

Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine

Three from Midland

Dual-band v.h.f./u.h.f. Hand-helds

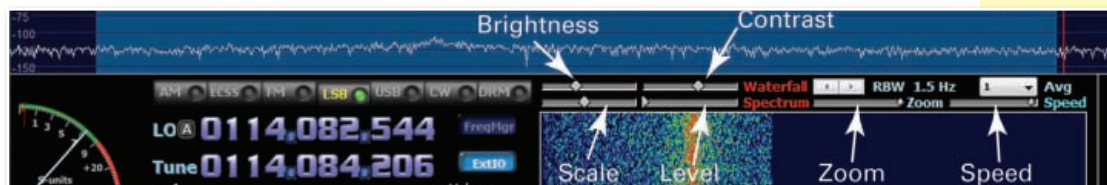


How to Ident Coils

What's that old coil?

Practical Way

Build a regenerative receiver

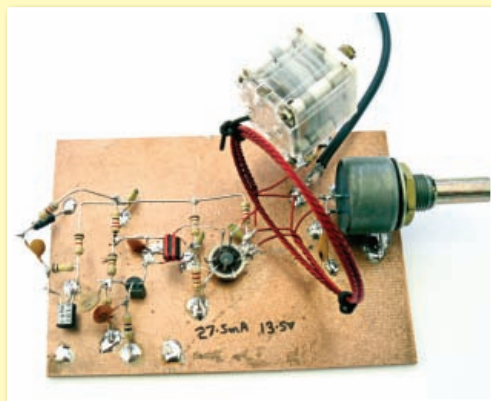


Data Modes

Over the waterfall

In Focus

The 2454 Warbreck Squadron
Air Training Corps



Doing it by Design

The development of a noise
bridge

Available Now!

The World of VHF

The Olympic Games and VHF/UHF



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07



WATERS & STANTON

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Exclusive Offer - Hurry!

Kantronics KAM-XL HF TNC £449.95

£169.95



BRAND NEW Factory sealed stock! 1200 & 300 baud Dual Port operation * Ports: 2x DB-9 radio, 1x DB-15 telemetry, 1x DB-9 aux/GPS port, 1x RS-232 terminal port. It looks like and emulates the industry standard KAM Plus, but with many more features.

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West Mountain RADIO RigBlaster-PRO



USB and serial port. Superior DC and RF isolation with high grade audio transformers. Record both sides of a QSO, process audio in real-time, or even join an EchoLink using your own radio microphone. The RigBlaster also provides true FSK, serial port CW

keying, a wide range of CAT/CI-V rig control options. Front panel control for transmit levels. Dual RCA jacks for direct footswitch, or external sequencer. **£269.95 C**

Exclusive UK Resellers

HFYagi

InnoAntennas

Builders of the Biggest and Best HF Array!

These Antennas will "outperform" anything else that you have of a similar size. They will also reduce many noise problems. Come and visit us and the designer, G0KSC, at the World EME Conference in Cambridge, 16-18th August - see: www.eme2012.com

The "LFA" Secret! The LFA is a major advancement in the development of the Yagi in recent years. The rectangular loop laid flat on the boom provides out-of-phase sections towards the element tips.



- 3-LFA-144 3 element 8.67dBi gain **£59.95 C**
- 4-LFA-144 4 element 9.49dBi gain **£74.95 C**
- 5-LFA-144 5 element 11.16dBi gain **£89.95 C**
- 6-LFA-144 6 element 11.88dBi gain **£104.95 C**
- 8-LFA-144 8 element 13.32dBi gain **£164.95 C**
- 9-LFA-144 9 element 14.06dBi gain **£194.95 C**
- 10-LFA-144 10 el. 14.73dBi gain **£227.95 C**
- 12-LFA-144 12 el. 15.80dBi gain **£269.95 C**

See The Full InnoAntennas Range @ wsplc.com

- 3-50-LFA 3 el. 50MHz 8.9dBi gain 20dB F/B Boom 2.14m **£119.95**
- 2-LFA-28 2 el. 10m 6.4dBi gain 13.5dB F/B Boom 1.28m **£159.95**

Big or small, HF or UHF, or Exposed locations: we can provide an antenna that does the job and has a guaranteed performance. All the gain, F/B, and side lobe specifications are proven, not generated in the advertising department! If you want performance and an antenna that lasts, look no further than Essex! That's the new world centre for antenna excellence.

HF - UHF in One Box!

YAESU FT-897D base or portable, this 1.8 - 440MHz transceiver is great value. 1.8 - 50MHz 100W 2m 50W 70cm 20W. **IN STOCK £819.95 D**

FT-857D The great value mobile or base 1.8 - 440MHz. HF-6m 100W, 2m 50W 70cm 20W. **IN STOCK £714.95 D**

KENWOOD

The **TS-2000E** is a firm favourite for those wanting ultimate all-mode performance on all bands. 1.8-144MHz 100W 70cm 50W. It has the highest power on 2m & 70cms and the TS-2000X version adds 23 cms! Includes auto ATU, DX cluster facility and digital IF for superb weak signal performance. **IN STOCK £1549.95 D**

ICOM IC-7000

The most compact, high spec. HF-UHF transceiver available. With its lovely display and digital IF filters, it can handle all your needs - SSB CW and data. HF-6m 100W, 2m 50W and 70cms 35W. All in one lovely box. **IN STOCK £1189.95 D**

HF on a BUDGET!

YAESU FT-450D transceiver comes with the extra IF filter & an Auto ATU built in. 100W 160m - 6m with 3 IF filters 300Hz, 500Hz & 2.4kHz. **IN STOCK £839.95 D**

ICOM IC-718 SSB CW up to 100W from 160m-10m. You won't find a more cost effective HF radio! **IN STOCK £594.95 D**

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

KENWOOD

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

TEN-TEC

Jupiter-538CE 160m - 10m 100 Watts SSB CW AM FM with on-screen CW reader and socket for PC keyboard. **IN STOCK £1649.95 D**



Orderline 01702 206835



Online Catalogue www.wsplc.com

HF High Performance Transceivers

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. **IN STOCK £1264.95 D**

FT-2000 160 - 6m Transceiver

This radio is a DXers favourite and widely used for DXpeditions and contests. Covering 160m to 6m. It has all the digital features and auto ATU. Available as 100 Watt or 200 Watt version. **IN STOCK 100W £2259 D 200W £2899 D**



FT-DX5000 160 - 6m Transceiver

The current Yaesu "flagship" radio, covering 160m to 6m delivering 200 Watts. **ALL IN STOCK**
FT-DX5000 Standard radio £4635.95 D
FT-DX5000D + SM-5000 monitor £4939.95 D
FT-DX5000MP + monitor & filters £5369.95 D

KENWOOD TS-590S

160m - 6m with superb receiver inc. dual roofing filters, Auto ATU, 32 bit f/p DSP & USB PC connection.



This radio has won the admiration of the radio press and hams all over the world. The best dynamic range in its class, digital IF, narrow roofing filters and auto ATU. Also FREE PC control program that can be downloaded. Exceptional value. **IN STOCK £1329.95 D**

ICOM IC-7410 HF-6m Transceiver

This lovely new HF-6m all-mode 100W transceiver offers superb front end dynamic range, and has a 15kHz roofing filter. It also features a 36kHz DSP razor sharp filter, internal auto ATU, PC control via a USB port and speech synthesizer. **IN STOCK £1695.95 D**



IC-7600 HF Transceiver



The IC-7600 HF/50MHz transceiver is enhanced with some of the main features tried tested on the flagship IC-7700/7800 models. It is highly regarded by Amateur operators world-wide. Features inc a double conversion superheterodyne system, dual DSP units & 3kHz IF (roofing) filter. **IN STOCK £3299.95 D**

IC-7700 HF Transceiver



The IC-7700 HF/50MHz 200W transceiver shares many features with its "big brother", the world famous IC-7800. With two independent DSP units, a +40dBm 3rd order intercept point and ultra wide dynamic range to name but a few of the features. **IN STOCK £6364.95 D**

TEN-TEC OMNI-VII-588 HF Transceiver



Fire it up and you immediately know you are driving something different. The receiver is a delight and the transmitted audio is superb. This 100 Watt transceiver that covers 160m - 6m. Ethernet remote control ready. **IN STOCK £2699.95 D**

NEW PRODUCTS COMING SOON!

There's more to come! Keep in touch by visiting our web pages www.wsplc.com

Yaesu FT-DX3000 1.6-20m All modes & a great full colour screen



Heil ProSet-3 Studio Headphones



TenTec Argonaut-VI SSB CW 10W Carrying on the fine QRP tradition.



Yaesu FT-1DE Digital & FM



Super Antennas YP-3 Ultra Portable Yagi 20-10m



Elecraft Signal Source Calibrated 1uv & 50uv 160-2m



SuperAntennas PM-1 40-70cms



Be kept informed of all these & more together with prices & availability, email us at info@wsplc.com or phone 01702 203353 to be put on our data base - don't miss out!

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

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HF Linear Amplifiers

Alpin-100mkll 160m - 6m 1.3kW

New Low Price



The Alpin 100 desktop linear will deliver up to 1.3kW output from this desktop design. It covers 160m - 6m and has full tune up protection. The panel control display tells you exactly what is happening and makes operation simple. If you are looking for something rugged with full safety features at a sensible price - this is it!

£2299.95 D

AMERITRON AL-811XCE 160m - 10m 600W



This Ameritron design gives a sensible power gain for a very reasonable price. It has a hunky built-in power supply with full monitoring of operation conditions. It uses three low cost 811A tubes to achieve 600W power output running from a 1500volt HT line. This desktop design can easily be accommodated. 350 x 210mm Weight: 14.51kg

£899.95 D

It Costs Less At W&S!

Turn This >>>> Into This!



Radio has never been cheaper in real terms but that does not help if you are short of cash. So why not turn out all that old gear and part exchange it for what you really want. EVEN DEAD equipment has a value! Just call us on 01702 203353 or e-mail us your list of gear together with what you want to buy. at: sales@wsplc.com. We will give you an immediate quotation. That new radio is waiting.

AirNav Systems



RadarBox-Pro **Price Reduction! Save £100!**

We've lowered the price of the RadarBox-Pro by £100! If you've always wanted to try the RadarBox now is the time to do it! See real aircraft on your computer screen just like on a real radar.

£399.95 £299.95 C

RadarBox-3D

£489.95 C

See real aircraft on your computer screen with Google Earth 3D.

VHF UHF Mobiles



NEW TM-281E 2m FM 65/25W Mobile £169.95 D

On or off the road, Kenwood's TM-281E is a mobile you can count on. This MIL-STD compliant transceiver delivers powerful performance, excellent audio clarity, and a host of advanced features.



FT-2900E 75 Watt 2m 3W Audio, CTCSS, DTMF mic & "WIRES" internet. **£142.95 D**



FT-7900E 2m/70cms mobile 50/40W CTCSS, DTMF, "WIRES" internet, wide Rx **£239.95 D**



FT-8800E Dualband Mobile 50W / 30W Great Value **£343.95 D**



FT-8900R Quad band 10/6/2m/70cm FM 50W (70cm 35W) **£389.95 D**



FTM-10E 2m/70cms Blue Tooth & built-in mic. **£324.95 D**



FTM-350E 2m/70cm Mobile Bluetooth GPS APRS **£479.95 D**



ID-E880 50 Watt Dual band 2m/70cm with D-Star and airband receive. **£439.95 D**



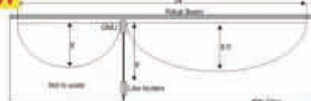
TM-D710E 50 Watts 2m/70cms with APRS **£445.95 D**



TM-V71E 2m/70cm Mobile with Echo Link **£299.95 D**

Radio Works NEW 34ft Attic Antenna

NEW



Here's a great idea for those with a small garden or no garden! The attic is a smart alternative. It's dry, put of the wind and rain, and probably higher than you can erect an outside antenna. The above shows the antenna strung across the ridge of the roof. Coverage is 40-6m (inc WARC bands), and many internal ATUs can match it. Includes balun matching unit and antenna isolator. Ready built to go. Great value.

CW-COMPACT-40 Folded back el. 40-6m 1500W. min height 25ft inc balun & isolator. **£139.95 D**

SHORT-40 40-6m 1500W 50ft long inc balun and isolator **£134.95 D**

CW-COMPACT-80 Folded back el. 80-6m 1500W 69ft inc balun and isolator **£149.95 D**

CWS-80 Carolina Windom Special 80-6m 1500W 66ft long inc balun and isolator **£139.95 D**

CW-40 Carolina Windom 40-6m 1500W 66ft long inc balun and isolator **£121.95 D**

SHORT-160-SPECIAL 160-6m 1500W 100ft long inc balun and isolator **£147.95 D**

SHORT-80 80-6m 1500W 100ft long inc balun and isolator **£146.95 D**

Handheld Transceivers



ID-31E **NEW**

70cms D-Star handheld with built-in GPS, IPX7 submersible & D-Star DV mode, SD card slot, 1252 memories & 5W output. **£349.95 D**

TH-K20E & TH-K40E

Two new handles from Kenwood. "K20E" offers 5.5W output and rx from 136-174MHz. "K40" offers 5W out and rx from 400 - 470MHz. **£119.95 D each**



VX-3E 2m / 70cm Handheld Wideband receive **£169.95 D**



VX-6E 2m/70cms handy, 5W Wideband Receive **£214.95 C**



FT-60E 2m/70cms, 5W handy Wideband Receive **£129.95 C**



VX-8GE Dualband 2m/70cm 5W + GPS Antenna **£349.95 D**



VX-7R Waterproof triple band handy (silver/black) **£299.95 C**



VX-8DE Triple Band 6/2m/70cm Upgraded APRS **£369.95 D**



IC-E80D Dual band 2m/70cm D-Star CTCSS & DTCSS GPS Compat. **£329.95 D**



IC-E90 Triple band 2m 6m 70cm + wideband receive 500kHz-1GHz **£244.95 D**



IC-E92D Dual band 2m/70cm waterproof fitted D-Star. Rugged radio. **£387.95 D**



TH-F7E Dual band 2m/70cm + wideband receive inc. SSB **£236.95 D**



TH-D72E Dual band 2m/70cm with GPS & TNC + SIRF **£426.95 D**



TG-UV2 Dual band 2m/70cm with CTCSS DCS & LED torch! **£84.95 D**

YouKits QRP 80-40-30-20m CW Transceiver



HB-1B QRP Transceiver

This little CW 80, 40, 30, 20m transceiver runs 6 Watts from ext. 12v or 4W from optional internal lithium cells. Has tunable filter 400Hz-3kHz, electronic keyer, programmable auto CQ, 30 memories, switched tuning speeds. Also receives SSB from 3.4 - 16MHz.

IN STOCK £249.95 D

WATSON

Made for Watson by MOCVO Antennas

NEW

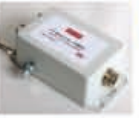


1:1-BALUN-1.5 1.5kW 1.8-30MHz A 1:1 balun able to handle up to 1.5KW RF power. Used to feed a balanced antenna, or doublet with unbalanced feeder, reduces static on feeding. **£54.95 C**

4:1-BALUN-1.5 1.5kW 1.8-30MHz A 4:1 4:1 Extra High Power 1.5KW current balun for Windom, off centre fed or folded dipoles. Reduces 200 - 300 Ohms at feed point of antenna to 50 Ohms enabling the antenna to be fed with 50 Ohm coaxial cable. **£54.95 C**



W-LINE 1:1 Line Isolator 400W 1.8-30MHz Removes RF from Coax. **£32.95 C**



1:1, 4:1-BALUN & 9:1-UNUN 400W 1.8-30MHz Can be used as centre feed point. Each model **£32.95 C**



MD-12HP 12m Mono for portable fixed station 400W CW 1:1 Balun 5.77m **£43.95 C**

MD-17HP 17m Mono for portable fixed station 400W CW 1:1 Balun 7.95m **£43.95 C**

LW-20 Multiband HF long wire 9:1 UNUN 80-6m inc WARC 20m long 400W **£43.95 C**

LW-10 Multiband HF long wire 9:1 UNUN 40-6m inc WARC 10m long 400W **£43.95 C**

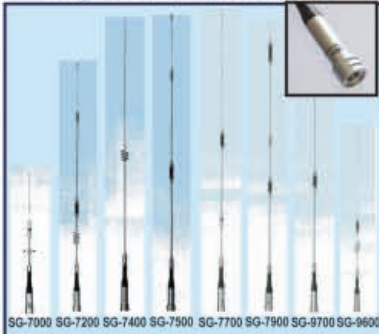
HW-80HP Multiband HF off-centre dipole 4:1 balun 80-10m 40m long 400W **£71.95 C**

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



DIAMOND ANTENNA

Engineered To Perform



SG-2000 2m/5.2dB 1.59m	£84.95
SG-7000 2m/70cm 2.1/3.8dB 0.47m	£66.95
SG-7200 2m/70cm 3.2/5.7dB 0.96m	£82.95
SG-7400 2m/70cm 2/5.5dB 0.99m	£71.95
SG-7500 2m/70cm 3.5/6dB 1.06m	£72.95
SG-7700 2m/70cm 4.3/6.8dB 1.27m	£92.95
SG-7900 2m/70cm 5/7.6dB 1.58m	£104.95
SG-9500M 2/70/23cm 3/6/9.7dB 1m	£96.95
SG-9600 6/2/70cm 0.82m	£86.95
SG-9700 6/2/70cm 0/3/5.8dB 1.07m	£92.95

Diamond Mounts



K-11 Gutter mount adjustable tilt	£36.95 A
K-300 Black gutter mount adjust. tilt	£TBA
TRA-II Trunk lip adjust. + 4m cable	£TBA
K-600M Trunk lip adjust + cable	£66.95 C



K-33 Hatch Mount adjustable	£43.95 A
K-400 Heavy Duty Hatch mount	£39.95 A
CRM Roof rail / Mirror Mount	£14.95 A
K-512 Roof bar mount	£44.95 C
ECH 5m cable kit PL-259	£12.95 A

DP-7RH Compact 40/30m Dipole



This is a rigid, telescopic 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-29 feed.
£134.95 C

HF Verticals

CP-6 80-6m 200W with 1.8m rigid radials. Mast mounted. 4.6m long
£359.95 D

CP-8040 80-40m with 1.8m rigid radials. 6.5m long.
£399.95 D

KV-5 80-40m ground mounted vertical approx 6.5m long.
£339.95 D

SD330

80-6m Remote Tuned Whip
This "screwdriver" design covers all the DX bands (inc WARC). 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.
£429.95 D

NEW LOW PRICES From UK Distributors!

