHz contact. But using single sideband (s.s.b.) we exchanged 5&8 both ways over 310km, my best DX on 1.3GHz to date! Using about 5W, I was very pleased with this – many thanks indeed to the operators at **G5FZ/P** for my first contact using the dish.

I had set up in a flat calm, but my session was curtailed when a gust of wind gently blew over the dish and tripod, leaving the 'bow-tie' feed rather bent and disconnected. Next time everything will be tied down properly!

What's Next?

I now have a good sized dish antenna that I should also be able to use at 2.3GHz with a suitable change of feed. So, off we go – to build a 2.3GHz transverter. I look forward to letting *PW* readers know how I get on! Cheerio for now! ●

Fig. 8: The counterweight mounted on the end of the support pole; the four rear tension cords are visible.

Fig. 9: The dish antenna in use for VHF National Field Day.

Rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations. PW Publishing Ltd. is attending at rallies marked *. Please check with the organisers that the rally is 'on' before leaving home.

Send your rally info to:

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

SEPTEMBER

September 10th

The Warrington Market
The Warrington Communications Market will be held at the Warrington Indoor Market, Bank Street, Academy Way, Warrington WA1 2EN. The doors will be open between 10.00am and 4.00pm and admission will be free. Car parking will be in the nearby multi-storey car park. There will be trade stands and catering will be provided by cafés in the market. Trade and club stands will be available from £10.00 and £5.00 per table respectively.
Patrick
Tel: 07581 545671
E-mail: marketfairs@hotmail.co.uk

September 11th

The Torbay Rally
The Torbay Annual Communications Fair will be held at Newton Abbot Racecourse, Newton Abbot, Devon TQ12 3AF. The doors will open at 10.00am (9.30am for the disabled) and admission will cost £2.00. There will be trade stands, a Bring &Buy, an RSGB bookstall, catering and facilities for the disabled.
E-mail: rally@tars.org.uk

Setpember 11th

The Cork Radio Rally
The North Cork Radio Group will be holding their second annual rally and electronics fair at the Blarney Golf Resort, Tower, County Cork, Republic of Ireland. The doors open at 11.30 and admission will cost €5.00. There will be free car parking, trade stands, a Bring & Buy, a raffle, demonstrations, an Irish Radio Transmitter Society (IRTS) stand and catering.
E-mail: info@ei1nc.com
www.ei1nc.com

September 17th

The Fog on the Tyne Rally
The Fog on the Tyne Rally will be held at Whitehall Road Methodist Church Hall, Bensham, Gateshead NE8 4LH. This event is organised by the Angel of the North Amateur Radio Club and the South Tyneside Amateur Radio Society. The doors will open at 10.30am and admission will cost £2.00.
Nancy Bone G7UUR
Tel: 0191 477 0036 (evenings)
E-mail: nancybone2001@yahoo.co.uk
www.anarc.net

September 18th

The Great Northern Hamfest
The 21st Great Northern Hamfest will be held in the Metrodome Leisure Complex, Barnsley S71 1AN. The doors will open at 11.00am and there will be trade stands, special interest groups, catering with a licensed bar, family attractions and facilities for the disabled.
Ernie G4LUE
Tel: 01226 716339
www.greatnorthernhamfest.co.uk

September 18th

The La Louvière Rally
The La Louvière (Mons) Amateur Radio Exhibition and Computer Fair will be held at the Lotto Mons Expo, Avenue Thomas Edison, 7000, Mons, Belgium. The doors will be open between 9.00am and 4.00pm. There will be talk-in via repeaters on 145.600 and 430.325MHz, trade stands and a flea market.
Michel ON7FI
Tel: 00 32 64 849596
E-mail: on7fi@skynet.be
www.on6ll.be

September 30th/October 1st

The National Hamfest*
The third Lincoln Short Wave Club and RSGB National Hamfest will be held in the George Stephenson Pavilion, Newark and Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark NG24 2NY (close to the junction of the A1, A46 and A17). There will be trade stands, a Bring & Buy, a flea market, catering, special interest groups, Morse proficiency tests on demand and facilities for the disabled.
www.nationalhamfest.org.uk

OCTOBER

October 7th/9th

The RSGB HF Convention
The RSGB HF Convention will be held at Horwood House, Mursley Road, Little Horwood, Milton Keynes, Buckinghamshire MK17 0PH.
www.rsgb.org/rsgbconvention

October 9th

The Autumn Hangar Sale
The Autumn Militaria, Electronics and Radio Amateur Hangar Sale will be held at Hack Green Secret Nuclear Bunker, Nantwich, Cheshire CW5 8BL. The doors will open at 10.00am and admission will be £2.50. There will be civil, military and vintage radio equipment plus vehicle spares and more.
Rod Siebert. Tel: 01270 623353
E-mail: coldwar@hackgreen.co.uk
www.hackgreen.co.uk

Emerging Technology

Chris Lorek G4HCL shows how we may soon be entering frequencies into our transceivers by thought control, details 3D transistors and transparent batteries, and shows how pioneering Amateur Radio techniques are being used to save lives underground

Welcome to the column where we look at the future of radio communications technology and I'm starting this by discussing operating radio transceivers by thought control! Yes, you read it correctly!

For some time now, simple interface devices that tap into brain activity to control equipment such as wheelchairs have been proposed and some have even become reality. But this now has gone several steps further, and researchers in California have developed a portable brain/computer interface which they claim can enable users to place a call on a cellphone using just thoughts.

According to **Tzyy-Ping Jung**, a researcher at the Swartz Centre for Computational Neuroscience at the University of California, the system is almost 100% accurate for most people after only a brief training period. It's claimed that this is the first time such a device has specifically been created to be small, cheap and portable. Tzyy-Ping and his colleagues initially developed the interface to act as an ultra-portable aid for severely disabled people.

However, Tzyy-Ping says broader applications are possible, such as a hands-free system for cellphone users, or as a device to detect when drivers or air traffic controllers are getting drowsy by sensing lapses in concentration. The system relies on electroencephalogram (EEG) electrodes on the scalp to analyse electrical activity in the brain. With this system an EEG headband is connected to a wireless Bluetooth radio transceiver module that transmits the signals to a Nokia N73 cellphone, which uses algorithms to process the signals.

Participants were trained on the system using a visual feedback system, where they were shown images on a computer screen that flashed on and off almost imperceptibly at different speeds. These oscillations can be detected in a part of the brain called the midline occipital, and Tzyy-Ping and his colleagues exploited this by displaying a keypad on a large screen with each number flashing at a slightly different frequency.

For instance, '1' flashed at nine Hertz, and '2' at 9.25 Hertz, and so on. This frequency can apparently be detected through the EEG, making it possible to tell which number the user is looking at.

The accompanying illustration shows a photo of a 16-channel mobile and wireless EEG system that incorporates dry spring-loaded probe electrodes, which usefully don't need any skin preparation or conductive pastes. Also used are miniaturised battery-powered bio-amplifiers, filters, analogue-to-digital converters and wireless telemetry circuits. These allow users to perform ordinary tasks in natural body positions and situations, like walking along or driving a car.

We already have Bluetooth control available for our amateur radio transceivers, Yaesu for example have mobile transceivers with this; the next step could well be us changing channel, checking repeater input and so on, simply by an add-on thought control module to our radio!

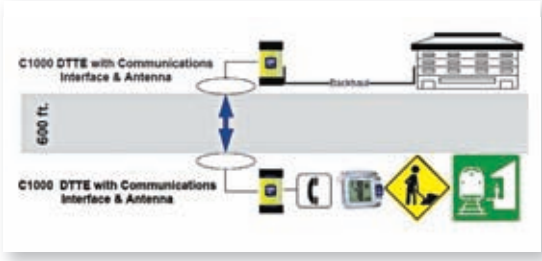
Underground SDR Radio Communications

Next, we're going underground – looking at Software Defined Radio (SDR) for Underground Communications. I've mentioned the use of ELF (Extra Low Frequency) in the past for communications between the Earth's surface and below through rock, soil and water.

An enterprising manufacturer has now taken things one step further and has used SDR and Digital Signal Processing (DSP) techniques with this to give a two-way radio communication system through up to 200m of solid rock, soil or concrete.

The C1000 Underground Communications System from Vital Alert uses a frequency range of 2-9kHz with a digitally modulated magnetic field to give either a push-to-talk voice communication link, or a full duplex low-speed data link. It has a digital 'always on' wireless interface, and I was pleased to take a look at this system first-hand the same week at which it was being demonstrated to personnel at my local Fire and Rescue Services.

The fire service people weren't interested in the technical aspects such as operating frequency or the use of DSP or SDR, but instead whether it simply worked or not, which it did very admirably! Once again, pioneering techniques in radio communication which we've evolved are now being used to save lives around the world.



See you soon as I explore the future on behalf of *PW* readers. Chris G4HCL.

KITS & MODULES

TRANSVERTERS for 2 or 4 or 6 metres from a 10 metre rig, or 4 or 6 metre from a 2 metre rig. Includes new overtone local oscillator, and integral interface unit. 20dB receive gain, 25W transmit power. Low level drive dual IF versions **TRC2-10dL, TRC4-10dL & TRC6-10dL**, high level drive single IF versions **TRC2-10sL**, **TRC4-10sL**, **TRC6-10sL, TRC4-2sL, TRC6-2sL**, Complete kit **£179.00**. **Built £266.00.**

TRANSVERTERS for ICOM rigs, supplied with cables. Automatic with no cable switching. IC756Pro & II & III, 775, 781, 7600, 7700, & 7800 use type **TRC4-10L/IC1.** IC735, 761, & 765 use type **TRC4-10L/IC3. Built to order £280.00.**

PSK31 INTERFACE KIT. Module as described in PW Feb 2009. Suitable for a variety of digital modes. PCB and components **£21.00**. Box kit complete with cables but excluding microphone plug **£35.50**.

STATION PREAMPS for 2 or 4 or 6metres. RF & DC switched. Adjustable 0-20dB gain. 100W power handling. **RP2S, RP4S, RP6S, PCB & Hardware kit £35.00, Ready Built £57.00**.

MASTHEAD PREAMPS, for 2 or 4 or 6meters. 20dB gain 1dB NF. 100W through handling. RF switched & DC fed via the coax. Heavy duty waterproof masthead box, and a DC to RF station box with SO239 connectors. **RP2SM, RP4SM, RP6SM, PCB & hardware kit £41.00, Ready Built £65.00**. **Masthead fitting kit £6.00**.

MASTHEAD PREAMPS 400W rated, for 2 or 4 or 6metres. RF switched. DC fed via a separate wire. 20dB gain 1dB NF. Heavy duty waterproof masthead box with SO239 connector. **RP2SH, RP4SH, RP6SH. PCB & hardware kit £42.50, Ready Built £65.00**. **Masthead fitting kit £6.00**.

5W WIDE-BAND HF AMPLIFIER
A useful push-pull broadband amplifier module giving a nominal 5W output over the range 1.8 to 29.7MHz with drive levels ranging from 37 to 97mW. Harmonics typically are 2nd –42dB, 3rd –18dB, 4th –49dB, and 5th –29dB. Should be used in conjunction with a double Pi type low pass filter, either harmonic halfwave or 5 element Chebychev. Normal supply 13.5V DC with current between 900mA and 1.86A. **Full kit of parts with heatsink but without wound toroids £29. Full kit with wound toroids £39. Ready built £49**. Price includes postage but not low pass filters.

NEW PRODUCT

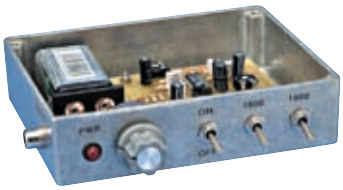
CTCSS TONE ENCODER as described in PW July 2011. All nine tones 67, 71.9, 77, 82.5, 88.5, 94.8, 103.5, 110.9, 118.8Hz link or switch selectable. PC board size 67x55x12mm. PCB kit inc PIC but excluding switch £21.00. Built inc PIC but excluding switch £30. Optional 9-way switch £2.00.

TRANSMIT AMPLIFIERS, for 2 or 4 or 6m, single stage RF switched, class AB linear. 13.5V DC operation. Diecast box with SO239 connectors and heatsink. TA2SA 5W in 25W out, TA4SA 2.5W in 25W out, TA6SA 2W in 25W out, Kit £63.00, Built £82.00. TA4SB 7.5W in 50W out, TA6SB 5W in 50W out, Kit £70.00, Built £89.00. With **RECEIVE PREAMP** 0-20dB adjustable gain, TARP2SA, TARP4SA, TARP6SA, Kit £89.00, Built £123.00. TARP4SB, TARP6SB, Kit £92.00, Built £126.00.

CLASSIC 20/80m SSB RECEIVER

Classic superhet receiver for 20 and 80m using a 9MHz IF and a 5.0-5.5MHz VFO. Uses a 6 crystal ladder filter with near symmetrical passband, 2dB insertion loss, 1.8:1 shape factor, and 70dB stopband. Minimum discernable signal 0.2uV. Fixed tuned bandpass preselector on 20m, tunable preselector on 80m. Logarithmic AGC and Signal meter response. Maximum signal handling 1mV. 500mW audio output. Supply requirement 13.5V at up to 250mA. **VFO with its drilled box, preselector and main board PCB's and component kits including crystals £92. Complete kit including box and hardware £147.00. Ready built £240.00.**

TWO TONE OSCILLATOR
as featured in *PW* March 2005. A vital piece of test equipment used together with an oscilloscope for setting up AM, DSB, & SSB transmitters. **PCB & hardware kit £28.00. Ready Built £52.50**.



OFF-AIR FREQUENCY STANDARD, crystal calibrator unit phase locked to Radio 4 using a two-loop system. Includes a monitor receiver to ensure Radio 4 is being heard loud and clear. Fixed outputs 10MHz at 2V p-p, and 1KHz at 1V p-p as oscilloscope CAL signal. Switched outputs 1MHz, 100KHz, 10KHz, and 1KHz at 6V p-p, into 500 Ohms. Single board design as featured in July & Sept 2008 PW. Background heterodyne whistle at 2KHz confirms lock condition. 12/13.5V DC operation at 65mA. **PCB kit with ferrite rod £50.00, PCB kit + drilled box and hardware complete £86.00. Ready built £131.50.**

PORTLAND VFO

A rock stable FET VFO. Meets the requirement for the Intermediate Licence VFO project. Modified to allow alignment to top and bottom of required band. Several versions available: 5.0 - 5.5Mhz for 20 & 80 metres; 7.0-7.2MHz for a direct conversion for the extended 40metre band; or 7.900 - 8.400MHz for use as part of a mixer-oscillator system as local oscillator for 4m RX or TX. Supplied with Buffer 2A to deliver 1.6V p-p into 50Ω with 2nd harmonic 40dB down. **PCB and component kit with potentiometer £18.00. Drilled Box and PCB kit with potentiometer and feedthroughs £27.00. Ready built £50.00**. State required frequency when ordering.

LCR BRIDGE

With 5 resistance ranges 100, 1K, 10K, 100K & 1M. 3 capacitance ranges, 100pF, 1nF, 10nF and 3 inductance ranges, 1mH, 10mH & 100mH, plus external reference. Scale calibrated 0.01 to 10 times reference value. Optional drilled and labelled plastic or painted diecast box. **PCB & parts with pot and switch £26.00. With plastic box £39.00, with diecast box £44.00.**

SPEECH PROCESSOR

An analogue low noise unit, which includes high pass filtering, clipping, and low pass filtering to enhance the higher voice tones that carry most of the intelligibility. It sounds nice too. Panel controls are included for clip level and output level. Hardware and wiring can be supplied to suit a wide range of circular mic connectors.
SP1000E, Boxed Kit £42.50, Boxed Built £60.00.

DUAL PEAK/NOTCH FILTER & AUDIO AMPLIFIER

It connects directly to the loudspeaker or headphone socket of the receiver and produces up to ½W of audio to a front facing loudspeaker. The unit can be used to notch out two unwanted heterodynes, or just one while enhancing the wanted audio frequency. Similarly it can be used sharpen otherwise dull speech or to dampen shrill audio. **PCB kit and all the potentiometers £35.75. PCB kit and all the hardware with drilled and labelled box £73.00. Ready Built £112.00.**

COMPONENTS

See our web-site or send SAE for list.

NEW: TOROIDS, dust iron types 2 and 6, ferrite types 43 and 61.

DUAL GATE MOSFETS
BF964S £1.50, 3SK45 £2.00, 3N201 £2.25, 40673 £2.50.

DUAL GANG BROADCAST VARIABLE CAPACITOR
330+330pF with 3:1 reduction drive.
£8.50 each plus £1.50 P&P.

CERAMIC WAFER SWITCH
4 pole 5 way with silver plated contacts. Rated at 2kV and 10A for use in ATU's and Power amplifiers.
£8.50 each plus £1.50 P&P.

CAPACITORS, ceramic, poly block, electrolytic, mica, trimcaps.
RESISTORS, ¼ W carbon film, 10Ω to 1MΩ, and trimpots.
DIODES, small signal, zener, rectifier, Shottky, & varicap.
TRANSISTORS, small signal AF and RF bipolar and FET, medium and high power VHF.
INTEGRATED CIRCUITS, linear & logic.
VALVES, tested good, B7G, B8A, Octal, and older.
QUARTZ CRYSTALS, HC18U, HC25U, & HC49U, new and used.

SPECTRUM 10mm COILS, pin compatible with TOKO types. Coil values 1.2, 2.6, 5.3, 11, 23, 45, and 90uH. Some types have the primary tapped at ¼ turns and a low impedance secondary winding. Others have centre tapped primary and relatively high impedance secondary winding. Full details of turns ratios, etc. can be found on the website.
1-24 qty 75p each plus £1 P&P. 25-99 qty 55p each plus £2.50 P&P.

G2DYM / G4CFY AERIALS

TRAP DIPOLE for 80/40/20/15//&10m. 106 feet long. Supplied with 70 feet of low impedance twin feeder. 600W rated. Low TVI and low noise. 2 S-points quieter than a G5RV with same feeder length. PVC covered wires with lugs.
Regular duty £164.50, strong £182.50, inc. carriage.

TWIN FEEDER 100 Ohm, 2kW rated, 24/0.2 in individual polyethylene sheaths with an outer cover of polyethylene. Solid construction to avoid water ingress. Good flexibility to overcome work hardening and fracture. Typically 0.5dB/m quieter than wide spaced 300 and 450 Ohm feeder and coax. Loss 0.04dB/m at 10MHz. 75p/metre plus £3 P&P. 100m drum. £70 inc P&P.

1:1 BALUN 160-10m, 1kW rated. Loss under 1dB from 1.8 to 40MHz. Ideal for use with the G4CFY trapped dipole, or any other aerial fed with low impedance twin feeder. £43.00 inc P&P. Version with Marconi-T switching. £53.00 including P&P.

TRAPPED INVERTED L AERIAL 80/40/20/15 & 10m, for a small garden. Coax driven from far end of garden and tuned against ground. A good all round aerial with 6dB more gain than a 24 foot trapped HF vertical. That's 4 times power on TX and one S point extra on RX.
Regular duty £80.00, strong £95.00, inc. carriage.

E-mail: tony@spectrumcomms.co.uk
Prices inclusive of postage unless stated. Payment by Cheque or Postal Order payable to Spectrum Communications, or by Credit/Debit card.

Web site: www.spectrumcomms.co.uk
Web site: http://spectrumcomms.eu5.org

Tony Nailer G4CFY's Technical for the Terrified
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-mail: tony@pwpublishing.ltd.uk

Looking at V, L, C & F

Tony Nailer G4CFY, explores measurements of voltage, inductance, capacitance and frequency in his *Technical for the Terrified* column this month

In the previous article in this series I dealt with radio frequency (r.f) power meters, standing wave ratio (s.w.r.) meters, and the noise bridge. Continuing this theme of measuring equipment, I'll deal with other equipment that is essential for the keen constructor.

Basic direct current (d.c.) measurements are simple because even a basic multimeter will measure currents from milliamps to amps as well as voltages and often they will have a range of resistance readings tool. There are some more expensive meters that also measure diodes and transistor gain and leakage.

My suggestion is to have large-scale analogue multimeter, with a sensitivity of at least 20,000Ω/V, or better still 50,000Ω/V. The reason is that when tuning for a peak or trough level of current or voltage it's so easy to observe the trend on an analogue scale. With a digital meter it's very difficult to see the direction and level of change, unless tuning is done very slowly.

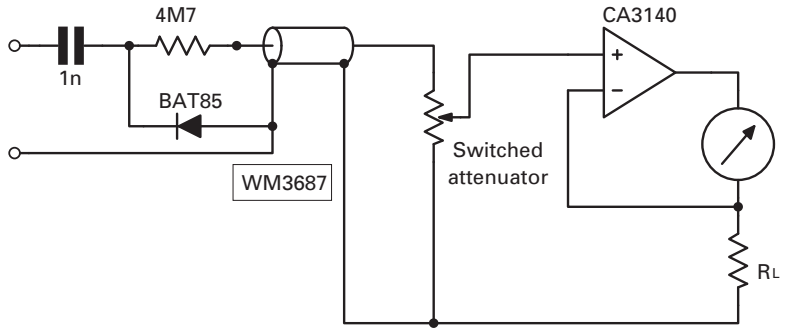


Fig. 1: A skeleton of a probe circuit for r.f. measurements, may simply be an in-line 1nF capacitor, a shunt Schottky diode and a 4.7MΩ resistor in line with the input of the meter circuit.

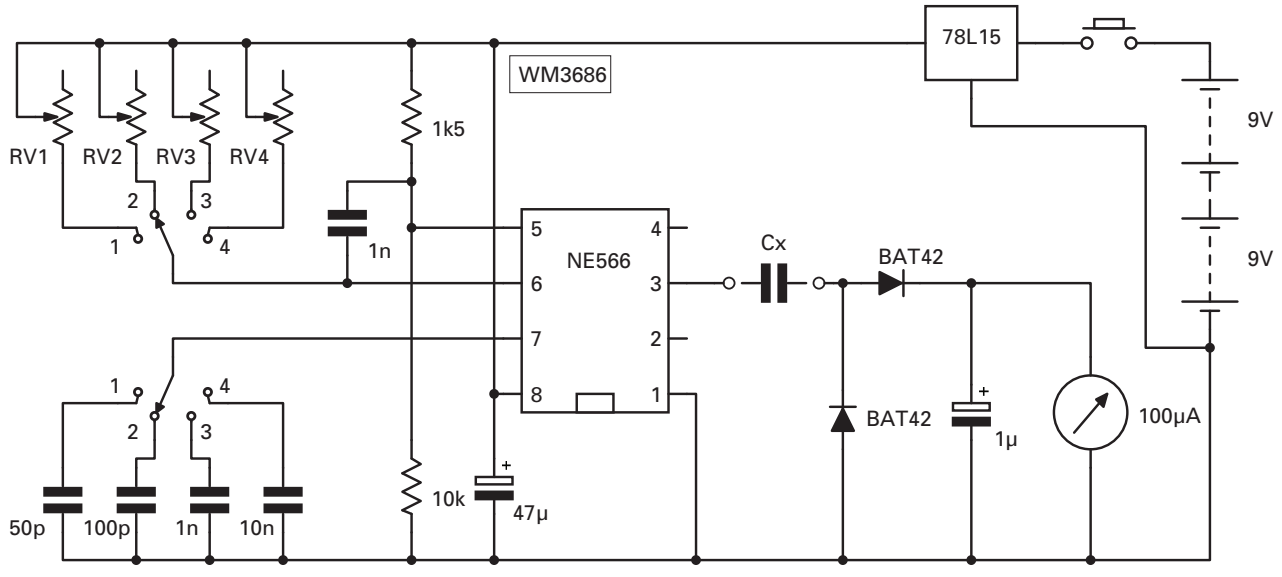
Alternating Current Measurements

On to alternating current (a.c.) measurements next. Measurement of voltages and currents at low frequencies present few problems with a multimeter. But even above a few kilohertz the high capacitance of the rectifiers and the inductance of wire-wound precision resistors in the meter cause increasing reading errors.

High Frequency Voltmeter

It's not often we need to know the value of high frequency a.c., more often than not, we need to know the voltage. The most useful instrument for this is the high impedance voltmeter with an r.f. probe. Such a device was the subject of an article in *PW* December 1986

Fig. 2: A slightly edited version of the circuit of the Simple Capacitance Meter by Martin Michaelis DK1MM, which appeared in PW in October 1985.



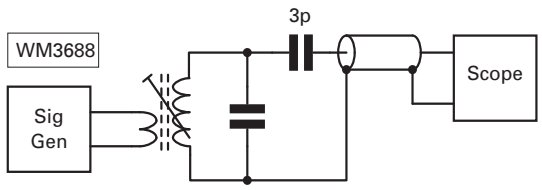


Fig. 3: A 3pF capacitor in series with the inner wire, isolated the capacitance of the coaxial cable, allowing values of inductance to be measured with an accuracy of about ±2%.

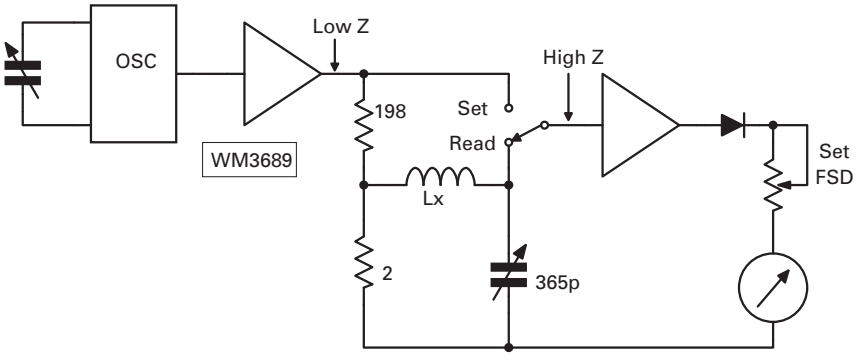


Fig. 4: This shows the principles of a *Q*-meter. An interesting project, entitled Sarum *Q* Meter by M Tooley BA, and based on these principles, appeared in the November 1978 issue of *PW*.

issue, entitled *High Impedance MOSFET Voltmeter* by **John Thornton Lawrence GW3JGA**.

Essentially the m.o.s.f.e.t voltmeter is a very high impedance input, d.c. voltmeter. For r.f. measurements a probe with an in-line 1nF capacitor, a shunt Schottky diode and a 4.7M resistor in series with the input is used. A skeleton circuit is shown in **Fig. 1.**

The diode in the probe conducts the negative half cycles to ground and allows positive half cycles to be passed, though the resistor along the cable to the instrument. According to the article the probe's output is flat up to 10MHz and within ±1.5dB up to 100MHz.

At the input of the meter amplifier circuit, is a ladder attenuator driving the non-inverting input of the m.o.s.f.e.t operational amplifier (op-amp). The output of the op-amp is fed through the meter movement and a resistor RL to the 0V line. The junction of the meter and resistor is taken back to the inverting input of the op-amp. The op-amp drives the output voltage up until the voltage drop across RL is equal to that at the take-off point from the switched divider.

The original design included eight positions for 100 and 500mV, 1V, 5V, 10V, 50V, 100V, 500V r.m.s full scale, as well as a zero position (to check and set the zero offset), and a battery test. It may be worth me resurrecting this design with a new printed circuit board (p.c.b.) and incorporating the attenuator steps to give 100mV, 300mV, 1V, 3V, 10V, 30V, 100V, 300V, which I used when I built my version.

Capacitance Measurement

Often when carrying out experimental work it would be useful to know the capacitance value of a variable capacitor at 'part mesh'. Also, when I'm repairing equipment it could be useful to be able to measure capacitors which have been highly stressed – to see if they still function and haven't changed value significantly.

A number of circuits have appeared in publications, for direct reading capacitance meters, which are simple to understand and construct. One that caught my attention was the *Simple Capacitance Meter* by **Martin Michaelis DK1MM**, which appeared in *PW* in October 1985.

Martin's design uses a function generator to produce a square wave output, which passes through the test capacitance and is rectified to drive a meter. The current through a capacitor is equal to its value in Farads times the rate of change of voltage. This means that in a system with constant amplitude square wave the current is directly proportional to the frequency.

A slightly edited circuit of the capacitance meter is shown in **Fig. 2**. Trimpots RV1 to RV4 should be either 47kΩ or 10kΩ with fixed values in series from zero to 22kΩ. I need to build and test this to determine if I can get away with ten-turn 47kΩ trimpots and have sufficient setting ability. Ranges 1-4 for full scale are the same as the switched capacitors.

To calibrate the unit you need duplicates of each of the switched capacitors to use in the test position. The appropriate trimpot is then adjusted for full-scale deflection. The readout is now linear down to about one tenth scale. For the 50pF range just half the reading.

Inductance Measurements

Recently, I needed to batch test inductors from a new a supplier – but I didn't have an instrument sufficiently accurate for values below 100μH. Fortunately, most of the coils were designed with a low impedance secondary winding, which could be driven directly from a 50Ω source of a signal generator.

I then added a capacitor across the main winding with a value judged to be of the right order for a specific frequency. To measure the resonant frequency, I monitored the voltage across the main winding using a plain coaxial lead with 'tail' ends connected to an oscilloscope. The signal generator was then swept in frequency until a peak voltage was obtained and the inductance was calculated, knowing C and F.

The resonant frequency readings I got were far lower that I expected, indicating that the calculated inductance was also very much higher than I'd expected! Puzzling this over, I remembered that, an un-terminated or mismatched coaxial line has a capacitance of around 100pF per metre. (This extra capacitance can dramatically alter the resonant frequency of any circuit it's attached to).

LAM London: (020) 3432 4414 LAMGM: (0141) 530 4077

LAMCO
LAM COMMUNICATIONS LTD

01226 361700
01226 351037

call us on skype now: lamcomms
www.lamcom.eu
www.lamcommunications.net
sales@lamcommunications.net

We are MAIL-ORDER SPECIALISTS for all of the UK-EU tracked FedEx

KENWOOD
Listen to the Future

TS-2000.....£1,474.95
TS-2000X.....£1,799.95
TS-480SAT.....£779.95
TS-480HX.....£879.95
TM-D710E.....£449.95
TM-V71E.....£299.95


Kenwood TS-480HX £879.95


Kenwood TS-2000 £1,474.95


KenwoodTM-V71E £299.95

CG ANTENNA


CG-3000

CG SB-2000 ACC-101 FT-1000MP MK5+Field/2000/9000.....£117.95
CG SB-2000 ACC-102 IC-746, IC-7400, IC-756, IC-7600, IC-7700.....£117.95
CG SB-2000 ACC-103 IC-703, IC-706(MK2, MK2G), IC-718, IC-78.....£117.95
CG SB-2000 ACC-104 FT-450, FT-950.....£117.95
CG SB-2000 ACC-105 FT-100(D), FT-817, FT-857(D), FT-897(D).....£117.95
CG SB-2000 ACC-106 TS-570, TS-2000.....£117.95
CG SB-2000 ACC-107 TS-480(SAT, HX).....£117.95
CG-3000 (NEW RANDOM WIRE AUTO ATU).....£294.95

LAMCO DU-3000T

LAMCO DU-1500T

LAMCO DU-3000T.....£689.95
manual roller coaster ATU 3000 Watts hand built to perfection. Coaxial, balanced line and end fed wire.
LAMCO DU-1500T.....£479.95
manual ATU 1500 Watts hand built to perfection. Coaxial, balanced line and end fed wire.
LAMCO DU-1500L.....£499.95
manual roller coaster ATU 1500 Watts hand built to perfection. Coaxial, balanced line and end fed wire.
LAMCO DU-800.....£389.95
manual ATU 800 Watts hand built to perfection. Coaxial, balanced line and end fed wire.


LAMCO DU-1500L


LAMCO DU-800

ICOM

IC-7800.....£8,884.95
IC-7700.....£6,129.95
IC-7600.....£3,199.95
IC-7200.....£829.95
IC-718.....£429.95
IC-910H.....£1,285.95
IC-910HX.....£1,549.95
IC-7000.....£1,149.95
IC-2820 D-STAR.....£699.95
IC-V80E.....£104.95
IC-T70E.....£163.95
IC-7410.....£1,694.95
IC-9100.....£2,889.95

LAMCO Approved Used Equipment has 12 months warranty

ICOM KENWOOD YAESU

YAESU


Yaesu FT-897 £799.95


Icom IC-7600 £3,199.95


Icom IC-7200 £829.95

FT-950.....£1,259.95
FT-450D.....£839.95
FT-897D.....£799.95
FT-857D.....£729.95
FT-817ND.....£549.95
FT-8900R.....£379.95
FT-7900E.....£249.95
FT-1900.....£139.95


Yaesu FT-857D £729.95


Yaesu FT-817 £549.95

LDG ELECTRONICS

LAMCO stock a range of LDG Electronics Tuners



LDG AT100Pro2.....£199.95
LDG AT-1000 Pro.....£499.95
LDG AT-200Pro.....£209.95
LDG AT-600Pro.....£299.95
LDG AT-897 Plus.....£179.95
LDG IT-100.....£159.95
LDG Z-100.....£139.95
LDG Z-817.....£159.95
LDG Z-11Pro.....£117.95


Icom IC-9100 £2,889.95


Icom IC-7410 £1,694.95

LAMCO are very proud to offer our very own **cavity filters** for your **repeater system.** Call Lee Marsh on 01226 361700 to discuss your frequency. £1299.00 for the latest cavity supplied for VHF (2m).