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
£99.95 C

SX-200 1.8 - 200MHz. 5/20/200W FSD. 1W sensitivity for FSD. Single sensor. 0.15dB insertion loss. PEP/RMS **£94.95 C**

SX-400 140 - 525MHz. 5/20/200W FSD. 4W sensitivity for FSD. Single sensor. 0.2dB insertion loss. PEP/RMS **£99.95 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.
£169.95 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 **£239.95 C**

Diamond Power Supplies



GSV-3000

30 Amps continuous
1 - 15VDC variable
250 x 150 x 240 mm inc. DC cooling fan, weight 9kg
£194.95 C



GZV-6000 60A

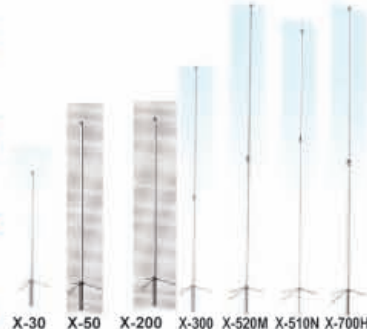


GZV-4000 40A

GZV-6000 60 Amps continuous 1 - 15VDC variable 210 x 110 x 3300 mm inc. DC cooling fan, weight 5.2kg
£349.95 C

GZV-4000 40 Amps continuous 1 - 15VDC variable 210 x 110 x 3300 mm inc. DC cooling fan, weight 3.5kg
£199.95 C

Base VHF/UHF Antennas



X-30 2/70cm 3/5.5dB 1.3m 150W **£57.95 D**

X-50 2/70 4.5/7.2dB 1.7m 200W **£66.95 D**

X-200N 2/70cm 6/8dB 2.5m 200W **£94.95 D**

X-300 2/70cm 6.5/9dB 3.1m 200W **£104.95 D**

X-520M 2/70cm 8.3/11.7dB 2.5m **£159.95 D**

X-510N 2/70cm 8.3/11.7dB 5.2m 200W **£154.95 D**

X-700H 2/70cm 9.3/13dB 7.2m 200W **£279.95 D**

FlexRadio Systems® Software Defined Radios

Waters & Stanton First To Get Their Hands On A Flex-6000!



Main picture: Klaus (European Service), Gerald Youngblood, the president and designer, and Jeff Stanton.



Waters & Stanton were invited to the USA presentation of the new Flex-6000 series. A new major development in SDR technology. Production begins in October on this new high end design. Centred around a completely new software system, to be known as SmartSDR, performance will be transformed. Digital rx processing will now take place at the antenna socket. We hope to have the first UK Demonstration at Newark Show. Full details on our web site.

Flex-3000 160-6m 100 Watts Auto ATU

94dB dynamic range. 96kHz wide receiver display. Firewire connection. Built-in auto ATU, 100 Watts and weighs just 3.2kg. The FLEX-3000 is the high performance mid-range 100 watt all-band, all-mode amateur radio transceiver that achieves receiver performance that rivals all other traditional analog hybrid DSP transceivers in its price class. The FLEX-3000 is the perfect transceiver for hams just getting started with high performance software defined radios or a companion SDR for existing FLEX-5000 owners who want a more convenient solution for portable operation.
£1379.95 D



Flex-1500 160-6m 5 Watts USB cable

86dB dynamic range, 48kHz receiver display, USB cable, 5 Watts output. Low Cost Transceiver with Software Defined Radio Features and Performance This is a common theme for FlexRadio Systems' software defined radios - a focus on performance and exceptional value. And the FLEX-1500 continues that tradition for a transceiver in the sub £600 price class. A QRP radio that works perfectly with your laptop and a great driver for VHF/UHF transverting. Experience the excitement and wonderment of all modes and fantastic receiver performance for such a low price.
£579.95 D



Hygain Vertical Antennas

AV-6160 6-160m aerial 43 feet self supporting 1500 Watts **£434.95 D**

AV-6110 160/80m high efficiency matching network **£279.95 D**

AV-12AVQ 10-15-20m Vertical 1.5kW 13ft **£169.95 D**

AV-14AVQ 10-15-20-40m Vertical 1.5kW 18ft **£209.95 D**

AV-14RMQ Roof mount kit: baseplate/mast & radials **£109.95 D**

AV-18AVQ11 10-15-20-40-80m vertical 1.5kW 18' **£279.95 D**

AV-18HT 10-12-15-20-40-80m Vertical 1.5kW 53ft **£1,089.95 D**

AV-18HTJR 10-15-20-40-80m 5kW Vertical 39ft **£399.95 D**

AV-18VS 10-12-15-17-20-30-40-80m vertical 1.5kW 18' **£134.95 D**

AV-620 6-20m Vertical inc WARC 1.5kW, 22.5' long **£329.95 D**

AV-640 6-40m Vertical inc WARC 1.5kW 25.5' long **£479.95 D**

DX-77A 10-12-15-17-20-30-40m vertical 1.5kW 29' **£479.95 D**

DX-88 10-12-15-17-20-30-40-80m Vertical 1.5kW 25' **£409.95 D**

KIT-160-88 160m add on kit for DX-88 **£209.95 D**

GRK-88 Ground radial system for DX-88 **£109.95 D**

RRK-88 Roof radial system for DX-88 **£109.95 D**

LC-160Q 160m mod kit for AV-18HT 150 W **£124.95 D**

MK-160A 160m mod kit for AV-18HT 1 KW **£135.95 D**

MK-6 6m add-on kit for most HF yagis & rotatable dipoles **£49.95 C**

MK-17 17m add-on kit for AV-14AVQ **£99.95 D**

MK-80 80m add-on kit for AV-14AVQ **£94.95 D**

AV-640



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



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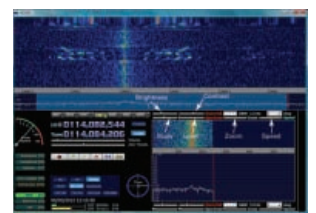
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This month the Rev. **George Dobbs G3RJV** takes a look at a classic project and reflects on the fact he – and many of us! – are analogue type constructors but he's not being pessimistic!

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Brian Nuttall M0OYG describes how his Air Training Corps Squadron in north west England is busy training Air Cadets in radio communications.

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The traditional brown dustcoat he's wearing announces it's **Phil Cadman G4JCP** manning the *PW* vintage 'shop' this month!

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It's inevitable that the Olympic Games organisational requirements would end up creeping into *PW* – and **Tim Kirby G4VXE** explains in details how Amateur Radio v.h.f. operating in the UK will be affected.

56 Old RF Coils and How to Identify Them

That's the suggestion from **Stef Niewiadomski** – our keen constructor author. Stef then describes how readers can discover just what that old coil is!

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Rob Mannion G3XFD/EI5IW's

Keylines

Rob G3XFD discusses his recent trip to Wick in Scotland, offers an apology for an 'Olympic Overload' in *PW* and offers a challenge to everyone who operated a GQ callsign to celebrate Her Majesty The Queen's 60 years on the throne.

The *PW* 'club visit' to the **Caithness Amateur Radio Society** (CARS) in Wick in the far north of Scotland – started as I left from Bournemouth on Tuesday afternoon May 1st. I arrived safely in Inverness on Wednesday May 2nd – even though the locomotive hauling the Caledonian Sleeper train broke down between Perth and Inverness!

Full marks to Scotrail though – within an hour, coaches were on hand to get us to Inverness and I managed to catch the 'Far North' train to Wick. It was a wonderful trip through Dingwall – I have fond memories of my time living in Wester Ross – and onwards via Helmsdale and up to Thurso and Wick. I recommend this train ride to anyone!

The Club arranged for me to be met by a car and I was soon relaxing over a light lunch in the most pleasant and modern holiday accommodation for disabled people – literally a stone's throw from Wick Harbour. It was arranged by **Hamish Duncan MM0HDW**, Chairman of CARS, his daughter **Anne Campbell** and son-in-law **Donald Campbell**.

The club meeting at their venue at the Nethercliffe Hotel started with a soup and sandwich meal (what a great way to start an evening meeting!). We then all enjoyed a very sociable evening today – ending up with a *PW* 'Question & Answer' session.

On the Thursday I had a guided tour of Wick's Old

Pulteney Distillery in company with Hamish MM0HDW – followed by an hour or so on board the local RNLI lifeboat – the first time I've ever been on a lifeboat – even though I live near Poole RNLI headquarters! The deep-sea going vessel was absolutely spotless inside and out and ready for business!

In the late afternoon Hamish and I were taken for a horse and carriage ride courtesy of **Mary Edmundson and Bob Renshaw MM0RJR** (CARS Events Manager) and his wife **Jane**! What an experience!

Amateur Radio is alive and well in the far north of Scotland! And I'm so pleased I decided to do the journey by train – combining my two hobbies – thank you everyone – it was a wonderful club visit!

Olympics Overload?

I think it's necessary for me to apologise to those who may feel consider that *PW* has been 'invaded' by the Olympic Games this month! It was inevitable that – due to the radio communications demands of this huge commercialised event – that there would be some duplication – albeit from different viewpoints – from our regular columnists.

Our columnists do their best to cater for their own specialist subjects and as Editor, I'm pleased with the way they've handled the all-pervading Olympic Games. However, as an Amateur Radio magazine *PW* will support any reader or club who operates an Olympic orientated Amateur Radio station. So make sure that

you get photographs of your own Special Event station to *Newsdesk* as soon as you can.

I may not be the Editor of a sports magazine – but if Amateur Radio helps support others in their endeavours I want to hear about it! I have the highest respect for the athletes taking part in the Olympic Games and their personal efforts to do their best for themselves and the sports they represent. My lack of enthusiasm for the Olympics is due to the politicians and 'profiteers' who have 'hijacked' the event for their own purposes.

The Queen's Jubilee

Before preparing this edition of *Keylines* I had several pleasant QSOs with a number of GQ (and the regional variations) callsigns. As UK Radio Amateurs they were helping to celebrate the amazing 60 year reign of Her Majesty Queen Elizabeth II (Queen Elizabeth in Scotland, of course!).

I would be very pleased to hear about your experiences on the air with your own GQ callsign and if you had a special QSL card printed for your Jubilee operations – please include it with your letter to be published in *PW*. If you didn't have a special card printed – please send a photo of yourself in your shack. I'm planning to publish as many as we can find space for and I'll be awarding a special Editor's prize for what I judge to be the most interesting letter. I look forward to hearing from you!

Rob Mannion G3XFD/EI5IW

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Subscriptions

Subscriptions are available at £42 per annum to UK addresses, £51 Europe Airmail and £61 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: rob@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

Amateur Radio Is 'Cooler' than Ever!

Dear Rob

I was, as a young lad, somewhat of a zealous, perhaps (some might say obsessed) 'radio boffin'. I managed to obtain my Licence aged fifteen – which I think on reflection was a reasonable effort considering the standard of the RAE at the time. It also seemed to require months of night school and lots of study to pass.

The Internet was of course yet to be invented, mobile phones or worldwide communications, the stuff we now take for granted was still the stuff of *Star Trek* and the often wildly inaccurate predictions of BBC's *Tomorrow's World*! A two-way radio in the car was even considered by the general public as something seriously clever!

Having elected for a career in the Royal Navy as a radio and electronics tech, playing with wireless as a hobby took a back seat and then was dropped entirely as girls, cars, the pub and other social interests gradually occupied more and more of my social life. But as the end of the 1970s approached, affordable personal computers were surfacing, nevertheless as I look back and reflect it seemed Amateur Radio was somewhat stuck in the past. It seemed for me to have lost its 'cool'.

But, as the Internet developed during the subsequent two decades, it has, as we all know, evolved into something quite astonishing. I freely admit I continued to maintain the thought that the Internet would consign Amateur Radio to obsolescence and so my interest in radio waned even further. However, a change circumstances in my personal life was the catalyst for me to finally seek out the radio club in Dunedin NZ where I now live. It also proved that I could not have been more wrong in my predictions!

The effect of the Internet on Amateur Radio has been astonishing; research, support, circuits, software, access to suppliers, the list goes on. A few moments ago – before I wrote this E-mail to you – I picked up my NZ cellphone while sitting on a friend's couch in Liverpool in England, opened the *Echolink* app, connected via WiFi to the Internet, found a node in New Jersey, called "CQ" for some information on a US radio dealership and got an immediate answer. Its all quite stunning, especially as my actual rig is 12,000 miles away!

My club in NZ has over 60 members, which for a city of 120,000 people is quite an accomplishment I hope you will agree. Proof of how popular the hobby remains. As for the future? Thanks to the Internet I see the hobby going from strength to strength and I am pleased my predictions were wrong. Amateur Radio is cooler than ever! 73

Chris Knight G8IPK/ZL4WHO
Dunedin
New Zealand

Editor's comment: Nice to hear from you Chris – a fascinating letter!

Armagh Observatory & ELF Receiver

Dear Rob,

Further to your comments in *Topical Talk* in the May 2012 issue of *Practical Wireless*, I have taken the liberty of attaching some information that you might find of interest, possibly for publication in *PW*. It's a small section of a much larger report describing the ULF/VLF element of a Digital Meteor Station used at Armagh Observatory. It is part of a Europlanet "Empowering the amateur community" project.

This section refers to the building and utilisation of a very simple ULF/VLF 'receiver'.

As you can see, it is basically one transistor, one f.e.t., two i.c.s and chicken wire on a cardboard tube! The spectrograms illustrate just how well it works, if used carefully.

I have attached spectrograms that best illustrate the natural and anthropic signals which can be received and analysed with the complete system, which comprises the 'receiver' recorder and spectrum analysis software.

It is quite remarkable what can be detected with it, both in the natural Geophysical field and from a VLF 'signals' aspect. For example Tesla/Schumann resonances, Whistlers or ALPHA, etc.

I have a professional interest in the Electrophonic or electrostatic meteor detection field (A topic all to itself!) but the assessment of the 'background environment', occurring in the receiver's pass-band, is fascinating, ongoing and possibly of interest to your readers. You may find this link to our web site of interest, there's quite a lot going on! www.arm.ac.uk/ Regards.

James Finnegan G14FFL
Armagh Observatory
Northern Ireland
E-mail: Finnegane32@aol.com

Editor's comment: Thank you James! I'm sure many readers will be interested.

There's no room to publish the details of the receiver on this page – but I'll supply the information to any reader who requests it via E-mail (E-mail only please). The number of requests will also help evaluate the level of interest.

Becoming A Radio Amateur

Dear Rob

Thanks for your invitation – I am still tempted to write that article for *PW* about my experience of becoming a Radio Amateur over the last couple of years. But in the meantime a more pressing question which may affect many readers; I have been on the RSGB Teach the Trainers course and my club – **Bromley District Amateur Radio Society** has been good enough to allow me to teach student Amateurs.

Many of the articles in *PW* are extremely well written and at a level suitable for student learning. I would like to copy some of the articles as study material for my students. Does *PW* have a policy on copyright in these circumstances which might help me please?

I enjoy reading my copy of *PW*. I am certain it contributed to attaining my Advanced Licence so quickly.

Graham Dobson M0PTD
Goddington
Orpington
Kent

Editor's reply: We look forward to your article Graham! We try to assist when requests to reproduce our copyrighted articles for non-profit making use and we handle each request on an individual basis and I look forward to hearing from you on the matter (See Topical Talk).

Non-transmitting *PW* Readers

Dear Rob,

I have been reading *PW* since my schooldays in the 1960s and although I have had the opportunity of getting my transmitting licence I am too busy in my workshop. In fact I don't think I could find time to get on the air and I very much enjoy working on my bench while listening to the h.f. and v.h.f. bands.

As a mobile service Engineer looking after agricultural equipment (you would be amazed at the number of microprocessors I come across on tractors and other farming equipment) – I'm using a mobile 'phone and the PMR radio in my van as I travel all over the Highlands. So I do get on the air – but not on the Amateur Bands!

Personally, I have never felt 'left out' in *PW* because the magazine is still based

Emergency Services Amateur Radio DX Group

Dear Rob,

I wonder if you would like to include the following in the next edition of *PW*? At the end of last year the 'Emergency Services Amateur Radio DX Group' was born on Facebook. The idea was that serving and retired members of any of the Emergency Services could meet through the Group to discuss their common interest in Amateur Radio. The Group has been very successful and a net has now started on 7MHz.

The net is run by **Jim Bertram GM0GMN** and myself **Tony Barrett M6AIV** and is open to anyone who serves, or has served within one of the services, either full-time or as a volunteer. This could be any emergency service such as RNLI, coastguard, or in my case Ambulance service. Of course visitors would be very welcome to the net. I run an Icom IC-718 with 10W at the moment, and a Yaesu FT-817 at 5W, still make good use of that little lady!

I have been in the South West Ambulance service since 2004, and a Paramedic since 2007, I also mentor new university-trained Paramedics as they need placement on front line vehicles to add practical experience to the academic training. The net takes place on 7.173MHz every Thursday evening at 1800hrs UTC. Further details from myself of Jim (We're both QTHR). 73.

Tony Barrett M6AIV
Newton Abbot
Devon
E-mail: m6aiv@btinternet.com



on construction, although there's not so many of the 'funny little projects' we had before *PW* became dedicated to Amateur Radio.

I enjoy building some of the **Rev. George Dobbs G3RJV**'s projects and also the ideas that come from **Tony Nailer G4CFY**.

I particularly enjoyed **Phil Cadman G4JCP**'s battery monitor unit PIC project too – it has proved extremely useful to me and I am looking forward to seeing some more of Phil's projects. My thanks go to all your authors who offer projects we can build – it makes a nice change from the sort of work I do 'in the field' nowadays – mostly changing p.c.b.s!

Thank you for answering my E-mail so quickly Rob – I was disappointed that you had been in Inverness recently on your way to and from the Caithness Club up in Wick – if I had known you were about I could have at least met up with your train at a station as I was working up in Tain in Ross-Shire most of that day!

As it was, I saw several trains on the 'Far North' line that day – perhaps you were on one of them? I hope you enjoyed

the trip but I am sorry I missed you as you passed through Inverness – and I hope that the next time you come to the Highlands I will get the chance to meet you face-to-face. Best wishes.

Andy McDonald
Raigmore
Inverness
Scotland

Editor's comment: Thank you for your very interesting E-mails Andy and I hope that the next time I come through Inverness we will meet up! I used to be a regular visitor to Raigmore Hospital because that's where my prosthetic arm 'attended' for maintenance! However, on the way home on the Friday evening to catch the Caledonian Sleeper to Euston I met a delightful American couple from Colorado. They were on holiday and both had been keen Radio Amateurs. It wasn't until we parted company that I realised I had my own copy of *PW* in my trolley-bag! Hopefully, they will contact *PW* via the website details I gave them at the time. It was great meeting them and I hope next time I'll meet you Andy!



News & Products

Send your info to:

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

E-mail: newsdesk@pwpublishing.ltd.uk

New Book From PW Publishing Ltd.

Diary of a Maritime Radio Officer

Newsdesk has some 'hot' news – the Broadstone, Dorset-based publishers of *Practical Wireless* – PW Publishing Ltd. – are soon to re-publish a book written by **Ross Bradshaw G4DTD** entitled *Diary of a Maritime Radio Officer*. Ross G4DTD has recently completed a three part series in *PW* looking back at his work with the UK Government's Diplomatic Wireless Service (DWS), which proved very popular with readers.

The book looks back at Ross' time – and adventures – at sea and will be launched in *PW* with an accompanying book review written by **Rob Mannion G3XFD** who was (unusually for him!) rather tight lipped when *Newsdesk* asked for comment! "You'll have to wait for the full book review – but I will say that if you enjoyed the DWS series – you're in for a treat with this book!"

Watch this space – the *Diary of a Maritime Radio Officer* is coming soon!

You've Just Got Time To Visit The HF Conference 2012 In Omagh!

Philip Hosey M10MSO/EI8GPB contacted *Newsdesk* with a last minute reminder of the **West Tyrone Amateur Radio Club's 2012 HF Convention**. The venue is **The Technology Education Centre, 2 Spillers Place, Omagh, Northern Ireland BT78 1FA** on **Saturday June 16th**.

The Draft Programme includes: "How did Amateurs get their bands: The VHF, UHF, SHF & EHF Bands" by **John Breen EI7BV**, "An historic overview of ITU World Radiocommunication Conferences 1947 to 2007 and their impact on the Radio Amateur focused on the bands above 30 MHz (VHF/UHF/SHF & EHF)".

"The Making of Modern Amateur Radio in the UK" by **Angus Annan MM1CCR** – An account of the factors that drove the changes away from the RAE to the three tier licence system.

"Getting the best from your new Rig" by

Simon Lloyd Hughes GW0NVN.

Common features on h.f. transceivers. How to use them to get a comfortable, successful QSO. The techniques also apply to v.h.f. and above. Simple station improvements will also be described.

"The Whys and Wherefores of the Windom, the G5RV and other Magical Antennas"

The lecture concentrates on the design and workings of the Windom, G5RV and other antennas in their various forms, their use and misuse by **Simon Lloyd Hughes GW0NVN**.

"A Little Pistols

Guide to Contesting and DXing" by **Frank Hunter G14NKB**. Chasing DX and contesting from a normal station – with no antenna farm. For further information on Ham Con see <http://gn4oma.blogspot.co.uk/> **Philip Hosey M10MSO/EI8GPB**



The GB80PW QSL Cards Have Arrived!

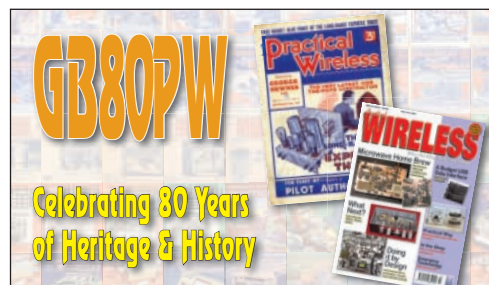
Rob G3XFD writes: "The GB80PW QSL cards have arrived and I'm busy working my way through the backlog of envelopes to return the cards in the stamped envelopes provided. However, a number of return envelopes have been found without the necessary postage stamps attached. So, if your awaited QSL card doesn't arrive or you receive a demand from the Royal Mail to pay a surcharge (the Royal Mail will demand the surcharge but don't identify what's in your 'package'!) it may be your GB80PW card, which I could have posted without realising there was no stamp.

"A number of foreign QSL cards have been received with return envelopes with the correct postage in British stamps and they've been posted back – I'm grateful to those correspondents who've managed this! However, if you live abroad and require a GB80PW card for your QSO – please E-mail me via rob@pwpublishing.ltd.uk so we can arrange postage. **Please remember that QSLs for GB80PW cannot be sent via the QSL Bureau** and must be sent to my home address marked to: **Rob Mannion G3XFD (GB80PW) Flat 1, 1 Spencer Road, Bournemouth, Dorset BH1 3TE**.

"Although propagation conditions have been very poor during the last two Saturday sessions – and the bands have been very crowded (particularly 7MHz) – we hope to work as many of you as possible. Please listen for news of the different modes (c.w., PSK31 and RTTY) we plan to use. Don't forget also – that to celebrate the actual 80th anniversary of publication – **we shall also additionally activate GB80PW on Thursday September 13th.**" (full schedule below). Rob.

Saturday Schedules

June 16th, July 14th, August 11th, September 15th, October 13th, November 10th and December 15th.



The Hull & District ARS Open Day

Sunday 24th of June will be a busy day for members of the **Hull & District Amateur Radio Society (H&DARS)** when members will be holding an 'Open Day' event. The day will include a Bring & Buy, followed by an Auction at 1pm. The doors open for viewing at 10.30am. The club members will also be running a barbeque and refreshments will be available they will sell your unwanted equipment (selling fee 10% to club funds).

Further Details: **Julian Randall M6JMR** (Vice Chairman) via julianrandall@rocketmail.com or on Tel: **07901230012** or **Keith Shaw 2E0BRQ** (Secretary) via 2e0brq@gmail.com or on (01482) 217776. Club address:

**The H&DARS Club House
Walton Street Leisure Centre
Goatland Close (Off Walton Street)
Hull
East Yorkshire HU3 6JB**

The PR 35 Gets Better With Age

Essex-based **Waters & Stanton PLC** – UK importers of Heil Sound microphones issued a press release on behalf of the American microphone producer. The press release states "Heil Sound has announced an upgrade to their popular PR 35 hand-held dynamic microphone. The PR 35 was first introduced in 2008 and quickly found favour with artists such as **Joe Walsh**, **Charlie Daniels**, **Stevie Wonder** and others.

"While at first glance the changes are cosmetic in the form of a new chassis, several significant internal improvements have also been made. Rear rejection, which has always been a strength with the PR series of microphones from Heil, is -42dB with the upgrade. A concealed two-position roll **Off** switch replaces the former thumb switch. Visually, the new PR 35 harks back to a time when wired hand-held vocal microphones had a certain 'look' and could be identified when seen on camera. The PR 35 ships with three interchangeable coloured trim collars that can be 'mixed and matched'. The new PR 35 will be priced the same as the current model and is available to Heil Sound dealers now".

Further details from:

**Waters & Stanton PLC, Spa House,
22 Main Road, Hockley, Essex SS5 4QS**
Tel: **(01702) 206835**
FAX: **(01702) 205843**
E-mail: **sales@wsplc.com**
Website: **http://www.wsplc.com/**



Harwich Interest Group To Activate GB4LV

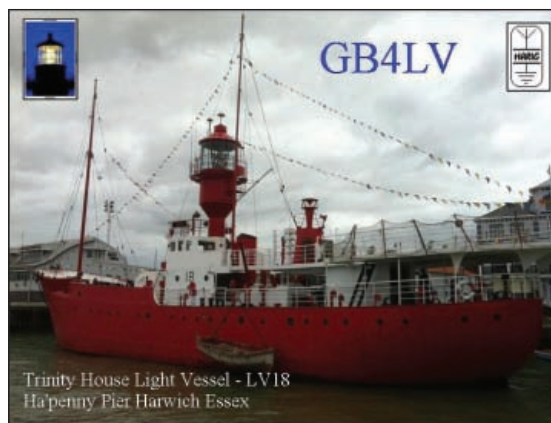
Members of **Harwich Amateur Radio Interest Group (HARIG)** will be active on the h.f. bands during the **International Lighthouse & Lightship** weekend on the 18th and 19th August using the special call sign of **GB4LV**. The station will be located onboard the former Trinity House Lightship **LV18**.

Built in Dartmouth England and launched in 1958, the vessel was the UK's last manned Lightship and remained in service until 1995. Amongst the exhibits on board are vintage marine radios and many photographs of LV18 at various stages in its history.

After several years of restoration work – enthusiastically carried out by volunteers from the Pharos Trust who own LV18 – the vessel is now a floating Museum and open to the public and is moored at **Ha'penny Pier Harwich, Essex**.

The lightship was featured in the 2008 film *The Boat That Rocked*, which was set in 1966, featuring a fictitious Pirate Radio Station called *Radio Rock*. Restricted Service Licence (RSL) Stations for *Radio Northsea International*, *Radio Caroline* and *Radio Mi Amigo* have also been on air from the vessel. The BBC Radio Essex station has also transmitted from the boat as *Pirate BBC Essex*. The route QSL is via **MOZZO**.

Further information from **Kevan Pugh 2E0WMG (Secretary HARIG)** via E-mail: **kevan2e0wmg@live.co.uk**



Neath Sea Cadet Unit TS Encounter On The Air

The **Neath & District (South Wales) Sea Cadet Unit Training Ship (TS) Encounter**, based in Briton Ferry, recently opened a new classroom block thanks to the work of the Unit's Commanding Officer Lieutenant (SCC) **Simon Oglesby** RNR and support from the **Clothworkers Foundation**, London. The classroom block is divided in two and has computer training facilities for eight cadets with full Internet access.

The second room is kitted out as a new shack, containing a Kenwood TS-850S 'wide-banded' for use on both military and Amateur Radio frequencies. There's also a RadioWorks Carolina Windom and Tigertronics USB interface. The shack also has Internet access and also contains the Unit's electronic weather station.

The unit's callsign **MC0NSC** can be heard once again operating on Tuesday and Friday evenings around 1900 local time with Cadets on the microphone wherever possible and usually on 7MHz. Other operating times and bands are possible depending on time and conditions and the availability of communications instructor Chief Petty Officer (CPO) (SCC) **Carl Mason GW0VSW** who is also *PW's HF Highlight's* columnist.

A QSL card, depicting the Second World War destroyer that gave the unit its name,

is at the printers and all requests for cards will be answered as soon as possible via the bureau and eQSL. The clock in the photo was kindly donated by *PW* reader **Colin Topping GM6HGW** and has both the Sea Cadet crest and the unit's club callsign on its face. The clock has a quartz movement and displays the old 500KHz and 2182KHz silence periods*.

Further information on the SCC unit from;

Carl Mason GW0VSW

E-mail: **gw0vsw@btinternet.com**

*If you would like a GM6HGW clock for your shack personalised with your callsign and club logo contact Colin at **colin@stamagic.com**



From the left, Communicators AB Cadet Morgan Davies, Junior Cadet Shane Bevins, PO Cadet Natalie Ferrier and Ordinary Cadet Gareth Pearce. Chief Petty Officer Carl Mason GW0VSW stands proudly by his keen crew!

The New FlexRadio 6000 Series



Newsdesk has just received the first details of the new range of FlexRadio equipment – via **Waters & Stanton PLC** (UK importers). The press release (edited for length) states, “FlexRadio Systems is changing the face of Amateur Radio. It’s not often that a team of smart people are allowed to start with a clean sheet of paper and dream!

“With the FLEX-6000 Signature Series radios, FlexRadio brings a wealth of new capabilities to the Amateur including direct digital reception, transmission and networking. At the core of all these new capabilities is SmartSDR. SmartSDR organises all of the signal processing power in the FLEX-6000 Signature Series radios into an advanced reusable framework. First, the r.f. subsystems in the FLEX-6000 are virtualised as re-usable hardware blocks or Signal Capture Units (SCU) with specific capabilities. SmartSDR ‘understands’ the capabilities of each SCU and how to harness its power.

“SmartSDR performs advanced Digital Signal Processing (DSP) on the data, splitting it into individual Panadapters and Slice Receivers. Panadapters are visual displays of the RF spectrum akin to a spectrum analyser, but with more capabilities for the Amateur. Slice Receivers are dynamically allocated full performance receivers that can be directed to the speaker or headphones for listening, or can be streamed as digitised r.f. to external digital applications.

“An elegant graphical user interface (GUI) places the operator in complete control. Want to create an additional Panadapter to watch for possible 28MHz band openings? No problem! simply click

to add the Panadapter and SmartSDR directs everything from the advanced signal processing software down to the filters in the SCU to form an optimised receiver.

“SmartSDR takes complex hardware and software and makes it elegant and simple to use. It sets a new bar for visual radio display and control. We built a new graphical interface that is easy to learn and use. Multiple high-resolution, real-time spectral displays are at the heart of the SmartSDR experience. Intuitive controls are hidden from view to minimise clutter – yet are instantly available when needed.

Plug & Play

“The FLEX-6000 Signature Series was designed with plug-and-play installation as a requirement. There are no drivers or interface cards to install. Just plug the radio into an antenna, power supply and network, load the SmartSDR software on your existing PC and operate.

“Networking is at the heart of the new FLEX-6000 Signature Series radios. From across the shack or across the world, these new radios are designed with the latest networking capabilities.

“Each FLEX-6000 Signature Series radio is equipped with a 1Gb-ethernet network port for communication to existing PCs or other future display platforms. Initial software enables operation within the home network domain. Future releases will enable operation from any location in the world with an Internet connection. No external computer or expensive adapters are required at the radio site for remote operation.

“The FLEX-6000 Signature Series

achieves the ultimate goal of r.f. to bits at the antenna connector. Digital Down conversion (DDC) of the signal at r.f., virtually eliminates the performance limitations inherent in legacy superheterodyne roofing filter based transceivers. Weak signals near the noise floor are easier to copy due to the elimination of in-band phase distortion inherent in crystal filters.

“Since 100% of the receiver and transmitter mixing and filtering are done in the digital domain, unwanted sideband suppression, filter shaping, carrier suppression, and image rejection are no longer limited by non-linear analog circuits. Further, infinitely variable brick wall digital filters allow precise interference elimination without added distortion.

The FLEX-6700 and FLEX-6700R incorporate two independent, synchronous Analog Devices AD9467 16-bit 245.76MSPS (Mega samples per second) analog to digital converters (ADC) that allow direct digitisation of the RF spectrum.

Each of the two Spectral Capture Units allows simultaneous reception from their own respective antenna or the two can be optimally combined to deliver increased dynamic range. In addition, dual SCUs provide the capability for diversity reception.

The FLEX-6700 transceiver and FLEX-6700R receiver each allow creation of up to eight independent Slice Receivers providing reception from 0.03MHz to 77MHz and 135MHz to 165MHz. The FLEX-6500 allows creation of up to 4 Slice Receivers with tuning from 0.03MHz to 77MHz. Each Slice Receiver can provide independent spectral display of up to 384 kHz. Slice Receivers allow you to visually and audibly monitor multiple frequencies within the same band, or multiple bands, simultaneously.