All new HF Aerials Exclusive to LAMCO
LAMCO City Windom 40.....£139.95
LAMCO City Windom 80.....£149.95
No more feeders in your garden with the city windom

LAMCO W3DZZ+5.....£139.95
see our website for more details.
www.lamcom.eu

LAM Communications Ltd. | 52 Sheffield Road | Hoyland Common | Barnsley | South Yorkshire | S74 0DQ | UK
Shop Opening Times - Mon to Fri : 0930 hrs - 1730 hrs
Sat : 0930 hrs - 1600 hrs

Shop Online securely with LAMCO
Our website is Secure and Authentic by COMODO
Identity Assured up to $250,000

FedEx

ebay
find more brilliant buys in our ebay shop

Tired of your existing supplier? Then give us a call now on
01226 361 700 or 01226 351 037

twitter
@lamcomms

facebook
LAM Communications Ltd

LAM London: (020) 3432 4414 LAMGM: (0141) 530 4077
E&OE

As my probe lead was about 1.2 metres long, it was adding about 120pF across the tuned circuit. So I added a 3pF capacitor in series with the centre wire and repeated the tests. Now the results were exactly as expected and I was able to determine the minimum and maximum values of inductance with an accuracy of about 2%. The arrangement is shown in **Fig. 3**.

Explanation Of *Q*

The quality factor *Q* of a coil is defined as the ratio of its reactance to its loss resistance (at a particular frequency). A coil wound on a former with ferrite core that's 'lossy' at the wanted frequency will have a low *Q*. The number of turns on a coil is the dominant factor in determining the inductance by mutual coupling between the turns.

A less dominant factor is the size of the wire, where a thin gauge gives a higher self inductance and thicker gauge gives a lower self inductance. Thinner gauge also has higher resistance so exhibits lower *Q* and conversely a thicker gauge has lower resistance and higher *Q*. Coils wound on specially selected dust iron toroidal cores can achieve high inductance with few turns and result in high *Q* factors.

Measurement Of *Q*

The circuit shown in **Fig. 4** shows the principles of a *Q*-meter. The variable frequency oscillator can be set to the desired test frequency and the buffer will present a low impedance drive. In the **SET** position this signal is passed through to the meter and can be adjusted to give full scale deflection.

A potential divider with a ratio of 100:1 is employed to drive the unknown inductor together with the 365pF variable capacitor as a series resonant circuit. When the switch is at read position the variable capacitor is adjusted to give a peak reading on the meter.

The take-off point at the junction of L and C will exhibit the voltage magnification due to the *Q* of the circuit. Provided the variable is an air variable and not a film variable then its effect on the *Q* is negligible.

An interesting project based on these principles entitled *The Sarum Q Meter* by **M Tooley BA** appeared in the November 1978 issue of *PW*. The project included a v.f.o. with six switched ranges covering 950kHz to 32MHz. Coils for the v.f.o. were wound on 7mm diameter formers with dust iron cores.

The p.c.b. was huge and today the project would be difficult to reproduce in its original form, due to the unavailability of coil formers. I have worked out the inductance values for the coils and now intend to re-design the unit using the new Spectrum range of coils. This would be so much easier to assemble and with good repeatability.

Measuring L With A *Q* meter

The circuit arrangement of the *Q* meter can be adapted for a direct reading inductance meter for low values. Instead of using a variable frequency oscillator, use a logic inverter with a 5MHz crystal and a switched frequency multiplier to give third or fifth harmonic. Instead of using the 365pF variable, use a 10-100pF variable.

The instrument will then have three switched ranges:
Range 1: Frequency 5MHz, 10.1 – 101μH.
Range 2: Frequency 15MHz, 1.12 – 11.2μH.
Range 3: Frequency 45MHz, 1.25 – 0.125μH.

The values of inductance will be on a scale with three concentric (0-180°) semicircles and can be calculated directly from the variable capacitor values. The capacitor values, of course, need to be measured using the direct reading capacitance meter described earlier.

On 5MHz, L = 1013 / CpF, μH.
On 15MHz, L = 112.5 / CpF, μH.
On 45MHz, L = 12.5 / CpF, μH.

Frequency Measurement

Most radio shacks nowadays include a frequency counter – or one or more transceivers or receivers with digital frequency readout. So, fairly accurate frequency measurement is not a problem.

It must always be considered though that frequency counters and digital synthesisers are referenced to one or more crystals. While AT cut crystals are chosen because they have a relatively flat coefficient of temperature around 20°C, they do move considerably at a rate of about 20Hz per MHz per °C. This means that a 10MHz reference crystal can be as much as 2kHz off frequency when the equipment is at 10°C or 30°C. This assumes it was correctly set at 20°C to start with!

The sure way to check and set frequency counters and crystal references is with the aid of an Off-Air Frequency Standard. I described such a product in July and September 2008 *PW* and included it in my kit and built-up product range. Using it with my own frequency counters I found the HP signal generators were accurate enough not to need adjustment.

On the other hand, my regular bench test frequency counter was initially 250Hz off-frequency at 20°C and reads several hundred Hertz different on the 10MHz range when the laboratory is cold and when it's hot.

Harmonic Measurements

Receivers may be able to measure some harmonics and even show relative amplitudes. A more useful instrument is the wavemeter. This is a tuned circuit with a detector and meter, which is put close to a coil in a circuit to sniff the fundamental, harmonics and any spurii.

The variable capacitor usually has a 10:1 capacitance swing, say 10-100pF, which means the frequency swing is 3.16:1. This reveals that a wavemeter arranged for a minimum frequency of 14MHz will be able to read to 44.24MHz, which includes the second and third harmonics.

It was a requirement of the old Amateur Radio Licence that 'the radiation of harmonics and other spurious emissions shall be suppressed to such a level that they cause no undue interference with any wireless telegraphy.' Wavemeters with a selection of plug-in coils are vital to determine not just harmonic outputs but other spurious and unintended signals, which can easily be generated in home-built equipment. ●

Final Remarks

I've given a number of useful ideas for measuring equipment for the serious experimenter here, and lots of potential for constructional projects for future *Doing It By Design* articles. I hope they'll have stimulated your interest, in particular to the construction of a direct reading inductance meter. I may be contacted in relation to this article by E-mail: **tony@pwpublishing.ltd.uk** Cheerio for now!

Mike Richards G3WNC's Data Modes
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-Mail: mike@pwpublishing.ltd.uk

Amateur Radio on the Keyboard!

This month Mike Richards G4WNC explains MT63, a robust data mode plus a new and powerful audio spectrum analyser to help you identify and measure audio signals.

The MT63 mode is yet another mode that originated from the hand of Pawel Jalocha SP9VRC and has been designed specifically to handle typed QSOs under noisy band conditions. It uses a relatively wide bandwidth of between 500Hz and 2000Hz depending on the selected mode.

At the heart of the MT63 system is the use of Walsh functions and interleaving to spread the data in both time and frequency. By using these techniques it improves its immunity to atmospheric affects and interference.

Simplified Flow Chart

I've shown a simplified flow chart of the MT63 encoding process in **Fig. 1**. The first stage is to apply the 7-bit ASCII characters of the message to the Walsh/Hadamard function. This function generates a 64-bit code for each character in the message and forms the basis of the forward error correction (FEC).

The coding technique is very effective and enables accurate recovery of the original character, even when up to 25% (16-bits) of the original 64-bit word is lost.

The next stage in the process is concerned with distributing the data to give it the best possible chance of getting through an h.f. radio link. The idea here is to distribute the message characters in both time and frequency to ensure the greater part of each character makes it to the decoder. The modulation system chosen for MT63 is known as Orthogonal Frequency Division Multiplex (OFDM).

In simple terms, OFDM means spreading the data over lots of narrowly spaced carriers. Each carrier is modulated with low speed data. In the specific case of MT63, a total of 64 carriers (spaced at 15.625Hz) are employed, each of which is Bipolar Phase Shift Keyed modulated (BPSK) at 10baud.

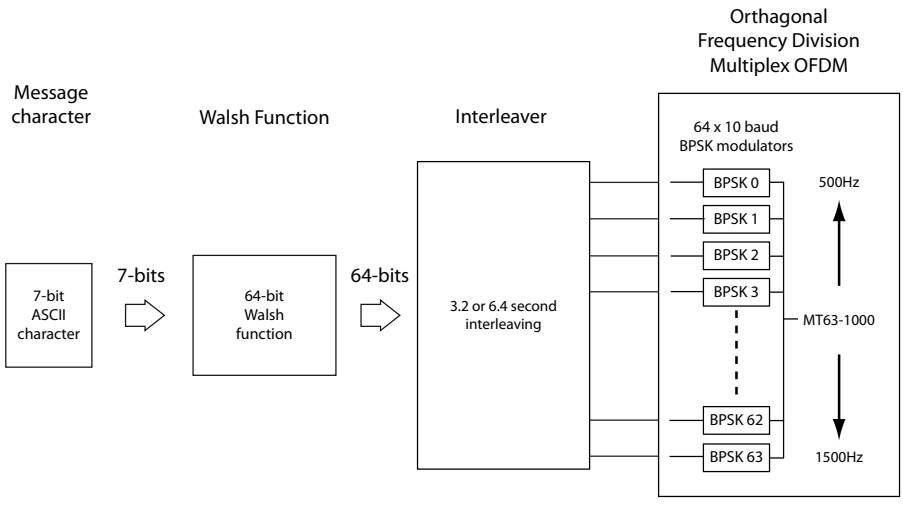


Fig. 1: Block diagram of the simplified MT63 encoding process.

You can think of it as being rather like a series of compressed versions of PSK-31 on the band. With a suitable very narrow band receiver you could tune across an MT63 signal and receive each of the 10Baud signal separately. I've shown a spectrum display of an MT63 signal in **Fig. 2**.

With OFDM available to provide the frequency distribution of the data, MT63 then employs interleaving to spread each character in time. Instead of applying all 64-bits directly to each 64 tone set (known as a symbol), each character is spread over 32 consecutive symbols and thus takes 3.2 seconds to get through the link.

The system still sends the equivalent of 10 characters per second but you have to wait 3.2 seconds after the start of the message for the decoded characters to start appearing. There is an even more robust version of MT63 that employs a 6.4 second interleave.

The end result of the MT63 encoding is very robust with three stages of protection for the data: Stage 1 - Walsh forward error correction, stage 2 – OFDM frequency distribution and finally, stage 3 – interleaving over 3.2 or 6.4 seconds. When you listen to an MT63 signal the sounds you will hear are more like noise than a data signal with no particular pattern or tone discernible.

At the receiving end, the encoding process is simply reversed. This starts with 64 differential bipolar phase detectors. These are configured to ignore amplitude and frequency changes and just provide a 1 or 0 output that is determined by the phase of each of the 64 tones.

The next stage occurs when the results are passed to 64 Walsh decoders and the message is then finally decoded and presented back to the host program for display. Because of the interleaving for each character there will be a 3.2 or 6.4 second delay after commencement of the signal, to displaying the first decoded character.

In addition to the 1000Hz bandwidth version described so far, there are two other standard modes namely: MT63-500 with 50w.p.m. capability limited to 500Hz bandwidth and the wider bandwidth MT63-2000 featuring 200wpm and a 2000Hz bandwidth. It's also possible to set each mode to operate with a longer interleave of 6.4 seconds to provide an even wider time

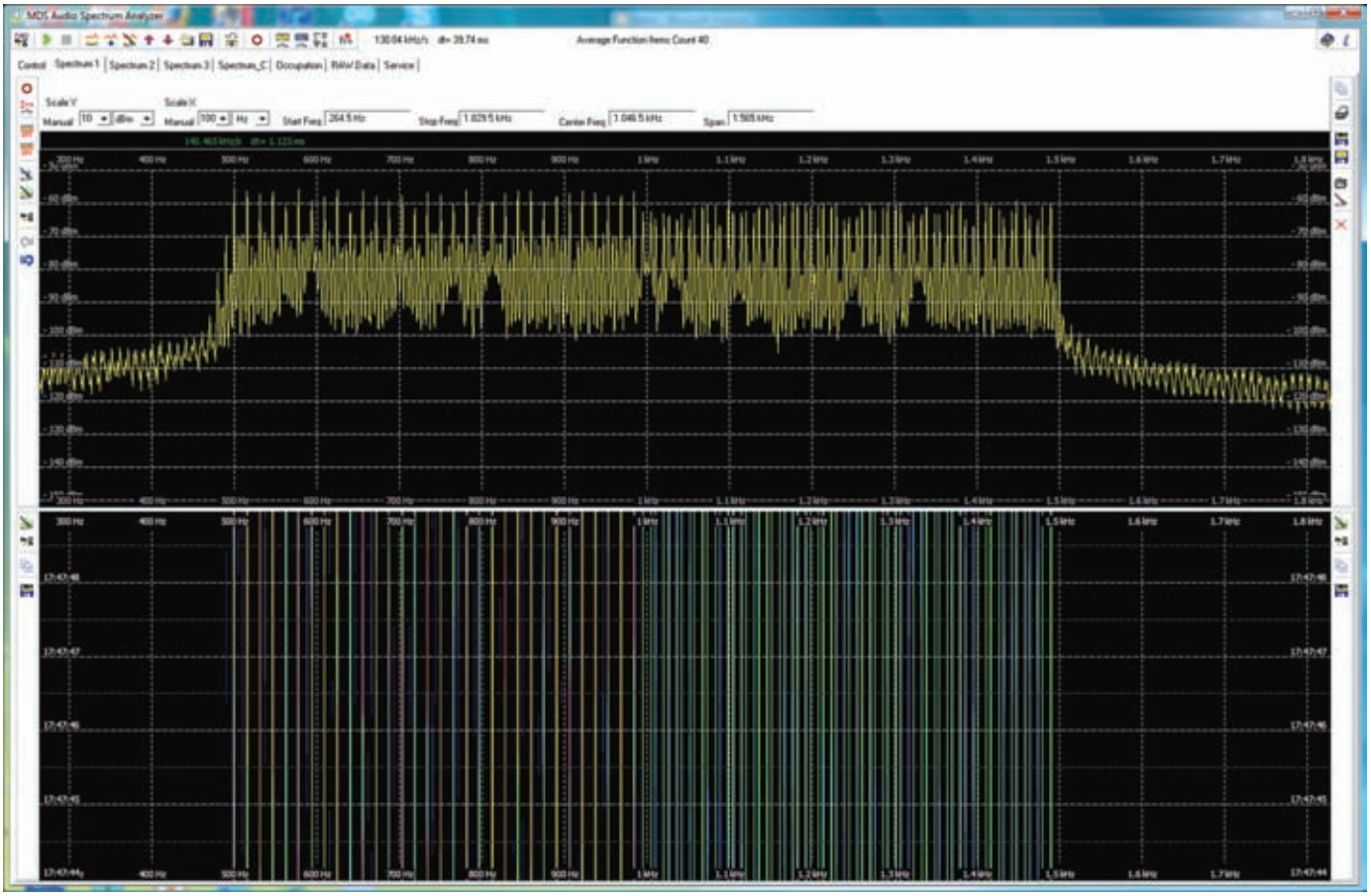


Fig. 2: Spectrum display of a MT63 signal showing the 64 BPSK signals.

spread and thus a greater resistance to impulse interference.

You will have noticed that MT63-2000 is a pretty fast mode at 200wpm and it's really more suited to data transmission than typed QSOs. In fact the MARS (Military Auxiliary Radio System) network has completed a report on MT63 and it has recommended the MT63 mode for use on their emergency networks.

Receiving MT63

As with all the modes we've covered so far, reception can be handled via a standard computer soundcard using freely available software. *Ham Radio Deluxe* includes the MT63 modes so if you're already using that software you'll be fine. Alternatively there are a few standalone systems you can install and try.

One popular choice is the *MT63 Decoder* from **IZ9BLY**. This is a simple terminal that's dedicated to MT63 and works very well. You can also find MT63 in many other decoder systems.

Tuning MT63 signals is not overly critical as you just need to get to within about 50Hz or so and the decoder does the rest. However, the system doesn't handle fast frequency changes well so don't bother to fine tune as you'll probably throw the decoder out. One aspect of the set-up that is critical is the accuracy of your soundcard's clock frequency.

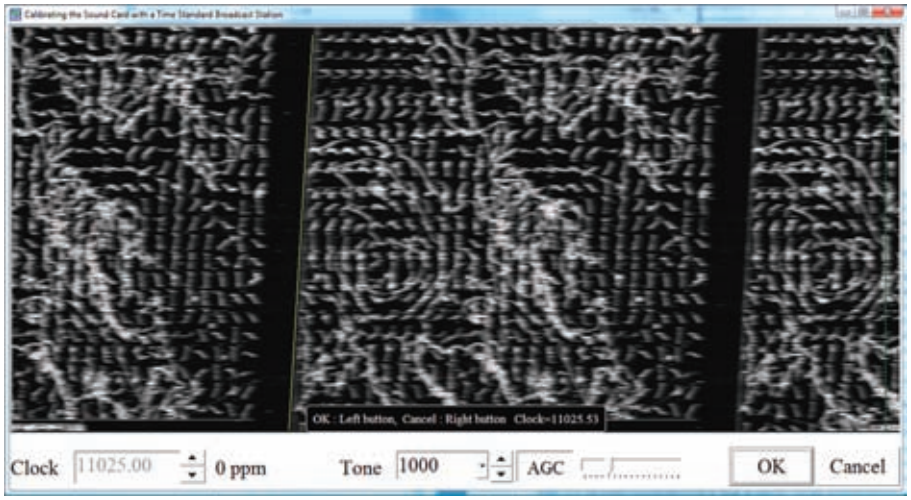


Fig. 3: Soundcard clock calibration using MMSSTV.

The accuracy of the clock signal isn't really surprising, when you consider that you're trying to simultaneously receive 64 p.s.k. signals each running at 10Baud with spacing of just 15.625Hz! As a result MT63 decoders usually include a facility to enter a frequency offset to correct any inaccuracy in your clock.

The easiest way to check your soundcard clock's accuracy and determine a correction factor is to use a FAX or SSTV program to monitor a Standard Frequency transmission. Here's how to do it with *MMSSTV*.

Standard Frequency Transmission

First of all you need to find a standard frequency transmission – these can usually be found around 5MHz, 10MHz and 15MHz. If you can't find one choose a FAX station instead - Hamburg Met on 7.88MHz is usually pretty reliable in the UK. Next, start *MMSSTV* and select **Option – Setup MMSSTV** and go to the **Misc** tab. Here you will find an **Adj** button in the Clock Adjust section. Click the button and the measurement process will start.

As both the FAX and standard frequency stations send out signals with very accurately timed pulses a

pattern should start to appear on the MMSSTV calibration screen. Make sure the window is expanded to be as large as possible and make sure there is a pattern building-up on the screen – now go and make a cup of tea! When you get back you should find one or two clear (near) vertical lines on the screen.

To measure the off-set left-click at the top of one of the vertical lines and draw a line that follows the slant down to the bottom and click again, as shown in **Fig. 3**. This will automatically update the *MMSSTV* sample rate – make a note of the corrected number. We have just worked out the correction for an 11025Hz soundcard sample rate.

If that's the sampling rate you're using in MT63, you can just enter that number. However, if your software uses an 8000Hz sample rate you need to work out the correction. To do this, just divide your result by 11025 and then multiply this new figure by your software's sample rate. Here's a worked example:

In my system the *MMSSTV* calibration produced a figure of 11025.55Hz so the correction factor is 11025.55/11025 = 1.000049887, i.e., not far out. To get the correction for a system with an 8000Hz sample rate just multiply the sample rate by 1.000049887, i.e. 1.000049887x 8000 = 8000.399. With the calibration complete, it's just a case of finding a few signals and joining in the fun.

Despite being an extremely effective mode MT63 is not that popular and probably the best place to look is 14.1MHz ±20kHz. If you want to try a few "CQ" calls then the weekend is a good time and 14.109MHz or 21.109MHz are good starting frequencies.

Signal Analysis Tools

I'm always on the look-out for useful software and my latest discovery has been an excellent *Audio Spectrum Analyser* by Lithuanian based **Aidiga**. They produce a range of software analysers but their *Audio Spectrum Analyser* is particularly useful and available for free. You can download a time limited trial from their website but if you E-mail them, then they're currently happy to send out licence codes free of charge – which is very generous of them!

The audio analyser is a slightly stripped down version of their *RF Spectrum Analyser* and I've found it to be extremely fast and accurate. The only minus point, is the user interface which employs some unconventional navigation techniques that will have you flummoxed! However, I've spent some time working my way through it so, I can pass on some useful tips to make your life a bit easier! You can get the software from the following site: **http://aidiga.com/**

Fig. 4: Using MDS Spectrum Analyser to measure an Olivia 16/500 signal.

Once you've downloaded and installed the software the first task is to make sure it's setup properly for your system. To do that, click on the **Setting** icon at the top left of the screen and in the **Digitizer** section make sure that **Simulate Digitizer** is unticked. The next step is to move on to the Control tab on the main screen, here you can set the start and stop frequencies plus the resolution.

Amateur Radio Analysis

For Amateur Radio work, I suggest a start frequency of 0Hz, stopping at 3kHz and a resolution of 3Hz. To start the analysis, press the **arrow** button at the top of the screen. If all is well you should see signs of life when you click on the **spectrum 1** tab. The raw display is usually very jerky and benefits from some averaging to smooth out the variations.

To set this up select the Settings tab at the top left of the screen and choose the **Math** tab. Select **Function = Average** and set the count to 100 with **Unlimited** unticked. To turn the averaging on and off press the right-hand icon on the toolbar – this toggles the Math function on and off.

Navigation is a bit unusual so I'll run through the basics here. To zoom-in on a section of the display, left click/hold and draw a box around the section of the waveform that you want to zoom – you must do this from top-left to bottom right. To return to full scale just draw a box anywhere from bottom-right to top-left. To move the trace around in the window, right-click on the display area and drag it.

To change the Y axis dB scale, put the cursor over the scale and click/rotate the mouse wheel. The same technique works for the X axis except the cursor can be anywhere but on the Y axis scale. To make accurate measurements you can add measurement cursors on the display by double-clicking. Once placed, the cursors can be dragged to a precise location.

If you place more than one measurement cursor, hovering your mouse pointer over any cursor will display the frequency and level differences between all the cursors. This latter feature is excellent for measuring frequency shifts. To remove a single measurement cursor – double-click on it. To remove all measurement cursors hit the **Remove Markers** button on the side panel.

Speed Things Up

If your PC is struggling with speed it's worth going to each of the other **Spectrum** tabs on the main display and turning the channel off. To do this, find the Visual Settings icon for each Spectrum tab and un-tick **Channel Active**. I'll give some more tips on how to get the best out of this analyser in a later *Datamodes* column. ●

ML&S martin lynch & sons

The World's Favourite Ham Store

20 Celebrating years ML&S

FRIENDLY, HELPFUL ADVICE

OUR ORDER HOTLINE

0345 2300 599

FT-950
Base Transceiver
£1265.00

A "proper size" HF/6m Base Station offering 100W output on all bands.

Add the MyDEL MP-925 power supply for only £1369.95 combined.

FT-DX5000 HF Base Transceiver
The very best HF DX Radio
£4699.95

FT-DX5000D: £4999.95 FT-DX5000MP: £5399.95

All models in stock NOW. Best prices GUARANTEED. Call if you find one cheaper.

Principal sponsor for the RSGB convention & T32C DXpedition

Yaesu FT-2000
The DX Choice of 3B7C
£2249.95
2000D: **£2799.95**

Yaesu FT-857D & ATAS-120A Package
160m-70cm HF Base/ Mobile.
Still our best selling HF Mobile Radio.

FT-857D: £729.95
FT-857D + ATAS-120A: £999.95

New Yaesu FT-450D
£849.95

Following on the success for the FT-450 original, the FT-450D has many improvements and comes fitted with the Auto ATU as standard.

Yaesu VX-8GE
2/70cm version of the VX-8DE. Fitted GPS, dedicated to APRS on 2/70.

Only £349.95!

IF-2000
IF Interface board for the FT2k & FT-950
£219.95
Both on DEMO at Chertsey
www.hamradio.co.uk/acatalog/RF_Space.html

Yaesu VX8DE
Triple Band 6/2/70 with enhanced APRS.
£379.95

Yaesu VX-8GE
Identical to VX-8DE but 2/70 only, fitted but APRS & GPS as standard.
£349.95

Yaesu VX-3E
Micro Handie 2/70 with scanner
£169.95

Yaesu FT-60E
Twin band handie
£179.95

Yaesu VX-6E
2/70 handie
£259.95

Yaesu VX-7R
Black or silver triple band handie
£309.95

Yaesu FT-270E
2M 5W Handie
£109.95

Yaesu FT-1900
Rugged 50W 2m FM
£129.95

Yaesu FT-2900
2m 75W, MiL spec, high performance **£149.95**

Yaesu FT-7900
with FREE YSK7800
£239.95

Yaesu FT-8800
Receive on 2m & 70cm simultaneously
£349.95

Yaesu FT-817ND
All Band All Mode Portable Transceiver
£549.95

Yaesu FTM-10R
Compact 2/70- Mobile
£325.95

SPECIAL PRICE
£359.95
on current stock only

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

Yaesu FT-897D
High Power version of the FT-897. Use as a transportable, (20W) or as a base/ mobile (100W)
£799.95 or with AT-897Plus Auto ATU £924.95

Yaesu VR-160
Miniature communications receiver
£199.95

Yaesu FTM-350AEM
Dual-Band APRS Mobile FM with Latest firmware & FREE FGPS-1 GPS Module
£459.95

QUADRA (VL-1000)
1kW HF/6m Linear Amplifier with PSU & Auto-ATU **£4499.95**

Did you know that Martin founded his business buying and selling USED AMATEUR RADIO equipment?

Twenty-one years later
he's still buying UNWANTED EQUIPMENT at TOP PRICES!

Call now or e-mail your equipment details to sales@HamRadio.co.uk

Yaesu VR-120D
100kHz - 1300MHz FM/ WFM/A **£139.95**

DMU-2000
Data management unit for the FT-2000/FT-950
£1099.95

MD-200a8x
Elite Deluxe base Station Microphone **£229.95**

MD-100a8x
Base Station Microphone
£139.95

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

YAESU ML&S

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

Yaesu Rotators

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

G-450C Medium duty rotator - available today.

Only £339.95

G-550 Elevation rotator for satellite operation £329.95

G-5500 Heavy-Duty PC Controlled Vertical rotator for satellite and EME applications £629.95

G-650C Medium duty with higher brake torque than the G-450 ..... £379.95

G-1000DXC This new, high-performance rotator is ideal for heavy-duty applications. Its slim-line constructions is ideal for many crank-up tower installations. Rotation range: 450°, with presets. £499.95

G-2800DXC Yaesu's top-of-the-line rotator is for extra-heavy-duty antenna installations. It includes Auto Slow Start and Auto Slow Stop features to avoid sharp jolts to the antenna array and tower. The G-2800A includes a mast clamp to simplify installation. Total rotation range: 450°, with presets. £949.95

GS-065 Mast Bearing £57.14

GC-038 Lower Clamps £34.95

Rotator Cable 25m with plugs fitted £69.95

Rotator Cable 40m with plugs fitted £123.95

Rotator Connector plugs £25.95

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

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

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

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

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

MasterCard DELTA VISA

FOLLOW US ON TWITTER
HamRadioUK

ML&S martin lynch & sons

The World's Favourite Ham Store

20 Celebrating years ML&S

FRIENDLY, HELPFUL ADVICE

OUR ORDER HOTLINE

0345 2300 599

Brand New Product!

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

ML&S Price: ONLY £99.99

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

Look at the frequencies in this display!!!

Wouxun KG-679E/2M 2m FM Handie
Also available for 70cm!

ML&S Prices:

KG 679E/2M **£59.99**

KG-679E/U 70cm (400-470MHz) **£59.99**

or with Voice Scrambler KG-689E/U **£69.99**

The UK's Best Selling Dual Bander!

Wouxun KG-UVD1P

2/70 Full Dual Band FM Handie

ML&S Price: £92.99

Wouxun

New KV-UV920R

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

Wouxun KG-699E/4M

4m FM Handie

ML&S Price: £79.99

Full range of Wouxun accessories are available.

The New Icom IC-9100

HF through to 23cms Base Transceiver

ML&S Price: £2899.95 available ex-stock

Or Plus 4 Pack only £3875*

Options:

UX-9100 23cm Module.....£623.99
UT-121 D-Star Board.....£180.00
FL-430 6kHz Roofing Filter.....£60.00
FL-431 3kHz Roofing Filter.....£60.00

*Plus 4 Pack includes all of the above.

ICOM

Full Icom range always in stock!

CANCELLED EXPORT ORDER!

ML&S have a limited supply of brand new 2 year warranty Icom IC-718 HF Base Station transceivers at a massive saving of £260 off RRP. Stock is very limited so ORDER NOW!

BRAND NEW Icom IC-718 100W Base station

RRP £690

ML&S £429.95 !!!

Icom HF Products

IC-718.....~~£589.95~~ SEE OFFER
IC-7200.....£829.95
IC-7000.....£1189.95
IC-7410.....£1695.00
IC-7600.....£3279.95
IC-7700 DEMO £4995
IC-7800..... £Call!

IC-PW1Euro £4699.95

Icom Receivers

IC-R9500 ..... £Call!!

Icom V/U Products

IC-V80E £105.00
IC-E80D.....£329.95
ID-E880E £439.10
IC-E90 .....£239.95
IC-E90/4m £299.95
IC-E92ED.....£388.95
IC-E2820 .....£485.95
IC-E2820 +UT-123 .....£699.95
IC-910H £1296.96
IC-910X.....£1549.95

New TS-590S HF/6m Transceiver

Latest HF & 6M FULL DSP Base Transceiver from Kenwood

AVAILABLE FROM STOCK £1369.95

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

TS-2000X

Flagship HF-23cm. All Mode Base Station

This really is a total shack in a box.

Only £1699.95!

KENWOOD

Kenwood Ham Radio Dealer of the Year 2010-2011

TS-2000E

HF-70cm Auto ATU Base

£1469.95

TH-F7E

Dual Band with all-mode scanner built in

£239.95

TH-D72E

New FM dual band transceiver

£429.95

PS-60 Matching PSU for TS-590/2000

£299.95

TS-480SAT

100W HF+6m Auto ATU Mobile/Base

£779.95

TS-480HX

200W HF+6m Mobile/Base

£879.95

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

TM-V71E 50W 2/70 Mobile

£299.95

TM-D710E

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

MC-60A Deluxe Desk Microphone

£119.95

ML-5555

10m Multimode Transceiver

Available from stock: £149.95

MyDEL

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

ML-5189

20W 4m Mobile

Only £139.95

Includes FREE DTMF Mic

Solid State Amplifiers from RM!

RM ITALY

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

NEW BLA-350!

300Watt output key down HF Linear Amplifier with built in PSU.

Only £649.95

Palstar

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

Palstar AT-2KP

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

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

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

Software Defined Receiver

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

Perseus VLF-LF-HF Receiver

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

Perseus-FM+

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

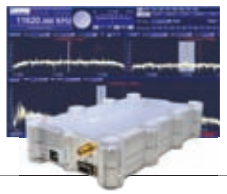
Want to dabble in D-Star without the expense of a radio?

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

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

WiNRADiO Excalibur Pro. WR-G33DDC

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



WiNRADiO WR-G31DDC EXCALIBUR

£699.95

For full details see web.

Flex 1500
SDR Low cost SDR Transceiver.
£579.95

Flex 3000
With ATU 100 Watt SDR 160-6m with Auto ATU fitted. **£1299.95**

FACTORY APPOINTED DEALER for FLEX
The entire FLEX Range is now on demonstration in the ML&S Super Store!

MFJ Products

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

Lots more MFJ stocked! See web for details

Flex 5000A
Flagship 100W SDR Base 160-6m
£2495.95

FlexRadio Systems

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

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

AirNav Systems

The New RadarBox is now available from ML&S!

Radar Box-3D....**£489.00**
Radar Box-Pro...**£399.00**

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

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

MyDEL

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

MyDEL MP-8230
13.8V DC, 25A power supply, switch mode.
£69.95

MyDEL MP-925
Linear PSU
£99.95

Ideal for FT-817ND or most handhelds.

MyDEL MP-6A
13.8V DC, 6A power supply. **£29.95**

Two-year warranty on all MyDEL PSUs

MyDEL PS-30SW11
Latest high performance switch mode PSU. 25amp.
£84.95

MyDEL MP-9626
120A, 13.8V DC power supply, switch mode.
£299.95

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

MyDEL MP-9600
60A switch mode power supply.
£199.95

Alinco DM-330MW

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

Yaesu FP-1030A

2 year Warranty

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

HF Linear Amplifiers

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

OPENING HOURS

Monday to Friday: 9.00am to 5.30pm
Saturday: 9.30am to 4.30pm

Tel: 0345 2300 599

SAFE ONLINE SHOPPING

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

Begali

Begali Morse Keys

Magnetic Classic Gold

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

KENT KEYS **Kent Keys**

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

Twin Key

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

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

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

Idiom Press

Leads for any rig **£19.95.**

NEW Microbit RRC-1258mkIIS

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

NEW VERSION OLD PRICE £399.95

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

Tigertronics

Tigertronics SL-USB

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

From only £99.95

Call to discuss your rig-to-cable requirements.