“Direct r.f. to digital conversion allows the FLEX-6000 Signature Series to deliver up to +45dBm (3rd Order Intercept Point) and 110dB IMD DR3 (3rd Order Dynamic Range) inside the final filter bandwidth. This means that the FLEX-6000 Signature Series dynamic range is just as high at 100Hz spacing as it is at 2kHz spacing”.

Further details from Waters & Stanton PLC. Price to be announced.

Note: We hope to review one of the new FlexRadio transceivers as soon as they are available. **G3XFD.**

The New Kenwood TS-990S Will Be On The Block Soon!

Kenwood Electronics UK have confirmed that their new ‘Flagship’ transceiver will be marketed as the Kenwood TS-990S. And although no date has been set for the arrival of the rig in the UK and no official ‘studio’ shots released yet – Newsdesk has obtained a pre-launch ‘preview’ photograph, courtesy of Martin Lynch, for *PW* readers and in the meantime we eagerly await its arrival! **Editor.**



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**

New TH-K20E 2m FM Handheld, with 136-174 MHz RX and 5.5W output for only **£119.95**

New TH-K40E 70cm FM Handheld, with 400-470 MHz RX and 5.5W output for only **£119.95**



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 **£Call for best price!**

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**

Hand-helds

"NEW" ID-31E D-Star single band 70cm full 5 Watt handie with GPS **£349.95**

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 0.495-999.99MHz with built in DSTAR **£389.95**

IC-E90 Tri band 6/2/70cm RX 0.495-999.99MHz **£244.95**

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 **£99.95**



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 compatible, 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**



Icom Base Mega Offer



Icom base IC-7410 + Icom Handie IC-E80D for just **£1695.95** (while stocks last).

Icom base IC-9100 + Icom Handie IC-E80D for just **£2899.95** (while stocks last).



AT-588 2m 60W mobile RX 136-174 MHz **£149.95**

AT-5189 4m 25W mobile RX 66-88MHz **£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**



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!



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 **£349.95**

VX-7R Tri band 50/144/430MHz RX 0.5-900MHz, 5 Watts out **£299.95**

VX-6E Dual band 2/70cm RX 1.8-222/420-998MHz, 5 Watts output **£249.95**

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 **£169.95**

VX-170E Last few at this price **£99.95**

FT-270E Single band 2m, 144-146MHz, 137-174MHz Rx **£109.95**



Mobiles

FT-857D All mode HF/VHF/UHF 1.8-430MHz, 100 Watts output **£714.95**

FTM-350 Dual band with Bluetooth, GPS & APRS **£479.95**

FT-8900R Quad band 10/6/2/70cm 28-430MHz, 50 Watts output **£389.95**

FT-8800E Dual band 2/70cm RX 10-999MHz, 50 Watts output **£339.95**

FTM-10E Dual band 2/70cm, 50 Watts output **£324.95**

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

FT-2900E Single band 2m 75 Watt heavy duty transceiver **£142.95**

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 **£819.95**

FT-817ND HF/VHF/UHF Backpack Transceiver RX 100kHz - 56MHz 76-154MHz 420-470MHz 5 Watts **£539.95**

Base

FT-2000D HF/6m All mode 200 Watts transceiver RX: 30kHz - 60MHz **£2,899.95**

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 **£1,259.95**

FT-450 Compact transceiver with IF DSP, HF+6m 1.8-54MHz, 100 Watts output **£649.95**

FT-450D HF/6m LSB, USB, CW, AM, FM 100 Watt transceiver with built in ATU & 300Hz CW filter All for just **£839.95**



Hand-helds

KG-UVD1PL New fab dual band 4m/2m handie just **£99.95**

New KG-UVD6 improved version of KG-UVD1P dual band handie at under a ton - amazing **£94.95**

KG-679E Superb single band 2m **£59.95**

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**

ANNOUNCING THE NEW KG-UV6D "PRO-PACK"



For a Limited Time Offer Wouxun has bundled together all your favourite accessories and placed them inside one presentation box which includes, the popular KG-UV6D dual band handie, desk top charger (110-234v & 12V input) & power cord, cigar car charger, headset with PTT & Mic, eliminator, remote mic/speaker,

leather case, 1300mA Li-Ion battery, 1700mA heavy duty Li-Ion battery, AA empty cell case, pc programming lead, PC drivers & software, all at only **£159.95** Great deal - Great saving!



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

TG-UV2-ELEM Battery Eliminator **£9.95**

TG-UV2-SPK Speaker microphone **£9.95**

TG-UV2-CASE Leather case **£9.95**

TG-UV2-PROG Programming cable and software **£19.95**



MOONRAKER 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

MOONRAKER 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

MOONRAKER 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
HB9-627	6/2/70 Triband (Boom 45")	£69.95

MOONRAKER 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

MOONRAKER G5RV Wire Antennas

The most popular wire antenna available in different grades to suit every amateur ... All from just £24.95!

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

MOONRAKER 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 38 th 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, 3/8 th 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, 3/8 th 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, 3/8 th fitting, (great for static use or even home base - can tune on four bands at once)	£74.95

DIAMOND ANTENNA Yagi Antennas

Diamond performance from the superb Diamond factory

A502HB	6m 2 Elements, Power 400W, Gain 6.3dB, Radial Length 3m	£99.95
A144S10R	2m 10 Elements, Power 50W, Gain 11.6dB, Boom Length 2.13m	£86.95
A144S5R	2m 5 Elements, Power 50W, Gain 9.1dB, Boom Length 95cm	£47.95
A430S15R	70cm 15 Elements, Power 50W, Gain 14.8dB, Boom Length 224cm	£69.95
A430S10R	70cm 10 Elements, Power 50W, Gain 13.1dB, Boom length 119cm	£52.95

"NEW" lower prices!

MOONRAKER HF Mobiles

Get great results with the Moonraker range of HF mobiles!

... from as little as £19.95!

AMPRO-10	28MHz, Length 220cm, 38 th fitting (slimline design)	£19.95
AMPRO-12	24MHz, Length 220cm, 38 th fitting (slimline design)	£19.95
AMPRO-15	21MHz, Length 220cm, 38 th fitting (slimline design)	£19.95
AMPRO-17	18MHz, Length 220cm, 38 th fitting (slimline design)	£19.95
AMPRO-20	14MHz, Length 220cm, 38 th fitting (slimline design)	£19.95
AMPRO-30	10MHz, Length 220cm, 38 th fitting (slimline design)	£19.95
AMPRO-40	7.0MHz, Length 220cm, 38 th fitting (slimline design)	£19.95
AMPRO-80	3.5MHz, Length 220cm, 38 th fitting (slimline design)	£24.95
AMPRO-160	1.8MHz, Length 220cm, 38 th 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

MOONRAKER 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 3.0dB/5.0/7.5dBd, Length 150cm, PL259 fitting (high quality)	£39.95
MRQ273	2/70/23cm Gain 3.5/5.5/7.5dBd, Length 85cm, PL259 fitting (high quality)	£49.95

MOONRAKER 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

SQBM100P	2/70cm 3.0/6.0dBd, RX 25-2000MHz, Length 100cm SO239	£49.95
SQBM100N	2/70cm 3.0/6.0dBd, RX 25-2000MHz, Length 100cm N-Type	£54.95
SQBM200P	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239	£54.95
SQBM200N	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, N-Type	£59.95
SQBM500P	2/70cm, Gain 6.9/9.2dBd, RX 25-2000MHz, Length 250cm, SO239	£74.95
SQBM500N	2/70cm, Gain 6.9/9.2dBd, 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

MOONRAKER 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

MP2500

All New

HF Base Loaded Mobile Antenna

TX 40-6m & RX 3-100MHz VSWR 2:1 (atu recommended for best results) length 2m power 120W SSB

intro price just £199.95

CHAMELEON ANTENNA

New appointed UK dealer! New lower prices on these smash hit antennas from the U.S.

Chameleon V1	HF/VHF/UHF 11 bands 80-70cm multiband base antenna 500W SSB	£149.95
Chameleon V2	HF/VHF/UHF 11 bands 80-70cm multiband mobile antenna 200W SSB	£99.95

Chameleon Zepp HF Multiband is a brilliant base or portable stealth antenna working 10-80m with 600 Watts SSB maximum



Chameleon Accessories

Chameleon 13ft	4 section heavy duty air cushioned antenna stand	£79.95
Chameleon heavy duty	specialty designed carry bag (antenna acc not inc)	£79.95
Chameleon 9:1	Unun 500 Watts completely waterproof housing	£29.95

Chameleon V3 HF/VHF/UHF 160-70cm ultimate portable antenna 250W SSB..... £349.95



Chameleon V4 HF/VHF 20-6m Ultra portable antenna, dipole or end fed 250W SSB..... £109.95



Moonraker Retail Shop & Mail Order
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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



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-50 new 50m reel of mil spec RG58 in a great handy size only	£24.95
RG58M-DRUM-100 Mil spec, 5mm, 50 ohm, 100m reel	£44.95
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-50 Mil spec, 9mm, 50 ohm, 50m reel	£59.95
RG213-DRUM-100 Mil spec, 9mm, 50 ohm, 100m reel	£109.95
WESTFLEX103 Mil spec, 10mm, 50 ohm, per metre	£1.75
WESTFLEX-DRUM-50 Mil spec, 10mm, 50 ohm, 50m reel	£79.95
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

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 1/2 inch aluminium tube with terminal connections	£7.95
DPC-38 Dipole centre with SO239 socket with two 3/8" sockets to make mobile dipole	£6.95
DOGBONE-S Small ribbed wire insulator	£1.00
DOGBONE-L Large ribbed wire insulator	£1.50
DOGBONE-C Small ceramic wire insulator	£1.00
EARTHROD-C 4ft copper earth rod and clamp	£24.95
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
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PL58M-10 10m Mil Spec RG58 PL259 to PL259 lead	£12.95
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SO239-N Adapter to convert PL259 to N-type male	£3.95
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BNC-PL Adapter to convert BNC to PL259	£2.00
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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 3.5-54MHz 300W tuner with X-needle SWR/WATT	£194.95
MFJ-969 1.8-54MHz 300W all band tuner	£219.95
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LDG AT-200 Pro 1.8-54MHz	£209.95
LDG AT-1000 Pro 1.8-54MHz continuously	£469.95
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AV-400 (14-525MHz) (Power to 400W)	£49.95
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Perfect size reels of cable at the perfect price - why have they not been available before!

From stock we have the following:-

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RG58 Mil spec	£24.95
RG213 Mil spec	£59.95
WESTFLEX 103	£79.95

Three from Midland

Dual-band v.h.f./u.h.f. Hand-helds

Tim Kirby G4VXE, the *PW* v.h.f. specialist author takes a look at three rigs from Midland – familiar to everyone who has used CB radio – but new to the Amateur Radio market.

The Midland CT-210 144MHz Hand-held



Although I was very familiar with the Midland brand but I had not associated it with Amateur Radio rigs. Therefore, I was very interested when an E-mail arrived from the Editor inviting me to review a new handheld, a Midland CT-790. A hasty bit of research revealed a picture of the rig, which looked somewhat familiar.

Already Reviewed

I was soon able to confirm, with the kind assistance of **Mike Devereux G3SED** at Nevada Radio that things were as I suspected and that the Midland CT-790 was a re-badged Wouxun KG-UVDP1P. We have already reviewed the Wouxun 144/430MHz f.m. handheld dual-bander

The Midland CT-210 144MHz f.m. Hand-held publicity claims the following features:

Frequency range:	144-146MHz (export version 136-174MHz)
Output power:	Up to 4W with Hi/low power selection
Channel spacing:	25kHz / 12.5kHz
Repeater tone:	1750Hz
Repeater shift	
50 CTCSS tones and 105 DCS codes	
Up to 128 memory channels	
VOX function for hands-free communications	
Scan and priority scan function	
LCD display with backlight adjustable in three different colours	
Time-out Timer (TOT) function	
Busy channel function	
Squelch adjustable in nine different levels	
Keypad lock	
Channels and frequencies selectable through the keypad	
Self contained 7.2V Li-Ion battery pack	
Accessory jack is a two-pin Kenwood type	

in *PW* December 2011, so repeating a full review seemed unnecessary. However, we thought readers would be interested in a quick summary of the facilities of the rig.

In addition, when speaking to Mike G3SED, he told me that Midland have also produced two single-band f.m. hand-held rigs, the CT-210 (144MHz) and CT-410 (433MHz). These rigs are new to the market and we hope that readers will find them of interest.

First impressions

The first impressions when I received the CT-210 was positive. It has a pleasing, rugged and solid feel to it. It fits nicely in the palm of the hand. Getting the rig ready for use was a simple matter of attaching to the battery to the back of the rig and attaching the antenna (male SMA, therefore not

interchangeable with Wouxun or the Midland CT-790).

The CT-210 comes with a drop in charger. I wasn't too keen on the supplied adapter to allow the 2-pin plug on the power lead from the charger to be plugged into a UK 3 pin mains socket – but I carefully tightened it up, making sure that it was secure and safe as possible.

The charging system itself worked well and although the battery was charged when the rig arrived, I decided to ensure that the battery was fully charged. An indicator light on the drop in charger indicates when the charge is complete.

How easy was it to use? Switching on, changing frequency and adjusting the volume were all straightforward and achieved without having to resort to the manual. To programme the

repeater shift, CTCSS tones and then store these parameters in the memory, I had to resort to the manual! The menu system is quite straightforward once you get used to it and I very quickly set-up the parameters for my local 145MHz repeater GB3WH, some 24km (15 miles) away from me, near Swindon.

The manual is better than some I've seen recently. It's concise and clear – and I found it quite straightforward to find out what I wanted to do.

On The Air

I took a little while to get the squelch set as I wanted it (there are nine different levels in software) to balance between triggering at every little bit of noise in the shack and being unable to hear strong signals. So, I took the rig up onto Windmill Hill, a mile or so away from

my home for the on-air tests. I put a call through the GB3WH repeater and was pleased to be answered by **Andy Joyce G6REG**.

Andy felt that the rig was perhaps a little low on deviation and that the response was a little too much 'bass' When I 'talked the rig up' a bit more the audio level came up nicely. Andy reported that I was a little noisy into the repeater, but easy enough to copy. In radio frequency (r.f.) terms, this is probably around average for a similarly powered hand-held at this location. It was easy to listen on the input of the repeater – a useful feature which is sometimes awkwardly tucked away in some hand-helds.

Received audio sounded good and there was plenty of volume too. Enough that I think if you wanted to listen to the

rig in a car, there would be sufficient audio to do so.

Battery life seemed good and I was able to use the rig for several operating sessions without having to worry about charging. A useful feature I thought!

Straightforward & Solidly Built

The Midland CT-210 is a straightforward 144MHz single-band handheld. It's solidly built. It's simple to use and the manual is easy to understand. On air it performs reasonably well and will certainly 'meet your needs', if you need a single-band unit. The antenna is something of a compromise and if you want to get more performance out of the unit, you may consider changing to a more efficient antenna. However, the supplied rubber duck will easily suffice for most people's short distance

The Midland CT-410 433MHz f.m. Hand-held



The Midland CT-410

The Midland CT-410 433MHz f.m. hand-held is a new rig and the publicity claims the following:

Frequency Range :	430-440MHz (export version 400-470MHz)
Output power:	Up to 4W Hi/low power selection
Channel spacing:	25kHz/12.5kHz
Repeater tone:	1750 Hz
Repeater shift	
50 CTCSS tones and 105 DCS codes	
Up to 128 memory channels	
VOX function for hands-free communications	
Scan and priority scan function	
LCD display with backlight adjustable in three different colours	
Time-out Timer (TOT) function	
Busy channel function	
Squelch adjustable in nine different levels	
Keypad lock	
Channels and frequencies selectable through the keypad	
Self contained 7.2V Li-Ion battery pack	
Accessory jack: two-pin Kenwood type	

The CT-410 is identical in construction to the CT-210 although the antenna is very slightly shorter. All other aspects of the rig, including the user interface and operation are the same. A drop-in charger is supplied with the rig.

On The Air

Andy Joyce G6REG was also able to assist with the on-air tests on 433MHz. I put a call through the GB3TD 433MHz repeater at Swindon. Andy said that compared to the 145MHz variant, the signal was fully quieting and also that the audio was more 'punchy'. (However, I don't think we should read too much

into that, as the audio response of the two repeaters is likely to be different).

However, the r.f. performance was better – presumably because the antenna was less of a compromise on the higher frequency. I was also able to access the GB3UK repeater located on Cleeve Hill in Gloucestershire over a distance of 64km (40 miles) from Windmill Hill.

Conclusion

The Midland CT-410 is well built and performs as you would hope. If you need a single band 433MHz handheld, then this would be a good one to look at.

The Midland CT-790 144/433MHz f.m. Hand-held

The Midland CT-790

Frequency range: 144-146 and 430-440MHz (receive and transmit).

Working modes: u.h.f. – v.h.f., v.h.f. – v.h.f. or u.h.f.-u.h.f.

Output power: 5W v.h.f and 4W u.h.f.