MiniVNA pro

Pro-Antenna Analyser with Blu-Tooth.£379.95
SPECIAL OFFER £369.95

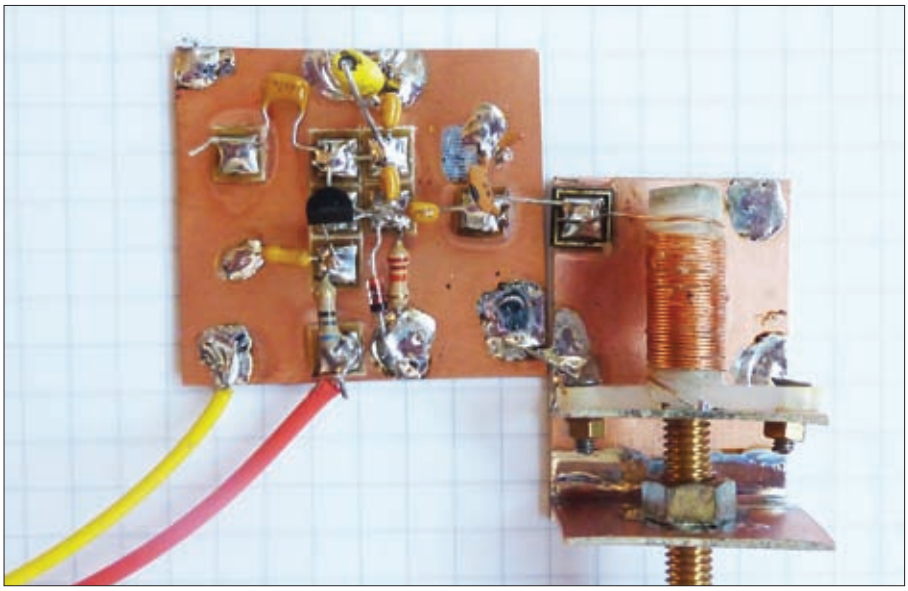
The new miniVNA PRO is an extraordinary and unique handheld vector network analyzer that makes available a multitude of new features and capabilities which are perfect for checking antennas and RF circuits for hams and commercial users.

MiniVNA original still available
(without Bluetooth)
£259.95

Rev. George Dobbs G3RJV's Carrying on the Practical Way
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-Mail: pracway@pwpublishing.ltd.uk

Permeability tuning – it's sometimes called 'Slug Tuning'!

This month the Rev. George Dobbs G3RJV takes a look at using permeability tuning to control an oscillator. Once very popular in car radio receivers, George has a few suggestions that could prove most useful for radio constructors.



The materials of action are variable, but the use we make of them should be constant
Epictetus (Greek Stoic, 55-135)

Epictetus nicely sums up the problem of a variable frequency oscillator (v.f.o.). The action of a v.f.o. is to produce a signal that can be varied but should remain constant when the variation ceases. Much has been written about building stable v.f.o. circuits – including more than a little material by myself!

Everyone agrees that the method of building the v.f.o. can be as important as the choice of circuit. Most of the circuits that appear in the Amateur Radio literature are capable of producing a stable oscillator but most of them can also produce an oscillator of poor stability – if it's badly built.

It is also important to use good quality components, especially those associated with the frequency determining parts of the circuit. Capacitors should be as temperature stable as possible. Modern COG multilayer ceramic or NPO ceramic capacitors serve the purpose well as do the older silvered mica and polystyrene capacitors.

The physical construction should be robust with individual parts rigidly mounted and, ideally, enclosed in a metal enclosure. "Build it like a brick outhouse" was the old timer's advice for building a v.f.o.

Most attention is generally given to the tuned circuit that controls the frequency of the oscillator. Many constructors prefer conventionally wound coils to those wound on a toroidal cores and all agree that if a variable capacitor is used, it should preferably be a high quality air-spaced type.

I like to use coil formers with a tunable core to enable fine setting of the v.f.o. to the required frequency. Others dismiss this idea because of possible heating effects within the core. Purists tend to favour ceramic coil formers without an adjustable core.

Permeability Tuned Oscillator

One variety of v.f.o. does away with variable capacitors and uses the core within a coil as the method of varying frequency and is known as the permeability tuned oscillator (p.t.o.). The diagram, **Fig. 1**, shows three varieties of tuned circuit that can be used in a variable frequency oscillator and Fig. 1**a** shows a simple tuned circuit using a fixed inductor (coil) and a variable capacitor to control the frequency.

The diagram, Fig. 1**b** is a similar circuit with a variable capacitor and a coil with a core that can also vary the frequency. The diagram Fig. 1**c**, shows a tuned circuit with a fixed value of capacitance with the core of the coil used to vary the frequency. This is a permeability tuned oscillator (p.t.o.).

Those readers who recall car radios with pre-set stations may have opened the case and seen that when a pre-set button was pressed a core would move inside a coil to tune the required station. They were permeability tuned coils. The p.t.o. was also favoured by some of the best known American manufacturers of Amateur Radio equipment including Collins, Drake and Ten-Tec.

Very often these variable inductance coils used brass cores rather than ferrite cores. Inserting a ferrite core into a coil increases the inductance but inserting a brass core deceases the inductance.

Some readers may remember an old piece of radio service engineer's equipment called a 'tuning wand'. One end was ferrite material and the other

end was brass and the engineer could vary the tuning of coils up or down using the wand.

I have used p.t.o. circuits in past editions of this column and this came to mind when I was sorting out one of the remaining radio boxes of my move some three years ago. I found several pieces of 0BA brass studding; 3 inch lengths of brass rod with a 0BA screw thread. "They could make an ideal p.t.o. core", I thought – an idea that was further amplified when I also found a quarter-inch Aladdin coil former.

The Aladdin coil formers were once very common coil formers – although any plastic tube of similar size would do the job for what I'm about to describe. The brass studding slides nicely in and out of the coil former.

Brass studding is commonly available from model engineering supply shops. Another search revealed a plastic knob to fit a 4mm shaft, which when drilled out nicely fits the brass studding. That, together with a 0BA nut and a few pieces of printed circuit board (p.c.b.) material, gave me all I needed to make a variable inductance coil assembly for a p.t.o.

Variable Inductance Coil

The diagram, **Fig. 2**, shows the method I used to make the variable inductance coil. The base is a 25mm by 35mm piece of p.c.b. material with two 20mm by 25mm upright pieces of p.c.b. material mounted about 10mm apart.

The studding is cut to a length of about 50mm. The uprights are drilled centrally to allow the studding to pass through them. The uprights are soldered to the base and the front upright bracket has the 0BA nut soldered in the centre hole. The back upright takes the coil former. The drawing probably explains this better than the words, as does the photograph.

I wound 35 turns of 30s.w.g. enamelled copper wire onto the former. The turns are close wound and held in place by running a little bee's wax onto the wire. Bee's wax makes a fine securing agent for small coil windings and does not appear to interfere with the electrical properties of the winding. A simple method is to melt a little of the wax using the tip of a soldering iron, allowing a few drops to fall on the coil wire.

A quick wipe with the hot soldering iron across the turns spreads the wax along, and into, the coil. This does no harm to the soldering iron but the tip does have to be re-tinned with some fresh solder afterwards. To complete the job, the bottom end of the winding is soldered to the base of the coil assembly to form the ground connection. The enamel must be scraped away from the end of the wire and the exposed bare (bright copper) wire tinned with solder.

I added a small copper clad pad of the type I use for Manhattan style construction glued on the base plate for the top connection of the coil. The completed assembly gave me a measured inductance swing of some 2.40μH to 3.25μH.

My chosen oscillator configuration was the Colpitts form and the circuit I used is shown in **Fig. 3**. As with many of my projects, the oscillator is configured to work on the 7MHz (40m) band. Some readers have ask me why I haven't used the 3.5 MHz (80m) band for my *PW* projects – it's because 7MHz is a popular band with UK QRP operators.

However, **Fig. 4** gives the values for changing the circuit on the 3.5MHz band. Readers will have to experiment with the number of turns on the coil to achieve an inductance of around 5.5μH.

Other Oscillator Types

Other types of oscillator could be used but I've almost always had good results with the Colpitts oscillator. This variant is an adaptation of the Seiler-type oscillator developed by **Mark McLellan W2YM** in the 1960s and so eloquently described by **Wes Hayward W7ZOI** in the classic book *Solid State Design for the Radio Amateur*.

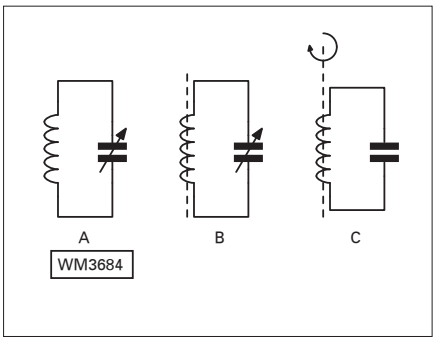


Fig. 1: Three varieties of tuned circuit that can be used in a variable frequency oscillator.

Fig. 2: The method George used to make the variable inductance coil. The nut is tag-soldered to the front piece of p.c.b. material, to prevent it turning. The coil former is glued in place on the rear section, so as to allow the brass studding to slide in and out.

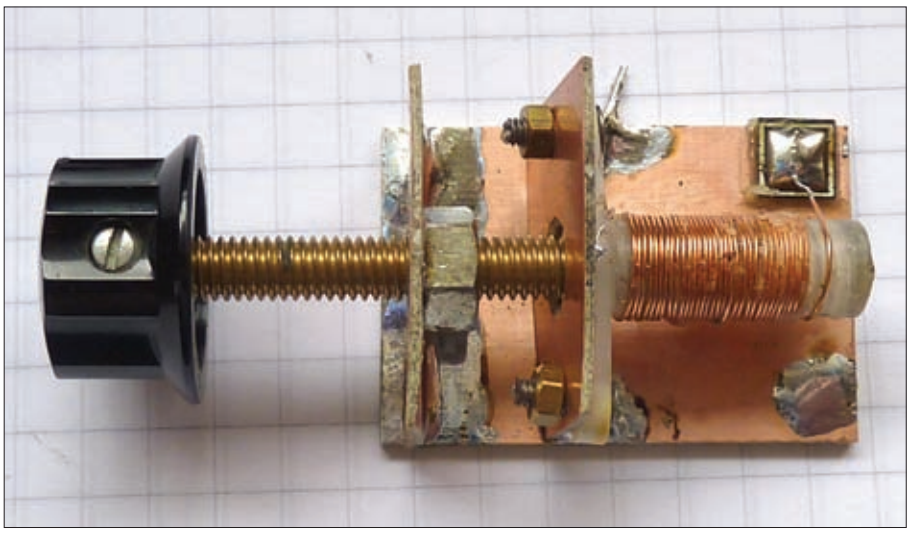
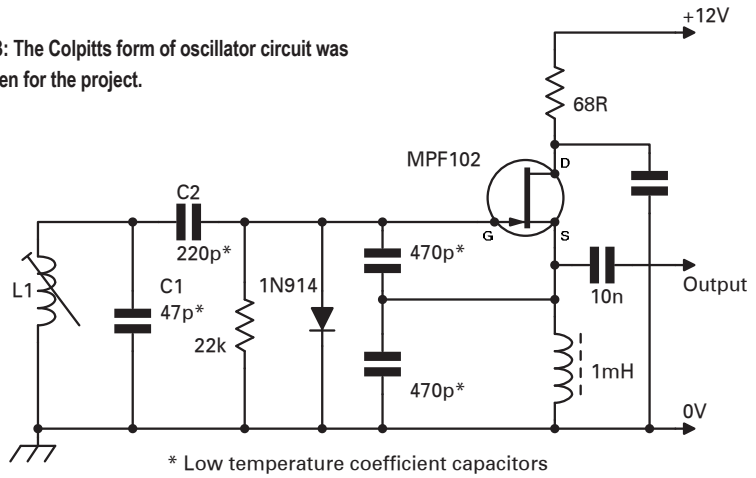


Fig. 3: The Colpitts form of oscillator circuit was chosen for the project.



An MPF102 field effect transistor (f.e.t.) forms the oscillator. The frequency of the oscillator is controlled by the tuned circuit of L1 and C1 which is coupled to the oscillator via C2. The inductor, L1, is the variable inductance assembly described above. The 1N914 is added as a gate clamp diode to limit the positive voltage swing and aid stability.

Like any oscillator, the circuit requires a positive feedback path for the signal between the output and input of the f.e.t. In this type of oscillator the feedback path is provided by the capacitive divider formed by C3 and 4. Some of the output from the f.e.t. that appears at the top of the 1mH choke is fed back to the gate of the MPF102. The 1mH inductor is a commercial axial radio frequency (r.f.) choke.

The resonant frequency of the tuned circuit is not merely the product of L1 and the capacitance of C1. Capacitors C2, and 3 also form part of the tuned circuit and must be taken into account. With the values shown in Fig. 3, a capacitance of about 50pF at C1 should enable the oscillator to hit 7MHz.

I added a 47pF capacitor for C1 and on initial switch-on the output of the oscillator was 7.043MHz – enabling me to obtain full coverage of the 40m band with the adjustable inductor at L1. This may be worth a little experimentation, perhaps using a good quality trimmer capacitor in conjunction with a lower value for C1.

Note: The tuning rate is not linear with the rotation of the knob and it is probably best to adjust the values so that 7MHz occurs with the core about halfway in the winding.

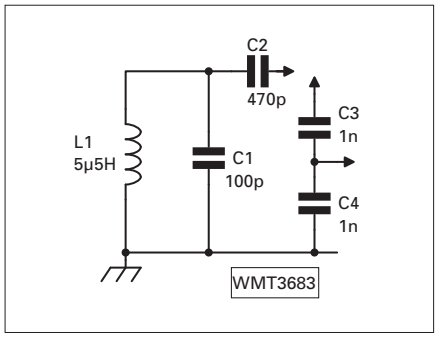


Fig. 4: Values for using the circuit on the 3.5MHz band. You may have to experiment with the number of turns on the coil to achieve an inductance of around 5.5µH.

As I've already mentioned, temperature stable capacitors should to be used in the frequency determining parts of the circuit and C1, 2, 3 and 4 are such capacitors in Fig. 3. The prototype used NPO capacitors. By the way, this should really be NP0. (n.p.zero) It refers to the temperature coefficient and means (n)egative coefficient zero, (p)ositive coefficient zero.

Sometimes NPO capacitors are referred to as COG capacitors and they are really the same type. There's an excellent guide to capacitor types and appropriate use by **Paul Harden NA5N** on the **G QRP Club** website at **gqrp.com**

My bench testing of the oscillator was not done under ideal conditions. The oscillator was not enclosed in a metal box nor was the temperature very stable on a warm evening in my small shack with the window open. The output was attached to a frequency counter. Initially there was a frequency drift of some tens of Hertz. This was probably the slight heating effect of the brass core. I set the core to 7.03 MHz, the QRP frequency for 40m, and went off to watch the ITV *News at Ten* programme! On my return, about an hour later, the total long term drift was about 10Hz. This represents very acceptable stability for most Amateur Radio use. I have yet to make a secure housing for the oscillator. Perhaps I will one day!

The tuning rate is also reasonable. It requires nearly three complete revolutions of the tuning knob to cover the 7MHz band. This would be good enough to use it in the c.w. (Morse) end of the band and single side band s.s.b.) stations higher up the band. Probably adjusting C1 and altering the positioning of the core within the coil would achieve slightly different tuning rates. I would also like to fabricate a larger tuning knob – always an asset to any receiver.

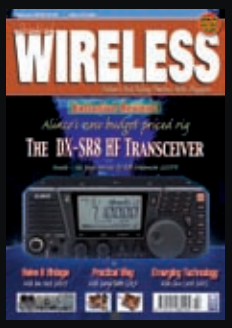
In recent times many approaches to the permeability tuned oscillator have appeared from a variety of sources. For a short time a p.t.o. kit was sold by **James McNutt WA6OTP**, in the United States which supplied the components and hardware for a permeability tuned oscillator. Several people have built a p.t.o. based on using a MacDonald's or Starbucks drinking straw for the coil former with a small brass bolt as the core.

Dominic Baines M1KTA features one such p.t.o. in his radio blog site. It is a fruitful area for the Amateur Radio experimenter. Perhaps this article will inspire readers to build their version of the permeability tuned oscillator. Good luck! ●

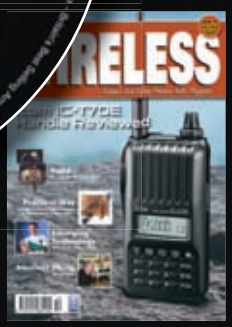
The *Practical Wireless* Archive 2010 on CDROM

You've been asking for them and you've been waiting for them! At last they're here!

The new 2010 *PW* archive is on a single CDROM and it's provided in a searchable PDF form. It's ideal for any computer – there'll be no problems!



Once you've purchased the 2010 archives there'll be no need to search through a year's worth of paper magazines or struggle to hold a heavy set of issues in binders! The CDROM will make things so much easier!



Find the articles you want much quicker. Enlarge the article and circuit diagrams to suit your needs. Use your CDROM archive as much as you like and keep your paper magazines in pristine condition to be read and enjoyed when you've found what you need on the CDROM!

The CDROM *PW* archive for 2010 contains the complete *PW* – including the full editorial, adverts, etc. In other words – nothing is left out. No short change here – you get a fully readable archive of your favourite magazine in an amazingly compact and convenient form!

The Editor Rob Mannion G3XFD has already tried out the CDROM archive – and here's what he thinks: "What a wonderful idea! Readers have been asking for archived issues for a long time – and I can tell you that wait will have been worth it! Every day I work on *PW* I need to research previous issues so the *PW* 2010 Archive on a CDROM is perfect and I thank my colleagues for their hard work in preparing it. So, don't delay – order yours now and you'll always be 'looking back' in a much more convenient style!"

The *PW* 2010 Archive CDROM costs £14.99 plus p&p. Please see page 76 for ordering details.

Phil Cadman G4JCP's Valve & Vintage
21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX
E-mail: phil@g4jcp.freeserve.co.uk

Feedback and Power Valves

The brown dustcoast announces that it's Phil Cadman G4JCP on duty at the *Valve & Vintage* 'Shop' this month. And it seems he's had some interesting feed-back from readers!

Hello and welcome once again to the *Valve & Vintage* (*V&V*) 'shop'. I'm happy to say that I've received several letters and E-mails in response to the requests for information which I made last time.

So, before I go on, may I sincerely thank everybody who has been in touch. Your information and comments were very interesting and extremely helpful. By the way, I **do reply** to all letters and E-mails, so if anybody has tried to contact me and has not received a reply, please try again.

Regarding those extraordinarily expensive capacitors, I've received E-mails from **Eric Edwards GW8LJJ** and from **Tony Barns**. Eric worked in the civil aviation industry and Tony in defence aviation, and both gentlemen used NATO part-numbered components extensively.

They both emphasised that in the aviation and defence industries, in addition to the reliability factor, there was the important issue of traceability. All components had to be accompanied by documentation detailing where they had come from. That included the supplier, the manufacturer and all the source components and materials. Such a 'paper trail' would indeed be expensive to produce, inevitably resulting in very high prices for such components.

The replies from Eric and Tony may also give a clue as to why the capacitors were being sold at a radio rally: they may simply have become separated from their documentation, effectively rendering them useless for their intended purpose. Tony also mentioned tape recording, echoing my comments about recording people's stories, especially those involved in radio and electronics. Fortunately, Tony has many recordings of his family and of national events.

Civic Tape Recorder

Although I still don't know for sure the source of **Godfrey Manning G4GLM**'s Civic tape recorder, **Julian Moss G4ILO** certainly recognised the deck as a Collaro. As did **Bernard Brodribb G1EHS**, who provided additional information on the deck.

Like BSR, Collaro decks were used by both major and lesser known manufacturers, and they were also available to home constructors. In fact, Julian's Father built his own tape recorder from kits advertised in *PW* and *Wireless World*. I wonder, does anybody still have a home-made tape recorder? Possibly in working order?

One of my longtime correspondents, **Wyn Mainwaring GW8AWT**, tells me he once worked for the Civic chain of shops and remembers selling Civic tape recorders. So it's still not yet clear whether Godfrey's recorder was made for Curry's or for the Civic electrical chain.

Interestingly, Wyn also remembers a recorder which used a kind of cassette: quarter-inch tape wound on spools housed in a plastic case. (I wonder if it's the one which was advertised by Garrard in 1960?) Essentially, operation was no different to a normal tape recorder, but with the cassette no threading of the tape from spool to spool was required. Unfortunately, the idea didn't catch on until Philips introduced the much smaller Compact Cassette.

Micromatic Radio

Next, I'm moving on to the Sinclair **Micromatic** radio. **Andrew Howlett G1HBE** tells me he also had a Micromatic but his kit used three transistors. Apparently, early Micromatics were similar to Sinclair's previous **Micro6** in that they used three transistors in a reflex circuit, while later versions managed with just two transistors.

A friend of Andrew's bought the two transistor version, which also used a different method of obtaining reaction. In contrast to my futile efforts to get the set to work properly, Andrew says that with careful adjustment, he could hear Radio Caroline on his Micromatic almost as well as he could on his Japanese six-transistor superhet!

Next came an E-mail from **Peter Lewis G4VFG**. Peter didn't buy any of Sinclair's tiny radios but his Saturday morning gardening money did allow him to get one of Clive Sinclair's books on transistor radios. More recently, he built a four transistor circuit from the February 1961 issue of *PW*.

Using germanium transistors from the 1960s, he says the receiver works well with a ferrite rod antenna. And Peter has even copied Morse on 1.8MHz by 'jiggling' the reaction. It's clear that providing suitable transistors are used, these old circuits can be made to work. Radio history in action!

Finally, I received an intriguing home-made post card signed only by '**Michael**'. Michael hails from Brownhills in the West Midlands and laments the loss of Tandy's shop from the town. He says he's too young to remember Sinclair's miniature radios but decided to try the **MicroMidget Pocket Portable** circuit which I featured last time. He used a redspot transistor for Tr1 and two OCP71 photo transistors (painted black) for Tr2 and Tr3. Powered by a single AA cell, it worked! Radio 5 Live was received with just four feet of wire. I'm amazed. Thank you 'Michael'!

Staying With Audio

I'd like to stay with audio for a little longer if I may, just to mention a 'missing' loudspeaker enclosure and the 75th anniversary of a couple

of classic valves. Those of you with good memories may remember that some years ago I asked if anybody knew anything about a loudspeaker enclosure from the early 1950s.

It was of interest to me because I'm sure it was the same loudspeaker enclosure that was used on the stage at my (hated!) old school. A few weeks ago – and purely by accident – I came across a web site devoted to the enclosure. I then discovered I was a decade out as it had been designed in 1960 and not the early 1950s. And it's a fascinating story.

The enclosure was designed in July 1960 by one **Jabez Gough**, a radio engineer who owned a radio shop in Cardiff, South Wales. The design turned out to be one of the most widely constructed yet unconventional and controversial enclosure designs of the period.

It could be made from a single sheet of half-inch plywood (measuring six feet by four feet), and was basically rectangular in shape. The height was 31 inches, width 24 inches, and was 10 inches front to back. The loudspeaker drive unit – nominally a full range, eight inch unit – was mounted at the top of the enclosure facing upwards and backwards at 45°. The sound from the drive unit is reflected off a lid also angled at 45°.

The enclosure was first demonstrated in Tongwynlais village hall (five miles north of Cardiff), and the quality of the reproduced audio resulted in an enthusiastic report in the *Western Mail*, the national newspaper of Wales. The story was taken up by *The Observer* Sunday newspaper and subsequently by *The Times* newspaper. Jabez Gough was even interviewed on the *Here Today* ITV television programme!

The success of Gough's loudspeaker enclosure was eventually reported in many countries around the world but it also attracted controversy as well. There was an article in the December 1973 issue of *Audio* magazine, the reporter interviewed Gough who was still working in his radio shop.

Jabez Gough had three sons and it's the middle son - **Julian** - who has created the web site to commemorate the work of his father. The URL is **www.gough-speakers.co.uk**/ where you'll find the full story behind the loudspeaker enclosure and a copy of the *Audio* magazine article.

There's also a copy of the original plans for the enclosure, which eventually sold over 35,000 copies! It would be very interesting indeed to build a couple of these enclosures and fit them with good quality full range drive units and compare them with modern loudspeakers. I wonder if any carpenters read *V&V*?

Fig. 1: Brimar's 6L6GA, a recent glass tubular version of the original metal 6L6.

Fig. 2: A ruggedised version of the 6L6G, the 5962/6L6WGA produced by Sylvania.

Quite A Year For Anniversaries!

As far as anniversaries go, 2011 is quite a year, as it's now 75 years since the introduction - by **RCA** - of two 'classic' valve types: the **6L6** and the **6J5**. Of course, these weren't the only valve types introduced that year – but they are possibly the most significant and successful.

The 6L6 was the first commercially available beam tetrode power valve. Or should that be 'tube', seeing as it's an American design. Actually, the initial design for the beam tetrode came from **EMI** - the parent company of **Marconi Osram Valve** (MOV) - as a direct result of trying to find a way around the Philips' pentode patent.

The beam tetrode has a pair of metal plates (normally held at cathode potential) placed between the screen grid and the anode. These confine the electron stream into a beam which has sufficient space charge to suppress the generation of secondary electrons from the anode. The annoying tetrode 'kink' is thus eliminated.

Moreover, by optically aligning the control and screen grids the screen current is reduced, thereby making the valve more efficient. So what was at first merely a way around the Philips' patent, actually led to the creation of a series of audio output valves whose performance has never been surpassed.

The manufacture of this new type of valve was proving problematic for MOV so the company made a deal with RCA. The American company's engineers solved the production problems and came up with the 6L6 – see **Fig. 1** – which was introduced in 1936. Information was passed back to MOV whose own engineers then designed the **KT66**. The KT66 was something of an improvement over the 6L6 and was introduced in the UK the following year.

Over the years the maximum ratings of the 6L6 have been increased, in particular, the anode dissipation was raised from 19W to 30W with the 6L6GC. In addition, many variations have been produced for specific applications, such as ruggedised versions for military and industrial use, like the 5932/6L6WGA shown in **Fig. 2**.

And I cannot fail to mention the **807** (**Fig. 3**), which is probably the most famous derivative of the original 6L6, at least as far as Radio Amateurs are concerned. Later versions of the 6L6 are still being made today, their widespread use in both Hi-Fi and guitar amplifiers providing a significant market.

The 6J5

By contrast, the 6J5 has, perhaps, not had the attention it deserves. As far as I can tell, it too was introduced by RCA in 1936, being classified in the data books as a 'general purpose triode'.

The basic 6J5 design (and its glass variants, the 6J5G and 6J5GT - see **Fig. 4**) has appeared in many forms over the years and other valve manufacturers have produced direct equivalents. There are several variants

Fig. 3. An 807– maker unknown. The electrode structure is similar to that of the Brimar 6L6GA. Notice the screen around the lead-out wires to minimise coupling between the anode and the control grid.

Fig. 4: A 6J5G, maker unknown.

Fig. 5: Sylvania 6SN7GT, made over 60 years ago.

Fig. 6: A modern 50W per channel valved amplifier from Icon Audio. The low-level valves are 6SL7GT (centre, and higher μ than the 6SN7) flanked by two 6SN7GT phase splitters. The output valves are four KT88s, switchable between triode and ultra-linear connection.

of its double form - two 6J5 triodes in one envelope - the most common being the **6SN7GT** – see **Fig. 5**.

By the way, many web sites give the ECC33 as a direct equivalent to the 6SN7GT. This is wrong. A glance at the data sheets will reveal that the μ (gain) of the 6SN7 is 20, whereas the μ of the ECC33 is 35. Hardly an equivalent!

Happily, the 6J5/6SN7 is finally being recognised as one of the best valves for use in high quality audio amplifiers: take a look at **Fig. 6**. You see, before negative feed-back was widely used to reduce distortion in audio amplifiers, valves had to be as linear as possible.

Later on, and particularly with the introduction of all-glass miniature types, valve manufacturers often seemed to favour increased gain and ease of manufacture over linearity. That may well have been felt acceptable as negative feed-back could be relied on to take care of any increase in distortion.

Unfortunately, large amounts of negative feedback can produce instability and momentary overloads can upset the operation of an amplifier for a much longer duration than if no feed-back were used. Consequently, there are many audio enthusiasts and amplifier designers who try to use as little feedback as possible, some preferring to use no feed-back at all.

Central to philosophy of minimum feedback is the use of low distortion valves. Inspection of the characteristic curves for various valve types does indicate that the 6J5/6SN7 is more linear than most.

Morgan Jones Details Distortion

In his book *Valve Amplifiers* (3rd ed.), **Morgan Jones** gives details of the distortion produced by several popular audio amplifier valves. To measure the irreducible distortion the valves produced, Jones tested them in a single-ended stage with an active load.

The active load appears to the valve like a very high resistance and so the load line is almost horizontal. As expected, the 6J5 and 6SN7 produced significantly lower distortion than all other common audio valve types.

I wonder if the designers of the 6L6 and 6J5 ever dreamed that their creations would still be in production 75 years after they were introduced. Furthermore, both valve types continue to be designed into new audio equipment.

Next time, I'll briefly mention the 6L6's UK cousin – the KT66 – and other beam tetrodes including transmitting types. In the meantime, please remember to send your comments and letters to me, either via E-mail to: **phil@g4jcp.freeserve.co.uk**, or by mail to: **21 Scott's Green Close, Scott's Green, Dudley, West Midlands DY1 2DX**. 73 and happy listening, Phil G4JCP.

●

nevada radio warehouse

Ecoflex®

New Ecoflex Low Loss Cables & Connectors at Nevada!

New range of cables & connectors at Nevada! Flexible with PE-LLC dielectric and gas content of over 70% for very low loss and use up to 6 GHz

Ecoflex 15

Specification
- Diameter: 14.6mm
- Loss per 100m: 2.81dB @ 100MHz, 1.96 dB @ 50MHz

Price: £5.99 per metre, **£539** per 100m drum

Ecoflex 15 Connectors
- **PL259** connector (Part: 7350) **£8.95**
- **N type** connector (Part: 7395) **£9.95**

Ecoflex 10

Specification
- Diameter: 10.2mm
- Loss per 100m: 4.0dB @ 100MHz, 2.8 dB @ 50 MHz

Price: £2.89 per mtr, **£260** per 100m drum

Ecoflex 10 Connectors
- **PL259** connector (part: 7378) **£5.95**
- **N type** connector (part: 7367) **£6.50**
- **BNC type** connector (part: 7379) **£6.50**

Aircell

Aircell range is a highly flexible coaxial cable for use up to 6 GHz. The low losses in relation to the diameter and the small bend radius of the cable make it perfect for the Radio Amateur.