128 storable channels

VOX function

Chronometer

105 DCS codes and 50 CTCSS tones

Repeater tone: 1750Hz

VOICE function: Voice indication of the selected function

SOS Emergency function

Wide/narrow bandwidth selection: 25kHz/12.5kHz

Three available display modes: Channel number and channel name

Reverse frequency function

Scan function

Flashlight

Band II f.m. radio receiver

Frequency steps: 5, 6.25, 10, 12.5, 25, 50 or 100kHz

Output power selectable: high(4-5W) or low (1W)

Offset frequency setting: 0-69.950MHz

Frequency shift direction setting

Busy channel lockout function

Vocal indicator of the Low battery level

Roger Beep tone at the beginning/end of the transmission

TOT function (Time out timer)

Keypad lock function

Scan of the frequencies with CTCSS/DCS tones

DTMF Encoder

Reset function

Self-contained Li-Ion battery pack

Accessory jack: two-pin Kenwood type



The publicity says; A new dual-band v.h.f./u.h.f. (145/433MHz) narrow band frequency modulated (usually referred to as f.m.) hand-held transceiver with a great list of features – which even includes a chronometer and very handy flashlight.

As noted earlier, the CT-790 is a re-badged Wouxun KG-UVD1P, so please consult the review in the earlier *PW*, for a more detailed examination of the features of this transceiver.

The one criticism I've had of the Wouxun units in the past has been the manual. It looks as if Midland have tried to improve the content in a few areas, but largely it's the same as the original version. Armed with the manual you should not encounter any problems setting the rig up, although I would say that if you are one of those people who like a manual to be 'just so', then the CT-790 may not be the rig for you.

I found that I was able to manually programme some repeaters into memory quite easily. I was curious to see if the software I have used for programming Wouxun radios (*KG-UV Commander* by **KC8UNJ**) would work with the Midland. It did, flawlessly! Nevada said that a custom

Midland programming lead was required to interface the rig to the computer. My suspicion is that they may very well be interchangeable with the Wouxun programming leads – as I was able to use the Midland lead on a Wouxun rig successfully, but I didn't have a Wouxun lead to test on the Midland.

On The Air

My on-air the tests were fairly brief but they didn't reveal any issues. Transmit audio level was a little low but wasn't a significant problem. When switching between v.h.f. and u.h.f. 'v.f.o.s' on one occasion, the rig appeared to go into something of a 'sulk' and displayed the word 'Coping' on the display. I suspect that's a literal translation of 'Busy' by a Chinese Engineer! I turned the rig off for a few minutes and when I switched back on, the problem had been solved. Despite considerable efforts – I was not able to recreate the 'Coping' message.

I enjoyed the CT-790 and found it a flexible unit to have around the house or in my pocket if I was out for a walk. It was easy to program both manually and through software.

Conclusion

I would always recommend a dual-band handheld over a single band unit if you can afford the extra money – simply because you will have more flexibility and more fun with the two bands. Clearly though, if there are no 70cm repeaters in your locality, the additional band may be unnecessary to you.

As a re-badged Wouxun unit, this is a well-known and well-respected rig, although you should note that Wouxun now have a replacement for the KG-UVD1P with the KG-UV6D model.

If you are after a value-for-money dual-band transceiver, then the Midland CT-790 may well be one for you to look at.

Thanks & Acknowledgements

To Mike Devereux G3SED of Nevada Radio in Portsmouth for always being willing to answer my questions and for the loan of the review models.

Comment & Prices from Mike G3SED

Mike G3SED writes:

"The sample sent to Tim in a hurry to meet the deadline had not had the UK plug fitted and so Tim was left to fit the adaptor himself. Under normal circumstances this adaptor would be fully fitted, an error on our part, my apologies! Mike.

Selling Prices are:

CT-790 Dual-Band	
Hand-held	£99.95
CT-410 430MHz (70cms)	
Hand-held	£79.95
CT-210 144MHz (2m)	
Hand-held	£79.95
(all plus p&p).	



Remembering a Classic QRP Project

This month the Rev. George Dobbs G3RJV takes a look at a classic project and reflects on the fact he – and many of us! – are analogue type constructors but he's not being pessimistic as the appropriate quotation indicates!

The firm, the enduring, the simple, and the modest are near to virtue.

Confucius (551 BC - 479 BC)

Welcome to *Carrying on the Practical Way (CotPW)*! And to start this month – without being too pessimistic – I can say that we Amateur Radio constructors are a passing breed, especially those, like me, who are analogue based! But this seems to be common with almost all hobby pursuits.

Some time ago I was speaking to the secretary of a model engineering club in Wales. The club was displaying some of its fine work on a stand at a hobbies exhibition. Their table was full beautiful examples of steam engines; many based on static industrial engines.

Their Club Secretary explained that the club had a well-equipped workshop available for members' use but it was sadly underused. He was also concerned

about the membership, it was falling and the club did not have a single member under 60 years of age. Amateur radio shares this problem.

A couple of years ago, when the G QRP Club held its first Buildathon event and I had to choose a photograph from the event to use in the club journal, *Sprat*. A Buildathon is an event where novice radio constructors build a project under guidance from more experienced constructors. The photograph I chose was of a young lady soldering her Buildathon project.

I'm not sure what point I was trying to make but I had chosen a rare combination in that neither "young" nor "lady" is typical of Radio Amateurs. A quick check of attendees at most Amateur Radio events shows that they are predominantly male and the average age is high!

An American friend of mine, Roy

Lewallen W7EL, maintains that he has always been the average age of an American Radio 'ham'. Roy began in the heyday of the American Novice licence and is now in his 60s.

One of the sad outcomes of the aging Radio Amateur population is that we lose good radio friends through death. I was very saddened by the loss of **Peter Linsley, G3PDL** with whom I had shared 50 years of Amateur Radio. He taught me Morse code and encouraged me to take an Amateur Radio Licence.

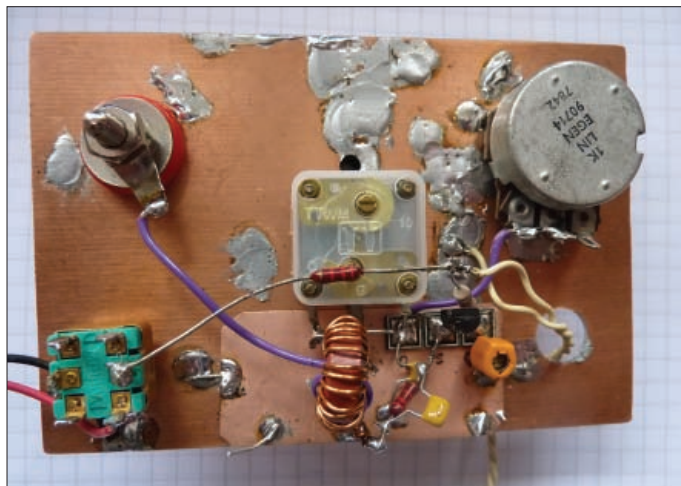
In recent months in this column I have reported on the deaths of **Gilbert Davey**, who brought radio construction to many young people through his books and articles and **Steve Ortmayer G4RAW**, who offered simple and easy to build radio projects through *PW* and *Sprat*.

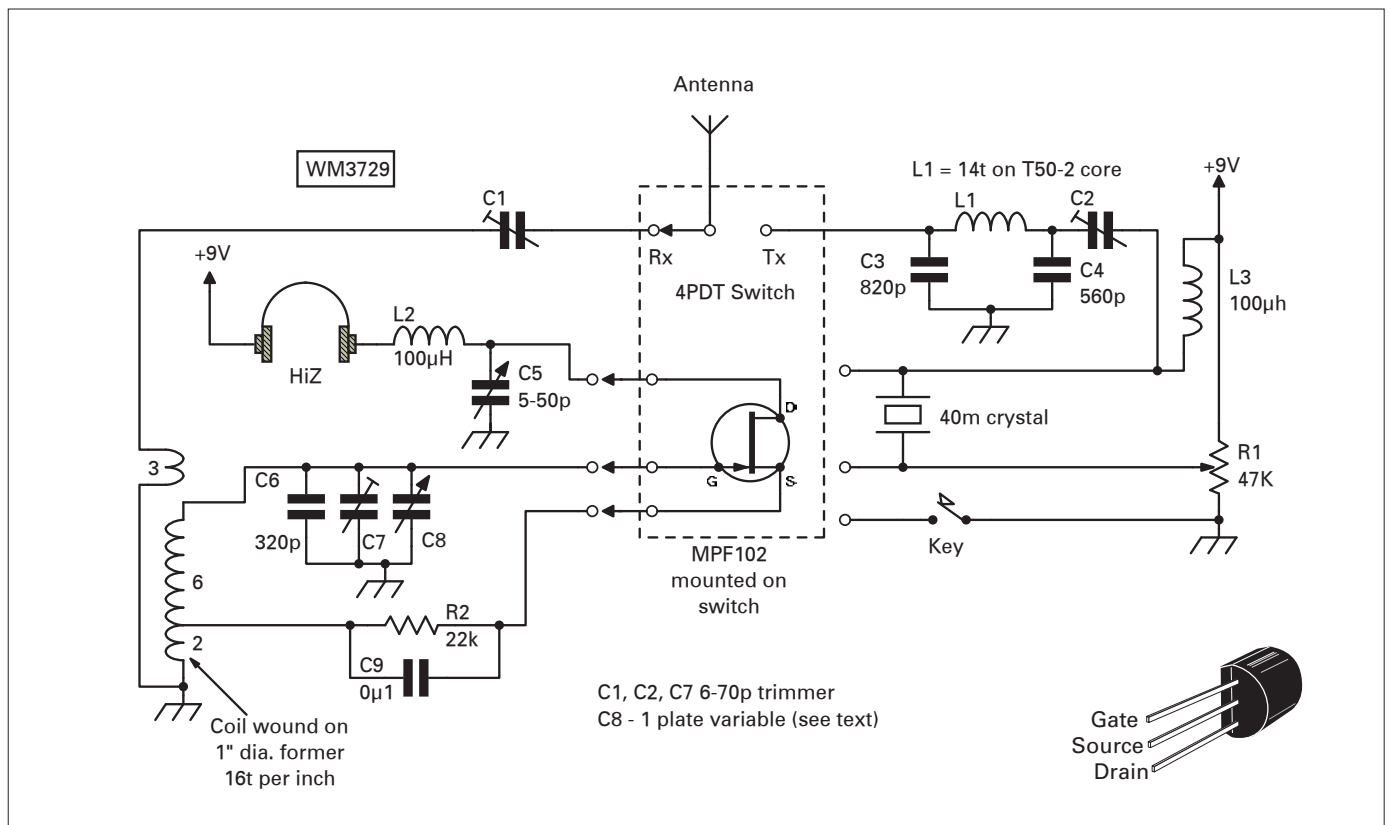
Some Radio Amateurs, like Gilbert Davey and Steve Ortmayer, are remembered for a volume of work that they contributed to the hobby. Other Amateurs are remembered because of one outstanding project they offered to their fellow amateurs.

I recall **Derry Spittle VE7QK**, who became very well-known for one radio design – the *Epiphyte*. The *Epiphyte* was a simple single sideband (s.s.b.) transceiver for the 3.5MHz 80m band designed as a beginner's project.

A lot of *Epiphytes* were built and for most of the builders, it was their first venture into s.s.b. transceiver construction. I built an *Epiphyte* and had a lot of fun with it. In fact, as I type this column, it's on a shelf behind me, reminding me of the pleasure I derived from Derry's design.

Recently I heard of the death of another "one well-known design" Amateur who was around 80 years old when he





produced a very novel and innovative project. This was **Glenn Yingling W2UW** and his project was called the *FET-1*. Glenn lived in Newark Valley, New York State in the USA and was a life-long Radio Amateur.

The *FET-1* Circuit

have seen versions of this circuit in which a three-pole switch is used for the f.e.t. and another single-pole, change-over switch is used for the antenna switch. However, this arrangement does mean that both switches have to be operated together to enable the change from receive to transmit.

around 7.030MHz. Glen W2UW described it as a “One plate variable capacitor” and it is made by carefully pulling the vanes off a small value air-spaced variable capacitor until only two are left. It sounds a bit drastic but I have used the same method several times in the past to obtain a small value variable capacitor. **Note:** C1 is set for optimum results on receive depending upon the antenna used as it’s possible to swamp the regenerative action if the input signal is too high.

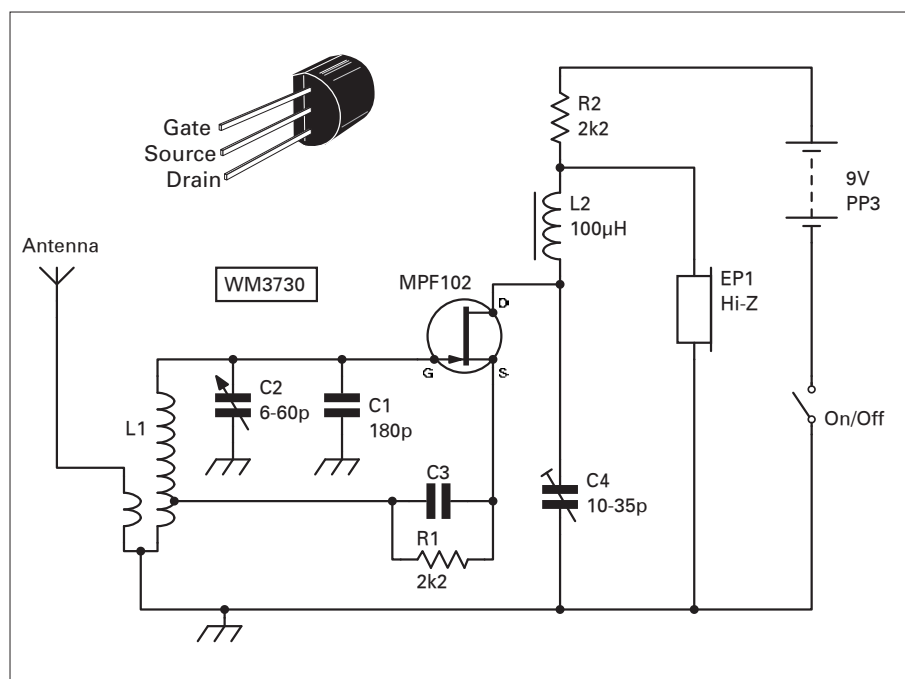


Fig. 2: Roger G3XBM decided to try the W2UW receiver section alone and produced a very simple nine component project.

I must confess that I haven't built the *FET-1* but I know of several people who have – including *PW* author **Roger Lapthorn G3XBM**. Roger built an *FET-1* for 3.5MHz (80m) and found it worked well. He called his version the “*FETer*” and wrote an article for *Spratt* about the project saying, “What amazes me is how well this little circuit works”.

Roger received an E-mail from W2UW congratulating him on his version of the transceiver. Glenn added, “By the way you might be interested to know that I have made 451 QSOs with the little rig. I am 81 years old and still think radio is magic!”

Receiver Section Alone

Roger G3XBM decided to try the receiver section alone and produced a very simple nine component project. He's has been kind enough to let me share his experiences with *PW* readers and this is a project I did build! In fact I built it and got it going in an evening in under two hours.

The circuit of the one f.e.t. regenerative receiver is shown in **Fig. 2**. I found it a very satisfying, and satisfactory evening's work.

My one f.e.t. receiver is designed for the 7MHz band. The tuned circuit is L1 with C1 and C2 (C2 is one section of a polyvaricon variable capacitor). I used one of the polyvaricon two-gang variable capacitors that are current available from several sources. One section (marked 'A' for antenna) has the range 8 to 140pF, the other section (marked 'O' for oscillator) has the range 6 to 60pF. I used the 6 to 60pF section.

The L1 is wound on a T50-2 core.

The main winding is 20 turns of 24s.w.g. enamelled copper wire with a tapping 4 turns from the bottom. The link winding from the antenna is 2 turns of *pvc* covered wire wound over the centre of the main winding. Depending upon the antenna used, the link winding may only require 1 turn. **Note:** Each time the wire passes through the core counts as 1 turn.

Using a 180pF fixed capacitor for C2 gave me a tuning range from a little below 7to almost 8MHz. The simplest way to measure this is to adjust C4 until the receiver oscillates and listen for the signal on another receiver. For C4 I used a Murata 5mm trimmer capacitor; the orange coded ones cover 6 to 50pF.

The tuning range is a little coarse, although with a large knob on C2 it was possible to tune individual stations with relative ease. The inductor L2 is an axial r.f. choke of 100µH (microHenry).

The crystal earpiece (EP1) gives plenty of volume for many stations. There's no volume control. Like all regenerative receivers, the secret of successful reception is the careful use of the regeneration control, in this case C4. This is adjusted to just above the point where the receiver oscillates. The correct setting soon becomes evident in use. This setting should work across the whole range of the 7MHz band.

The G3RJV Version

I built my version of the receiver on the back of a panel I had used for a previous *PW* project. It looks a little untidy but suits my frugal radio style!

The MPF102 has a rather odd arrangement of connections and I have a past history of getting them wrong. In the

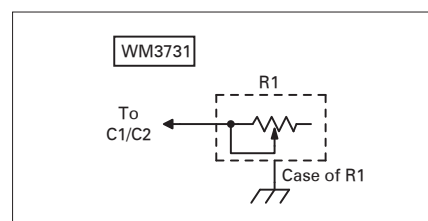


Fig. 3: This unusual use of a rotary potentiometer, allows a very small change of capacitance to be created. This is a method G3RJV used in the past to provide a very small capacitive adjustment. It requires the use of metal cased potentiometer – the value is non-critical.

left-hand photograph on page 18 you'll see how it can be mounted on three insulated pads, with the interconnections shown.

The rest of the receiver was built, point-to-point in ugly style. Take care when mounting the polyvaricon capacitor. Depending upon the thickness of the panel, a washer may be needed under the mounting screws to prevent the screws accidentally touch the vanes of C2.

As I mentioned above, the tuning rate is a little coarse but usable. A reduction drive could be used to make tuning easier but these are expensive for something as simple of this receiver. The alternative is to have a smaller value of variable capacitor in parallel with C1 and C2 to provide 'bandsread' tuning. The W2UW one plate capacitor idea would do the job – but again that could be expensive.

The diagram, **Fig. 3**, shows a method I have used in the past to provide a very small capacitive adjustment. It requires the use of metal cased potentiometer; the value is non-critical. The case of the potentiometer must be firm connected to ground on the circuit. The wiper (centre) connection of the potentiometer is connected to one of the side connections; the other side of unconnected.

Rotating the potentiometer wiper produces a slight change in capacitance. The larger the physical size of the potentiometer, the greater the change. That change is not linear and it's small – but I found it a great help in resolving s.s.b. signals.

I was surprised by the little, minimalist, receiver. As Roger G3XBM says, “it works well, is sensitive and produces decent level signals on s.s.b. and c.w. into a small crystal earpiece.” Increasing R2 to 5.6kΩ and using a 12V supply will increase the audio output. If you have never tried a regenerative receiver, this may be the circuit for you.

So, for very little outlay in money and time you can be monitoring the 7MHz band. Try it and see!

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- **Comms from Europe** Simon Parker tells of an individual who made a big impact on the CB hobby in the Czech Republic and a new venture for the Charlie Tango group. He also looks at the Gain-Master antenna and reports on a new transceiver
- **Software Spot** This month, in addition to software that's likely to be of interest to active radio amateurs, the compilation includes a number of programs specifically developed for those enthusiasts whose enjoyment comes through listening
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Tony Nailer G4CFY's Doing it by Design

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What's all the Noise About?

In his bi-monthly *Doing it By Design* column, Tony Nailer G4CFY outlines the development of his noise bridge.

This month in *Doing it by Design (DiBD)* I'll add another useful piece of test equipment to those already developed in this series – the Antenna Noise Bridge (ANB). The ANB has a twofold purpose. Firstly, it may be used to tune up an antenna and feeder system with the aid of an antenna tuning unit (a.t.u.) so it exactly matches a 50Ω reference. Additionally, it can be used to undertake measurements of resistance and reactance of the antenna on its own to determine if it's too short or too long.

In considering this useful piece of equipment I'll also describe how it has evolved over the decades. However, there's no mention of this device in the 1968 *RSGB Radio Communication Handbook 4th Edition*!

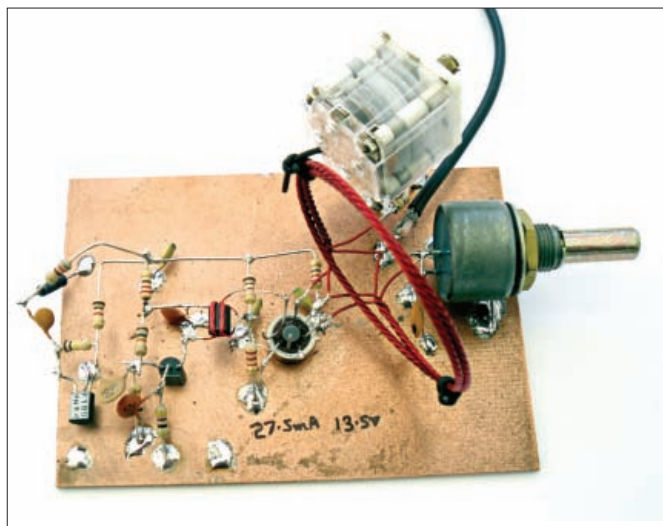
Original Circuit

The most common circuit appeared in British radio hobby magazines in the early 1970s. Often using a zener diode as a noise source, followed by a three-stage amplifier using fast switching transistors such as the 2N706, 2N2369A and 2N2222 types. The resultant amplified noise is fed to one winding of a trifilar-wound toroidal transformer.

The remaining two secondaries of the toroidal transformer are then series-connected. One end of the combined winding has a reference 50Ω resistor terminating it and the a.t.u. and antenna terminate the other end of the windings.

The centre junction of the two secondary windings is fed to the receiver, or transceiver. A typical circuit for the set-up of the period up to 1976 is shown in **Fig. 1**. The current limiting resistor R1, in the diode feed, was not specified but is usually in the range 270Ω to 1kΩ. A value usually adjusted for best noise from a particular value diode.

In the form shown in Fig. 1, the ANB isn't used for antenna measurements but instead used solely to aid tuning up an antenna and feeder for the 'best match' to 50Ω. Simply, when the a.t.u. has cancelled out any reactance of the antenna and



Tony G4CFY's antenna noise bridge (ANB) under development!

transformed the radiation resistance (so it's exactly the same as the reference resistor R8) the noise at the centre point will drop to a minimum level.

Noise Bridge In *RSGB Handbook*

In the RSGB's *Radio Communications Handbook 5th Edition* (November 1976) the typical noise bridge is described on pages 18.23 & 18.24 and shown this time with a quadrifilar transformer.

The circuit of the bridge transformer, now has two primary windings, connected in series, as shown in **Fig. 2**. This transformer is described as four lengths of 28s.w.g. enamelled wire twisted together and then has six turns wound with it on a toroid core.

The material used in the core of the RSGB noise bridge

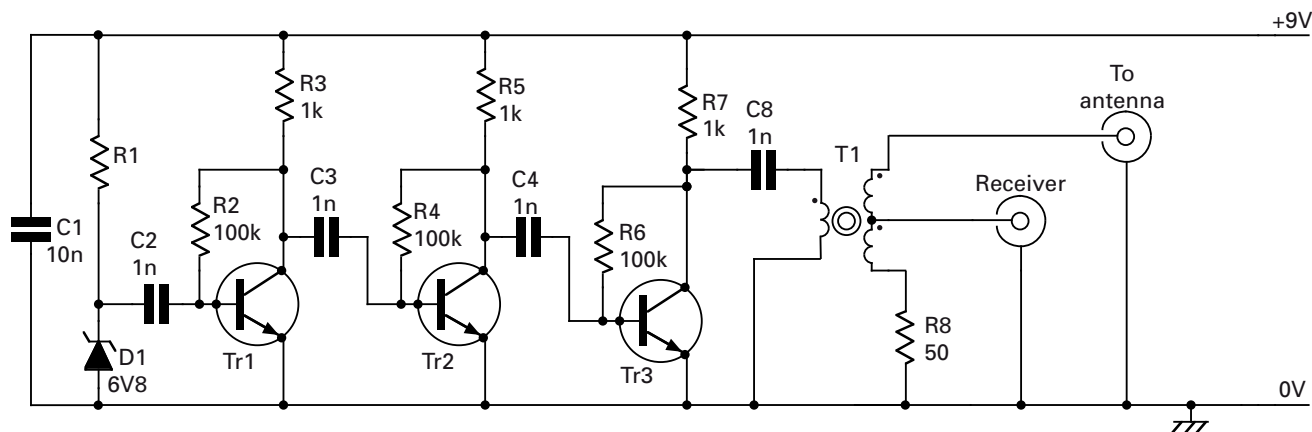


Fig. 1: A typical circuit set-up, of a noise bridge up until around 1976. This featured an amplified noise source and a bridge circuit using a receiver as 'null-detector'.

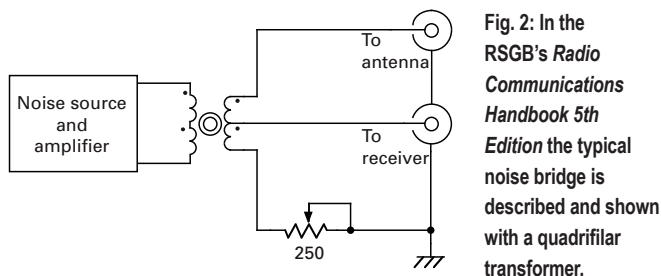


Fig. 2: In the RSGB's *Radio Communications Handbook 5th Edition* the typical noise bridge is described and shown with a quadrifilar transformer.

wasn't mentioned. However, according to my experience this device is really a transmission line transformer and requires the core to extend the effectively length of the twisted wires – so the best coupling can exist over a very wide frequency range. I presumed that the fourth winding was added to try and improve the balance between the two arms of the secondary windings that form the bridge.

Ham Radio's Version

In the American magazine *Ham Radio* in February 1977 we find their version of the noise bridge. The article, entitled *Improvements to the RX Noise Bridge*, was produced by **Robert A. Hubbs W6BXI** and **A. Frank Doting W6NKU**. Between them they found four factors, which affected the accuracy of the bridge particularly at the top end of the high frequency band.

The first factor, they described was the use of the quadrifilar transformer, but with one end of the primary windings being left un-terminated. The second factor was the use of an electromagnetic shield between the noise generator and the toroid. The third was grounding and earth loops. The fourth and last factor was a 'gimmick wire' added to the un-terminated winding end and trimmed for best balance.

The circuit, **Fig. 3**, was described briefly in my *Technical for the Terrified* article in August 2011's *PW*. The *Ham Radio* design for the bridge, included a 365pF variable capacitor in parallel with the variable reference resistor. It also had a fixed capacitor of 180pF in parallel with the antenna port of the bridge.

The addition of the two capacitors in the bridge, makes it possible to determine if the antenna is capacitive or inductive at any particular frequency. However, as was pointed out by a *PW* reader, the parallel arrangement of variable resistor and capacitor as well as the parallel capacitor with the antenna, results in the measurements of admittance instead of measurements of impedance.

Whilst the statement regarding admittance is strictly true, it's only of significant importance if the bridge is to be used for laboratory measurements, or in academic study. Nevertheless,

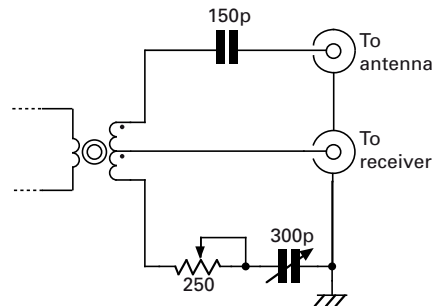


Fig. 4: The ARRL *Radio Amateur Handbook* of 1981 and 1986, showed series connected capacitors in the bridge circuit.

the original article went into great detail of how to calibrate the unit. The article also described the use of a Smith Chart and numerous calculations to determine the actual impedances.

The RSGB's *Test Equipment for the Radio Amateur 2nd edition* of 1978, has the original RSGB 1976 circuit on page 5.5. It also has the circuit of the toroidal part exactly as that of the *Ham Radio* article with un-terminated winding and the parallel capacitors on page 5.6.

The ARRL Noise Bridge

The ARRL *Radio Amateur Handbook* 1981, and the later 1986, editions have a modulated two-transistor noise bridge with the old trifilar transformer – but with series connected capacitors as shown in **Fig. 4**. A picture of the noise bridge shows the scale for the variable capacitor calibrated from a central zero to plus and minus 120pF.

To determine the reactance of the system, requires putting the measured capacitance C and frequency F into the formula $X_c = 1/(2\pi F C)$. Obviously, the capacitances labelled as 'minus' may be calculated in the same way, but they're then defined as inductive reactance.

The PW Noise Bridge

A similar noise bridge (to the RSGB's and the slightly later ARRL's noise bridge) appeared in an article entitled *RF Noise Bridge* by **E. (Ted) A. Rule G3FEW** in *PW* January 1982. It also featured a quadrifilar toroid, but used just a variable resistor in the reference arm – so it was suitable for antenna tuning rather than other measurements.

In his article, Ted G3FEW, went into considerable detail about the construction of the transformer and again one of the primary windings was left un-terminated. It was stipulated as being wound on a Mullard FX1598 or Neosid 28-511-35 core, which is about the size and permeability of a dust iron core type T50-2.

In Ted's article, wire size wasn't specified, but it's likely to be about 28s.w.g. and length was 200mm each strand. The wires weren't twisted together but were wound closely side by side and then spaced evenly around the core.

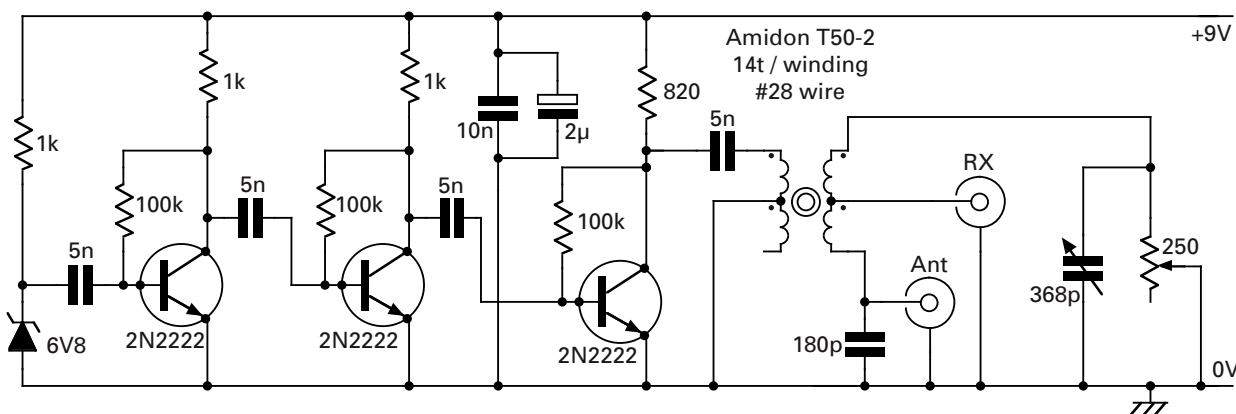
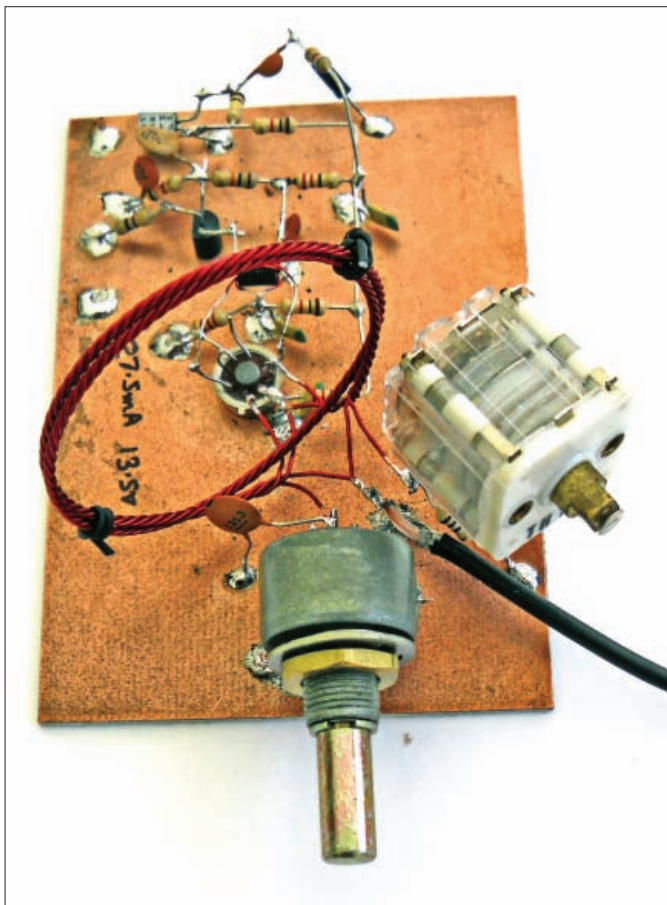


Fig. 3: The American magazine *Ham Radio* of February 1977, carried an article, entitled *Improvements to the RX Noise Bridge*, by Robert A. Hubbs W6BXI and A. Frank Doting W6NKU.



A closer look at the air-wound, transmission-line transformer.

A Precision Noise Bridge

An article titled *A Precision Noise Bridge* by **Forrest Gehrke K2BT** appeared in the American magazine *Ham Radio* in March 1983. The author claims to have wound a hundred or more different toroidal transformers in an attempt to create the best balance and avoid reactive errors throughout the h.f. frequency range.

The most successful transformer Forrest found, was one using two 300mm strands of 21s.w.g. (0.81mm) enamelled wire twisted together as a primary and two 25s.w.g. (0.51mm) strands of enamelled wire twisted together for the secondary winding. The primary and secondary windings are then twisted together. This time, the wires were **not** wound on a core but instead were just coiled into two or three turn loops.

As in previous noise bridges, the secondary side was terminated with a parallel variable resistor and capacitor combination on the reference side and a fixed capacitor in parallel with the antenna port. Again a gimmick wire was necessary to balance the bridge arms sufficiently for accuracy of measurements at 30MHz.

Considerable detail was included on the adjustments at both the low and high frequency (h.f.) ends of the range. The author also mentioned that noise output from different diodes varies a great deal, which explains why the supply resistor varies significantly between designs.