Aircell 5

Specification
- Diameter: 5.0mm
- Loss per 100m: 9.4dB @ 100MHz, 6.61dB @ 50MHz

Price: £1.39 per mtr, **£125.00** per 100m drum

Aircell 5 Connectors
- **PL259** connector (part: 7760) **£2.25**
- **N type** connector (part: 7700) **£3.95**
- **BNC type** connector (part: 7720) **£3.25**

Aircell 7

Specification
- Diameter: 7.3mm
- Loss per 100m: 6.28dB @ 100MHz, 4.52dB @ 50MHz

Price: £1.99 per mtr, **£179** per 100m drum

Aircell 7 Connectors
- **PL259** connector (part: 7390) **£2.65**
- **N type** connector (part: 7392) **£5.25**
- **BNC type** connector (part: 7371) **£5.25**

Aircom Plus

Operating up to 10 GHz, this semi Air spaced cable has a massive oxygen free copper inner conductor covered with a thin film of PE to prevent corrosion permanently

Aircom Plus

Specification
- Diameter: 10.3mm
- Loss per 100m: 3.8dB @ 100MHz, 2.6 dB @ 50MHz

Price: £3.65 per mtr, **£328.00** per 100m drum

Aircom Plus Connectors
- **PL259** connector (part: 7378) **£5.95**
- **N type** connector (part: 7367) **£6.50**
- **BNC type** connector (part: 7379) **£6.50**

MFJ Accessories

MFJ 16C06 ..4 pack Ceramic Insulators	£5.95
MFJ 259B ....HF/VHF Analyser	£259.95
MFJ 260C ....300W Dummy Load	£45.95
MFJ 269 ....HF/VHF/UHF Analyser	£349.95
MFJ 260C ....300W Dummy Load	£45.95
MFJ 550 ....Practice Morse Key	£16.95
MFJ 557 ....Morse Key With Oscillator	£45.95
MFJ 9018 ....Portable 200 Watts ATU	£109.95
MFJ 912 ....Remote Balun Box	£79.95
MFJ 931 ....Artificial Ground	£114.95
MFJ 941E ....300W Versa-Tuner II	£139.95
MFJ 949E ....300W 1.8-30Mhz Antenna Tuner	£179.95
MFJ 969 ....300W HF + 6m Antenna Tuner	£219.95
MFJ 971 ....200W Portable AntennaTuner	£122.95
MFJ 993B ....300W Fast Automatic Tuner	£254.95
MFJ 1025 ....Noise Canceller/Enhancer	£184.95
MFJ 1026 ....Noise Canceller + Active Antenna	£204.95

Featured Icom, Kenwood and Yaesu

Kenwood TS590S
Latest HF/6m

NOW £1339.95

Icom IC-7000
All Band HF/VHF/UHF

NOW £1189.95

Kenwood TS480SAT
100 Watts HF/6m

NOW £779.95

Yaesu FT857D
Mobile HF/VHF/UHF all modes

NOW £699.95

Yaesu FT450D
HF/6m with ATU/DSP

NOW £849.95

Kenwood TH-D72E
High performance handheld.....**£429.95**

Yaesu FT817ND
Lo power HF/VHF/UHF portable **£549.00**

Yaesu FT7900E
Twinband mobile 2m/70cm.....**£249.95**

Yaesu FT897D
All mode multibander.....**£799.95**

Large selection of QUALITY USED EQUIPMENT in stock! Visit our web for latest details

AirNav RadarBox	Virtual Radar £299	Kenwood TS-570DG	100W HF DSP/ATU TX £589
Alinco DX R8E	Ex-Display Comms Receiver £519	Kinetics	Real-Time Virtual Radar Receiver £299
AOR 8200 MkII	Wideband Handheld Scanner £299	Icom IC-575A	28/50MHz All mode Transceiver £425
Bearcat UBC-800XLT	6000 Ch Scanner £225	Yaesu FRG100	Communications Receiver £329
Eton Satellit 750	Receiver Ex-Display Model £269	Yaesu FT100	HF/VHF/UHF All Mode TX £399
Icom IC-7800	Immaculate Flagship TX £5495	Yaesu FT450AT	HF/6m Transceiver £599
Icom R75	All mode RX, UT106 DSP fitted £499	Yaesu VR-5000	DSP Wideband Receiver £429

NEVADA – Cable Specialists

Westflex 103	
100 metre drum	£139.95
75 metre length	£106.86
50 metre length	£71.24
Price Per metre	£1.50
RG-213U – Mil Spec	
100 metre drum	£116.00
50 metre length	£62.50
Price per metre	£1.29
RG-213tm – Economy version	
100 metre drums	£99.00
RG-Mini 8 (Super XX)	
100 metre drum	£59.95
Price per metre	£0.65
RG58/CU – Mil spec	
100 metre drum	£39.95
Price per metre	£0.45
450 Ohm Twin Feeder	
100 metre drum	£89.00
Price per metre	£0.99
300 Ohm Twin feeder	
100 metre drum	£76.50
Price per metre	£0.85
Flexweave Antenna Wire	
100 metre drums	£49.95
Price per metre	£0.55
Coated Flexweave Antenna Wire	
100 metre drums	£88.00
Price per metre	£0.98

Antenna Collection

VHF/UHF Base Antennas

Comet	
GP1 ....145/433MHz 3/6 dbi 1.25m	59.95
GP3 ....145/433MHz 4.5/7.2dbi 1.78m	69.95
GP6 ....145/433MHz 6.5/9.0dbi 3.07m	99.95
GP15N 50/145/433MHz 3/6.2/8.6dbi 2.42m	99.95
GP98 ....145/433/1200MHz 2.94m Length	139.00
CA-52HB4 High-Gain 4 Ele Beam 50MHz (6M)	119.00
Diamond	
V-2000 ....50/144/430 MHz 2.5m	127.67
Nevada Professional Series	
WDM8010-Pro ....132" MIL Spec Kevlar Windom Antenna 80-10m 1kW	79.95
WDM4010-Pro ....66" MIL Spec Kevlar Windom Antenna 40-10m 1kW	£69.95
Sirio	
CX4 ....70MHz (4m) 4.15dBi 2.9m Length	69.95
SY68-3 ....70MHz (4m) 3 Element Yagi Beam	79.95
Gainmaster ....Fibreglass 10m (28MHz) Vertical	129.95
Tornado ....Vertical Base Antenna 50MHz (6m)	49.95
Vector **NEW** 4000 Big 10m (28MHz) Vertical	89.95
2008 ....High Gain 10m (28MHz) Vertical	89.95

HF Base Antennas

Comet H-422 ....40/20/15/10m Dipole	269.95
Comet CHA-250BL ....6 to 80m Vertical	299.95
Sirio SY27-3 ....3 Element 28 MHz Yagi	74.95
Sirio SY27-4 ....4 Element 28MHz Yagi	89.95
Moonraker GP-2500 ....6-80 mtr Vert	199.95

HF Wire Antennas

Van Gorden G5RV 40-10mtrs	21.95
WDM3 ....40/10mtr Heavy Duty Windom	69.95
WDM4 ....80/10mtr Heavy Duty Windom	89.95
WDM-8010 ....Std. 80/10 Windom	44.95
WDM-4010 ....Std. 40/10 Windom	39.95

PALSTAR® Power Supplies

PS 8250
25 Amp Switch Mode Supply

- Twin meters for current and Voltage
- Lightweight
- Fully protected

~~£99.95~~ £79.95

SPS-9600
60 Amp Switch Mode Supply

- Variable output voltage
- Fully protected

£199.95

PS-50
50 Amp (peak) Bench Supply

- Fully protected
- Voltage and Current metering

£199.95

PS-30M
30 Amp (peak) Linear Supply

- Variable Voltage
- Fully protected

£99.95

Other Palstar supplies

PS-04	4A 13.8V DC supply	£24.95
PS-06	6A 13.8V DC supply	£29.95
PS-15	15A 13.8V DC supply	£59.95
SPA-8230	23A 13.8V DC Switch Mode	£59.95

LDG Tuners

Popular Models

NOW in STOCK!

AT100 Pro II	(160-6m) 125 Watts	£189.95
AT200 Pro	(160 - 6m) 250 Watts	£204.95
AT600 Pro	600W Auto Antenna Tuner	£299.95
AT897 Plus	for Yaesu FT897	£179.95
AT1000 Pro	(160 - 6m) 1kW	£499.95
IT100	for Icom Models 125 Watts	£159.95
YT100	for Yaesu Models 125 W	£179.95
YT450	for Yaesu FT450/950	£224.95
Z11 Pro2	(160 - 6m)125 Watts	£159.95
Z817	QRP for FT817 160 - 6m	£119.95
FTL	Meter for FT857, FT897	£79.95
Balun 1:1	200 Watts	£34.95
Balun 4:1	200 Watts	£34.95

ALINCO

DX-SR8
100W HF Multi Mode Transceiver

- Modes: SSB, CW, AM, FM
- QRP Mode: (0.1 to 2.0) Watt
- Receiver: 135kHz-29.99999MHz
- TX: 1.8-30MHz (5MHz band w/optional mod)

£599.00

DX-R8
New SDR capable RX.....£549

Alinco DJ-G7E
- Transmit: 2m/70cms/23cms
- Receives: 0.5-1299.95MHz
- 1,000 Memory Channels
- Full duplex operation
- CTCSS, DCS encode/decode
- Supplied c/w Li-ion 1200mAh battery and Drop-In charger

£329.00

DM-330MW-UK
30 Amp Switch Mode, high quality Supply

- Low noise
- Lightweight and portable
- Triple Protection circuit
- Low Ripple • Fully Filtered

£99.95

DM-340MW
Linear Power Supply

- 30-35 Amp Linear Power Supply (1-15V)
- Two analog meters for separate display of Volts & Amps (Class 2.5)
- Cigar lighter power socket (max. 10A)
- Auto protection switching (to load <35A)
- Size: 235 x 153 x 280m, WHD, Weight 9.5g

£149.95

DR-635
Advanced dual band handheld....**£299.00**

DR-135 MkII
50W VHF Mobile Transceiver **£179.00**

DR-435
70cm 35W FM Transceiver.....**£189.95**

DJ-175
Rugged 2 metre handheld.....**£89.95**

DJ-V17
2 metre waterproof handheld.....**£149.00**

AnyTone

Anytone AT-5189D
- 4m (70MHz) FM Transceiver
- Up to 25 Watts output
- Includes optional DTMF hand microphone

£148.95

Anytone AT-588
- 2m (145MHz) FM Mobile Transceiver
- 10/25/60 Watts selectable power output
- Includes QHM-03 DTMF multifunction microphone

£149.95

Anytone AT-5555-N
- 10m (28MHz) All Mode Mobile Transceiver
- Up to 21 Watts PEP SSB
- Fully programmable with optional pack

£149.95

TYT-UVF1
Dual Band Transceiver
- 2m/70cms • 128 Memories
- C/w re-chargeable battery pack, drop in charger, power supply + more!

£99.95

TYT-800
VHF 2 Metre 5W Handheld
- 199 memories
- Steps: 5,10,12.5,20,25,30,50kHz
- 50 CTCSS codes
- VOX time-lapse

£49.95

For unbeatable deals online 24hr shopping 7 days a week

www.nevadaradio.co.uk

Unit 1 Fitzherbert Spur Farlington Portsmouth Hampshire PO6 1TT

email sales@nevada.co.uk

PHONE **023 9231 3090**

showroom hours Monday to Friday 9.00 - 17.30

Tim Kirby G4VXE's World of VHF incorporating VHF DXer
Willowside, Bow Bank, Longworth, Oxfordshire OX13 5ER
E-mail: tim@g4vxe.com Twitter: g4vxe

Regional Variations and Using "CQ" on 144MHz

Tim Kirby G4VXE introduces his latest exciting look at the world of Amateur Radio above 30MHz. This time he discusses Regional variations (or is calling "CQ" a bad thing?).

Welcome to the *World of VHF* (*WoVHF*) where we explore the world of Amateur Radio above 30MHz! Over the last week or so (in early August), I decided that I would try calling "CQ" on 144MHz f.m simplex a bit more. After all, our f.m contacts can be about a lot more than just repeater contacts, enjoyable though those can be!

I mentioned on Twitter that I had called "CQ" on 145.500MHz. And it was interesting to receive a light-hearted message from **Charles Brain G4GUO**. Charles said that in his part of the world (the South Coast) that really isn't the done thing and how it is much preferred to announce "G4VXE listening 145.500", for example.

Interesting! That's always been the way I have been taught to call on a repeater and I wouldn't dream of calling "CQ" on a repeater! However, I suspect the situation for a simplex "CQ" might be a little different. Once upon a time, before rigs were scanning lots of memory channels, everyone was listening in once place which was probably 145.500MHz. Therefore a quick announcement "G4VXE listening 145.500" would probably be adequate and hopefully result in a reply.

However, if we assume that our listener is scanning 10 or more memory channels – of which 145.500MHz is just one. The chances of a quick announcement being heard are significantly reduced as the receiver is probably scanning another channel as you call! So, for your chances of being heard to increase, a longer call will hopefully be sufficient for the scanner to latch on to your call and stop! This is the tack I take, at least, and living in a fairly rural area, it seems to work.

The 144MHz moonbounce array of Joop Muller PA0JMV highlighted against an oncoming storm.

I suppose if you live in an area where there's a significant amount of activity on 145.500MHz, then Charles G4GUO's suggestion would work much better. However, I think areas of the country which have sufficiently high levels of activity are probably quite few and far between.

The 50MHz Band

On to your reports next, starting with the 50MHz band. **Paul Bowen M0PNN** (Shropshire) worked PJ6D on June 29th on c.w and then July 2nd on s.s.b. Paul worked 4X1DA using PSK31 on July 1st (it's interesting to see that there's much more activity on data modes during Es openings in recent years). Paul also caught some of the openings to the USA.

Ronald Pincho ZB2B (Gibraltar) sent an interesting report. Ronald found the band open in the late morning on July 23rd to the southeast part of the USA, working K4WMS (FM17), N3LL (EL86), KC4PX (EL98), N4IS (EL96), K4MM (EL97) and N4QV (EL96). Conditions moved slightly and he was working CT1EUB (IM67) and EA7IZZ (IM66) (I wonder if these were backscatter QSOs as the distance would be quite short from Gibraltar).

After that the multi-hop propagation came back and he worked W4BP, NJ2F and EA8AAW. The opening had died out by 1215z. Later on in the day, Ronald checked the band around 1725z and found it open to the north eastern USA, with around 25 QSOs made from the US call areas 1,3 and 9 as well as Canadian call areas one and two. He also found CU1CB (HM76).

The band stayed open until around 1900z. **Ernie Stagnetto ZB2FK** (Gibraltar) had a c.w. pile-up going and worked plenty of stations using his V2000 vertical. Ronald comments that these verticals are becoming quite popular! Indeed they are. There's no substitute for a beam, of course, but if you are challenged for space, then getting a vertical such as this up should give you the opportunity to make a few contacts.

The neat antenna system of Phil Oakley G0BVD in Great Torrington, Devon.

Don't feel that you need to use a commercial vertical – perhaps try home brewing one yourself. For some years when I rented a flat, I used a home-made 5λ/8 wave vertical mounted on the side of a shed and it worked just fine, where a beam would have looked sorely out of place.

Mark Marment CT1FJC (Portugal) has had another good month with lots of interesting contacts made. July 7th was a good day with A45XR and Z30U being worked in the morning. There was a good late and loud opening to the USA in the evening with lots of stations worked, KC8WDT (EM88) was the best DX at around 6325km. There

was a brief opening to the USA on the 8th with two W1s worked.

More eastern USA stations appeared on the 11th with the best DX being N4JQQ (EM55) at around 6950km. Mark had a European opening on 13th mostly to Scandinavia, but right at the end he worked PW1GUR/P from Brazil!

The 14th was quiet, although not dead as Mark worked VP5/W5CW (FL31). July 15th saw a good European opening with plenty of stations being worked including quite a number of UK callsigns.

Next day on July 16th, there was a good combination of openings to the USA and Europe and C6ANX was a nice one. More Europeans were heard on 18th, 19th and 20th. The 23rd was varied with the band opening early into the Ukraine, but by three hours later it had swung around into Florida with the best DX being around 6900km into EL87.

Mark was particularly pleased to work ST0R (KJ54) on July 26th – he said the operator there did a good job to pull him out of the pile-up. On July 28th there was an opening to western Scandinavia with OY1CT (IP62) and LA/OE9ICI (JP43) worked. August 1st had a couple of interesting contacts; T77C and GB5FI from Flatholm Island. Finally, another USA opening came on August 2nd with K0HA (EN10) at around 7300km being very nice DX. Mark says that 9Y4D has been a strong signal into Europe on a number of evenings.

Phil Oakley G0BVD (Great Torrington Devon) has had another good month working new countries and squares on the band. On July 7th he worked EA3AYQ (JN11), IK5RLP (JN52), EA3AR (JN12) with EA7KW/P (IM76) and S51CK (JN76) on July 10th. On July 13th he caught an opening, the highlights of which were EA6NL and OH5CW. Phil found more openings on July 16th and 19th. On July 21st, Phil was pleased to work HB9MXY (JN36), DK1FW (JN48) and 9A4A (JN74) for new countries and new squares with SM7RYO worked on July 27th being another new country and new square.

Graham Boor G8NWC (Spalding, Lincolnshire) fitted a temporary 50MHz dipole in the loft. Since then he's been pleased to work a number of stations including EA3EVL (JN00), IW4AOT (JN54), IS0BSR/P (JN40), S51CK (JN76) and S57VW (JN76). Graham was using a Yaesu FT-857 running around 50W.

Here at G4VXE I have enjoyed a few Es openings. On July 10th, I was pleased to work 5C12M from Morocco.

On July 13th, after a tip off from **Mark Hickford M0MJH** (Suffolk) on Twitter, here at G4VXE I worked EA6SX. Additionally, EA6SA was worked on July 26th and the 27th was a good day with a nice little opening with 10 or 15 QSOs made on c.w. – one of the highlights being **Roger Parsons 9A/VE3ZI** who lives in Sudbury in Canada (Roger's sister lives in the same village as us here in Oxfordshire, so it's always fun to make QSOs with him!). On the 28th I was glad to catch an opening to the north east and east with OH2ZZ (KP20), UW8SM (KN28) and ES2BH (KO29) being the most distant.

If you enjoy 50MHz, you may want to consider joining the **UK Six Metre Group**. **Graham G8NWC** told me that there is a complementary *Six News*, the journal of the group available on their website at **http://uksmg.org/news.php** so that you can get a flavour of the group. The edition available for download makes good reading and I recommend it to you.

Note: I also see that the group offer an 'internet only' subscription of £10 per year where, rather than you having *Six News* posted to you, you can simply download it from their website. This seems like a great idea and I'm sure will be a success.

The 70MHz Band

Up to the 70MHz band next and it's great to have a first report from **Dave Proctor M0IOK** (East Riding, Yorkshire). He writes, 'I was in my car – about half a mile from my home in Sproatley, near Hull at around 1555z, on July 13th I heard S51DI calling on 70.450MHz. He worked an Italian station and then after he called "CQ", he came straight back to my call! As we exchanged callsigns and locators, I was pleased to get a 5&8 report from him as the propagation improved between us."

David runs a Philips FM1000 converted PMR set, with about 20W output to a home made antenna on the car. David wonders why there's not more activity on 70MHz s.s.b. outside contest periods. (Say what you like about contests, but they get people to come onto the bands!).

Mark Marment CT1FJC was hearing strong 50MHz signals from the USA on August 3rd, so he took a look for the WE9XUP beacon on 70.005MHz. He comments, "To my surprise it was there, peaking RST449 with deep fading, plus a flutter riding on the signal. This was around 1100z, and was in and out for about 45 minutes. I hope to get a cross-band contact using 50 and 70MHz next time I hear it. Perhaps too late in the year, this year, but you never know"!

Operating from Mt. Parnitha in KM18ud. the AthensQrpNet has had many successful contacts with their friends from Izmir Turkey. Operating from Mount Parnitha in KM18UD, the Athens QRP Net has had many successful contacts with their friends in Izmir in Turkey. The TC3NIF team were operating from the Nif mountains across the Aegean Sea between July 2nd and 3rd using the special callsign SY1AQN. The crew involved was Jimmy SW1JGW, Koulis SW1KWZ, Panos SV1GRNM and Demetre SV1KLN.

The 144MHz Band

On to 144MHz band and **Paul Bowen M0PNN** (Shropshire) was pleased to work YL2OK on 144.300MHz, on June 10th. Paul was particularly pleased as the rig had been left on lower power following a "CQ", so the contact was made using just 5W!

On July 13th Paul worked YU7TT (KN05). Both of these were two new countries on 144MHz for Paul. Well done – great contacts and it just goes to show that when you are in the right place at the right time with Es, you really don't need high power.

Due to the heat it's essential to have protection from the sun at TC3NIF. A bit different to UK weather!

The team from TC3NIF take a break for a group photo.

Mark Marment CT1FJC caught an Es opening on the morning of July 16th into France, Luxembourg, Italy and Slovenia making around 20 QSOs. What's interesting is that two of the QSOs; F6FHP (IN94) and F1YT (JN14) are very short distances for Es, being around 1100 – 1300km where as the other contacts were paths from around 1800 to 2200km long. Actually, I wonder if these two contacts were made via slightly different propagation. Fascinating! Best DX in the opening was S50C at 2195km. After the opening ended at around 1100z the band was quiet until around 1400z when Mark worked CU3EQ (HM68).

Steve Smith G0TDJ (Kent) enjoyed the RSGB UK Activity contest on August 2nd and made seven contacts. **Matt Grice 2E0FNG** (Coventry) says "144MHz c.w **is not** dead!" Matt worked M0JDB and G6KMQ – a first with his 3-element beam. I've also heard Matt's 144MHz c.w down here in Oxfordshire but we've not been able to complete a contact so far.

Graham Boor G8NWC (Spalding) came on briefly for the RSGB UK Activity Contest and his best DX was G4RRA (IO80) at 341km.

Following on from the comments in a previous column about vertically polarised signals being more susceptible to temperature related effects than horizontal, **Nigel Booth M0CVO** (Grantham, Linconshire) had noticed similar effects on the GB3LM (Lincoln) 144MHz repeater. Nigel noticed signals fading as the temperature rises but also noted it being much more stable at the beginning and the end of the day.

From G4VXE I enjoyed a QSO with **Mike G0XAE** (Westbury on Severn) on 144MHz f.m simplex who came back to a "CQ". Mike's signals were good over a difficult path of 40-50 miles which seemed good for f.m.

The 432MHz Band

Not much from your 432MHz activity this time – bu**t Pete Goodhall 2E0SQL** (Oxford) made some QSOs during the RSGB 432MHz activity contest on July 12th, working M3HBI/P (IO92), G3WKZ (IO91) and G0XDI/P (JO01). Keep busy Pete!

The 900MHz band

No! We haven't got a new allocation at 900MHz. But it was good to talk to **Stephen Adams K4STA** and **Scott Brown KD4YDD** about their use of the 900MHz band in the North Georgia region of the USA. Steve is new to the band and with Scott's help has got a Motorola f.m handheld programmed up to enable him to make some QSOs through the local repeater. No commercial gear is available for the band, but Amateurs have both mobile and portable gear 'retasked' from converted PMR sets.

Scott sent me some links to *YouTube* videos showing the gear in use and it looks very impressive (search 'KD4YDD 900MHz repeater' to see for yourself). Scott also has a good demonstration of handheld 900MHz equipment accessing a repeater some 50 miles away. It looks a really interesting band and I have asked Steve and Scott to keep us in touch with 900MHz in the USA.

Satellite Opration

Pete Goodhall 2E0SQL (Oxford) says it's been an interesting month with the launch and deployment of the ARISSAT-1 satellite. When the astronauts from the International Space Station came to deploy the satellite – it seemed that the u.h.f antenna was missing! Despite this, people seem to have worked through the uplink. Pete has decoded SSTV and voice messages from the satellite already.

On FO-29, Pete worked GW0NKG (IO81) who said that it was his first s.s.b QSO through a satellite. Pete also worked some new squares; UA3IDQ (KO66) on AO-51, RA4CBY (LO31) and RK3BX (KO85) both on FO-29. Also worked on FO-29 was GB4FUN operating from the AMSAT-UK conference.

Visual QSOs!

Richard Gosnell G4MUF (Wootton Bassett,Wiltshire) was operating portable on the summit of the Malvern Hills with his FT-60 handheld when a station suggested that he would flash a mirror in the direction of the summit to see if Richard could see him. Rather inconveniently the sun went in at that moment – so the experiment couldn't take place. However, Richard wonders whether any readers have tried heliographing or 'mirror-flashing' from hilltops and what distances may have been covered?

Richard has decided to take an ordinary mirror in his backpack when he goes hill walking and once he's established a QSO on 144 or 432MHz to try flashing a mirror. Richard says that from his local hill-top, Hackpen Hill near Swindon he can see the Brecon Beacons on a clear day, over a distance of around 120km – so he'ss curious to see if a 'visual' QSO can take place. I said to Richard that although I find 'audible Morse' second nature, I find decoding 'visual Morse' quite challenging!

A really good and varied postbag this month! Thanks for all your input and ideas – until next time, enjoy your v.h.f/u.h.f activity. ●

Graham Hankins G8EMX's In Vision
92 Sunningdale Road, Tyseley, Birmingham B11 3QJ
E-mail: g8emx@tiscali.co.uk

New ATV Kit

In this month's column, Graham Hankins G8EMX waxes lyrical about a new 1.2GHz ATV project kits. And he says spectrum release is not an option!

In August's *In Vision* column, I was excited about a new 24cm (1.2GHz) Amateur TV receiver kit being offered by the British Amateur TV Club (BATC). The club's website states that the kit: "uses a particularly sensitive pre-aligned front end unit with an 18MHz bandwidth. It has the capability to provide phantom power down the input coaxial cable for use with converters to other bands.

"It has an on-board sound demodulator for 6MHz and 6.5MHz and software functions that enable other frequencies to be selected depending on the ceramic filters fitted. There's also an external RS-232 control port that, although not yet implemented in software, will soon become a feature of future software updates."

So, I'm delighted to be able to tell you that my euphoria continued with the BATC's announcement of two more kits essential for the Radio Amateur transmitting television – a test card generator and a colour-bar board.

Close-up of the new 1.2GHz ATV receiver kit that caught Graham's attention, is available from the BATC.

Designed by **John Hudson G3RFL**, the test card kit produces the usual cross-hatching over the full screen with a colour bar strip and frequency grating across the lower half, a centrally placed callsign with further test patterns above that. These are stored in a 27C512 Electrically Programable read-only memory, EPROM for those of us who may have forgotten), clocked by an Electrically Programmed Logic Device (EDLP) – and I'd not met that acronym before.

Using a 12V supply, the unit has a 1V composite output as well as an S-video output too. There's one surface-mounted device and it's claimed that the kit can be built in an evening. As with the 24cm receiver, the BATC is supplying a 'bare bones' kit of all the hard-to-get components and an EPROM pre-programmed to customers' requirements.

Look Great

Colour bars always look great when an ATV station is 'public' as at rallies. Those who have taken an unhealthy interest in broadcast TV and read about bars, test cards and such like, learn that there are (or certainly were) many 'standards'. Along with differences in the actual visuals required by broadcasters, 'EBU' bars conform to the European Broadcasting Union specifications.

Other sets of 'bars' may be "more typical of the colour saturation levels from studio cameras". The BATC's kit produces the usual eight vertical strips across the screen, peak white on the left, through yellow, cyan, green, magenta, red and blue, finishing on black on the right. The order of these colours is not, of course, random – each represents a step-down change in luminance (brightness) from left to right.

The colour bar kit was designed by a New Zealand Radio Amateur, **Grant ZL1WTT**, composite Phase Alternate Line (PAL) output and again a 12V supply. Again, the main components are supplied, with a construction time of just two hours! Both kits will be featured in the BATC's August magazine *CQ-TV*. The above information comes from its website: **www.batc.org.uk** Then click on the 'Kits and Bits' link.

Great news from the BATC – all we need now is a nice 12V, 10W analogue transmitter. With one simplex frequency and one for repeater inputs. Off you go!

In his answer, BATC chairman **Trevor Brown G8CJS** said: "We've not managed to locate a suitable f.m. transmitter design yet, but the search is on!"

Going Dutch

Someone very familiar with the Dutch ATV scene, **Bill Shepherd EI4KB/PA3FDK/G0KPR**, is currently investigating why there seems to be more interest in ATV contesting in the Netherlands than in the UK. Meanwhile, he's drawn my attention to a joint response from the RSGB, AMSAT, the UK Microwave Group and the BATC to a consultation document from the Department for Culture and Media on releasing public radio spectrum.

The response mentions that: "The 435-438MHz sub-section is the largest active band for international amateur satellites as well as highly innovative long range spectrally-efficient digital ATV developments (typically QPSK DVB-S based)".

While this recognition of DATV as 'spectrally-efficient' is welcome, this should not be seen to exclude the continuation of analogue ATV, as a much easier – and at the moment much cheaper – method of transmitting ATV.

The response was also very favourable about 24cm ATV repeaters saying: "Whilst the common perception of Amateur Radio is short wave orientated, the v.h.f./microwave bands are host to a series of communities and special interest groups exhibiting considerable skills in either narrowband long-range DX operation, or local ATV activity. From their analogue roots, both these sectors are rapidly evolving leading edge digital techniques with consequential improvements in range and spectral efficiency."

The response continues: "Whilst the UK currently just has one local TV multiplex, (Channel-M in Manchester), the Amateur TV network in the lower microwave bands is actually far more extensive, based on well-engineered 24/7 repeater infrastructure. Many of these are now linked to and supplemented by high performance internet streaming, courtesy of **www.batc.tv**/ for broader coverage.

"It should be noted that all these are full broadcast quality dual-band duplexed repeaters. They permit any local Amateur Television transmission to be received and re-broadcast (typically with 25W e.r.p.) on a separate output frequency. These repeaters and their user base represent a significant investment in effort and hardware and any loss due to 1.3GHz or 2300-2400MHz release would have a major impact on them."

Indeed it would! In my opinion, 'releasing' this spectrum is not an option!

Tel: 01922 414796

Established 1997

Radioworld communications

34-42 Brook Lane, Great Wyrley,
Walsall, WS6 6BQ
skype: radioworld_uk
E-mail: sales@radioworld.co.uk
Open six days a week - Mon-Fri 9.00am-5.00pm, Sat 9.30am-4.00pm
http://www.radioworld.co.uk

HF/VHF/UHF transceivers

TM-D710E VHF/UHF mobile ... £439.00.
TS-480SAT - HF&6m 100W..... £754.99.
TS-480HX - HF & 6m 200W.... £859.00.
TS-2000 - HF/6/2/70cms ..... £1468.00.
TS-2000X-HF/6/2/70/23cm... £1749.00.
TM-V7E - 2m/70cm's ..... £376.00.
TH-F7E - 2mtrs/70cm's ..... £235.00.
TH-D72E 2/70/GPS ..... £424.95.
TM-271E-2m/FM Mobile ..... £165.95.
TM-V71E - VHF/UHF ..... £289.00.
IC-7410 HF/6m base ..... £1695.95.
IC-9100 NEW HF/6m base ... £2895.99.
IC-7600 HF 6m transceiver....£3189.00.
IC-7700 HF & 6m Base ..... £5995.00.
IC-7800-2 HF/50MHz 200W.....£8875.00.
IC-7200 HF+6m 100w .....£799.00.
IC-7000 - HF/6m/2m/70cm's.....£1149.00.
IC-718 - HF 100W.....£569.00.
IC-910H - 2M 100W/70cm 75W £1275.00.
IC-E91 - Top Flight Handheld....£259.95.
IC-E90 - 2m/6m/70cm Handheld £238.99.
IC-E2820 Dualband VHF/UHF ....£478.99.
ID-E880 2/70 digital mobile .....£433.00.
IC-E92D D/STAR handy ..... £387.00.
IC-V80E 2M handheld ..... £109.00.
ID-1 mobile TRX 23CM/FM..... £714.00.
IC-T70E 2M/70CM Handy ..... £158.00.
IC-E80D D-Star V/U ..... £320.00.
PW-1 HF Amp 1KW ..... £5055.00.
FT-950 HF Transceiver..... £1264.00.
FTM-10E - VHF/UHF tx/rx ... £309.00.
FT-897D - HF/6m/2m/70cm.. £779.00.
FT-817ND - 1.8-430MHz 5W. £539.00.
FT-857D - HF/6m/2m/70cms £679.00.
FT-7900 mobile VHF/UHF ..... £239.00.
FT-8800E - 2m/70cm mobile. £329.00.
FT-8900 - 10m/6m/2m/70cm. £369.00.
FT-1900 - 2m 55W mobile.. £133.00.
FT-2900M - 2m 75W mobile.. £138.95.
VX-7R - 6m/2m/70cm handy. £299.95.
VX-6E - 2m/70cm handheld.. £249.95.
VX-3E - 2m/70cm handheld.. £169.00.
FT-60E - 2m/70cm FM 5W .. £129.95.
VX-8DE handy with APRS ..... £369.00.
FT-450D transceiver ..... £799.00.
FT-2000 HF/6M Base 100W... £2119.00.
FT-2000D 200W HF/6M Base £2599.00.
FT-DX5000 ..... £4339.95.
FT-DX5000D ..... £4892.00.
FT-DX5000 MP ..... £5400.00.