The G4CFY Noise Bridge

With all the research in mind, I'll next turn to my own G4CFY version of the noise bridge! Having considered the efforts of those who have worked on all these designs it's obvious that the **big issue** is reactive and signal balance between the two secondary windings. These effects are the direct result of using a single ended drive amplifier – making 'gimmick' wires necessary to achieve a reactive balance of the two primaries.

However, it seems strange to me that none of the previous designers or experimenters have written about driving the transformer from a balanced push-pull amplifier! But I suppose that's how technology moves forward, with each innovator adding another step to those who have gone before (apologies to *Star Trek* fans!).

My thoughts went straight to a circuit described as a differential amplifier with a current source, also known as a long-tailed pair. For over 20 years I have had a large stock of CA3028A integrated circuits and never really found a use for them – until I started work on the ANB.

The circuit of this CA3028A is shown in **Fig. 5** and to the Electronics Engineer can be seen as a device that can be configured as a differential amplifier, or a phase splitter, or

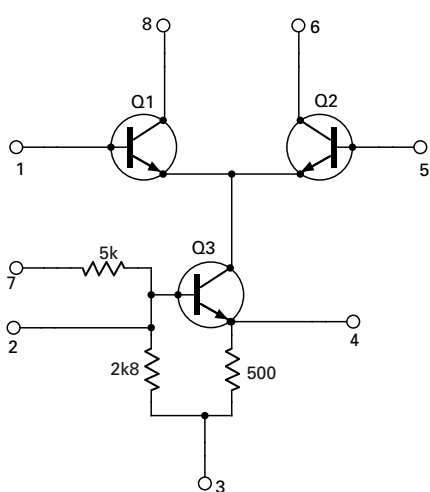


Fig. 5: The internal circuit of the CA3028A. It contains a useful 'long-tailed pair' of transistors, with their constant current emitter feed device.

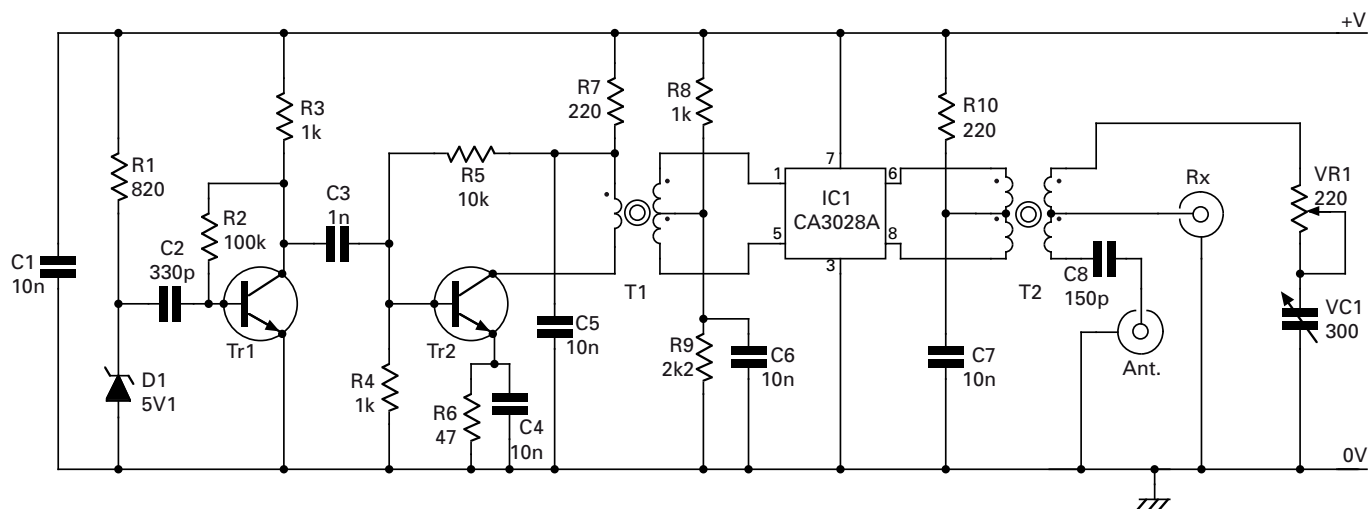


Fig. 6: The G4CFY balanced-drive noise bridge.

as a cascode amplifier. So, with all those possible uses I'm surprised I have not previously found a use for one!

Development Model

I drew a circuit of a development model like that shown in Fig. 6 – but initially without the first transistor stage. The first transistor at that time drives the primary of a trifilar toroidal transformer to differentially drive the bases of the transistors Q1 and Q2 of the CA3028A.

The collectors of these two devices drive each end of series-connected primary of the bridge transformer. The toroidal transformer was made as described in *Ham Radio's* article, *The Precision Noise Bridge*.

In my version of the noise bridge, I terminated the reference side with two 100Ω resistors and a 300pF polyvaricon in parallel, though eventually I intend to have them in series as shown in Fig. 6. On the other side I fitted a 220Ω variable resistor in parallel with a 150pF capacitor and likewise intend them to be in series in the final version.

My ANB worked first time and the noise output was comparable with that of a pre-1976 noise bridge I'd made a couple of years ago. With the aid of a spectrum analyser I found for my particular 5V1 diode the maximum noise output was achieved with an 820Ω supply resistor.

Trying the unit in conjunction with a Target HF3 receiver I then found the noise output was insufficient to clearly determine the null. A transistor stage was added between the diode and the previous first stage and the output noise again observed on the spectrum analyser.

After adding the transistor gain-stage, there was lots of noise. There was sufficient to even achieve a clear null with the Target receiver when using the narrow passband for single sideband (s.s.b.) operation.

Further Development

Finally, I really didn't like the concept of individually twisting primary and secondary turns first and then together. Twisted pairs are the way telephone signals are kept separate – even in bundles with hundreds of pairs. So, I wound a new

transformer using 300mm lengths of 25s.w.g. enamelled wire as a plain quadrifilar bundle and then winding it into a two turn loop.

After scraping all the ends and determining which each wire was and connecting two in series as primary and two in series as secondary I connected it to the bridge. My decision was the right one – there was more output everywhere across the range with a particular improvement at the high frequency end of the range.

Circuit Works Well

The circuit works well so far and likely can be put into production when a suitable p.c.b. has been created. I've also taken on board all the details other authors have described for improving the precision and the suppression of strays and unwanted reactances.

Polyvaricon capacitors with gangs over 250pF are becoming difficult to obtain so I am trying to purchase and import a huge quantity of dual 300pF types for this and many other projects.

Referring again to Fig. 5, the internal circuit of the CA3028A device, I have further thoughts on trying a circuit using two CA3028A i.c.s. Using the first as a single ended differential amplifier, whereas Q1 acts as an emitter follower and Q2 as a common base amplifier. This means a single ended drive on the base of Q1 will result in near perfect balanced anti-phase outputs on pins 8 and 6.

Also – by using resistive collector loads for these outputs – I might be able to set the standing collector voltages at two-thirds the supply rail for direct connection to the second CA3028A. This arrangement does away with both the trifilar transformer T1 and the base bias components R8, R9 and de-coupler C6.

This project is however, a work-in-progress and (time permitting) I intend to complete it and offer a kit in *DIBD* in September's issue of *PW*. If you wish to contact me regarding this, or previous articles, you can email tony@pwpublishing.ltd.uk.

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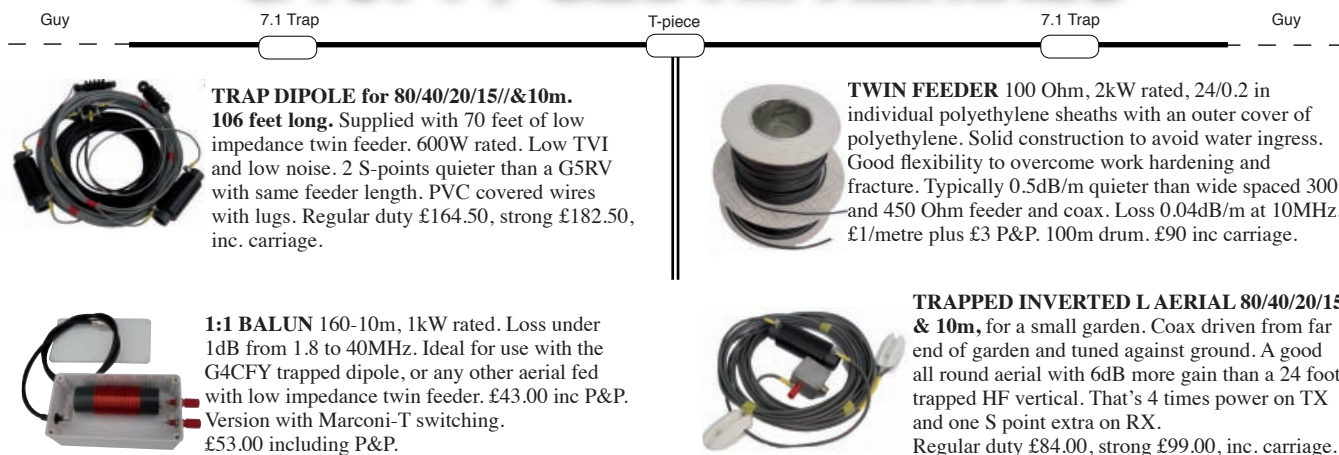
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The 2454

Warbreck Squadron Air Training Corps

Brian Nuttall M00YG describes how his Air Training Corps Squadron in north west England is busy training Air Cadets in radio communications.

The Air Cadet Organisation (ACO) provides young people between the ages of 13 and 20 with opportunities to do many things including gaining additional qualifications, learning to fly, shoot and kayak as well as taking part in the Duke of Edinburgh awards scheme to name but a few. More details of the activities available can be found at www.raf.mod.uk/aircadets/

However, I think there's a good reason for this *In Focus* article to be appearing in *PW*. This is because as well as all the opportunities already mentioned the cadets are able to learn about radio and communications allowing them to gain other awards and qualifications along the way and to perhaps become Radio Amateurs themselves.

Our Training Schedule

As the Radio Officer at 2454 Warbreck Squadron located to the North of Blackpool, in Lancashire, I'm pleased to describe the varied and busy training schedule the Cadets undertake at our Squadron.

As the cadets training progresses during their time with the ACO they gain classifications. These start with their First Class qualification, which they complete during their basic training. They then progress through a number of classifications to Master Cadet and then Staff Cadet which is attained after they turn 18 years of age, which enables the cadet to train younger Cadets.

A classification is not a rank, but



Fig. 5: Illustration of the Communications Badge and further picture of Flight Sergeant Nuttall receiving his Communications Badge from Flight Lieutenant Browell.

denotes the Cadet's progress in their training. At each level the Cadets have to pass one or more formal short answer test examinations which then allow them to progress.

The Cadets are trained in a variety of subjects from aircraft handling to map reading, however more importantly they also learn about Radio, Radar and Satellites along the way. The Cadets also undertake the following radio training program over their career in the ACO.

The Different Classifications

Classification: **First Class**, see Fig. 1.

At this stage the Cadets are trained to *The*

Provisional VHF/UHF Radio Standard.

They learn the basics of operating a v.h.f./u.h.f. radio safely. They learn about military procedures and security rules as well as how v.h.f./u.h.f. radio waves travel.

Classification: **Leading Cadet**, see Fig. 2.

There's no formal requirement for cadets to undertake any radio training at this stage. However, some cadets choose to undertake further training as a special project which normally means training for the Amateur Radio Foundation Licence or other activities, such as the obtaining the military *Full VHF/UHF Radio Certificate, Internet Communications Module.*

Some of the training typically lasts six months, as it has to fit around other training and events taking place in Squadron. We have found this longer period offers the best chance of success for younger cadets who take the Foundation Licence rather than trying to do it over just one weekend.

Classification: **Senior Cadet**, see Fig. 3.

During this level of training cadets are taught Advanced Radio and Radar. This is a complex subject as it covers a wide spectrum of knowledge from Instrument landing systems (ILS) to Digital Resolution Direction Finding (DRDF) and, of course, the working of Military communications networks and aircraft systems for identification and distress signals to name but a few.

Classification: **Master Cadet**, see Fig. 4.



First Class Badge

Fig. 1: The First Class badge that can be earned by Air Training Corps Cadets.



Leading Cadet Badge

Fig. 2: The Leading Cadet badge awarded by the ATC.



Senior Cadet Badge

Fig. 3: The Senior Cadet badge, as awarded by the ATC.



Fig. 4: The Master Cadet badge awarded by the ATC.



Fig. 6: The Cadets learn how to use (and get them on!) man-pack and hand-held radio equipment.

At this level of Training cadets look into Satellite Communications which takes in the major part of space history from Telstar to the International Space Station (ISS). We look at types of rocket and of course the Space Shuttle as well as the theory behind how Satellites are placed in orbit or are sent out as probes into outer space.

Finally they are taken through communication with the Satellites what they are used for? And how they send and receive data from the first pictures relayed via satellite during the moon landing to the current use of telecom, television, mapping, weather and GPS applications?

How Do The Cadets Benefit?

Readers may ask, "How do the Cadets benefit from all this training?" In answering the question, amongst all these subjects are some very fundamental physics principles, history and an awful lot of things that they don't teach in schools! However all this does dovetail nicely into the science the youngsters are being taught at GCSE and A Level.

Sometimes what I'm teaching them, further backs up what is happening at school. Sometimes the Cadets come in and say that they have just covered something I've already covered in the Squadron training. Or I may have even demonstrated in a practical lesson at squadron – for example radio waves or propagation – something they have been shown at school or college.

Many people don't realise that doing Amateur Radio training can enable Cadets to fulfill the skills section of the Duke of Edinburgh Awards scheme at either Bronze or Silver levels – but it does! And I know I didn't before I started teaching at the ACO.

The Cadets also gain a BTEC in Aviation studies the equivalent to two GCSEs, Foundation Licence and a Communications Badge **Fig. 5** Illustration of the Communications Badge and photograph of **Flight Sergeant Nathan**

Nuttall receiving his Communications Badge from **Flight Lieutenant Browell**, as well as transferrable skills that help from the time when they are in school right through to employment.

Successful Cadets

Two former Cadets are successfully employed by a multinational company utilising their electronic skills. One cadet is due to start a BEng (Hons) degree in Electronic Engineering at University. One Cadet is currently doing an HND in Electronics.

Other former Cadets are at University doing a Policing Degree and use radio in their role as Special Constables. One said to me "Your lessons have really helped me to take to that aspect of the job so much easier than other people on my course!"

And finally, one of our new Cadets said just the other day when using a radio for the first time "This is so cool!"

Camps & Exercises

During the time a Cadet is with the ACO they are also able to take part in camps and exercises, in which radio plays either a part, or is the focus of the activity. I personally put on at least two weekends a year at the squadron where cadets do exercises or training towards the Foundation Licence.

The Cadets have also taken part in a Special Event station at the **Ribble Steam Railway Museum** in Preston Docks (which also hosted **GB75PW** for *Practical Wireless*), which was set-up with the very kind help of the **Central Lancashire Amateur Radio Club** for the 70th Anniversary of the Battle of Britain. It was a great success and raised £300 for the funding of Squadron Radio Equipment.

The cadets also get to use radios during what we refer to as fieldcraft weekends, (see **Fig. 6**, showing Cadets donning man-pack radios on for field craft training) as well as cadet radio events such as the 'Messagathon' (message-

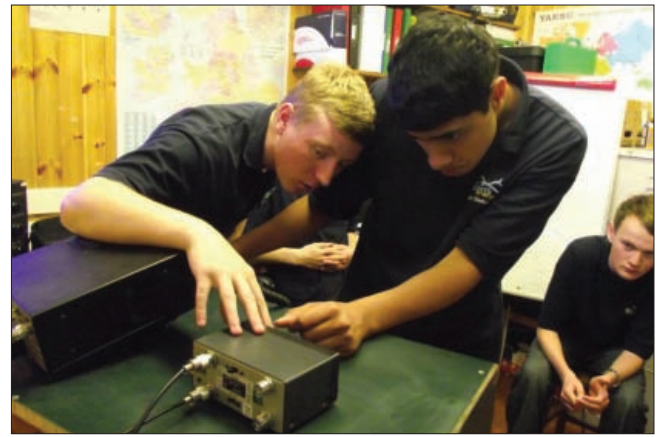


Fig. 7: Photograph showing **Flt. Sgt. Nathan Nuttall** training **Cadet Sreekar Ganti** how to adjust the s.w.r. on a radio unit on the newly built trolley with **Cadet Matthew Lightfoot** almost out of shot.

passing 'marathon' exercise), which take place each year.

During the last two years at cadets we've had had eight cadets pass the Foundation Licence and one Cadet obtained his Communication Badge. Another 10 Cadets used radio-related training – including the Foundation Licence, to sign off on the Duke of Edinburgh award skills section, while all of the others have been through the Provisional and Full VHF/UHF radio training.

A Very Busy Life!

It's a very busy life for myself and the other Radio Officers around the country who give up around five hours a week over two nights and put numerous hours in preparing for lessons and weekend activities that the Cadets never see. Just in the last twelve months **John Topping** (one of our Civilian Instructors who is now **M6JIT**), my son, **Flight Sergeant Sergeant Nathan Nuttall 2E0OCC** and myself spent a weekend building a mobile radio trolley **Fig. 7**, for the Squadron to enable the Cadets to get closer to the radios when operating and being taught.