Transceiver accessories

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

MFJ Enterprises

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

RigExpert ®

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

HEIL SOUND Microphones & Headsets

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

COMET

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

Tigertronics

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

WATSON

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

butternut

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

HUSTLER

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

PALSTAR

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

Miracle Antenna

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

AT-1000 Pro

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

£499.00

Z-100 Plus

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

£134.99

DM-7800

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

£136.00

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

Z-817 ATU

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

£119.00

LDG IT-100

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

£158.95

LDG RBA 1:1&4:1

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

£35.00

LDG ELECTRONICS

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

LDG ELECTRONICS

TONNA

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

West Mountain RADIO

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

DIAMOND ANTENNA

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

AMERITRON

The High Power Specialist

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

RADIO BOOKS

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

SGC

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

Rotators

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

Feeders & Wire

RG-213 Military Spec High grade 50 Ohm coaxial Cable

£139.95 per 100m Drum

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

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

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

FlexRadio Systems

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

Telecom linear amplifiers

Self-contained, solid state

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

Cushcraft

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

Second Hand List

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

Accessories
MFJ-722 CW / SSB Filter £59.00
Yaesu FRV-8800 RX VHF Converter £99.00
OP-90 Leatherette Case for MVT-9000 £15.32
SEM TranZmatch with Ezi-Tune £89.00
Alinco DJ-X3 £89.00
Comet CF-BPF 6 band pass filter £30.00
EDC-168 adapter £9.99
Kent Straight Key £45.00
WELZ DL-600 Dummy Load £68.95
50-Watt Dummy Load £56.95
TS-711/811PX Interface £59.95
Kenwood YK-88S SSB Filter £49.00
Kenwood VS-2 Voice Synthesizer £59.00
Kenwood VS-1 Voice Synthesiser £39.00
SGC MAC-200 Antenna Controller Auto-Tuner £220.00
MFJ-784B DSP Filter £219.00
Icom ut-102 Voice Synthesizer Unit £25.00
AOR AR5000 Digital Voice Interface. £126.31
Midland 48 Plus Multi £69.00
MFJ-1817 2m/70cm Telescopic Rubber Duck £22.00
CSC-83 Soft Carry Case for FT-817ND £15.00
Icom PS-85 Icom 20A 13.8V Switch Mode £159.00
Kenwood DFC-230 external digital freq controller £89.00
Kenwood YK-88SN SSB Filter £49.00
SC-8200 Soft Case for AR-8200-8200-S2 £10.00
Kenwood YG-455C-1 - CW Crystal Filter £89.00
Kenwood YG-455CN-1 - CW Crystal filter £100.00
Kenwood YK-88CN CW Filter £50.00
SC-45 Soft Case for TH-G71E £10.00
CASE FOR KENWOOD TH-47 £10.00
010-10117-02 Garmin GPSCarry Case £5.00
FT-290/790MKI Carry Case £15.00
HS-800/PRO High Sierra Standard Control Box £75.00
CFX-514 Triplexer £35.00
HMC-3 Vox Headset £20.00
Host Master II £20.00
Eton S-350 Field Radio £65.00
Icom LC-158 Carrying Case for IC-R20 £12.00
Bremi BRL-5 - 3-way switch with SWatt dummy load £20.00
JD Model 151 - TVI Low Pass Filter £10.00
Archer Antenna Discharge Unit £15.00
Yaesu SC-1 Station Console £89.00
Icom CR-293 High Stability Crystal Unit £80.00
Dee Comm Dummy Load £69.00
BRV-1 Mirror Mount £10.00
Jim M-75 Pre-amp £49.00
Yaesu CSC-92 soft case with integral belt clip VX-3E £10.00
60W Max Dummy Load £35.00
300W Max Dummy Load £79.00
BP-262 Battery Case £7.00
Drake DL-300 Dummy Load £50.00
Revex L20 50 Ohm Dummy Load £25.00
MTU-30/20 RF u-tuning Unit C £500.00
MTU-80/40 RF u-tuning Unit B £500.00
Bush Sunrise Radio £49.95
KIF700 Keyboard & Interface £69.00
SC-37 Soft Case £6.00
SC-41 Soft Case £6.00
Diamond DL1000 Load £99.00
CT-5000 CTCSS Board for AR-5000 £60.00
ICOM HM-175GPS hand microphone FOR IC-E92 £120.00
Philips HC8349 Wireless Rechargeable Headphones £25.00
BC-177 Desk top charger for IC-E92 £35.00
Toyo T-100 Dummy Load £59.95
MAG-BM145PL £14.95
MFJ-3328 BNC Magmount £15.95
FMU-747 for FT840, FT-747 etc. £69.00
SU-1 Barometric Pressure Sensor Unit £29.95
Yaesu XF-8.9KCN CW filter £40.00
Inrad Pre-amp board to fit FT-1000mp £57.50
T1-30D 15-Watt Load £20.00
Hansen DL-20 15-Watt Load £20.00
Icom UI-8 FM Demodulator Board £60.00
Garmin GPS-38 Personal Navigator £49.00
FM Wide Modification Kit for FRG-8800 £60.00
AirNav RadarBox-Pro 2010 £299.00
SSB-SP-2000 2m Masthead Pre-amp £159.00
SSB-SP-7000 70cm Masthead Pre-amp £189.00
2-way Coax Switch (SO-239) £8.33
Daiwa CS-401 4-Way Antenna Switch £39.00
Trio CO-1303D Oscilloscope £40.00
Icom UT-84 Tone Squelch Board £49.00
CSC-73 Soft Case for VX-5R £7.00
LC-152A Leatherette Carry Case for IC-E90 £10.00
Amplifiers
Kenwood VB-2200GX 2M Amplifier £79.00
Explorer 1000 1KW HF Amplifier £799.00
Ampere APB-57A UHF Amplifier £129.00
MML 144/30-LS 2m 30W Amplifier £89.00
R-25 Microvet 30W 2m Linear Amplifier £89.00
Analyzers + SWR meters
MFJ-259B Antenna Analyzer £199.00
Daiwa CN-101 1.8-150MHz SWR Meter 15w-1.5kw £55.00
Kenwood SW-200 £79.00
AV-20 AVAIR VSWR POWER Meter £25.00
Harrier SWR-1 SWR & Power Meter £15.00
TOYO T-430 SWR £39.00
Kenwood SW-2100 SWR Power Meter £99.00
MFJ-862 VSWR POWER Meter £55.00
Antenna
Wellbrook Indoor Receiving Loop £149.95
EZ-TUNE-7000IBCIX High Sierra Control box for £85.00
MC-4MT Mobile Cable £13.00
Heathkit HD-1424 Active Preselector £59.00
Arno 40m EH Antenna £99.95
Telescopic 4m Band Whip £15.00
2m Telescopic Antenna £10.00
Wideband Scanner Antenna £15.00
Wideband Base Scanner Antenna £15.00
Desktop Discone £25.00
Palstar AA-30 Active Antenna £79.00
Wellbrook ALA330 Receiving Loop £174.95
ATX-1080-uni Multi band antenna 80 to 6m £35.00
C-POISE Wander-Wand Tunable £35.00
X-30 Diamond 2m/70cm Fixed Station Vertical £49.00
Antenna Rotators
KR-600RC Rotator £220.00
Antenna Tuners
Icom AH-4 Antenna Tuner £229.00
Yaesu FRT7700 Antenna Tuner £69.00
Global AT-2000 SWL ATU £79.00
Yaesu FC-30 Antenna Tuner Unit £159.00
LDG AT-897 Autotuner £149.00
LDG-Z-11Pro Antenna-tuner £129.00
Vectronics VC-300D Tuner with LED PEP Meter £199.00
MFJ-971 MFJ QRP Portable ATU, ANTENNA TUNER. £99.00
SG-231 SGC Smartuner £275.00
MFJ-924 MFJ UHF ATU £85.00
MFJ-994 Automatic ATU 1.8-30MHz £255.00
Capco SPC-100 300W ATU £95.00
MK-II Multi-tuner £48.95
Books
Icom IC-R20 manual in Italian £5.00
AERAD Chart 1994 £2.00
Air Band Radio Handbook 8th Edition £5.00
Air Band Radio Guide 6th Edition £5.00
Airwaves 2007 £8.00
ARRL Handbook 1983 £10.00
ARRL Handbook 1984 £10.00
ARRL Handbook 1985 £10.00
ARRL Handbook 1987 £10.00
Usborne Audio and Radio Book £5.00
BBC Radio Transmitting Stations 1993-94 £5.00
BBC Radio Transmitting Stations Spring 1990 £5.00
Beginners Guide To Pocket Radio £5.00
Ferrell's Confidential Frequency List £8.00
Flight Routings 2001 £5.00
Flight Routings 1992 £5.00
International Airband Radio Handbook £5.00
International FM Guide £2.00
Intermediate Licence Book £4.00
IBA Guide to TV and Radio 1990 £2.00
Microcomputers in Amateur Radio £5.00
PM3055-57 Oscilloscope Manual £5.00
Packet Radio Primer £5.00
Radio Amateur Operator's Handbook £5.00
"Radio" by Tucker & Wilkinson Vol-2 £5.00
"Radio" by Tucker & Wilkinson Vol-3 £5.00
Radio Servicing Vol-4 £5.00
Radio Amateurs' Examination Manual £5.00
RAE Revision Notes £5.00
R&EW Amateurs Handbook Vol 1, 2 & 3 £4.00
RSGB IOTA Directory 2000 £5.00
Scanners 2 International £5.00
UK Scanning Directory 4th Edition £5.00
UK Scanning Directory 2nd Edition £5.00
"Calling Shanwick" £5.00
Shortwave Voices of the World £5.00
"49 The Thyristor Book" £5.00
Transistor Equivalents and Substitutes £5.00
UK Scanning Directory 6th Edition £5.00
UK Scanning Directory 8th Edition £5.00
USA Radio Amateur Callbook 1986 £5.00
VHF Communications Magazine 1975 £5.00
Wireless Servicing Manual £5.00
WRTV Handbook 36th Edition £5.00
WRTV Handbook 1987 Edition £5.00
WRTV Handbook 40th Anniversary Edition £5.00
WRTV Handbook 27th Edition £5.00
RSGB Amateur Radio Operating Manual £5.00
Scanners 4 Book £5.00
"The Antenna Experimenter's Guide" by Peter Dodd £10.00
Shortwave DX Handbook by DL2VFR £10.00
G-QRP Club Antenna Handbook £10.00
"HF Antennas for all Locations" by Les Moxon £8.00
RSGB Radio Communication Handbook 10th Ed £10.00
RSGB 1994 Call Book £10.00
International Listings 1994 Call Book £10.00
International Listings 1991 Call Book £10.00
CB
Lodestar SWR-2T SWR Meter £15.00
Emperor Ninja CB £69.00
Lodestar SWR-2S SWR Meter £15.00
CB SWR Meter £15.00
Ranger RCI 2970DX 10 - 12m " 150w" Transceiver £249.95
Maycom EM-27 CB Transceiver £55.00
CB Magmount Antenna £10.00
Harrier-CBX CB Radio £69.00
DAB Radio
Gemini 46 Digital Radio £39.00
Sony XDR-S55DAB £30.00
Tevion DAB & FM Radio £30.00
Data Comms
Kamtronics KAM Multimode TNC £129.00
ERA Microreader CW Decoder £79.00
USB 56K MODEM £10.00
MFJ-1278b DSP Multimode Data Controller £249.00
DC/Cig adapter/chargers
NC-386 Ni-Cd Battery Charger £20.00
Duplexer / Triplexer
Revex D24 duplexer 1.6-150 MHz £22.00
Filters (various)
Bremi BRL-10 - TVI Low Pass filter 27MHz £10.00
AEC LP-30 - Low Pass Filter £15.00
Packer TVI Filter £9.95
Vanco HF Low Pass Filter £14.95
YK-88C-1 CW 500Hz Filter £59.00
2m Helical Band Pass Filter £60.00
FL-132 CW Narrow Filter for Main Band £75.00
FL-133 CW Narrow Filter for Sub Band £70.00
Frequency Counter/finder
Maplin MF100 Multifunction Counter £59.00
Handheld Transceivers
Icom IC-E92D transceiver £295.00
Alinco DJ-V17E 2m Handheld £104.95
FDC-450A 70cm Handheld £79.00
FDC-150A 2m Handheld £79.00
Quansheng 70cm Handheld £79.00
Quansheng 2m Handheld £69.00
Kenwood TH-G71E Dualband Handheld £149.00
Wouxun KT-689 2m Transceiver £59.00
CSC-90 Soft Case for VX-2E £10.00
FT-708R 70cm Hand Held Transceiver £49.95
FNB-82LI (Spare) 1000mA Lithium-ion Battery pack for £18.00
CSC-72 Leatherette Case for VR-500 / VT-120 £10.00
Alinco DJ-S41 UHF Handheld £58.75
Jingtong JT-208 2m Handheld £49.00
Jingtong JT-308 70cm Handheld £49.00
EDC-144 Rapid Charge Cradle £29.00
Yaesu FNB-102LI 7.4V 1800mAh battery £40.00
ADMS-VX8 Programming software and lead for VX-8 £45.00
BT-13 Dry Cell case for TH-F7E £13.00
Puxing PX-777 UHF Handheld £49.00
HF Transceivers
TS-480HX £669.00
Yaesu FT-1000MK V 200w £1,499.00
Kenwood TS-950SD HF Transceiver £1,099.00
Kenwood TS-570DG/E HF transceiver £629.00
Yaesu FT-890AT HF Transceiver £425.00
Yaesu FT-100D Multiband Transceiver £425.00
Yaesu FT-990 /AC £799.00
Icom IC-765 HF Base Transceiver £799.00
Icom IC-706 MkIIG with DSP £629.00
Alinco DX-70TH HF & 6m transceiver £399.00
IC-756PRO-MKIII Icom HF + 6m Trx £1,575.00
Yaesu FT-2000 100W with internal power supp £1,599.00
Yaesu FT-2000D 200watts £1,950.00
IC-7400 HF, 6m & 2m transceiver £849.00
Icom IC-718 HF Transceiver £399.00
Yaesu FT-950 £989.00
Yaesu FT-690R II £275.00
IC-7200 HF Transceiver £649.00
IC-706 MK2 £499.00
Yaesu FT-450D HF/6m transceiver £675.00
Alinco DX-SR8 HF transceiver HF, 100W all mode £529.00
ICOM MB-117 - Carrying Handle for IC-7200 £10.00
ICOM MB-116 - Painted die-cast Handles for IC-7200 £45.00
Mics and Speakers
Yaesu MD-100 Desktop Microphone £95.00
SMC-34 Speaker/Microphone with Volume Control £21.63
HM-133 Remote Control Microphone for IC-E208 £52.46
MC-90 Desk Mic for DSP £149.00
Alinco EMS-8 - Speaker Microphone £10.00
SMC-33 Speaker/Microphone with 3 Function Buttons £15.00
EMS-47 Remote Control Hand Speaker/mic direct VFO in £15.00
Yaesu MH-32 Speaker-Mic £15.00
QS-112Y4S Watson Handheld Speaker Mic £10.00
Sharman's DM-300 Speaker Mic (Kenwood) £12.00
HM-131L GS Style Speaker/mic for IC-T3H £20.00
Icom HM-70 Speaker Microphone £20.00
Speaker Mic for Kenwood £10.00
Speaker Mic (Yaesu VX-1 etc.) £9.00
Speaker Mic (Icom Two Pin) £9.00
Sharman's Speaker Mic (Icom Two Pin) £9.00
Morse keys / tutors
MFJ-418 Pocket Morse Tutor £75.00
NATD Morse Key £199.00
Ex-Army Key with Operators Unit £39.00
Kent Twin Paddle Morse Key £79.95
Star-Masterkey CW Keyer £49.95
MFJ-451X Morse Interface (no keyboard) £85.00
Kent Keyer £79.00
Power supplies
Bnos 20AMP PSU £99.00
Kenwood PS-430 Power Supply £119.00
PT-1012 Microset 12A 13.5 PSU £109.96
Icom PS-125 £270.00
Farnell G-12 £59.00
B.N.O.S 12amp power supply £59.00
W-SA Watson SA 13.8V fixed power supply unit £24.00
Drae 6-Amp PSU £49.00
Yaesu FP-8 PSU £69.00
Apollo CB-35 PSU £20.00
Alta RPS-1203 £20.00
Drae 24 Amp PSU £99.00
GZV-4000 Diamond 40A Switch Mode £165.00
Mercury 20 Amp Output, 13.8 Volts PSU £50.00
Palstar PS-30M 30Amp PSU, POWER SUPPLY UNIT. £80.00
Receivers
Icom IC-R72 Receiver £399.00
AOR AR8600MkII £499.00
AOR AR-7030 £550.00
Realistic DX-394 HF Receiver £129.00
Yaesu FRG-9600 VHF-UHF Receiver £199.00
Yaesu FRG-100 HF Receiver £299.00
AOR AR-7030+ HF Receiver £699.00
Yaesu FRG-7700 HF Receiver £249.00
AOR AR-3000 Wide Band Receiver £350.00
R-30CC HF PALSTAR HF Rx £499.00
Alinco DJ-X30 Scanning Receiver 100KHz - 1.3GHz £125.00
ABM-1-KIT Ramsey Passive Airband Monitor Kit £60.00
IC-EX257 FM Board for IC-R71 £69.00
Palstar R-30A Short Wave Receiver £499.00
Scanners
AR-8200-MkIII AOR Scanner 530 kHz-3 GHz £359.00
Icom IC-R3 Hand held Scanner £250.00
Yupiteru MVT-7100 Scanner £179.00
GRE PSR-314 FM Base Scanner £89.00
MVT-7100 Scanner £179.00
UBC-92 XLT Uniden-Bearcat Handheld Scanner £85.00
UBC-720LT Scanner with 'Close Call' £74.95
AOR 8200 Mk I £220.00
UBC-785XLT Uniden Base Scanner 25-1300MHz £209.00
IC-RX7 - Wideband Handheld Receiver £179.00
PSR-255 GRE Handheld Scanner £50.00
Soft Case for Yupiteru MVT-7100 etc. £10.00
Realistic Pro-9200 Scanner £59.00
UBC-278CLT Uniden-Bearcat Base Scanner £60.00
Realistic Pro-2021 Base or Mobile Scanner £59.00
TTI TSC-3000R H/HELD SCANNER 150KHZ-1300MHZ £89.95
Scopes
kenwood SM-220 Scope £249.00
VHF/UHF Transceivers
Icom IC-271E 2m multi mode £299.00
Icom IC-490E 70cms Mobile £250.00
Kenwood TS-2000 All Band Base £949.00
Kenwood TS-271E £165.00
Kenwood TS-790E 2/70 Base £750.00
FT-290RMKI 2m Multi mode £150.00
Yaesu FT-790 £159.00
Yaesu FT-1500M £129.00
Trio (Kenwood) TS-711E 2m Multi-mode £375.00
Yaesu FT-817 Portable Transceiver £379.00
IC-7400 HF, 6m & 2m transceiver £849.00
Icom IC-821H Dual Band transceiver £599.00
Yaesu FT-290MkII 2m Multi-mode transceiver £250.00
Kenwood TS-2000 HF, 6m , 2m & 70cm Transceiver £1,199.00
Yaesu FT-736R 6m, 2m & 70cm Base £799.00
Yaesu FT-480R 2m SSB, CW & FM Transceiver £220.00
Yaesu FTV-901R 2m / 70cm Transverter £275.00
ICOM IC-207H Dual Band Mobile £149.00
Yaesu FT-817ND HF 6m VHF UHF SW Transceiver £439.00
Kenwood TS-2000 All Mode Multibander Transceiver £999.00
ICOM IC-2200H 144-146 £189.00
Icom IC-7000 1.8 - 70cms Mobile Transceiver - IC7000 £899.00
FT-817ohDSP Yaesu HF/6m/VHF/UHF SW Transceiver £499.00
Yaesu FT-1802E FM 2m Band Transceiver £98.00
The TINY-2 MK-II - With Open Squetch Board £109.00
Kenwood TH-741E - VHF/UHF transceiver £229.00
TM-V71E - VHF/UHF Mobile Transceiver. £229.00
DR-635E Alinco 2m/70cm FM Dual Band Mobile £239.00
Virtual Radars
AirNav Radarbox 2009 version £299.00

bhi

ANEM amplified module. .....£127.99.
1042 6-way switch box.....£29.99.
NEDSP-1061-KBD DSP module..£101.95.
NEDSP-1062KBD Noise Module.... £106.95.
NEIM1031 Noise Module.....£142.95.
NES10-2 MK III speaker .....£112.95.
1090 Radiomate Keypad.....£89.95.

bhi

PayPal MasterCard VISA VISA Electron SWITCH SOLO

Stock and prices accurate as of 23/08/2011. E&OE. For accurate, up-to-date prices please check our website before visiting our shop

http://www.radioworld.co.uk

Tel 01922 414796
Fax 01922 417829
skype radioworld_uk

Colin Redwood G6MXL's What Next?
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-Mail: what.next@pwpublishing.ltd.uk

'No See' Antennas!

In this *What Next?* column Colin Redwood G6MXL, says, hopefully the neighbours will have difficulty spotting your reduced visual impact antennas and looks at the new *PW* archives on CDROM.

Welcome to *What Next?* (*WN?*) where I'm considering that reduced visual impact antennas can be most helpful! Indeed, I suspect most Amateurs at some point will have had a finger pointed at them by family or neighbours in respect of their antenna systems. Others will perhaps have limitations on what they can realistically put up antenna wise.

So this month I'm looking at a number of approaches that can reduce the visual impact of an Amateur station's antenna systems. I should first make the point that the performance of most of the antennas I'm describing is generally less than their more visible alternatives. The location of some of the ideas I will be presenting may limit the maximum power that can be used without causing electromagnetic compatibility (EMC) issues.

Nevertheless, I hope that many readers will find something that will help them get on the air with less visual impact. The article may also provide an idea for an antenna system at an alternative location.

One Antenna – Multiple Bands

The first approach I am going to consider is using one antenna on multiple bands. It is probably the most obvious way of reducing the visual impact of an Amateur Radio station. No doubt many will think of using traps for high frequency (h.f.) antennas. Traps can be put into dipoles (**Fig. 1**), Yagi and even vertical antennas. They also have the advantage of slightly reducing the overall length of the elements of an antenna.

However, traps don't have to be confined to the h.f. bands. Some years ago, Jaybeam used to make a trapped 4-element 50/70MHz (6m/4m) beam.

For very high frequency (v.h.f.) operations, many Amateurs use dual-band 'white stick' poles for the 145 and 433MHz bands. There are designs that cover three bands. I have used a very compact 50/145/433MHz antenna for a number of years **(Fig. 2)**. And in practice I've found the performance on 145 and 433MHz bands to be perfectly satisfactory for participating in my club net and other local contacts.

While there are plenty of 50MHz antennas with better performance, I have found that a tri-band white stick is good enough to make some contacts around Europe and even across the Atlantic using Sporadic-E propagation. As I have said on previous occasions, getting the antenna as high as you can and using low-loss feeder (especially at 145MHz and above) will give best results.

Designs of Yagi antennas with elements that are cut for more than one band, sharing a common boom exist. I found for example that I

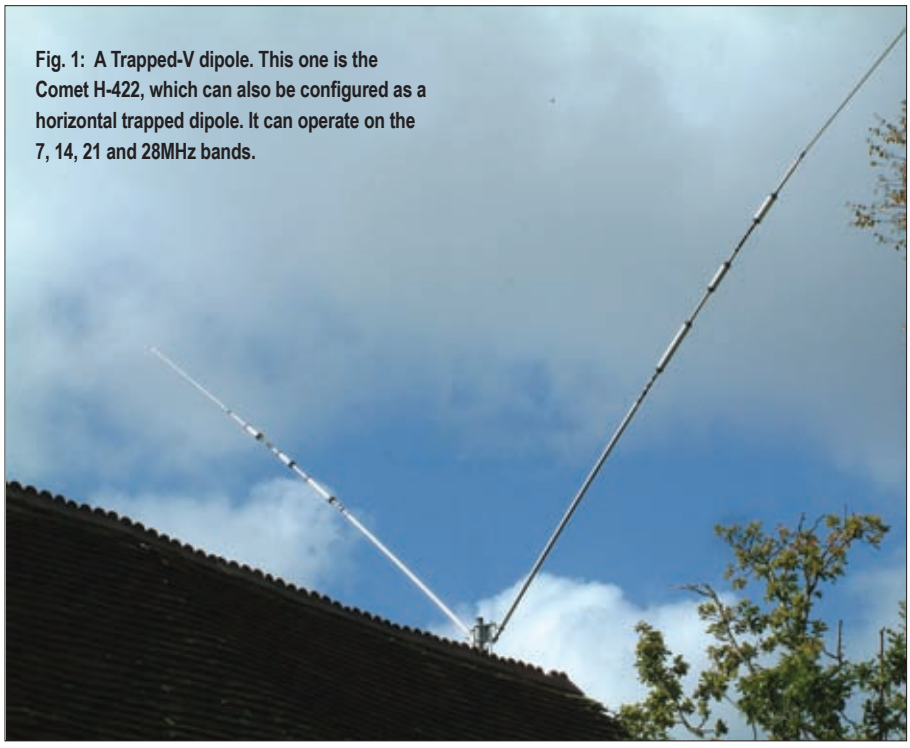


Fig. 1: A Trapped-V dipole. This one is the Comet H-422, which can also be configured as a horizontal trapped dipole. It can operate on the 7, 14, 21 and 28MHz bands.

Fig. 2: A small triple-band (50/145/433MHz) antenna, which is ideal for local contacts. Notice how the support mast has also been used to support the feed-point of a wire antenna saving the visual impact of a second support.

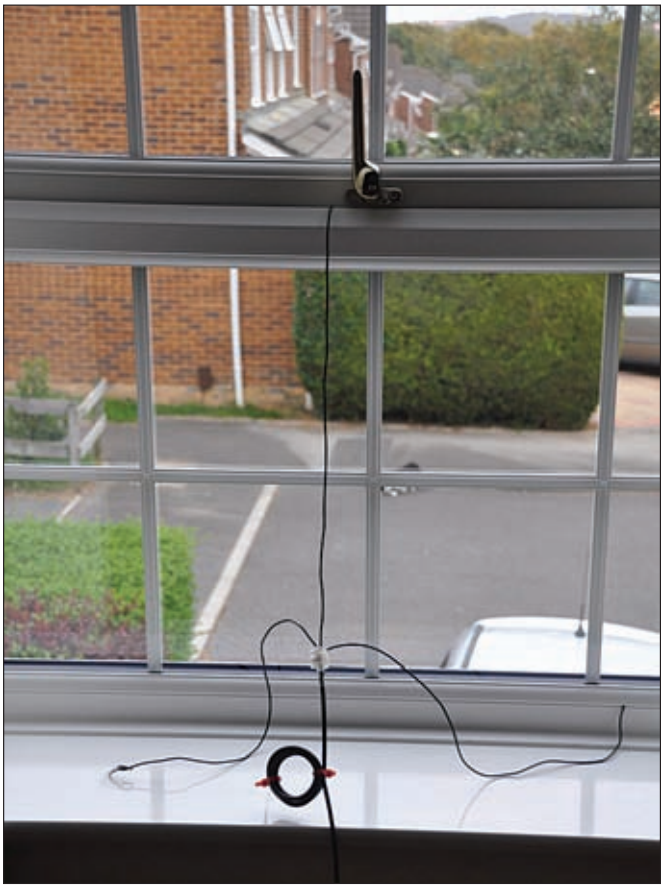


Fig. 3: A simple and cheap ¼-wave antenna for use from an upstairs window.

Fig. 4: Two mobile whips fitted back to back to form a dipole with coils to reduce the dimensions to a fraction of a normal dipole length.

could successfully install a 50MHz dipole onto the boom of a small 3-element Yagi for 70MHz. I suspect that performance may have suffered a little, but for me it meant getting on two bands rather than having to choose between them. This technique can also be used at h.f.

Indoor VHF Antennas

If you are limited to indoor antennas, I can suggest an idea that works quite well and doesn't cost a fortune (**Fig. 3**). Cut three pieces of wire about 480mm long. Next, take a 'chock-block' connector and connect the outer of some coaxial feeder to two of the wires. Then connect the centre of the coaxial cable to the other piece of wire. At the other end of the coaxial cable, fit a connector to suit your transceiver.

Mount the antenna by a window with the centre running vertically, and the two wires from the screen running to either side. Voila – one very simple, cheap and remarkably effective antenna for the 145MHz band! This makes an ideal antenna to take on your travels. It performs better than some flexible whip ('rubber duck') antennas. I see no reason why the design could not be scaled up to give an antenna for 70MHz or perhaps even 50MHz. Likewise it could also be scaled down to give a 433MHz antenna.

Reduced Size Antennas

Another approach to reducing the visual impact of antennas is to reduce their size. Inserting coils into dipole elements can reduce their lengths by a significant margin. Taken to the extreme, it is possible to use two mobile whips screwed into a centre-piece as a dipole (**Fig. 4**).

The same approach can work remarkably well and may enable operation on the 7 and 3.5MHz bands when space would not otherwise permit. Each side of the dipole will need to be carefully adjusted for length on the desired operating frequency on the band in question. I've found this approach can also be quite effective in temporary locations.

Another approach to reducing the size of an antenna is to use a centre-loaded 'sloper' design. This approach was described by **C.D. Peake G0NZI** in the October 2007 issue of *PW* where he described a top band antenna just 7m long!

Another approach is to use 'slinky' or 'springy' coils. This approach was

Fig. 5: A gutter mounted antenna. Changing the wire from black to white would make the antenna less visible, as would applying a little tension to prevent sagging.

described by **John Heys G3BDQ** in his *Antenna Workshop* article in the March 2008 issue of *PW*.

Down Pipes

Most people are pre-disposed to think that plastic gutter down pipes are installed on houses to get rain water from the gutter to the sewers. However, while this is probably the case for most pipes, I see no reason why it's not possible to install an additional down pipe in which to run antenna feeders!

Likewise, it should be possible to install a vertical antenna in a plastic down pipe. As long as the material is of the right colour and size to the rest of the premises, then I suspect this could be made to look very unobtrusive. Obviously – there must be no visible gap at the top or bottom to give the game away.

If you're considering this approach it might be worth trying a piece to see whether it affects the performance adversely, as I recall reading that some types of plastic absorb radio frequency energy. Also ensure that any water that does enter the top can drain away at the bottom.

Plastic Gutters

These days, many homes have plastic gutters. Based on a small sample of round profile gutters that I have looked at closely, I reckon that a wire antenna can be installed either behind or under most of them, depending on the design of the gutter clips. Choosing a plastic covered wire of a similar colour as the gutter should be easy, as most gutters are either white or black (**Fig. 5**).

When I tried the suggested technique, I found it helpful to keep some tension on the wire so that it didn't sag and become visible between clips. By using either a ventilation slot in, or drilling a discrete hole in the soffit board, feeder can be routed into the loft or attic space and then down to the shack.

If you are forced to install antennas surreptitiously, then it pays to do a bit of planning. For example, combining the installation of a gutter or down-pipe antenna with cleaning out the gutter can help disguise the activity from neighbours, as can choosing a time when they are not about (perhaps when they are on holiday). Another approach might be to combine the antenna installation with the outside Christmas lights that have become popular in recent years, and then perhaps leaving them up all year round.

Fig. 6a: Feeder partially concealed behind a plastic downpipe. The black feeder used here illustrates the idea.

Fig. 6b: Using white feeder has helped hide the feeder still more – an even better idea would be to use matching cable ties!

Feeder Routing

Careful routing of feeder can help minimise the visual impact of an antenna system. Clipping feeder to a wall behind a gutter down pipe, or even cable-tying it to the down pipe can minimise the visual impact. Again, simple things like the colour of the feeder, cable clips and cable ties, can make all the difference (**Fig 6**).

Tip: Did you know that it is possible to buy RG58 feeder with a white sleeve instead of the usual black? Used with the common white plastic down pipes and white or transparent cable ties, you could be well on the way to making your feeder much less visible than it might otherwise have been. An alternative approach to disguising the feeder is to thread it through cable sleeve of a suitable diameter and colour – making sure that you seal the top end to stop water ingress using self-amalgamating tape.

A Mobile Station?

If operating from home is really out of the question, perhaps you can install a station in your car and operate either in the drive or when parked elsewhere. There are two reasons why I would suggest that Amateurs avoid operating whilst actually moving. Firstly, the laws concerning driving without due car and attention and secondly many cars have so much electronics in them that they may be affected by strong radio signals from an installation so close by.

Back Numbers OF *PW* On CD

As I was preparing this article, I was looking back through several years of *PW*s to find some specific articles I wanted to refer to. I was amazed how much easier it was to find the articles I wanted when they were in 2010. Why? Quite simply I have purchased the *PW* Back Numbers for 2010 on a CDROM.

Now, instead of having to find the December issue 2010 (which I had misplaced) and then the index within it, and then find the issue and the specific article within the issue that I needed to refer to, I could simply look it all up on a single CD! But perhaps the biggest bonus is not having to re-file all the issues that I had extracted from archive boxes!

I found the CD really easy to use on my PC running *Windows XP SP3*. Each issue is absolutely complete from cover to cover on a separate '.pdf' file. This means that I can now free up some valuable shelf space. I am looking forward to welcoming further back-numbers on CD so that I can clear even more shelf space!

Updates to RSGB Books

From time to time, the **Radio Society of Great Britain** (RSGB) make updates to their training manuals and other books. Sometimes these are corrections, and sometimes the updates reflect minor changes to the syllabus or improvements. The updates can be found at **http://www.rsgb.org/books/extra/**

For training, I recommend purchasing the latest edition of the relevant book a few weeks before starting a course. If you have a previous edition, the updates can be quite helpful in bringing a previous edition up-to-date.

Readers' Antennas

I would be really pleased to feature some readers' low profile antennas in a future What Next column. I look forward to hearing from you very soon!

●

Harry Leeming G3LLL's In the Shop
The Cedars, 3a Wilson Grove, Heysham, Morecambe LA3 2PQ
Tel: (07901) 932763 E-mail: G3LLL@talktalk.net

Pot Cores and Kippered (Smoked) Rigs!

In this month's *In The Shop* column, Harry Leeming G3LLL discusses dodgy pot cores, safety problems, tobacco damage, awkward relays and switching faults.

Welcome to *In The Shop* (*ITS*)! Some time ago I received the following interesting E-mail from Derek Beales G3MWO (Sufolk), who wrote: *"Last year my Icom IC-761 continued functioning normally except that the output power was significantly lower than usual. I tested just about everything I could think of without success as all voltages seemed normal. Finally, a friend came to the rescue by lending me his IC-765 which is a very similar rig. I found that the drive r.f. levels much lower in mine than in his. Then I noticed that one of the driver tuned circuits had a small pot core on a coil in his rig, whereas in my '761 there was none.*

"Oddly enough the adjustable core would bring the drive to a peak without the enclosing pot core. Further investigation revealed that my pot core was on the floor on a dark surface where it was not easily seen. Clearly – as all this was after a spell of very hot weather – the core had fallen off the coil as the securing wax had melted, and laid inside the steel screen cover. in the IC-761 this particular coil pack lies upside down in normal use so gravity had taken over! Replacing the core brought the drive and output back to normal.

"The coil had peaked to resonance at some other (higher) unwanted frequency without the pot core – which is what fooled me. The pot must have fallen to the floor when I removed the outer screen cover without me noticing it. Without the help of my good friend ***David Johnson G3MPN*** *and his IC-765 for comparison, I would probably still be pondering!"*

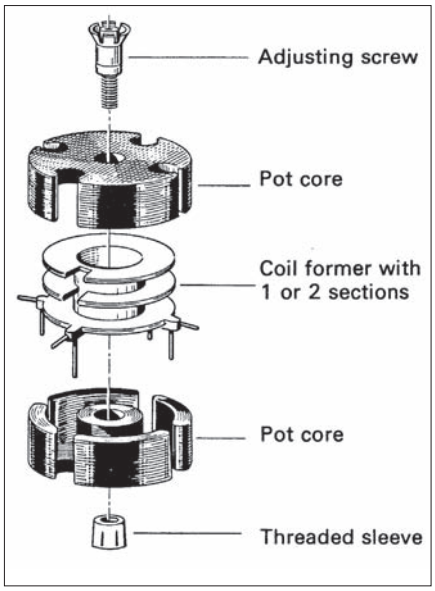


Fig. 1: The type of pot core that Derek G3MWO had trouble with.

Many thanks for that Derek, this fault could occur on any equipment fitted with this kind of coil, **Fig. 1** and so it is well worth passing on.

Another Look At The FT-102

Despite the fact that I have been retired for over 10 years, I seem to be getting more and more requests to look at these Yaesu rigs. I can – however – only do this for locals, so I'll make the position clear.

If you are thinking of buying an FT-102, my advice would be to only do so if you or a friend is competent to carry out repairs, and don't even think about buying one if you (or the present owner) are tobacco smokers!

The FT-102 is an excellent rig when it's working properly, but it does tend to suffer from intermittent faults. Because of this it's impossible for any repairer to be absolutely sure that every trouble has been definitely 'nailed'. And (whoever you get to repair one) you should be prepared to collect it, test it for a few weeks and then (if necessary) make a return visit if there's still a problem.

Sending the rig by carriers, or making round trips of several hundred miles is just not a good idea! So, having got that off my chest, let's have a look at some of the problems.

Safety warning: Please note the warnings about working on live equipment! Next - please remember that the FT-102 has been known to hold the charge on the 900V high tension (h.t.) rail for over a week after it's been disconnected from the mains. And there are several points under the chassis where you can accidently touch this high votage line.

I was working on an FT-102, having disconnected it from the mains, and then went on holiday. In fact, I remember when I came back from one holiday, that I found out **the hard way** that the 900V supply was still charged up. Since then, when working on the FT-102 I always, disconnect it from the mains, wait five minutes and then short the 900V line to chassis.

Small relays (such as the unsealed ones in the 211 series) can be a problem with any rig. The FT-101ZD for instance has only one, but the FT-102 has six relays, and it does not take a genius to work out that this considerably increases the chance of one of them causing trouble.

The Main Culprits

The main culprits are the five relays on the r.f. board, shown in **Fig. 2**. You can see two original relays with transparent covers, and two blue Omron ones that have been used as replacements. (The 'extra' blue one is a reflection in a screening cover!).

The yellow-bodied pen points at the fifth relay, which is located underneath the band switch spindle. (Just to make replacement or cleaning difficult!).

The fan at the rear draws air right

across these five relays and as the original items were not air tight any pollution in the atmosphere soon has an effect. Strangely, the rig doesn't just become intermittent, instead the receive gain, and sometimes also the transmit drive, fall off as the contact resistance increases with age. The best cure, of course, is to replace the relays, but as these are becoming difficult to get hold of I have recently resorted to cleaning the originals.

The first difficulty when trying to clean the relays is removing the transparent plastic covers because the relays are mounted very close together. To help, I've adapted a small screwdriver as per **Fig. 3**. I use this to lever the tops off the four relays that it's possible to get at.

Note: Before levering the tops off – it's important to mark the covers clearly to show as to which way round they fit! refitting the covers is difficult enough as it is in the cramped space, but if you don't know which way round they are supposed to go, you stand a very good chance of damaging a relay during the refitting operation.

Once you have removed the relay covers you'll need some switch cleaner that **does not** contain a lubricant, such as ' Aero Klene 50' from Maplin. (Don't use anything that leaves a residue, or which damages plastic). You'll also need a set of sparking plug feeler gauges with the '4 thousandth' of an inch blade cut down as per **Fig. 4**. With care you will find that you can pass the feeler gauge between the contacts, apply the switch cleaner, and then work it back and forth cleaning the contacts.

The fifth relay at the front is another story! First try cleaning it. If you put the rig on its side it is possible using the tool shown in Fig. 3, to force open the plastic case slightly. Once you have done this, flood it with the cleaning fluid, then fire up the rig (watch where you put your fingers!) and operate the push to talk (p.t.t.) and the pre-amplifier button quickly. Do this many times until the cleaning fluid starts to dry and then repeat the operation a few times.

With a bit of luck (sometime before your thumb drops off!) the rig will start to perform perfectly. If however, it's still somewhat intermittent gently poke at all the relays one by one. By doing this it's usually possible to identify the one that is still causing trouble. Once you've identified it, try re-cleaning it, and then if all else fails look on the internet for a replacement. The FT Club (also known as the 'Fox-Tango' Club) in the USA have a few – **but I'm sorry – I can't help**.

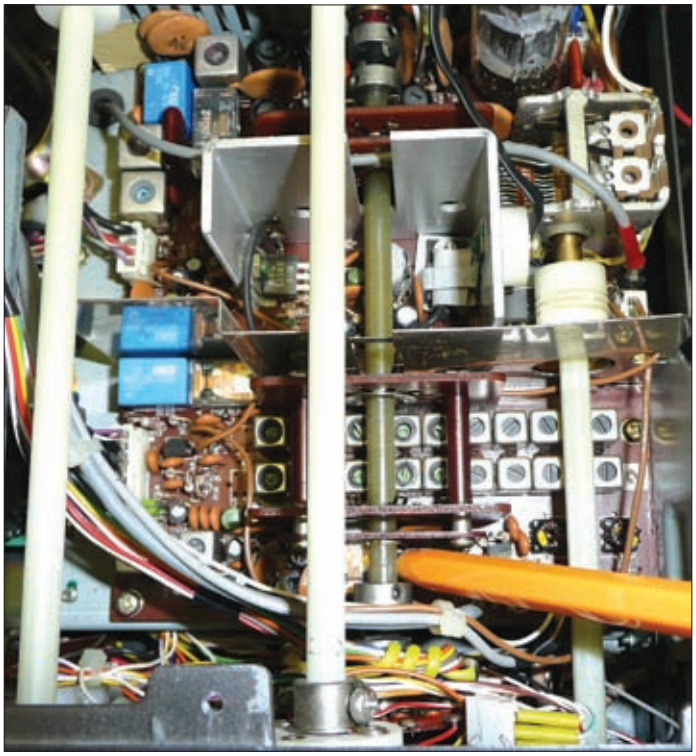


Fig. 2: The r.f. board from the FT-102. Note that there's a reflection of the lower blue relay on the metal screening wall. Once you've removed the relay covers you will need some switch cleaner that does not contain a lubricant.

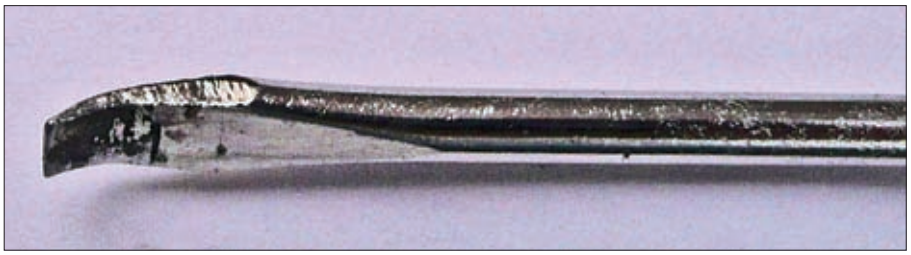


Fig. 3: A modified screwdriver can make the job of removing the relay much easier.

The front relay can be replaced with difficulty and patience. Cut the contact pins under the p.c.b. as short as possible and then use normal unsoldering techniques. It is just about possible to tease it out from under the band change switch, without getting involved with the mammoth task of removing the whole r.f. board, or the switch (if it's really necessary to do this, then carefully 'smash' the relay cover).

To fit the new relay similarly cut the pins short, and using sticky tape slide it in place. It's best to leave the cover on, but if necessary leave the cover off. If you have difficulty lining up the pins with the mounting holes, temporally hold the relay in place on the underside of the board to make sure that all the solder holes are clear.

The Band Change Switch

If you look at Fig. 2 you'll see that the band change switch incorporates three separate switches coupled together with spindle couplers. One coupler is at the front near the yellow pen, and the other coupler is near to the power amplifier (p.a.) valves at the rear. The spring loaded indexing ball is on the front section, and it is this section that determines as to what band is indicated by the display, and as to

Fig. 4: Feeler gauges can make an ideal relay contact cleaning tool.

The FT-102 is a great rig, but perhaps not if you are (or a previous owner was) a heavy smoker!

what frequencies are generated by the synthesiser.

A common fault with the FT-102 is that one of spindle couplers slips. If the one at the front moves only a fraction the rig will become intermittent, while if it moves more than a few degrees you end up with the synthesiser switched to one band and the receiver on another!

The result is that the receiver's reception becomes very weak; on some bands nothing is heard, but on others non-Amateur stations appear. If the rear section slips, the receiver will be okay, you will have loads of p.a. current, but a p.a. circuit which refuses to load or tune. The cure is obvious – align the switch correctly – but this is rather easier said than done!

If only the front coupler (and not the knob) has slipped, the display and the control knob will indicate as to which band the front section of the switch is set to. (At this point re-read the safety paragraph, before removing the p.a. stage covers) and then short the p.a. valve's top caps to chassis). It should then be possible to trace the wiring from the p.a. switch to the coil, and by referring to the circuit diagram determine when the switch is on (Let's say 1.8MHz).

Next, all you **should** have to do is to loosen the spindle coupler at the front, and rotate the front section of the band change switch, until this also indicates 1.8MHz. If only it were so simple!

On some rigs it seems that the three separate switches weren't purchased from the same supplier, as the indexing doesn't line up perfectly. There's some play in the spindle couplers. Because of this, on the FT-102 it's recommend that you always change band by rotating the switch in a clockwise direction. If you do this it's then possible to set the spindle couplers so that a reasonable compromise can be achieved, and that the switches all make contact on every band.

I did once have a rig where it seemed impossible to get the contacts on the rear ceramic switches to line up with the other switches on all bands. If I got them right on let's say 1.8MHz – they were hardly making contact on 14MHz!

If you have this problem it's possible to melt the solder and 'glue' on the out of line ceramic fixed switch contacts with an iron, and then to rotate them on their mounting rivet slightly. This help to obtain a better match with the slider.

Monitoring PA Current

The p.a. current on the FT-102 need monitoring! Although I don't like repeating myself too often, as I mentioned in the February 2007 issue, it's essential to keep a watchful eye on the p.a. current when operating the FT-102. Due to the three p.a. valves being very close together they do tend to warm each other up.

The close proximity can make the rig go into thermal run away. If you don't notice that the p.a. current indicated by the I/C meter is gradually creeping up, it can result in considerable damage. My recommendation is to set the p.a. current at about 60mA, (not 75mA as suggested in the manual) when the rig is cold and then always leave the rig's 'Meter Select' switch in the I/C position.

Watch the I/C reading whilst you are transmitting, and if the resting current starts creeping up to more than say 90mA, make your excuses quickly, and go back to receive while things cool. If this problem occurs frequently you may have to fit three new valves and improve the ventilation, or modify the bias on the p.a. stage. (More details about this next month).

Cooling Fans!

Excessive heat results in unreliability, and so small compact high power 13.5V power supply units (p.s.u.s) need powerful fans to keep them cool. If however, the p.s.u. is over-rated for the task in hand (if let's say a 40A unit is used to drive a 100W rig in the s.s.b. mode, the fan can safely be run at a lower speed and this will vastly reduce the noise.

The obvious answer way of achieving a lower speed is to connect a resistor in series with the fan. Unfortunately, as more current is required to start a motor than run it, this method will sometimes result in the fan not starting. The simple answer is to connect a filament type lamp in series with the motor. A normal 12 100mA pilot lamp must,(from Ohms Law R= E/I,) have a resistance of 120Ω when it's operating.

If you care to check a lamp with an Ohmmeter however, you will find that it has a resistance of about a tenth of this when cold. By trial and error you should be able to find a lamp that will slow the fan down the required amount, but which will still 'kick start' it. I usually start experimenting by trying lamps of the same voltage as the motor, with various wattages.

As an example a 25W mains voltage lamp, fitted in series with our bathroom fan very much reduces the noise while still enabling the fan to work efficiently. But please don't do the silencing and then end up 'cooking' your equipment! See you next time! ●

Problems

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 aren't 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).

Carl Mason GW0VSW's HF Highlights
2 Golwg-y-Bryn, Woodland Road, Skewen, Neath, Port Talbot SA10 6SP
Tel: (01792) 380822 E-mail: gw0vsw@btinternet.com

HF Highlights

Carl Mason GW0VSW presents his monthly round-up of your h.f. activities and welcomes some new reporters this month!

Welcome to this month's *HF Highlights* (*HFH*)! Now may be the time to remind you that winter is not that far off and now maybe a good idea to check out your antennas for wear and tear and correct anything before the colder conditions make working outside unpleasant.

In my own case, the coaxial cable feeding my SRC vertical was found to have corroded and required a replacement, which has not only improved the tuning and reception greatly but also that of received reports. It's amazing how quickly some of the feeders and plugs we use in our hobby deteriorate so quickly in our rather varied climate even when care is taken to prevent corrosion.

The DX News

On to some DX news now and first to Minami Torishima or Marcus Island OC-073, which is an isolated Japanese coral atoll in the north-western Pacific Ocean and lying about 1,848km (1,148 miles) South East of Tokyo. Take JG8NQJ/JD1 will be active here until mid-October and during this period he will be QRV on both 10 and 18MHz. later in December he will return to the island and operate on all h.f. bands (QSL via home call, direct or via the bureau). The island is currently used for weather observation and has a radio station on it but civilians are not normally allowed there.

The callsign 9Q6CC has been issued to **Christian Cardarello CX2CC** for his activity from Goma, on the northern shore of Lake Kivu, in the Democratic Republic of the Congo. He's there for one year and activity will be on all h.f. bands using s.s.b., digital modes and slow (QRS) c.w. The QSL route is via home-call Avenida Italia 3319, 11600 Montevideo, Uruguay. And all cards will be replied to after February 2012.

Off to Italy next! Italy, the home of the ancient Roman Empire only became a nation in its own right just 150 years ago on March 17, 1861. On that day, Victor Emmanuel II became the first king of a newly unified Italy. To mark the 150th anniversary the special callsign IO4UI will be aired on all h.f. bands until September 30th. The QSL route is via I4JEE and all contacts will be confirmed automatically via the bureau.

Fig: 1: Franks Wyer G8RY's Mazzoni Loop antenna.

Fig. 2: Peter Leng's portable QRP station.

Your Reports

On to your reports next, and first up is **Frank Wyer G8RY** (Suffolk), who sent in a photograph of the 1m diameter Mazzoni loop (mentioned in last month's column) mounted 4m above ground. It's rotatable and slightly directional and has a gain of about 3dB. It replaced a MFJ loop antenna which started his interest in this type of antenna and is used for the 7-28MHz bands. Frank is more than pleased with the loop and enjoys using it alongside a long wire antenna fed with an SGC Smartuner for the 3.5MHz band using a Icom IC-7800 and his preferred mode PSK31.

On the 7MHz band was **Bill Ward 2E0BWX** in Edwinstowe, Nottinghamshire who used a Icom IC-7400 at 50W and Pro Whip antenna to work stations DK5DE (Germany) 0750, ON7TQ (Belgium) using s.s.b. at 0900 and later PA3GEG (Netherlands) at 1800UTC.

Also on the band was **Geoffrey Powell M1EDF/M3UXB** who had c.w. QSOs with IK1QAD (Italy) 2010, DL9CM (Germany) 1910 and DK6LH at 2200UTC. The last two stations both had a nautical theme for their QSL cards, which Geoff has now added to his growing collection. All contacts were made using an Icom IC-718 and doublet antenna at 15m (50ft approx) a.g.l.

In New Zealand **Peter Leng ZL4TE** has found the bands "awful" but was on his way to Paihia at the top of North Island OC-036 with his Yaesu FT-817, MFJ tuner and long wire to try out some QRP operating. He's promised a report when he returns!

Roy Walker G0TAK/2E0RAF – celebrated his 72nd birthday in July and said "I like the way the French say "72" as it translates literally to 'sixty twelve' which I much prefer!!! In view of this I have resolved to only work QRP power levels for the next 12 months and look forward to working readers on or around the usual QRP calling frequencies.

New reporter **Colin Evans M0CGH**

in Keighley, West Yorkshire is a keen Summits On The Air (SOTA) activator and can often be heard, as M0CGH/P, from various summits. He wrote in to say "My local radio club held an activity and camping weekend in July near to the town of Skipton, North Yorkshire. I don't have transmitting antennas at my home QTH but I do enjoy building my own gear and the activity weekend was a good time to try out my creations on air. Starting out with my FT-817 to try my home-brew SOTA style multi-link dipole I used 1W of c.w. on 7.027MHz to work Joop PA3JD at 1243.

"I then switched over to my home made Tuna Tin 2 which is a simple transmitter that is fixed on 7.030MHz and uses just two transistors and produces about 340mW. I used my 'Sudden Storm' receiver by **Rex Harper W1REX**. I then worked Norbert DL2DBU, who lives near Oldenburg in North West Germany at 1320UTC.

"My next move was to switch onto 10MHz to try to gain a contact on my home-brew Rock Mite 30 transceiver. The Rock Mite is a popular kit designed and sold by **Dave Benson K1SWL**. My rig is slightly modified with a VXO which allows the rig to be put exactly on 10.116MHz, the QRP calling frequency on the band.

The rig also boasts a higher than standard output power of about 520mW with a 12V supply. Many 'CQ' calls were made but didn't produce a contact, so I gave up for the day. Finally, on Sunday the July 24th I was determined to have my first QSO on my little Rock Mite 30 creation. So once again, I erected my SOTA style multi-link dipole in an inverted-V configuration. After a couple of 'CQs', I managed to hook up with Hans HB9UH in Switzerland at 0850UTC, thus ending a brilliant weekend!

"Whilst only three QSOs were made, plus two whilst operating GX0KRS on QRO gear they were all very enjoyable and well worth the effort. I just wanted to share what can be achieved with low power and patience!"

Well done Colin! Now there may not have been a lot of contacts in the log but the feeling you get making a QSO with equipment you made yourself is well worth the time and effort. With kits now available for modest prices, there's no reason not have a go yourself, get out the soldering iron and build one as a winter project. Take a look at **www.w0ch.net/kits/kits.htm** for a few ideas and let us know how you get on!

The 10MHz band was also used by **George Davis G3ICO** in Yeovil, Somerset who used his Elecraft K2 at 5W with a 40m long doublet antenna working HB0/DM3MR (Liechtenstein) 1445 and later OJ0VR (Market Reef) EU-053 at 1932UTC.

Fig. 3: The QSL card from UZ9JR who was worked by Steve Wellon M0SAS on 14MHz using PSK.

Fig. 4: The QSL card from TM2RHC who was worked by George Davis on 14MHz using c.w.

The 14MHz Band

On the 14MHz band conditions were not all that great but George G3ICO found TM2RHC (France) at 0734 with a special callsign used by members of Val d'Issolle's club F8KGH and ADRASEC83 during June. This is used during the Air Show at Le Luc en Provence Army Airbase, near Saint Tropez in the South East of France (QSL via F4EUN). Then came DR800PORT (Germany) 1413 with a call celebrating 800 Years of the Port of Wismar in the Baltic Sea and HG2011EU (Hungary) 1816. This is a call celebrating the Hungarian Presidency of the European Union for which an award is available with details at QRZ.com.

Our next log is from **Eric Masters G0KRT** in Worcester Park, Surrey who used his Kenwood TS-570 at 100W to a modified home brew W3EDP antenna 26m (84ft) long with counterpoises tuned with an SGC-230. He then worked 4K6FO (Azerbaijan) with s.s.b. at 0803. Then dropping his power to just 1W, QRPp Eric then worked c.w. stations UX4FC (Ukraine) 1144, OH7QR (Finland) 1241, RA3AN (European Russia) 1250, UA2FL (Kaliningrad) 1420, UP4L (Kazakhstan) 1430 (QSL via UN7LZ). Then came DL2XL/P (Germany) 1528, OK2QX (Czech republic) 1558 and SP9DUX (Poland) at 1609UTC.

Using PSK31 at 25W Bill 2E0BWX found OK1DOZ (Czech Republic) 0735, OE4RGC (Austria) 0816 and DL9ZU (Germany) at 1713UTC.

We welcome another new reporter – **Andrew Adams M6AZA** – who lives in Tedburn St. Mary near Exeter in Devon, who was pleased to be in the right place at the right time and work FG4NN (Guadeloupe) NA-102 at 2155

Fig. 5: The GB5GHT QSL card for the Special Event station run by John Wakefield M0XIG.

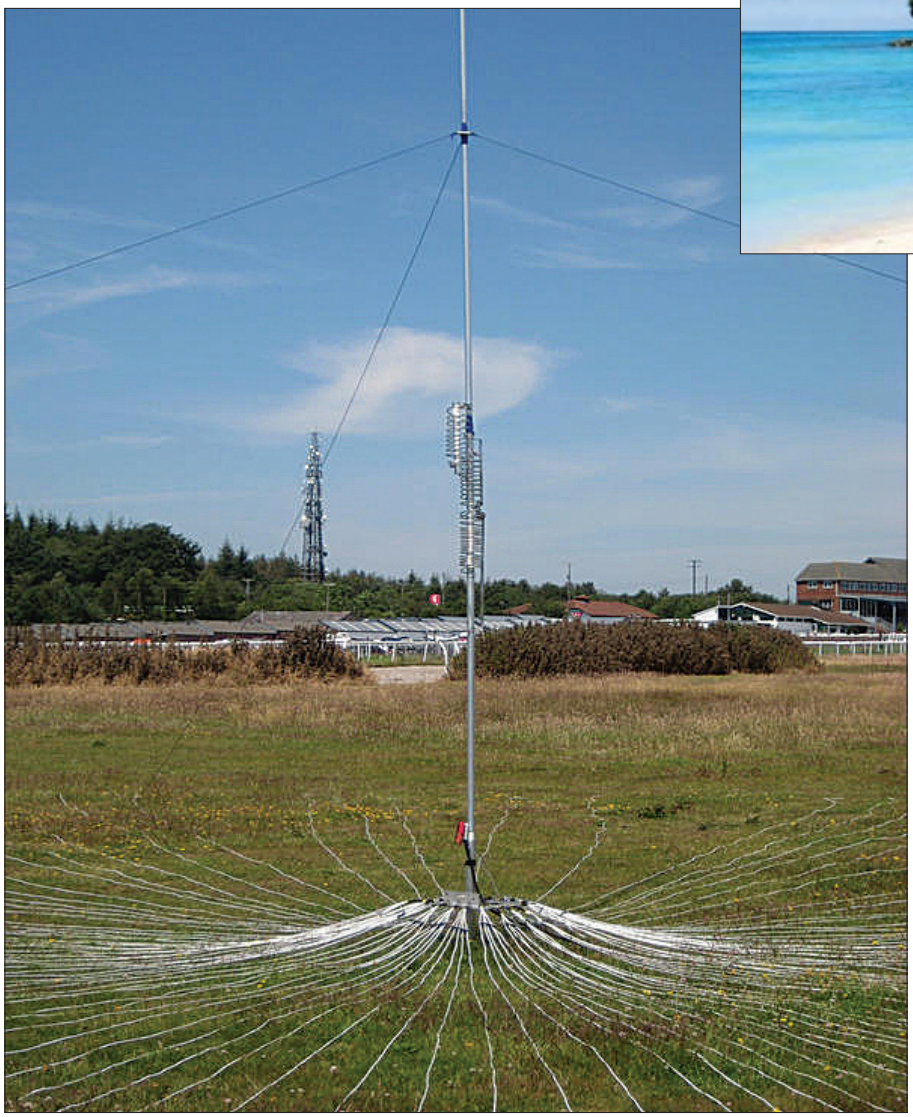


Fig. 6: John Wakefield's vertical antenna with radials used for GB5GHT.

(QSL via NI5DX) who was calling "CQ" on 14.170MHz. Andrew has only been licenced since early June and this contact is his best to date and was made using a Yaesu FT-450D at 10W to a G Whip end-fed Zepp cut for the band.

Well done Andrew! I'm sure your logbook will continue to grow as band conditions improve.

In Worcester, **Steve Wellon M0SAS,** is a keen aviation enthusiast and was very pleased to receive a QSL card from Yury Pronin UZ9RR in Churnigrov, Ukraine for a PSK31 QSO they had in March. Both Steve and Yury are now in regular contact by E-mail and it turns out that Yury was a former Soviet fighter pilot flying the *Flanker* or Sukhoi SU-27 jet.

Steve's contact was made using a Yaesu FT-857D with 20W to a Cushcraft MA-5B beam antenna.

In Devon John Wakefield M0XIG was operating another special event station this time using the call **GB5GHT** in Great Haldon near Exeter. Once again two antennas were used, a Butternut HF6V vertical with 60 10m radials and a WA2NAN True Talk wire antenna at 10m (33ft) with his Yaesu FT-1000MP Mark V with an ACOM 1000 amplifier running between 3 and 400W.

Fig. 7: The FG4NN QSL card sent after he worked Andrew Adams M6AZA on 14MHz using s.s.b.

Just over 1500 s.s.b. contacts were made including VK6WC (Australia) OC-001 near Perth, Western Australia at 0632, 9Y4LAS (Trinidad & Tobago) SA-011 at 0659, 8P6GU (Barbados) NA-021 at 0747, HZ1PS (Saudi Arabia) 1016. Then came W1URV (USA) in Medway, Massachusetts at 1112, HS0ZIN (Thailand) 1543, JR5XPG (Japan) AS-076 at 1829, VE3AO (Canada) 1700. Logged next were V51B (Namibia) 1702, PR7CPK (Brazil) 1934, RW9SJ (Asiatic Russia) 1940, 5B4AHL (Cyprus) AS-004 at 1947, V21MJ (Antigua & Barbuda) NA-100 at 2118. Finally came TA3SA (Turkey) 2124, LU7EC (Argentina) 2142 and ZB3M (Gibraltar) 2146UTC.

John always produces a nice QSL for his special event calls and this operation uses an image courtesy of **Luton Culture** and was made available to him with kind permission of **Dr Adey**.

Singing Off

Well that is it for another month. Once again the bands have been in poor shape but our reporters have managed to find activity even when using low power and simple antennas. As usual my thanks go to Maurio Pregliasco I1JQJ/KB2TJM editor of the 425 DX Newsletter for all the DX information and to all our reporters for their logs. Until next time I wish you all good DX. 73,Carl GW0VSW. ●

BARGAIN BASEMENT

BARGAIN BASEMENT RULES
Only £5 per advert. Subscribers FREE!
Please write your advert **clearly** in **BLOCK CAPITALS** up to a maximum of **30 words**, plus **12 words** for your contact details on the form provided and send it together with your **payment of £5** (**subscribers** can place their advert **free of charge** as long as they provide their **subs number or mailing label**). Cheques should be made payable to **PW Publishing Ltd.**, credit card payments also accepted.

Send your advert to **Bargain Basement, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or E-mail your advert to **peter@pwpublishing.ltd.uk** (If you don't want to include your credit card details on your E-mail, just 'phone us on **0845 803 1979**.

Please help us to help you by preparing your advert carefully. Any advert which contains ?? marks indicates that the advertiseing dept. could not read/interpret the wording.

Please avoid FAXing your advert - it could delay publication.

Advertisements from traders or for equipment that it is illegal to possess, use or which cannot be licensed in the UK, will not be accepted.

No responsibility will be taken for errors and no correspondence will be entered into on any decision taken by the Editor on any of these conditions.

You should state clearly in your advert whether equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

Bargain Basement adverts will now cost £5 per advert (subscribers still free) and will also be published in *RadioUser*, our sister magazine, unless requested otherwise.

FOR SALE

ICOM IC-746 with microphone, HF 6m VHF, 100 watts, £450. KW-107 tuner, £60. Yaesu FT-2100 scratches, serviced, £300. Kenwood TS-850S, nice condition, £450. No boxes.
Tel: G4MGX 01234 741330 (Bedford).

ICOM IC-7000 base receiver station. VHF, UHF with handbook in excellent condition, £325 including P&P. Yupiteru MVT-7100 hand-held receiver, Scan L/ case PSU, handbook, whip antenna, £125 including P&P.
Tel: George 01443 437345 (Mid Glamorgan).

ICOM IC-R8500 RECEIVER in excellent condition. Complete with AC adapter, user's manual. BHI noise eliminating speaker and Wellbrook active loop antenna, £600.
Tel: 01353 741917. Mobile: 07938 005 413 (Cambridge).

LAFYETTE HA-700 £50. Buyer collects. Tel: Tom M3EHA 01606 597342.

LOWE HF-150 in excellent working order. Plus original PSU, original keypad and handbook, etc. £185 plus postage.
Tel: 01903 859712 anytime (West Sussex).

SONY ICF-2001D RECEIVER In very good condition, manual, PSU, £100. Palstar R-30 receiver in mint condition, PSU, manual, £300. Hy-Gain 18 AVQ 10/80m vertical antenna. Brand new, never been used and in original packing, £120.
Tel: Bob Hughes G3HAG 0114 2747950 (Sheffield).

UN-MODDED R-1155N CLYDESDALE ext-PSU 10Q/2 meter. Best offers. Two new VR-102, £20. FDK 700E manual, CCT, £30. AVO valve tester, books, adapters, £160. Manual for AVO valve characteristics meter, £12. Prefer buyer collects. Tel: G3VRB 02380 613782 (Southampton).

YAESU VR-5000 radio in first class condition. No marks, works very well. Manual, PSU power unit. Posted at cost or can be collected, you choose. Sale price £199.
Tel: Don Hepworth 01527 878158 any time (Worcestershire).

WANTED

OLD HALF INCH FERRITE RODS must be half inch, 12.7mm, in diameter and be six inches long or more. Will pay very good money for the rods.
Tel: Peter Tankard 0114 2316321 between 9am and 9pm (Sheffield).

Don't forget to make cheques and postal orders payable to PW Publishing Ltd.

NOW £5

Bargain Basement order form

Please make any cheques or Postal Orders for advertisments payable to PW Publishing Ltd.

Please insert this advertisement in the next available issue of Practical Wireless.

☐ For Sale ☐ Wanted ☐ Exchange

PLEASE NOTE: as a security measure, you must include your house number and postcode.

Name .....

Address .....

.....

..... Post code .....

Telephone Number .....

CARD NUMBER

Signature..... Security number

LAST THREE DIGITS ON THE BACK OF THE CARD

Switch issue number (if on card) .....

Start date of card..... Expiry date of card.....

My Subs Number is.....(or send mailer label)

PW & RU ☐

PW ONLY ☐

		(30)	

CONTACT DETAILS FOR ADVERT. Please only write in the contact details you wish to be published with your advert, ie. do you want your name & address, or just your telephone number? Your advert, you decide! **PLEASE - No FAXed Ads!** (12)

Classified Ads

DISCLAIMER Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. ***Practical Wireless*** advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The publishers of ***Practical Wireless*** wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

Aerials

GAREX ELECTRONICS VHF/UHF accessories and aerials, TVI Filters, 4m & 6m Transceivers.
Tel: 07714 198374
www.garex.co.uk
PO Box 52, Exeter EX4 8WX

VORTEX ANTENNA SYSTEMS Delta Loops, Yagis. Monoband and multiband. For the home constuctor – antenna parts including 6082-T6 tubing, stainless U-bolts, saddles, mounting kits and much more.
www.vortexantennas.co.uk or
07943 871893.

TOP PRICES PAID
for all your valves, tubes, semi-conductors and ICs.

Langrex
Unit 4, Daux Road, Billingshurst, W. Sussex RH14 9SJ
Tel: 01403 785600.
Fax: 01403 785656.
www.langrex.co.uk

Valves

VALVES AND ALLIED COMPONENTS IN STOCK Ring for free list. Valves/ books/magazines wanted. Geoff Davies (Radio).
Tel: 01788 574774.

QSL cards

FULL COLOUR QSL CARDS for all your QSL needs. Shirts and caps with callsigns and also ham cartoons by GW3COI. For free samples contact Chris M0DOL. E-mail: qslers@aol.com
24 West Ridge, Kingsthorpe, Northampton NN2 7RA.

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

For sale

X-tals 100kHz-250MHz. Std 10.106, 10.245, 10.7, 11.155MHz @ £1.50. Callg 3.56, 7.030, 14.060, 28.060MHz @ £1.50. 1.7468MHz X-tal Clansman 321 ex-stock p.o.a. 10.7MHz 10kHz filter @ £5.75, 1.4MHz SSB filter p.o.a. P&P £1.50 + VAT. IQ Electo
Tel: 0208 391 0545.
E-mail: vincentvoy@hotmail.co.uk

CZECH MORSE KEYS 50 years old, still in original factory wrapping. Extremely well made with superb keying action.
www.czechmorsekeys.com

Repairs

REPAIRS TO ALL AMATEUR AND VINTAGE Rx/Tx Cost effective service. Phone or call in for details. Kent Rigs, 52 Salisbury Road, Chatham, Kent ME4 5NN. Tel: 07903 023437.

RELIABLE REPAIRS for all amateur and vintage equipment. Professional service, reasonable rates.
Tel: 01807 580376.
E-mail: radiorepairs@btconnect.com

Please ensure that and cheques or postal orders are made out to PW Publishing Ltd.

ORDER FORM FOR CLASSIFIED ADS

PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 20% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979, Fax: 01202 659950.

Please insert this advertisement in the ..... **issue of** ***Practical Wireless*** (if you do not specify an issue we will insert it in the next available issue of *PW*) for ..... insertion/s. I enclose Cheque/P.O. for £.....(42p per word, 12 minimum, please add 20% VAT to total).

Name: .....

Address:.....

.....

.....

.....

Telephone No.:.....

Box Number @ 70p: Tick if appropriate

Category heading:.....

Please photocopy this form or write on a separate sheet if you prefer

TRADERS TABLE

The equipment for sale on this page is secondhand or ex-demonstration

Disclaimer

Advertisements from traders for equipment that is illegal to possess, use or which cannot be licensed in the U.K, will not be accepted. While the publishers will give whatever assistance they can to readers or buyers having complaints, under no circumstance will the magazine accept liability for non-receipt of goods ordered, late delivery or faults in manufacture.

NEVADA

023-9231 3090

TRANSCEIVERS

ALINCO DJ596 DUALBAND H/HELD £89
ALINCO DJC7 DUALBAND H/HELD £84
ICOM 575A ALL MODE TRANSCEIVER £399
ICOM 7800 HF & 6M FLAGSHIP TX £5495
KENWOOD TS570DG TRANSCEIVER £599
YAESU FT100 MOBILE TRANSCEIVER £399
YAESU FTC740A 4M TRANSCEIVER £69
YAESU FT450AT TX WITH ATU £499

HANDHELD SCANNERS

AOR AR8200MK II H/H SCANNER £299
ALINCO DJX2 AM/FM/WFM RADIO £79
BEARCAT UBC800XLT H/H RADIO £225
ICOM R5 HANDHELD SCANNER £145
MAYCOM FR100 H/HELD SCANNER £45
REALISTIC PRO29 H/H SCANNER £59
YAESU VR120 HANDHELD SCANNER £99

BASE SCANNERS

BEARCAT 785XT DESKTOP SCANNER £199

RECEIVERS

ETON MINI 300 PORTABLE £13
ICOM R75 RECEIVER WITH UT106 ..... £499
YAESU VR5000DSP COMMS RX £425
MIDLAND BASECAMP £79
YAESU FRG100 ..... £329

ACCESSORIES

ALINCO EJ47U DIGITAL BOARD £46
BHI NOISE ELIMINATING SPKR £49
UNIROSS CHARGER & BATTERIES £12
INTELLIGENT DIGITAL MULTIMETER £25
CLAMP ON DIGITAL MULTIMETER £10
MFJ 208 VHF SWR ANALYSER £69
MFJ 784 DSP FILTER £229
PALSTAR PS15 POWER SUPPLY £99
WATSON POWER MITE 22A PSU £49
ZETAGI P27M PREAMPLIFIER £15

B-GRADE ITEMS

ALINCO DJV17 H/HELD TRANSCEIVER £99
BEARCAT UBC92XLT H/HELD SCANNER £99
ETON E100 PORTABLE SHORTWAVE RADIO £35
ETON G3 PORTABLE SHORTWAVE RADIO £69
ETON G6 PORTABLE SHORTWAVE RADIO £69
ETON SAT750 RECEIVER £269
GRE PSR200 SCANNING RECEIVER £89
MIDLAND 42 HANDHELD CB RADIO £89
MOONRAKER M8 RADIO £25

SHORTWAVE SHOP LTD

01202 490099

TRANCEIVERS

YAESU FRG-9600 ..... £225
YAESU VX-3E £95
YAESU FT-108M/E £95
RCI – 2950 10mtrs Multimode £125
ICOM IC-756 HF/50 ..... £695
ICOM IC-M401Euro Marine £90
ALINCO DJ-V5 ..... £200
ALINCO DJ-195 ..... £100
ALINCO DJ-S11 ..... £75
ALINCO DR-430 70cms £85
ICOM PMR 446x2Water Resist/w.charg £200
MIDLAND CB 77-250K £50
MIDLAND CB 77-805UK £55
MAXON ALERT 7E CB £65
STANDARD HX260E Marine H/H New £99

RECEIVERS

RCA AR-88 With Matching Spkr ..... £POA
YUPITERU MVT 7100 ..... £135
YUPITERU MVT 7300 ..... £99
GRE PSR 275 ..... £45
UNIDEN UBC-800XLT Ex Demo/software £265
BEARCAT UBC-278 BASE Ex Demo £139
REALISTIC PRO 2042 Base £129
REALISTIC PRO 34 ..... £55
REALISTIC PRO 50 ..... £25
REALISTIC DX 394 HF Rx £85
AMI DIGI SAT RX ASR WS201 ..... £129
ALINCO DJX3 ..... £70
WORLD RECEIVER WR2100 ..... £80
GOODMANS GCD200 DAB Special Price £50
BPL WORLD SPACE £25

ACCESSORIES

HI-MOUND HK-708 Straight Key £35
Air Ministry 1940 Straight Key £45
Military Straight Key Circa 1940 ..... £35
BHI NEIM 1031 ..... £55
BHI NOISE AWAY ANEM £55
ICOM AH7000 DISCONE £85
CREATE CLP 5130 Log Periodic NEW £250
ICOM HS-51 Special Bulk Price £29
YAESU MD1 B8 Desk Mic £50
AKD WA3 ABS Wave Meter £25
AEA PK-88 PACKET CONTROLLER £35
WATSON W20SM PSU £55
WATSON W25AM PSU £75
WATSON HUNTER Freq Counter £50
CG SB-2000 DATA CONTROLLER £75
DAIWA CN620A 1kw POWER/SWR £65
DAIWA PS-304 30A PSU £65
ZETAGI HP1000 SWR METER £65
MFJ 948 TUNER £75
MFJ 1278B DATA CONTROLLER £65
KENWOOD MC-80 ..... £70
MFJ 986 3k TUNER £185
WELZ SP-220 SWR/PWR METER £65
PM-2000 2Kw Pwr Meter £70
WATSON Tri 2/6/70cm Vertical £35
Various CB PSU's From £10
LOWE FX-1 GDO Complete £125
SCAM 40 Pump Up Mast £350

WATERS & STANTON

01702 206835

Make	Model	Description	Price
Icom	IC-A3E	Airband H/Held + NAV/COM 50ch Alphanumeric	£160
Microset	PT-110	12V Stabilized 10A PSU with Over V / A protection	£69
Optoelectronics	Model-2810	10Hz-3GHz Frequency Counter	£145
Microset	PR-430A	70cms 100 Watt Version 15db Gain -1.2db NF	£130
MFJ	MFJ-940A	28-30MHz 10m Mobile ATU + meter 150W	£39
Win-Radio	WR-G305i	9kHz-1800MHz All Mode PCI Internal Computer Controlled Communications Receiver	£399
Uniden	UBC-60XLT	66-512MHz (with gaps) FM Hand Held Receiver 80Ch. 4 x AA cells	£59
Microset	RU-432-95	70cm 3-25W in,95W out Linear + GaAsFET Preamp	£399
AOR	AR-3000A	100kHz-2036MHz All Mode Communications Receiver 400Ch. 12V + psu	£399
Uniden	UBC-69XLT-2	25-512MHz (with gaps) FM Hand Held Receiver 80Ch. 2 x AA	£55
Icom	IC-F4SR	SRBR Hand Held Transceiver Programmed for PMR-446 24ch	£149
Icom	IC-F4SR	SRBR Hand Held Transceiver Programmed for PMR-446 24ch	£149
Alinco	DJ-X30E	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 1000Ch.	£129
Alinco	DJ-191E	2m FM H/Held Transceiver + CTCSS & DTMF keypad	£119
Icom	IC-R3	0.5-2450MHz AM,FM,WFM Hand Held Receiver 450Ch. + 2" TFT colour TV	£269
Bencher	ST-1	Bencher Chrome Single Paddle on a Black metal base	£79
Alinco	DJ-V17E	2m FM Palm Transceiver 5W, DTMF keypad & CTCSS	£99
Roberts	R-9921	Portable FM MW + 7 Band SW Digital Radio 4x AA cells or 6V DC	£45
CG Antenna	SB-2000	CI-V Level Converter & CAT-RS232 Computer Interface via USB	£59
Diamond	SX-200	1.8-200MHZ SWR,PWR meter 200W	£69
President	KP-77	40ch 4w UK CB Base Transceiver mains or 12V DC	£79
Mizuho	KX-3	500kHz-30MHz 10W ATU 50-600ohm	£69
Roberts	R-861	Portable 150kHz-30MHz SSB , FM stereo RDS	£139
Icom	IC-R5	150kHz-1300MHz AM,FM & WFM Hand Held Receiver 1000Ch. + Nicads	£119
AOR	AR-8200 III	530kHz-3GHz All Mode Hand Held Receiver 1000Ch. Alphanumeric	£319
Albrecht	AE 6690	80Ch. 4W FM CB Mobile Transceiver + CTCSS	£99
Timewave	PK-12	1200bps V/UHF Packet controller + GPS firmware	£69
WinRadio	WR-UNIFSK	Universal FSK Decoder Software Option for G3 series receivers + Audio Lead	£199
WinRadio	WR-ADS-Full	Advanced Digital Suite Option for G3 series receivers	£119
WinRadio	WR-G303e/PD	9kHz-30MHz All Mode PC Controlled Communications Receiver + Pro-Demodulator 12V	£499
Radio Shack	Pro-60	30-512,760-999MHz AM,FM,WFM Hand Held Receiver 200Ch.	£79
Global	AT-1000	500kHz-30MHz SWL ATU	£59
Jim	M-75	24-2150MHz Low Noise GaAs FET Preamp	£69
Bhi	NES10-2	Noise Eliminating Extension Speaker with Audio Out 12V	£59
Yaesu	FT-920	HF, 6m SSB, AM, CW Base Transceiver Auto ATU Gen.Cov. 100W 12v	£699
Jim	M-75	24-2150MHz Low Noise GaAs FET Preamp	£69
Daiwa	PS-120M	12V Variable 10A (12A max) PSU + Meter	£49
Icom	IC-T70E	2m/70cm FM 5W Hand Held Transceiver + CTCSS & DTMF keypad	£119
Yaesu	SP-8BHIDSP	Matching Filtered Speaker 3W, 8ohm + 2 inputs with Bhi Audio DSP Filtering Unit	£189
Diamond	MX-72	1.6-150MHz & 400-460MHz Duplexer 1kW max	£29
Diamond	MX-2000	1.6-60MHz (PL-259), 110-170MHz (PL-259) & 300-950MHz (PL-259) Triplexer 800W max	£65
Jim	M-75	24-2150MHz Low Noise GaAs FET Preamp	£69
CG Antenna	SB-1000	Link-All-3.0 USB Radio Computer Interface	£59
Revex	W-520	1.8-200MHZ SWR,PWR meter 200W	£45
Icom	IC-E208	2m,70cm FM Mobile Transceiver 50W,35W + CTCSS, DTMF mic (Remote Head)	£169
AOR	AR-8600 mkII	500kHz-2040MHz All Mode Mobile/Base Communications Receiver 1000Ch. 12V	£499
AOR	AR-8200 mkII	530kHz-2040MHz All Mode Hand Held Receiver 1000Ch. Alphanumeric	£239
Yaesu	FT-1000MP mkV	Deluxe HF Base Transceiver + Gen.Cov. , ATU & DSP filters 200W inc FP-29 30V psu	£1,199
Shure	444	Dynamic Desk Microphone + Mic-lock & VOX	£49
Alinco	DX-70TH	HF,6m All Mode Mobile/Base Transceiver with Gen.Cov. & CTCSS 100W (HF & 6m) 12V	£429
Heil	GM-4	Deluxe "Goldline" Hand Mic with Studio & HC-4 inserts	£99
Icom	IC-PS15	13.8v 20A Power Supply.	£150
Icom	IC-737A	HF All Mode Base Transceiver with Gen.Cov.Rx, Auto ATU 100W 12V	£599
Icom	SP-21	3W 8ohm Matching Extension Speaker	£69
Icom	SM-8	Desk Mic 1.3k/600ohm + 2 inputs, Gain & Tone Control	£69
MFJ	MFJ-949E	1.8-30MHz 300W ATU + Dummy Load & X-meter	£129
Kenwood	TS-870S	HF All Mode Base Transceiver with Gen. Cov. + ATU & DSP in the IF, 100W 12V	£799
Hi-Mound	HK-707	Standard Straight Morse Key	£29
Daiwa	CN-620A	1.8-150MHz Cross Needle SWR,PWR meter 1kW	£49
Bhi	NES10-2	Noise Eliminating Extension Speaker with Audio Out 12V	£59
Heil	Pro-Set-Plus	Deluxe Dual Headphones + Boom Mic with HC-4 & HC-5 inserts	£149
Daiwa	PS-140 II	13.8V 12A PSU + Cigar Socket	£59
Alinco	DJ-175E	2m FM H/Held Transceiver + DTMF keypad & CTCSS	£65
Uniden	UBC-30XLT	87-174MHz (with gaps) AM, FM, WFM Hand Held Receiver 200Ch. 3 x AA cells	£35
Eton	FR-250	Compact Wind-up Portable AM, FM stereo & 7 Shortwave Bands Radio	£39
Yupiteru	MVT-7000	200kHz-1300MHz AM,FM,WFM Hand Held Receiver 200Ch.	£89
Yaesu	FT-920 AF	HF, 6m All Mode Base Transceiver + Auto ATU, Gen.Cov. FM option & AM Filter 100W 12V	£759
Yaesu	FT-817BHIDSP	HF,6m,2m,70cm All Mode Portable Transceiver + Gen.Cov. RX & DSP fitted	£479
Icom	IC-910HX	2m,70cm & 23cm All Mode Base Transceiver 100W, 75W 12V inc UX-910	£1,079

RADIOWORLD

01922 414796

Yaesu FT-2000D 200watts	£1,950.00
Yaesu FT-2000 100W with internal power supp	£1,599.00
IC-756PRO-MKIII Icom HF + 6m Trx	£1,575.00
Yaesu FT-1000MK V 200w	£1,499.00
Kenwood TS-2000 HF, 6m , 2m & 70cm Transceiver	£1,199.00
Kenwood TS-950SD HF Transceiver	£1,099.00
Kenwood TS-2000 All Mode Multibander Transceiver	£999.00
Yaesu FT-950	£989.00
Kenwood TS-2000 All Band Base	£949.00
Icom IC-7000 1.8 - 70cms Mobile Transceiver - IC7000	£899.00
IC-7400 HF, 6m & 2m transceiver	£849.00
IC-7400 HF, 6m & 2m transceiver	£849.00
Explorer 1000 1KW HF Amplifier	£799.00
Yaesu FT-990 /AC	£799.00
Icom IC-765 HF Base Transceiver	£799.00
Yaesu FT-736R 6m, 2m & 70cm Base	£799.00
Kenwood TS-790E 2/70 Base	£750.00
AOR AR-7030+ HF Receiver	£699.00
Yaesu FT-450D HF/6m transceiver	£675.00
TS-480HX	£669.00
IC-7200 HF Transceiver	£649.00
Kenwood TS-570DG/E HF transceiver	£629.00
Icom IC-706 MkIIG with DSP	£629.00
Icom IC-821H Dual Band transceiver	£599.00
AOR AR-7030	£550.00
Alinco DX-SR8 HF transceiver HF, 100W all mode	£529.00
MTU-30/20 RF u-tuning Unit C	£500.00
MTU-80/40 RF u-tuning Unit B	£500.00
IC-706 MK2	£499.00
AOR AR8600MkII	£499.00
R-30CC HF PALSTAR HF Rx	£499.00
Palstar R-30A Short Wave Receiver	£499.00
FT-817bhiDSP Yaesu HF/6m/VHF/UHF 5W Transceiver with	£499.00
Yaesu FT-817ND HF 6m VHF UHF 5W Transceiver	£439.00
Yaesu FT-890AT HF Transceiver	£425.00
Yaesu FT-100D Multiband Transceiver	£425.00
Alinco DX-70TH HF & 6m transceiver	£399.00
Icom IC-718 HF Transceiver	£399.00
Icom IC-R72 Receiver	£399.00
Yaesu FT-817 Portable Transceiver	£379.00
Trio (Kenwood) TS-711E 2m Multi-mode	£375.00
AR-8200-MkIII AOR Scanner 530 kHz-3 GHz	£359.00
AOR AR-3000 Wide Band Receiver	£350.00
AirNav RadarBox-Pro 2010	£299.00
Yaesu FRG-100 HF Receiver	£299.00
Icom IC-271E 2m multi mode	£299.00
AirNav Radarbox 2009 version	£299.00
Icom IC-E92D transceiver	£295.00
SG-231 SGC Smartuner	£275.00
Yaesu FT-690R II	£275.00
Yaesu FTV-901R 2m / 70cm Transverter	£275.00
Icom PS-125	£270.00
MFJ-994 Automatic ATU 1.8-30MHz 600W SSB 300W CW	£255.00
Icom IC-R3 Hand held Scanner	£250.00
Icom IC-490E 70cms Mobile	£250.00
Yaesu FT-290MkII 2m Multi-mode transceiver	£250.00
Ranger RCI 2970DX 10 - 12m " 150w" Transceiver	£249.95
MFJ-1278b DSP Multimode Data Controller	£249.00
Yaesu FRG-7700 HF Receiver	£249.00
kenwood SM-220 Scope	£249.00
DR-635E Alinco 2m/70cm FM Dual Band Mobile	£239.00
Icom AH-4 Antenna Tuner	£229.00
Kenwood TM-741E - VHF/UHF transceiver 144-146 / 430-	£229.00
TM-V71E - VHF/UHF Mobile Transceiver.	£229.00
SGC MAC-200 Antenna Controller Auto-Tuner	£220.00
KR-600RC Rotator	£220.00
AOR 8200 Mk I	£220.00
Yaesu FT-480R 2m SSB, CW & FM Transceiver	£220.00
MFJ-784B DSP Filter	£219.00
UBC-785XLT Uniden-Bearcat Base Scanner 25-1300MHz	£209.00
MFJ-259B Antenna Analyzer	£199.00
Vectronics VC-300D Tuner with LED PEP Meter	£199.00
NATO Morse Key	£199.00
Yaesu FRG-9600 VHF-UHF Receiver	£199.00
SSB-SP-7000 SSB ELECTRONICS 70cm Masthead Pre-amp	£189.00

THE PW PUBLISHING RADIO BOOKSTORE

RSGB YEARBOOK 2012

NOW Reformated for easier use!

NEW IN STOCK NOW

£19.99

With around 70,000 amateur radio licences on issue the RSGB Yearbook 2012 is the essential guide to these and matters amateur radio in the UK and worldwide. In a new format for easier use the RSGB Yearbook 2012 provides a comprehensive guide to UK and Irish Callsigns sorted in a wide variety of ways. Nearly 200 additional pages, of the very latest amateur radio information, make this book the indispensable guide for every amateur.

Features:
* Around 70,000 UK callsigns
* Irish callsigns
* Callsigns sorted by name and postcode
* Licensing Information UK and International
* A full colour Review of the Year
* National and Featured Club Information
* Exam Licence and Course Information
* Prefix Lists
* Latest Band Plans
* Award and Contest Information
* Technical Help and much more

FREE CD. Some buy this book for the CD alone not only do you get all of the information pages of the yearbook in a fully searchable format you also get, loads of bonus material. This CD contains over 600MB of bonus material. There are samples of RSGB, masses of amateur radio software, extra club information and more, all in an easily accessed format.

Callseeker Plus 2012 Cheaper than a RSGB Yearbook and with more callsigns For those who want the convenience of an instant search call book that not only covers the UK but Europe as well, that is Callseeker Plus! **£15.99**

COMPUTERS IN AMATEUR RADIO

NEW IN STOCK NOW

£16.99

Radio amateurs have always been quick to embrace changes to their hobby to make operating easier or provide something extra. Computers are no exception and they have become essential tools to get the job done quicker and easier than ever before. But there is much that can be done with a computer and many are simply not aware of the huge potential they offer. Computers in Amateur Radio sets out to provide an insight into the wide range of amateur radio uses for the humble home computer.

Free CD

This book is supplied with a CD packed with over 500MB of software. You will find programmes for logging, contests, mapping, Morse code training, APRS, RTTY, SSTV and a whole lot more.

AIRWAVES 2011

£11.50

CALLSIGN 2011

£11.50

CIVIL AIRCRAFT MARKINGS 2011

£11.99

£11.99

MILITARY AIRCRAFT MARKINGS 2011

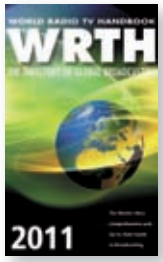
POCKET UK & IRELAND AIRBAND FREQUENCY GUIDE

15th Edition

The 15th Edition of this popular "POCKET FREQUENCY GUIDE" is now available, the contents represent the most comprehensive and up to date frequency listing currently available.
128 pages A6 (10.5 x 15 cm) Spiral Bound with Colour Cover.

£6.75

WORLD RADIO TV HANDBOOK 2011 EDITION



ONLY £23.00

The best selling directory of global broadcasting on LW, MW, SW and FM.

The Features section has an account of the history of Radio St. Helena, reviews of the latest equipment, an intriguing look back at some classic 80s and 90s receivers, a visit to AFN in Florida and much more, including the regular *Digital Update*.

The remaining pages are, as usual, full of information on:
- National and International broadcasts and broadcasters
- Clandestine and other target broadcasters
- MW and SW and DRM frequency listings
- Equipment reviews and articles
- Terrestrial TV by country
- Extensive Reference section

and much more!

	Pages	Price
AIRBAND		
● **CIVIL AIRCRAFT MARKINGS 2011** Alan S Wright. (abc)	448	£11.99
● **MILITARY AIRCRAFT MARKINGS 2011** Howard Curtis. (abc)	224	£11.99
● **AIRWAVES 2011** (Photavia)	144	£11.50
● **CALLSIGN 2011** (Photavia)	111	£11.50
● **THE UK, NORTHERN IRELAND & IRELAND FLIGHT ROUTES 2011** (Seldec)	225	£14.95
● **UK & IRELAND AIRBAND FREQUENCY GUIDE** 15th Edition (Seldec)	146	£10.50
● **POCKET UK & IRELAND AIRBAND FREQUENCY GUIDE** 15th Edition (Seldec)	128	£6.75
● **AIR TRAFFIC CONTROL HANDBOOK David** Smith	208	£16.99
● **VIRTUAL RADAR EXPLAINED** Mike Richards (RSGB)	64	£6.99
● **GUIDE TO THE AIRNAV RADAR BOX** (Seldec)	163	£12.95
● **THE RADARBOX COMPANION** (Seldec)	163	£12.95
● **DIRECTORY OF AIRCRAFT SELCALS** 8th edition. (Seldec)	205 PLUS CD	£15.95
● **HF AIRBAND FREQUENCY GUIDE** (Seldec)	225	£14.75
● **AIR TRAFFIC CONTROL** 10th Edition (abc)	112	£9.99
● **AIRBAND RADIO GUIDE** 7th Edition (abc)	112	£9.99
SCANNING & FREQUENCY GUIDES		
● **WORLD RADIO TV HANDBOOK 2011** (WRTH)	672	£23.00
● **RADIO LISTENERS GUIDE 2011**	160	£5.95
● **KLINGENFUSS GUIDE TO UTILITY STATIONS 26th**	588	£43.00
● **KLINGENFUSS SHORTWAVE FREQUENCY GUIDE 2011**	428	£35.00
● **KLINGENFUSS SHORTWAVE FREQUENCIES CD 2011**		£26.00
● **KLINGENFUSS RADIO DATA CODE MANUAL** 18th Edition	600	£43.00
● **SCANNERS 6** B. Robertson & P. Rouse	245	£9.95
● **HF MARINE FREQUENCY LIST**. (Seldec)	225	£14.75
● **THE POCKET UK & IRELAND VHF MARINE FREQUENCY GUIDE**. (Seldec)	108	£5.75
● **UK SCANNING DIRECTORY** - 9th edition (PW Publishing)	544	£19.75
ANTENNAS/TRANSMISSION LINES/PROPAGATION		
● NEW IN NOW **STEALTH ANTENNAS** (RSGB)	208	£13.99
● NEW IN NOW **HF ANTENNAS FOR EVERYONE** (RSGB)	336	£14.99
● NEW IN NOW **BUILDING SUCCESSFUL HF ANTENNAS** (RSGB)	224	£14.99
● NEW IN NOW **BASIC ANTENNAS** (ARRL)	216	£24.99
● **EVEN MORE OUT OF THIN AIR** (PW Publishing)	80	£6.75
● **25 SIMPLE TROPICAL & MW BAND AERIALS** E.M. Noll (Babani)	54	£1.75
● **AN INTRODUCTION TO RADIO WAVE PROPAGATION** J.G. Lee. (Babani)	116	£3.95
● **ANTENNA FILE** (RSGB)	285	£18.99
● **ANTENNA TOOLKIT 2** Joseph Carr	256	£28.99
● **ANTENNA TOPICS** Pat Hawker G3VA (RSGB)	384	£18.99
● **BACKYARD ANTENNAS** Peter Dodd G3LDO (RSGB)	200	£18.95
● OUT OF PRINT **EXPERIMENTAL ANTENNA TOPICS**	72	£3.50
● **HF ANTENNA COLLECTION** Edited by Erwin David G4LQI. (RSGB)	233	£19.95
● **HF ANTENNAS FOR ALL LOCATIONS** 2nd edition. Les Moxon G6XN. (RSGB)	322	£19.99
● **INTERNATIONAL ANTENNA COLLECTION 2**. G. Brown M5ACN. (RSGB)	200	£12.95
● **PRACTICAL ANTENNAS FOR NOVICES** John Heys	58	£7.99

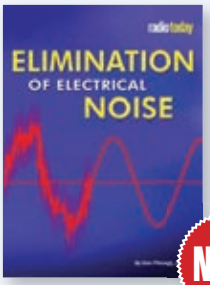
You can see full descriptions of all these books & order securely on-line at www.mysubcare.com see the magazine's related products section. Also, see www.pwpublishing.ltd.uk/bookstore/books.html for full descriptions of all these books.

	Pages	Price
● **PRACTICAL WIRE ANTENNAS 2** Ian Poole G3YWX	172	£11.99
● **RADIO PROPAGATION PRINCIPLES & PRACTICE** Ian Poole G3YWX	102	£14.95
● **SIMPLE AND FUN ANTENNAS FOR HAMS** (ARRL)	200	£16.99
BEGINNERS/LICENCE/MANUALS		
● **TECHNICAL FOR THE TERRIFIED** (PWP)	124	£12.99
● **ADVANCE! THE FULL LICENCE MANUAL** Alan Betts G0HIQ & Steve Hartley G0FUW. (RSGB)	104	£11.99
● **AMATEUR RADIO EXAM SECRETS** Alan Betts G0HIQ (RSGB)	104	£12.99
● **AMATEUR RADIO EXPLAINED** Ian Poole G3YWX. (RSGB)	80	£5.79
● **DISCOVER DXING**. 3rd edition. J. Zondlo	96	£6.95
● **FOUNDATION LICENCE NOW! 5th Edition** Alan Betts G0HIQ. (RSGB)	32	£4.99
● **HF AMATEUR RADIO 2nd Ed.** Ian Poole G3YWX. (RSGB)	144	£12.99
● **INTERMEDIATE LICENCE – BUILDING ON THE FOUNDATION 4th Edition** Steve Hartley G0FUW. (RSGB)	76	£6.99
● **NOVICE RADIO AMATEURS EXAMINATION HANDBOOK** I.D. Poole. (Babani)	150	£4.95
● **SECRET OF LEARNING MORSE CODE** Mark Francis. (Spa)	84	£6.95
● **MORSE CODE FOR RADIO AMATEURS**. (RSGB)	32 inc. CD	£7.99
DESIGN & CONSTRUCTION		
● NEW IN NOW **HOMEBREW COOKBOOK** (RSGB)	208	£12.99
● **CIRCUIT OVERLOAD** (RSGB)	504	£18.99
● **THE ART OF SOLDERING** R. Brewster. (Babani)	84	£3.99
● **THE SUPERHET RADIO HANDBOOK** I.D. Poole. (Babani)	104	£4.95
SHACK ESSENTIALS		
● NEW **RSGB YEARBOOK** 2012 edition. (RSGB)	528	£19.99
● NEW **CALLSEEKER PLUS CD** 2012 edition. (RSGB)		£15.99
● **RSGB PREFIX GUIDE**. 9th edition. (RSGB)	34	£8.99
● **RSGB AMATEUR RADIO OPERATING MANUAL** 7th Edition (RSGB)	224	£16.99
● **ARRL HANDBOOK 2011** inc CD. (ARRL)	1416	£37.99
● **ARRL OPERATING MANUAL** 9th Ed. (ARRL)	420	£19.99
● **DXPEDITIONING - BEHIND THE SCENES FOR RADIO AMATEURS WORLDWIDE** N Cheadle & S Telenius Lowe	180	£6.95
● **THE RIG GUIDE** S W White. (RSGB)	88	£4.99
● **AMATEUR RADIO ESSENTIALS** G. Brown. (RSGB)	288	£25.99
● NEW EDITION **AMATEUR RADIO ASTRONOMY 2nd Edition** J. Fielding. (RSGB)	384	£16.99
● **AMATEUR RADIO (VALUE) LOGBOOK** (RSGB)	80	£4.95
● **DIGITAL MODES FOR ALL OCCASIONS** M Greenman (RSGB)	208	£16.95
● OUT OF PRINT **RSGB RADIO COMMUNICATIONS HANDBOOK + CD** 10th Edition. (RSGB)	864	£29.99
QRP		
● NEW **INTERNATIONAL QRP COLLECTION**. (RSGB)	176	£11.00
● NEW EDITION **LOW POWER COMMUNICATIONS**. 3rd Edition. (ARRL)	240	£14.99
● **QRP BASICS**. George Dobbs G3RJV. (RSGB)	204	£14.99
VHF & HIGHER		
● NEW **MICROWAVE KNOW HOW** Andy Barter G8ATD. (RSGB)	192	£12.99
● **ALL ABOUT VHF AMATEUR RADIO** W. I. Orr W6SAI. (ARRL)	163	£8.95



NEW IN STOCK NOW

NEW **KLINGENFUSS GUIDE TO UTILITY STATIONS 26th**..... £43.00
NEW **KLINGENFUSS SHORTWAVE FREQUENCY GUIDE 2011**.... £35.00
NEW **KLINGENFUSS SHORTWAVE FREQUENCIES CD 2011**. £26.00



NEW!

£6.99

ELIMINATION OF ELECTRICAL NOISE FROM 30kHz TO 30MHz

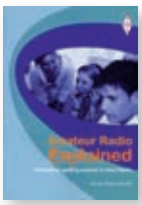
Many radio amateurs experience electrical noise problems and feel forced off the amateur radio bands. Don Pinnock, G3HVA is a firm believer that radio amateurs should deal with the problems rather than not be forced off the air. Elimination of Electrical Noise therefore tells of Don's personal experiences and provides solutions to noise problems that will help many.

RADIO LISTENER'S GUIDE 2011 EDITION

NEW IN STOCK NOW

Frequencies and transmitter information for all BBC and commercial radio stations, plus DAB digital transmitter details.
Radio Reviews - Independent reviews of analogue and DAB digital radios. News from BBC and commercial radio stations.
Analogue Radio switch-off - The latest information about plans for FM and medium wave switch-off. Digital Radio (DAB) - The latest news and information.Sky, Freeview and Freesat radio information and channel lists. Advice shows you how to get the best from your radio.

ONLY £5.95



AMATEUR RADIO EXPLAINED

Written by well-known author and radio amateur Ian Poole, G3YWX, this book provides the ideal introduction to the wonderful world of amateur radio. Amateur Radio Explained is for people first taking an interest in amateur radio and those ready to move on from Foundation level. Written in a readable and easy-to-understand fashion, Amateur Radio Explained is the perfect introduction to the exciting world of amateur radio. 80 pages.

£5.79

NEW!

STEALTH ANTENNAS

Tiny postage stamp-size gardens, intolerant neighbours, planning permission problems, living in apartments: these are some of the challenges facing the modern radio amateur when trying to get on the air. Stealth Antennas offers clear practical advice to those who might have thought they were unable to put up a suitable antenna.

£13.99

NEW!

HOMEBREW COOKBOOK

If you are interested in home construction, Eamon Skelton, EI9GQ is the acknowledged expert in this field. The RadCom columnist on the subject, Eamon brings his enthusiasm, common sense and easy to understand approach to the Homebrew Cookbook, such that readers will be reaching for their soldering iron with inspiration.

£12.99

AIR TRAFFIC CONTROL HANDBOOK

The complete guide for all aviation and air band enthusiasts.
This is a reincarnation of the Air Band Radio Handbook, an essential reference book first published over 20 years ago and a strong seller throughout its eight editions. The new title reflects not just the extent of overhaul and updating that has occurred for this new version, but also the fact that a larger proportion of the audience these days comprises air traffic controllers themselves (both trainees and fully qualified) as well as the traditional air band listening enthusiast. The expert author's accessible and comprehensive text explains the intricacies of air traffic control and its jargon, enabling the reader to locate and interpret what is actually going on in the airways overhead.

£16.99

FOUNDATION LICENCE NOW! £4.99.

INTERMEDIATE LICENCE. BUILDING ON THE FOUNDATION £6.99.

ADVANCE! THE FULL LICENCE MANUAL £11.99.

AMATEUR RADIO EXAM SECRETS £12.99

HITLER'S RADIO WAR

This book tells the story of Nazi international broadcasting during and before the Second World War. At its peak German radio stations broadcast in fifty-four languages to a worldwide audience. For the first time in an international conflict, citizens of the warring nations could hear enemy propaganda in their own living rooms. Many of the voices that they heard belonged to a new type of criminal, the radio traitor. The nickname Lord Haw-Haw is still famous internationally, but there were numerous other radio renegades speaking on behalf of the Nazis. The Nazis' propaganda was sinister enough, but they also ran a series of secret stations that spoke to enemy audiences in the name of 'patriotic' dissidents who claimed to be broadcasting from clandestine transmitters in their own countries. Using archival material, "Hitler's Radio War" dissects the message that Germany's overt and covert propaganda stations broadcast to their audiences, as well as the lives and motivations of the broadcasters.

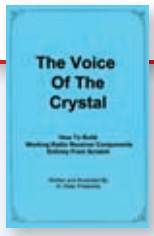
NEW IN STOCK NOW

£20.00

MARCONI'S ATLANTIC LEAP

A fascinating fully illustrated and documented description of the bridging of the Atlantic by wireless in 1901 by Marconi, who was only 27 at the time. 96 pages.

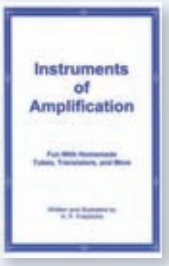
£6.99



VOICE OF THE CRYSTAL

185 pages of practical information on the fabrication of electronic components suitable for use in building crystal radio sets. Basic theory and simple analysis is combined with dozens of examples of historical practice, work by contemporary experimenters, and construction details for many instruments fabricated by the author himself.

£11.95



INSTRUMENTS OF AMPLIFICATION

Rob Mannion G3XFD writes: Peter Friedrichs has written a truly superb book but has chosen a title that really hides its 'light' under the proverbial bushel! Armed with the book an interested constructor can literally build a radio from scratch anywhere! Perhaps a better title could have been Desert Island Radio for the Shipwrecked because everything from simple earphones, detectors and mechanical amplifier to home made valves (tubes) and transistors. If you enjoy Rough Science on BBC2 you'll love this book! **Very highly recommended**.

£14.95

THE SECRET LIFE OF BLETCHLEY PARK

NEW IN STOCK NOW

A truly fascinating account of the people who worked at Bletchley Park – their work and recreation. This book is about people working in a very special environment.

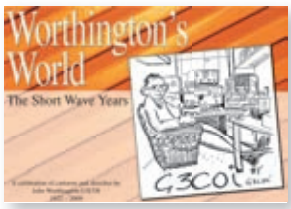
Despite the long hours – night shifts were where some of the most amazing breakthroughs were made – there was a social life complete with excellent amateur dramatics and many other activities. Winston Churchill even made sure the staff could have a tennis court! And, despite everything, romance often blossomed between staff!

£8.99

RADIO PIONEERS 1945

Discover the history of the Veteran Wireless Operators Association and the Amateur Radio Relay League. See some of the early wireless catalogues and amateur stations. Get a brief but to-the-point chronology of radio developments to 1925. You get pictures of early tubes, Poulsen in his lab, Marconi parabolic reflectors, a Fessenden alternator and more. The history is brief, fast reading, but informative. You'll read about the personalities and discover what they did.

£7.95



WORTHINGTON'S WORLD
The short wave years

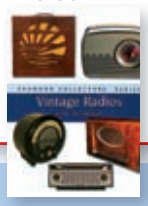
An amazingly apposite tribute to a wonderfully zany cartoonist that are presented in categories that blend together like a silky chocolate cake mix (John G3COI loved an old fashioned chocolate cake!). Chuckle away – you'll find old favourites and cartoons you missed!

£9.95

VINTAGE RADIOS

£19.95

This book tells the collector and the armchair wireless enthusiast everything there is to know about classic radios from the 1920s to the end of the 1960s. All the important makes and models are discussed and the author also covers buying and selling, care and restoration and many other topics, including foreign radios and radio-related ephemera. Illustrated with many colour photographs, this is the perfect collector's companion to the fascinating hobby. 208 pages.



THE PW PUBLISHING LTD
RADIO BOOKSTORE

mail order...huge range in stock...fast delivery...

	Pages	Price
● **GUIDE TO VHF/UHF AMATEUR RADIO** Ian Poole G3YWX.(RSGB)	180	£9.99
● **VHF/UHF HANDBOOK** Andy Barter G8ATD. (RSGB)	302	£14.99

HISTORICAL

● NEW **THE SECRET LIFE OF BLETCHLEY PARK** Sinclair McKay (Aurum Press)	368	£8.99
● NEW **HITLER'S RADIO WAR** Roger Tidy (Robert Hale)	240	£20.00
● **WORTHINGTON'S WORLD - THE SHORT WAVE YEARS** (PW Publishing)	146	£9.95
● **INSTRUMENTS OF AMPLIFICATION** HP 'Pete' Friedrichs	300	£14.95
● **RADIO PIONEERS 1945** (Lindsay)	64	£7.95
● OUT OF PRINT **FJ CAMM - THE PRACTICAL MAN** (RSGB)	110	£10.99
● **VINTAGE RADIOS** (Crowood)	208	£19.95
● OUT OF PRINT **AMATEUR RADIO - A BEGINNERS GUIDE** (1940 REPRINT) (Lindsay Publications). Douglas Fortune W9UVC	156	£7.70
● **MARCONI'S ATLANTIC LEAP (H/B)** Gordon Bussey. (Marconi)	96	£6.99
● OUT OF STOCK **RADIO & RADIO OPERATORS FROM SPARKS TO SATELLITES** (Package with Swedish hardback book, English spiral-bound translation and CD with printable PDF files) Birgitta Guftafsson	255	£15.00
● NEW LOW PRICE **THE SAGA OF MARCONI OSRAM VALVE** B. Vyse & G. Jessop	346	£17.50

CRYSTAL SETS

● **CRYSTAL RECEIVING SETS & HOW TO MAKE THEM** (Lindsay)	124	£8.95
● **VOICE OF THE CRYSTAL** (Pete Friedrichs)	185	£11.95

ELECTRONICS

● NEW IN NOW **COMPUTERS IN AMATEAUR RADIO** (RSGB)	200	£16.99
● NEW IN NOW **ELIMINATION OF ELECTRICAL NOISE** (RSGB)	64	£6.99
● **ELECTRONIC PROJECT BUILDING FOR BEGINNERS** (Babani)	110	£4.99
● **GETTING THE MOST FROM YOUR MULTIMETER** (Babani)	102	£4.99
● **HOW TO USE OSCILLOSCOPES & OTHER TEST EQUIPMENT** (Babani)	110	£4.99

BINDERS **PRACTICAL WIRELESS OR RADIOUSER**. £10.00

Why not tidy your shack with a binder?

A whole year of Practical Wireless on CDROM

NEW AND AVAILABLE NOW!
PW 2010 ARCHIVE £14.99

You can order securely on-line at

www.mysubcare.com

see the magazine's related products section.

HOW TO ORDER

Telephone: 0845 803 1979

Call the Bookstore, Monday to Thursday 9am to 4pm (now closed Fridays)

Callers with an appropriate BT inclusive call package can call this number free!

Your order will usually be delivered to you within a week!

Outside these hours your order will be recorded on an answerphone.

Post: Write to the Bookstore, remembering to include your name, address, daytime telephone number and payment details (Sterling please - cash not accepted. **Cheques made payable to PW Publishing Ltd.**), at: **Bookstore, PW Publishing Ltd., Broadstone, Dorset BH18 8PW.**

Fax: If you wish to FAX your order to us please mark it for the attention of the Bookstore and send it to: 01202 659950

E-mail: bookstore@pwpublishing.ltd.uk

Order Securely on-line: www.mysubcare.com

Photocopies & Back Issues: To order a back Issue, please call the Order Line or E-mail us to check availability. We can photocopy articles from issues that are not available - we have a Review List going back years!

	Current Issue	Back Issues
Practical Wireless	£3.50 (inc UK P&P)	£5.00 (inc UK P&P)
RadioUser	£3.50 (inc UK P&P)	£5.00 (inc UK P&P)

Overseas post: Europe or ROW postal charges to be added to the above.

Photocopies / Reprints (per article): £3.00 (inc P&P).

Overseas: Please add £1.50 to the above prices. E&OE

order form

10/11

Photocopies are acceptable

Please try to order from an up-to-date magazine to ensure correct prices and availability.

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

Total cost of books ordered:.....Price (£).....

Postage & Packing charges: Please remember to add P&P to your order. (£) .....

UK: £2.05 P&P for one item, £3.70 for two or more

Overseas Europe:
£3.30 P&P for one, £6.00 for two, £2 extra per item for three or more

Overseas Rest of World:
£5.30 P&P for one, £10.00 for two, £2 extra per item for three or more

Total cost of order including postage **£**

Send this completed form to:

Bookstore, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW

Payment Details. Please note: For security purposes, you must include your house number and postcode.

Name .....

Address .....

.....

.....

Postcode.....

Telephone (Daytime) .....

I enclose my Cheque/Postal Order for £.....

Please note: Cheques MUST be made payable to PW Publishing Ltd. and please write your cheque guarantee card number on the reverse.

or please debit my MasterCard/Visa/Amex

Expiry Date ..... Security No.

or please debit my Maestro/Solo

Expiry Date ..... Security No.

Start date ..... Issue No (if on card).....

Signature.....

Orders are normally delivered within a week but please allow 28 days for delivery. Prices correct at the time of going to press. Please note: all payments must be made in Sterling, cash not accepted.

Subscribe to Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine

NEW! No more renewal letters!

3, 6 and 12 Month Subscriptions are Now Available by Direct Debit*

- Never miss an issue
- Have it delivered to your door
- Subscribers get their copies before they reach the shops
- Avoid price rises
- Save £££s

Subscription Rates

Practical Wireless Subscription

	3 Month*	6 Month*	1 Year*	2 Year	3 Year
UK	☐ £10	☐ £20	☐ £38	☐ £73	☐ £104
Europe			☐ £47	☐ £89	☐ £130
ROW			☐ £57	☐ £108	☐ £161

Joint & Practical Wireless & RadioUser Subscription – Save £££s

	3 Month*	6 Month*	1 Year*	2 Year	3 Year
UK	☐ £20	☐ £38	☐ £73	☐ £138	☐ £197
Europe			☐ £79	☐ £170	☐ £246
ROW			☐ £101	☐ £207	☐ £307

* 3 and 6 month subscriptions are only available by Direct Debit. 12 month subscriptions are available to pay by Direct Debit if you wish (no more renewal letters!) Sorry, but due to financial restrictions, this service is not available for 2, 3 year or overseas subscriptions.

Existing subscribers will be offered the option to pay by Direct Debit at the end of their subscription.

To order a subscription please contact our subscription agency:

Practical Wireless Subscriptions
Unit 8 The Old Silk Mill
Brook Street
Tring
Hertfordshire HP23 5EF

NEW Address

Please note: any **cheques should be made payable** to **PW PUBLISHING LTD** and CASH is NOT accepted by ourselves or Webscribe.

Orders taken on:

NEW Numbers

01442 820580

between 9am - 5pm. Outside these hours your order will be recorded on an answering machine.

FAX orders taken on:

01442 827912

Secure Internet orders can be placed at:

www.mysubcare.com

or via e-mail to:

pw@webscribe.co.uk

On-line facilities are available as well as the usual way to pay by cheque, postal order, credit card and now by direct debit too.

Order a new subscription online Simply pay with a credit card or set up your direct debit subscription online using our secure server.

Check the status of a subscription online Existing subscribers can now log in to their own accounts and see how many issues they have left to run.

Update your details online If you move or change your personal details, you can now update them online without having to write in to let us know.

Renew an existing subscription online We've made renewing easier too. Everything you need to renew is now available online as well as by regular mail. (Subscribers still get a reminder in the post when it's time to renew unless it's payable by Direct Debit).

If you wish to pay by direct debit please contact Webscribe, our subs agency, to set it up - it's simple!

☐ *I wish to order a one/two/three* year subscription to* **practical wireless** *starting with the.....issue.*

☐ *I wish to order a joint one/two/three* year subscription to* **practical wireless & radiouser** *and starting with the.....issue.*

Payment Details

I enclose my Cheque/Postal Order* for £.....

*made payable to PW Publishing Ltd.

or please debit my MasterCard/Visa/Amex card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Security Number: ☐☐☐

Expiry Date.....

or please debit my Switch card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐

Security Number: ☐☐☐

Start Date.....Switch Issue Number (if on card).....

Switch Expiry Date.....

Signature.....

Name.....

Address.....

.....

Please note: For security purposes, you must include your house number and postcode.

.....

.....

Postcode.....

Daytime Telephone Number.....

E-mail.....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at time of going to press. E&OE.

Please note: All payments must be made in Sterling.
Cash not accepted.
Cheques made payable to PW Publishing Ltd.

*Delete as necessary. Photocopies of this page are acceptable

Rob Mannion G3XFD/EI5IW's

Topical Talk

The Editor reacts to feed-back from readers on the earthing topic and offers further thoughts in the hope readers will offer some suggestions.

My decision to discuss r.f. earthing at our radio installations has generated a great deal of feed-back from readers all over the world and I thank everyone for writing in. I was especially interested in comments from readers living outside Europe and I hope to publish more letters on the topic soon.

The letter from old friend **Alan Green GM4FLX** sums up the approach I think most of us actually adopt when we're using dipole antennas. However, I'm sure that Alan's comments that, "Your choice of earthing as a subject of debate should keep us all going on about it for quite a while"! – are likely to be quite correct!

Another old friend – **Albert Heyes G3ZHE**, a keen member of the **Warrington Amateur Radio Club** – also wrote a very interesting letter. Indeed, Albert's working career as an Electrical Engineer in the mining industry has given him a very practical insight to earthing electrical equipment safely.

Professional Earthing Techniques

Albert G3ZHE's letter made me sit back and think for a long time. I ended up doing quite a bit of research through my own technical library and other dedicated sources.

I was particularly keen on finding as much as I could about the earthing systems erected at broadcasting stations. In particular (because we use similar frequencies) I was keen to find out as much as possible about the massive buried earth mats that were installed at the BBC radio transmitters. These include the World Service transmitter sites at Rampisham (Dorset), Woofferton (On the Herefordshire/Shropshire border in the west of England, near the Welsh borders) and Skelton in Cumbria – all now owned and operated by **VT Communications** (now part of **Babcock International Group**).

The Woofferton transmitter is rather unusual, because the water table is extremely high at this site (it was a lake in pre-historic times!). Some years ago I was very privileged to visit this station thanks to **David Porter G4OYX** who is on the Engineering staff at the station. Dave has agreed to research and write about the earthing situation – and I'm sure his information will be most helpful (thanks Dave!).

When the transmitter was built during the Second World War the water table was so high that the (then) standard practice of having a basement underneath the transmitter halls wasn't used. Instead, everything was built on the same level, above the water table – which is very close to the surface! (see **www.bbceng.info/Operations/transmitter_ops/Reminiscences/Woofferton/woof50y-v2.pdf** for the fascinating history of the station up until 1993).

Traditional Transmitter Earthing

As I understand it, the earthing system that's traditionally been used by the UK broadcasters at their h.f. and lower frequency sites, have extensive earthing mats, especially when there's a mixture of polarisation used. The earthing mats can cover hundreds of hectares at larger stations. **Note:** I'm not ignoring medium frequency and low frequency transmitters – I'm just concentrating on h.f. for the moment.

Following my research (**I'm open to correction here from better informed professionals**) the antenna systems at h.f. bands transmitting stations used their own r.f. earthing system because they were considered to be isolated from the mains supply and the mains earthing system. The details I've found, show the (transmitter end) r.f. transformer systems, feeding into balanced open wire into the antenna arrays, have their own independent earthing system.

Due to the very high power mains supply demands of high power broadcast transmitters they usually have their own dedicated substation running from the UK's 11kV or 33kV three phase system (as far as my researches show). This usually means that the substation is either very close indeed, or actually on the transmitter site.

The Protective Multiple Earthing (PME) system will be in operation at the transmitter's 11kV or 33kV substation. This is as far as I can tell, because the information has been difficult to confirm.

So, that's as far as I can go this month! However, at this stage of the debate I think that I may be able to operate safely with an r.f. earth when using my fully isolated power supply. Or can I?

Rob Mannion G3XFD/EI5IW

SPECIALIST DEALERS

BERKSHIRE

LINEAR AMP UK

5 Swaledale Gardens, Fleet, Hants GU51 2TE
Tel: 01252 811370

www.linamp.co.uk
E-mail: linampuk@aol.com

Manufacturers of top quality HF, VHF and UHF high power valve linear amplifiers up to 1500W and antenna matching units.

Repairs of most make of amplifier undertaken

DORSET

PW Publishing Ltd

have a wonderful selection of radio based books and magazines.

We can also supply a copy of most individual reviews that you may have read in past editions of *Practical Wireless RadioUser, Radio Active* and *Short Wave Magazine* magazines.

Tel: 0845 803 1979

ESSEX

WATERS & STANTON PLC

Spa House, 22 Main Road, Hockley
Essex SS5 4QS
Tel: (01702) 206835/204965
Fax: (01702) 205843

Web: http//www.waters-and-stanton.co.uk
E-mail: sales@wsplc.demon.co.uk

Open 9am to 5.30pm Monday to Saturday inclusive.

MAIN AGENTS – ALL BRANDS
PHONE/FAX FOR FREE PRICE LIST

ESSEX

INNOVANTENNAS

THIS AD IS NOT FOR SERIOUS DX'ERS AND CONTESTERS
(THEY KNOW WHO WE ARE ALREADY)

WWW.INNOVANTENNAS.COM
INFO@INNOVANTENNAS.COM

CALL FREE
0800 0124 205

MID GLAMORGAN

SANDPIPER AERIAL TECHNOLOGY

Unit 5, Enterprise House, Cwmbach Industrial Estate, Aberdare,
Mid Glamorgan CF44 0AE
Tel: (01685) 870425 Fax:(01685) 876104

A full range of transmitting & receiving antennas available for the amateur commercial market.

www.sandpiperaerials.co.uk
e-mail: sales@sandpiperaerials.co.uk

SCOTLAND

JAYCEE ELECTRONICS LTD

20 Woodside Way, Glenrothes, Fife KY7 5DF
Tel: (01592) 756962 (Day or Night)
Fax No. (01592) 610451

New opening hours: Tuesday-Friday 9am to 5pm. Saturday 9am to 4pm. Closed Sunday & Monday.

KENWOOD, YAESU & ICOM APPROVED DEALERS
A good stock of new and secondhand equipment always in stock

SCOTLAND

TENNAMAST
General Steel Fabrication
Radio Masts | Masts | Boat Cradles | Trailers

A complete range of Multi purpose Masts
The best of Scottish engineering!
Tel: 01505 503824
www.tennamast.com
sales@tennamast.com

WEST SUSSEX

Adur Communications

PO Box 2047,
Steyning BN44 3XJ.
Tel: (01903) 879526
E-mail: service@durcomms.com

Repairs and alignment to all amateur and commercial radio equipment.

Telephone 0845 803 1979 to advertise in *Practical Wireless*

INDEX TO ADVERTISERS

HAVING TROUBLE FINDING PW?

The best way to ensure you receive every issue of Practical Wireless and/or RadioUser is to place an order with your local newsagent. Once set up, your copy of Practical Wireless and/or RadioUser will be held for you to collect, saving you the time and the frustration of having to search the newstand. Some newsagents may even offer a home delivery service making it even easier to obtain your copy. So don't miss an issue, simply complete the form opposite and take to your local newsagent today.

KEEP A LOOK OUT FOR THE LOGO AND NEXT TIME YOU VISIT YOUR NEWSAGENT REMEMBER TO JUST ASK! ABOUT OBTAINING COPIES OF YOUR CHOSEN MAGAZINES.

Please reserve/deliver* a copy of ..... on a regular basis,

commencing with the..... issue. *delete as appropriate

Title/Mr/Mrs/Ms.....

First name..... Surname .....

Address.....

.....

..... Postcode.....

Daytime Telephone No: .....

MOONRAKER
SALES LINE 01908 281705
E-mail: sales@moonraker.eu
Web: www.moonraker.eu

If we advertise it – we stock it!

VISA Maestro MasterCard PayPal

Cable

RG58 Standard, 5mm, 50 ohm, per metre **£0.35**
RG58-DRUM-50 Standard, 5mm, 50 ohm, 50m reel **£14.95**
RG58-DRUM-100 Standard, 5mm, 50 ohm, 100m reel **£24.95**
RG58M Mil spec, 5mm, 50 ohm, per metre (best seller) **£0.60**
RG58M-DRUM-100 Mil spec, 5mm, 50 ohm, 100m reel **£44.95**
RG58M-DRUM-50 new 50m reel of mil spec RG58 in a great handy size .only **£24.95**
RGMINI8 Mil spec, 7mm, 50 ohm, in grey per metre (amateur favourite) **£0.75**
RGMINI8-DRUM-100 Mil spec, 7mm, 50 ohm, in grey 100m reel **£64.95**
RG213 Mil spec, 9mm, 50 ohm, per metre **£1.30**
RG213-DRUM-100 Mil spec, 9mm, 50 ohm, 100m reel **£109.95**
WESTFLEX103 Mil spec, 10mm, 50 ohm, per metre **£1.75**
WESTFLEX103-DRUM-100 Mil spec, 10mm, 50 ohm, 100m reel **£149.95**
300-20M Ladder Ribbon, best USA quality, 300 ohm, 20m pack **£17.95**
300-DRUM Ladder Ribbon, best USA quality, 300 ohm, 100m reel **£69.95**
450-20M Ladder Ribbon, best USA quality, 450 ohm, 20m pack **£19.95**
450-DRUM Ladder Ribbon, best USA quality, 450 ohm, 100m reel **£79.95**

Antenna Wire (50m)

Perfect for making your own antennas, traps, long wire aerials etc.
SEW-50 Multi stranded PVC covered wire, 1.2mm **£19.95**
SCW-50 Enamelled copper wire, 1.5mm **£24.95**
HCW-50 Hard Drawn bare copper wire, 1.5mm **£29.95**
CCS-50 Genuine Copperweld copper clad steel, 1.6mm **£29.95**
FW-50 Original Flexweave bare copper wire, 2mm **£34.95**
FWPVC-50 Original clear PVC covered copper wire, 4mm **£44.95**
FW-100 Original high quality flexweave antenna wire, 100m reel **£59.95**
FWPVC-100 Original PVC coated flexweave antenna wire, 4mm, 100m reel **£79.95**

PAM-KIT

A great portable freestanding tripod which can be extended to 4m.
Perfect for field days at a perfect price
..... just **£59.95** complete

Rigging Accessories

Get rigged up, for full list of all options visit our website!
PULLEY-2 Adjustable pulley wheel for wire antennas, suits all types of rope **£24.95**
GUYKIT-HD10 Complete heavy duty adjustable guying kit to suit upto 40ft masts .. **£54.95**
GUYKIT-P10 Complete light duty/portable guying kit to suit upto 40ft masts **£39.95**
SPIDER-3 Fixed 3 point mast collar for guy ropes **£5.95**
SPIDER-4 Fixed 4 point mast collar for guy ropes **£6.95**
PTP-20 Pole to pole clamp to clamp up to 2" to 2" **£5.95**
DPC-W Wire dipole centre to suit either 300 or 450ohm ladder line **£5.95**
DPC-S Wire dipole centre with SO239 to suit cable feed connections **£6.95**
DPC-A Dipole centre to suit ½ inch aluminium tube with terminal connections ... **£7.95**
DPC-38 Dipole centre with SO239 socket with two 3/8th sockets to make mobile dipole **£6.95**
DOGBONE-S Small ribbed wire insulator **£1.25**
DOGBONE-L Large ribbed wire insulator **£1.65**
DOGBONE-C Small ceramic wire insulator **£1.00**
EARTHROD-C 4ft copper earth rod and clamp **£22.95**
EARTHROD-CP 4ft copper plated earth rod and clamp **£16.95**
G5RV-ES In-line SO239 replacement socket for 300 or 450 ohm ladder line **£6.95**
AMA-10 Self amalgamating tape for connection joints, 10m length **£7.50**

Mounting Hardware & Clamps

We have all the mounting brackets you could possible want – for all options see our website
TRIPOD-HDA Free standing, heavy duty, fold away tripod, which adjusts from 50-65mm **£149.95**
TRIPOD-25L Free standing heavy duty tripod to suit masts 65mm or less **£79.95**
TRIPOD-20L Free standing heavy duty tripod to suit masts 2 inch or less **£74.95**
TRIPOD-15L Free standing heavy duty tripod to suit masts 1.5 inch or less **£69.95**
TK-36 Heavy duty galvanised pair of T & K brackets, 36 inches total length **£49.95**
TK-24 Heavy duty galvanised pair of T & K brackets, 24 inches total length **£29.95**
TK-18 Heavy duty galvanised pair of T & K brackets, 18 inches total length **£24.95**
TK-12 Heavy duty galvanised pair of T & K brackets, 12 inches total length **£19.95**
SO-9 Heavy duty galvanised single stand off bracket, 9 inches total length **£9.95**
SO-6 Heavy duty galvanised single stand off bracket, 9 inches total length **£6.95**
CHIM-D Heavy duty galvanised chimney lashing kit with all fixings, suitable for upto 2 inch **£24.95**
CAR-PLATE Drive on bracket with vertical up stand to suit 1.5 or 2" mounting pole .. **£24.95**
CROSS-2 Heavy duty cross over plate to suit 1.5 to 2" vertical to horizontal pole **£14.95**
JOIN-200 Heavy duty 8 nut joining sleeve to connect 2 X 2" poles together **£19.95**
PTM-S Pole mounting bracket with SO239 for mobile whips, suits upto 2" pole . **£19.95**

bhi

NES10-2 Mk3 noise eliminating speaker .. **£112.95**
The NES10-2MKII Noise Eliminating Speaker removes unwanted background noise, hiss, hash computer hash, plasma TV interference, white noise etc from speech so that you can hear the speech much more clearly.

DESKTOP "noise away" robust base station speaker **£154.95**
The Desk Top "Noise Away" is a stylish robust base station speaker for use in radio communications, especially amateur radio

Telescopic Masts

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed **£129.95**
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed **£199.95**
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed **£149.95**
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed **£199.95**
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed **£249.95**
TMF-3 Fiberglass mast * 6 sections 240cm each * 65-23mm * Approx 50ft erect 8ft collapsed **£299.95**

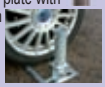
20ft Mast Sets

(5ft Sections)

These heavy duty masts sets have a lovely push fit swaged sections to give a strong mast set. Ideal for portable or permanent installations . . . also available singly
MSP-125 4 section 1.25inch OD mast set... **£39.95**
MSP-150 4 section 1.50inch OD mast set... **£44.95**
MSP-175 4 section 1.75inch OD mast set... **£49.95**
MSP-200 4 section 2.00inch OD mast set... **£59.95**
MSPX-150 4 section 1.50 inch 5mm scaffold gauge (very heavy duty) **£69.95**

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**
CARPLATE-HDT brilliant drive on plate with tilt – ideal to be used in conjunction with the portable telescopic masts and only **£44.95**



Patch Leads

PL58-0.5 ½m Standard RG58 PL259 to PL259 lead **£3.50**
PL58-10 10m Standard RG58 PL259 to PL259 lead **£8.95**
PL58-30 30m Standard RG58 PL259 to PL259 lead **£16.95**
PL58M-0.5 ½m Mil Spec RG58 PL259 to PL259 lead **£4.50**
PL58M-10 10m Mil Spec RG58 PL259 to PL259 lead **£12.95**
PL58M-30 30m Mil Spec RG58 PL259 to PL259 lead **£27.95**
PL213-10 10m Mil Spec RG213 PL259 to PL259 lead **£18.95**
PL213-30 30m Mil Spec RG213 PL259 to PL259 lead **£39.95**
PL103-10 10m Mil Spec Westflex 103 PL259 to PL259 lead **£29.95**
PL103-30 30m Mil Spec Westflex 103 PL259 to PL259 lead **£69.95**
(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)

Connectors

PL259-6mm Standard plug for RG58 ..... **£0.99p**
PL259-9mm Standard plug for RG213 ..... **£0.99p**
PL259-7mm Standard plug for Mini8 ..... **£1.25p**
PL259-6C Compression type for RG58 ..... **£2.50p**
PL259-9C Compression type for RG213 ..... **£2.50p**
PL259-103C Compression type for Westflex 103 ..... **£5.50**
NTYPE-6 Compression type plug for RG58 ..... **£3.95**
NTYPE-9 Compression type plug for RG213 ..... **£3.95**
NTYPE-103 Compression type plug for westflex 103 .... **£6.00**
BNC-6 Compression type for RG58 ..... **£1.50**
BNC-9 Compression type for RG213 ..... **£3.50**
SO239-N Adapter to convert PL259 to N-Type male **£3.95**
NTYPE-PL Adapter to convert N-Type to PL259 ..... **£3.95**
BNC-PL Adapter to convert BNC to PL259 ..... **£2.00**
BNC-N Adapter to convert BNC to N-Type male **£3.95**
BNC-SMA Adapter to convert modern SMA radio to suit BNC ... **£3.95**
SO239-SMA Adapter to convert modern SMA radio to suit SO239 . **£3.95**
PL259-38 Adapter to convert SO239 fitting to 38th thread **£3.95**

New lower prices!

MFJ Antenna Tuners

See our website for full details.
AUTOMATIC TUNERS
MFJ-925 Super compact 1.8-30MHz 200W **£174.95**
MFJ-926 remote Mobile ATU 1.6-30MHz 200W **£429.95**
MFJ-927 Compact with Power Injector 1.8-30MHz 200W **£254.95**
MFJ-928 Compact with Power Injector 1.8-30MHz 200W **£203.95**
MFJ-929 Compact with Random Wire Option 1.8-30MHz 200W **£214.95**
MFJ-991B 1.8-30MHz 150W SSB/100W CW ATU **£214.95**
MFJ-993B 1.8-30MHz 300W SSB/150W CW ATU **£254.95**
MFJ-994B 1.8-30MHz 600W SSB/300W CW ATU **£349.95**
MFJ-998 1.8-30MHz 1.5kW **£664.95**
MANUAL TUNERS
MFJ-16010 1.8-30MHz 20W random wire tuner **£71.95**
MFJ-902 3.5-30MHz 150W mini travel tuner **£102.95**
MFJ-902H 3.5-30MHz 150W mini travel tuner with 4:1 balun **£127.95**
MFJ-904 3.5-30MHz 150W mini travel tuner with SWR/PWR **£132.95**
MFJ-904H 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun **£152.95**
MFJ-901B 1.8-30MHz 200W Versa tuner **£109.95**
MFJ-971 1.8-30MHz 300W portable tuner **£122.95**
MFJ-945E 1.8-54MHz 300W tuner with meter **£134.95**
MFJ-941E 1.8-30MHz 300W Versa tuner 2 ..... **£144.95**
MFJ-948 1.8-30MHz 300W deluxe Versa tuner **£164.95**
MFJ-949E 1.8-30MHz 300W deluxe Versa tuner with DL **£184.95**
MFJ-934 1.8-30MHz 300W tuner complete with artificial GND ... **£204.95**
MFJ-974B 3.6-54MHz 300W tuner with X-needle SWR/WATT **£194.95**
MFJ-969 1.8-54MHz 300W all band tuner **£219.95**
MFJ-962D 1.8-30MHz 1500W high power tuner **£299.95**
MFJ-986 1.8-30MHz 300W high power differential tuner **£359.95**
MFJ-989D 1.8-30MHz 1500W high power roller tuner **£399.95**
MFJ-976 1.8-30MHz 1500W balanced line tuner with X-needle SWR/WATT **£479.95**

MFJ Analysers

MFJ-229 UHF Digital Analyser 270-480MHz **£209.95**
MFJ-249B Digital Analyser 1.8-170MHz..... **£269.95**
MFJ-259B Digital Analyser 1.8-170MHz..... **£259.95**
MFJ-269 Digital Analyser 1.8-450MHz **£369.95**
MFJ-269PRO Digital Analyser 1.8-170/415-450MHz..... **£389.95**

LDG Tuners

LDG Z-817 1.8-54MHz ideal for the Yaesu FT-817 ..... **£124.95**
LDG Z-100 Plus 1.8-54MHz the most popular LDG tuner ... **£144.95**
LDG IT-100 1.8-54MHz ideal for IC-7000 ..... **£163.95**
LDG Z-11 Pro 1.8-54MHz great portable tuner **£162.95**
LDG KT-100 1.8-54MHz ideal for most Kenwood radios **£174.95**
LDG AT-897Plus 1.8-54MHz for use with Yaesu FT-897 ..... **£187.95**
LDG AT-100 Pro 1.8-54MHz **£203.95**
LDG AT-200 Pro 1.8-54MHz **£219.95**
LDG AT-1000 Pro 1.8-54MHz continuously **£519.95**
LDG AT-600Pro 1.8-54MHz with upto 600W SSB **£334.95**
LDG YT-450 designed for FT-450 & FT-950 in stock now **£224.95**

AVAIR SWR Meters

AV-20 (3.5-150MHz) (Power to 300W) **£39.95**
AV-40 (144-470MHz) (Power to 150W) **£39.95**
AV-201 (1.8-160MHz) (Power to 1000W) **£49.95**
AV-400 (14-525MHz) (Power to 400W) **£49.95**
AV-601 (1.8-160/140-525MHz) (Power to 1000W) **£69.95**
AV-1000 (1.8-160/430-450/800-930/1240-1300MHz) (Power to 400W) **£79.95**

MOONRAKER Power Supplies

PS30SWII 25A continuous switch mode PSU with variable output voltage and cigar socket also includes noise offset function. All for just **£89.95**

QJ-PS30II 30A continuous, includes lovely large meter displays and large rear terminals for that thick power cable on high powered rigs.
Amazing at just **£69.95**
QJ-PS50II 50A continuous, same as above with lovely large displays and large rear terminals for that thick power cable on high powered rigs. 50AMPS for under a ton!
..... **£109.95**

New Yoteku premium connectors from Japan – in stock now!

PL259-6ST 6mm pure silver plated brass PL259 with gold plate pin **£4.99**
PL259-9ST 9mm pure silver plated brass PL259 with gold plate pin **£4.99**
NTYPE-6CST 6mm pure silver plated brass N-type with gold plate pin **£6.95**
NTYPE-9CST 9mm pure silver plated brass N-type with gold plate pin **£6.95**

ALL PICTURES ARE FOR REFERENCE ONLY

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

Yaesu are proud to be global sponsors of the T32C Christmas Island DXpedition 2011

Christmas is nearly here ... have you been good?

FT DX 5000 HF/50 MHz 200W Transceiver

The FT DX 5000 Series HF/50 MHz 200 Watt Transceivers are a new Premium Class of Yaesu radios with 2 Independent Receivers plus many unique options and accessories, designed to meet the performance requirements of even the most demanding Amateur Radio operator.

FT DX 5000
SM-5000 Station Monitor - Optional
300 Hz Roofing Filter - Optional
±0.5ppm TXCO Included

FT DX 5000D
SM-5000 Station Monitor Included
300 Hz Roofing Filter Optional;
±0.5ppm TXCO Included.

FT DX 5000MP
SM-5000 Station Monitor – Included
300 Hz Roofing Filter – Included
±0.05ppm OCXO – Included.

YAESU
Choice of the World's top DX'ers

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