My wife, **Jennifer M6MIJ** also spends a long time sorting out exam paperwork as well as being on the Squadron Civilian Committee and helping at fund raising events. Without her support I would not be able to put so much of my time into the ACO as I do! (Thank you Jenny!). I'm sure this scenario is replicated around the country and while it can be very rewarding – it's also a big commitment for all involved.

I suspect that there are many Amateurs out there who are far more qualified than I am to teach the ACO Cadets – and I know there are Squadrons that need help. So why not visit the ACO website to get further details? You could be 'taking off' on a new radio career very soon!



Phil Cadman G4JCP's Valve & Vintage

21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX
E-mail: phil@g4jcp.freemove.co.uk

Valve & Vintage

The traditional brown dustcoat he's wearing announces it's Phil Cadman G4JCP who manning the *PW* vintage 'shop' this month.

Summer greetings from the *Valve & Vintage* (V&V) 'shop'. With the warmer weather and more daylight hours, our thoughts naturally turn to outside activities. Of course, there are antennas to put up and experiment with, but I'm thinking more about mobile operation and mobile rallies, and I shall be talking about both later in the column. But first, I want to mention some interesting E-mails I've received over the last few weeks.

First, **David Robinson G4FRE** drew my attention to the Texas Instruments **TL783** three terminal regulator. This device is similar to the well known LM317, which I mentioned last time, but it can withstand an input-output differential of 125V and yet can supply up to 700mA (dissipation limited). This is a useful device that fills the gap between the standard LM317 and the circuit for output voltages up to 250V, which I featured last time. Indeed, for providing voltages in the range 25V to, say, 100V, the TL783 is ideal. Thank you for the information, David.

Gerry Bubbs Kolster Brandes DR10 radio has developed a fault – it breaks into oscillation when it's not receiving a signal. A faulty de-coupling capacitor is suspected. Gerry also mentions the problem of mains borne interference affecting reception. Valved radios don't have much in the way of interference suppression circuitry and he wonders if they are more susceptible to conducted interference than modern sets?

Good to hear from you Gerry! You've raised a good point. With the proliferation of power line transmission (PLT) and switched mode power supplies, the mains supply is awash with broad band interference from a few tens of kHz up to 30MHz and beyond. Domestic valved radios are invariably fed directly from the mains supply, so bringing the interference into the set itself. I wonder if any V&V readers have sets which suffer unduly from mains borne interference?

My comment last time about the lack of (real) radio stations broadcasting

music from the 1930s, 40s, and 50s, brought a response from **Ed Rixon GD6XHG**. He tells me that **Manx Radio** have specialist music shows at 9 and 10pm on Friday nights and at 9.00pm on Tuesday nights. Ed's a broadcast engineer at the station and shares our Editor's love of steam trains!

Manx Radio broadcasts on 1368kHz from the centre of the Isle of Man using 10kW into a pair of quarter-wave vertical aerials. The station can be received over much of the north west of the UK and in Ireland.

Many years ago I used to listen – at night – to Manx Radio, but now it's virtually inaudible. Is this possibly because of the interference Gerry mentioned above? Interestingly, the way engineers* reach the transmitter site is either on foot or by electric tram – there's no road! Wonderful, thank you, Ed!

Finally, a cautionary Email from **Duncan Telfer G8ATH**. Duncan asked me if I knew of any sure way of identifying genuine Mullard valves, particularly those made in Mullard's Blackburn factory. Some audio valves

– ECC83s, in this case – are now fetching such high prices on the various Internet auction sites, that non-Mullard valves are being disguised to look like the genuine article.

In the past, I've always relied on the valve code that's (normally) etched into the glass by the manufacturer. This is not the normal printing, which often easily rubs off. I described the coding system Mullard/Philips used, in more detail back in June 2001.

Not all valves have a manufacturer's code – but most major manufacturers did have some means of identifying their valves for quality control purposes. It seems even this code is now being faked by unscrupulous individuals!

While V&V readers aren't likely to

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... (text continues) ...

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... (text continues) ...

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Two Codar advertisements from *Practical Wireless* magazines of the late 1960s early 1970s.

become victims of any such deception – such are the ridiculously high prices asked for these valves – it's worth knowing that it does happen. More importantly, it's also worth knowing that while most valves are, sadly, of little worth these days, a few types are valuable.

In particular, certain audio valves are worth a significant amount of money to some people. So before disposing of any valve collection, it's prudent to check if there are any such valves present. A search on the Internet auction sites is one way to check.

**Some Broadcasting Engineers get all the plum jobs! Editor.*

The KW76 Receiver

In my December 2010 column I mentioned the **KW76** receiver and how it seemed to have had a very short production life. The set was designed, I would guess, in 1958/9, primarily for mobile operation.

It sounds surprising now, but Amateur Radio mobile operation wasn't permitted prior to 1st June 1954. Special permits must have been available for experimental work, but genuine mobile operation, that is transmitting while a vehicle was in motion, was not allowed by the Amateur Radio Licence. Of course, transmitting equipment could be carried in a vehicle, but the vehicle had to be stationary during the time any transmissions were made.

Interest in mobile working had grown over the years following the resumption of Amateur Radio operation after the Second World War, so there was no shortage of Amateurs eager to obtain a mobile licence. Yes, to operate on the move, a separate licence was required. In fact, even when I was first licenced in 1973 (as G8HHK), I had to apply for a separate mobile licence as I wanted to operate while mobile.

My first mobile operation was on 144MHz s.s.b., using a Liner II transceiver. While the set was infamous for producing all sorts of signals it wasn't supposed to, it did wonders for portable and mobile s.s.b. operation on 144MHz in the early 1970s.

It's easy to underestimate the difficulties experienced by those early mobile operators. Remember, there were very few solid state devices available then, and so almost all receivers, and certainly all transmitters of any reasonable power – used valves.

Valve heaters were wired for 12V operation (although cars with 6V systems did, I believe, still exist) and the various high tension (h.t.) voltages

were derived from vibrator packs or rotary converters. The transmitter and receiver (nearly always separate units) were either home constructed or, if you had sufficient wherewithal, expensive commercial rigs. Antennas were almost exclusively home made. Incidentally, were there any commercial offerings on sale in 1954?

All Bands To 144MHz

Even from the outset, all Amateur bands up to 144MHz were used by mobile operators, although 1.8MHz was by far the most popular. Which seems odd now, particularly as short loaded whip aerials are very inefficient at such long wavelengths. However, in those days 1.8MHz – 'Top Band' – was widely used for local contacts, and so mobile stations would always find activity on the band wherever they went.

Some Amateurs understood – like the professionals – that 144MHz was also a very good band for local contacts, particularly with the advantage of being able to use small yet highly efficient antennas. But I don't think many whip antennas were used, because the predominant polarisation on 144MHz was horizontal, hence the popularity of horizontal dipoles and Halo antennas.

As the popularity of mobile operation increased, someone decided it would be a good idea to have a meeting of mobile stations, where Amateurs could show off their installations and swap stories and useful tips. Thus, on Sunday 9th October 1955, the UK's first mobile rally was held at the Perch Inn, on the banks of the Thames, at Binsey near Oxford. It was organised by **G3GJX** of the Oxford and District Amateur Radio Society, with help from **G3GCS**, **G3HYZ** and **G8PX**. (The Perch Inn still exists and can easily be found on Google Earth!)

The November 1955 issue of the *Short Wave Magazine* carried a full report, saying that the whole affair had been a great success, with 23 cars out of those attending being fitted for mobile operation. Bands in use were 1.8MHz, 3.5MHz and 144MHz, with 1.8MHz being the most popular.

Incidentally, one 'maritime mobile' station attended; **G3HYZ** moored his motor cruiser near the Perch after operating on 1.8MHz while travelling on the river. Some 75 people attended that first rally, and from this small but successful start, more mobile rallies were organised all around the country. Indeed, by the summer of 1959, the larger rallies were attracting upwards of 1,000 visitors, arriving in several hundred vehicles equipped for mobile operation.

Amateur Radio Mobile Society

The still increasing interest in mobile operation caused the formation of a new society: The **Amateur Radio Mobile Society** (ARMS). The first issue of the Society's journal - *Mobile News* - was published in September 1959, and it proudly displayed the Society's call sign – **G3NMS** – on the cover. (It was reported – in *SWM* – that the journal was originally to be called '*Stroke Emma*'. Hmmmm.).

Although solid state receivers and transmitters were now more common than in 1955, most mobile equipment still used valves, as reports in *Mobile News* confirm. Four logs were reported, and in each case the equipment used was the KW **Valiant** transmitter and KW76 receiver. As far as I can tell, this line-up was extremely popular with those operators who could afford to spend a fair amount of money on a mobile installation.

The KW76 was specifically designed for mobile operation while the Valiant was equally suited to mobile or home use, where it could form part of a compact all-band base station. Even so, they are a far cry from today's small – even tiny – mobile transceivers, so a comparison may prove interesting.

Taking the KW76 receiver first, this was a compact double superhet covering the 1.8, 3.5, 7, 14, 21 and 28MHz Amateur bands. It also covered 26 to 28MHz, no doubt so that the American Citizens Band could be monitored for indications of likely openings on 28MHz. At least I hope that was the thinking behind the inclusion of the band!

The receiver was an all valved design requiring 1.5A at 12V for the heaters, and 70mA to 85mA at 200 to 250V for the high tension (h.t.) supply. The first i.f. was 4.6MHz, so the receiver had good image rejection, and a signal of 1µV produced an audio output of 1W with a signal to noise ratio of 6dB. Selectivity was quite sharp: 2kHz at the -6dB points, and both a noise limiter and b.f.o. were fitted as standard.

The receiver could be purchased in either kit or ready-built form, the kit saving budding mobile operators the significant sum of £8.

When I first asked about the KW76, I received a reply from **Robin Pickering G3UWP**. He had bought one at a rally some 20 years previously, but had since sold it. He had taken some photographs but had mislaid them. Some time later Robin E-mailed again, this time including some of the photographs he'd taken.

The photo, **Fig. 1**, shows the front panel and insides of the receiver, and

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it's clear just how compact the set was. Unfortunately, the dial scale wasn't fitted when the photograph was taken. At the time the KW76 and Valiant were in production, KW Electronics used sub-assemblies from the Italian company **Geloso**.

The one used in the KW76 was the Geloso Coil Unit 2619, which was also used in KW's G209 base station receiver. The Valiant transmitter also used a Geloso assembly, this time the 4/102 v.f.o. unit. Actually, the term v.f.o. does not do justice to the unit, as it's a three valve oscillator/buffer-multiplier/driver which can directly drive an 807 to full output on the 3.5, 7, 14, 21 and 28MHz bands. However, the power amplifier stage in the Valiant was a 6146, presumably chosen in preference to an 807 because of its small size.

The 6146 could be run up to 65W input on c.w., and for a.m. it was high level modulated by a pair of 6L6G valves. The set was, to a large degree, a compact version of KW's **Vanguard** transmitter. The latter having internal power supplies and intended for base station operation.

The Valiant was very compact given its specification - just 410mm by 160mm by 240mm – and so ideal for mobile use. It also found its way into shacks where space was tight. Like the KW76, it could be purchased ready built or as a kit and needed an external p.s.u.

Not Cheap!

A commercial mobile installation based on the KW76 and Valiant wasn't cheap, ready-built prices being £43-15s (£43.75) and £40-10s (£40.50) respectively. That would equate to around £700 and £650 today. Compare those prices with the cost of the relatively tiny Yaesu FT-857D all-band, all-mode mobile transceiver which costs around £715 at the moment.

Of course, KW weren't the only manufacturer to cater for the mobile enthusiast. A common pairing popular from the mid-1960s up to about 1971, was the **AT5** transmitter and **T28** receiver from the **Codar Radio Company**, shown in **Fig. 2**.

The AT5 was a two band c.w. and a.m. transmitter for the 1.8MHz and 3.5MHz bands. It had a rated power input of 10W on a.m. and 14W on c.w., ideal for 1.8MHz yet still useful on 3.5MHz.

The low power rating, and the use of B9A based valves throughout, allowed the AT5 to be very small yet not overly cramped internally. The T28 receiver was similarly styled but was all solid state. It covered 1.8



Fig. 1: The front panel and insides of the KW76 receiver, and it's clear just how compact the set was. Photo by Robin Pickering G3UWP who bought one at a rally some 20 years ago, though he's since sold it.



Fig. 2: The photograph was kindly sent to me by Ian Dilworth G3WRT. It shows the Codar AT5/T28 pair mounted in the 'cupboards' of (we believe) a Rover P4. Unfortunately, Ian can't remember where he got the photograph from. It would be very nice to find out who the gentleman was, and where the photograph was taken. And I wonder what antenna he used? Can anybody help out?

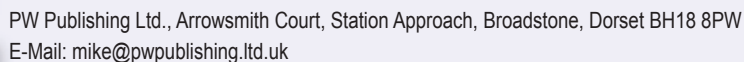
and 3.5MHz and had a b.f.o. for c.w. reception. It was certainly not in the same class as the KW76 – but for local working it was more than acceptable. Its chief advantage was its low power consumption – no flat battery even after a prolonged listening session!

Pricewise, the pair were probably within the budget of most Radio Amateurs, and that meant they found their way into many radio shacks as fixed stations. In 1970 the AT5 cost £17 (without p.s.u.) and the T28, £16. You can multiply those figures by ten to get what they'd cost today. Long-time readers of *PW* will doubtless remember

Codar as a regular advertiser in the magazine, and particularly their **CR70A** receiver, **CR45** t.r.f. set, Q-multiplier and pre-selector.

Ready For Next Rally!

Oh well, time to get my 'wheels on' ready for the next rally! By the way, I'd love to receive any tales of mobile daring-do. Please get in touch either via E-mail to: phil@g4jcp.freemove.co.uk, or by mail to: **21, Scott's Green Close, Scott's Green, Dudley, West Midlands DY1 2DX**. 73 de Phil G4JCP/M. Happy motoring!



waterfall and spectrum display. Controls for the spectrum and waterfall displays can be found in a number of places but the best starting point is to use the controls located immediately above the waterfall and spectrum displays.

The waterfall controls for *SDR-Radio* are located to the right of the waterfall label. The **Resolution** slider changes the FFT size for the waterfall from 512 for the fastest speed through to 262,144 samples for the super slow speed. You can also set the FFT size directly by clicking the down arrow adjacent to the Waterfall label.

The Contrast control in *SDR-Radio*, is to the right of the waterfall display and adjusts the sensitivity of the display. It should be adjusted to provide the clearest view of the signal you're analysing. If you are running a slow PC you may have problems getting a reliable display on the fastest waterfall setting. I've shown a summary of the *SDR-Radio* controls in **Fig. 2**.

The SpectraVue Program

Although the *Spectravue* program is fairly crude by the standards of modern SDR 'receivers', it is an excellent analysis tool. Because of this fact, you should consider using it in addition to your main SDR receiver.

Signal Recognition

When it comes to spotting data signal variants on the Amateur bands, the best technique is to learn to recognise the patterns, which different signals create on the waterfall display. To help you with this I've put together a collection of waterfall screen-shots using a WinRADIo Excalibur Pro receiver.

From the following illustrations you will see that there are unique identifying features to most Amateur signals and these can be combined with the measured bandwidth to accurately identify most data modes. So, I'll present a quick run through of some popular modes.

Illustrations Of BPSK

The illustrations of **Figs. 3, 4 and 5** show waterfall traces of BPSK-31, 63 and 125 signals respectively. You'll see that all three signals are very similar and have the characteristic two equal 'horns' at the start of the transmission.

On the waterfall display the only obvious difference between the speed variants is the bandwidth which increases proportionately with the speed.

The RTTY Signal

The oldest digital mode, RTTY, is a very simple transmission system with a

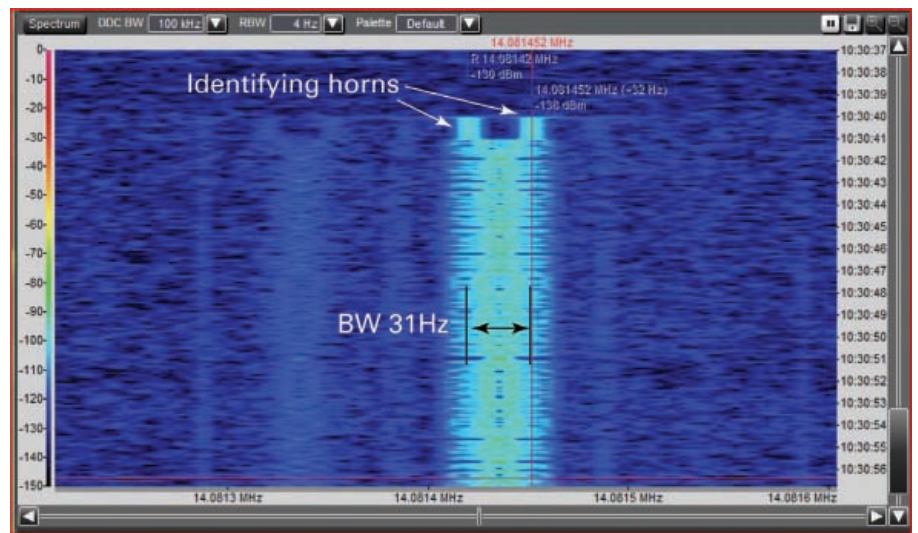


Fig. 3: A PSK-31 signal identification on the display of a WinRADIo Excalibur Pro receiver.

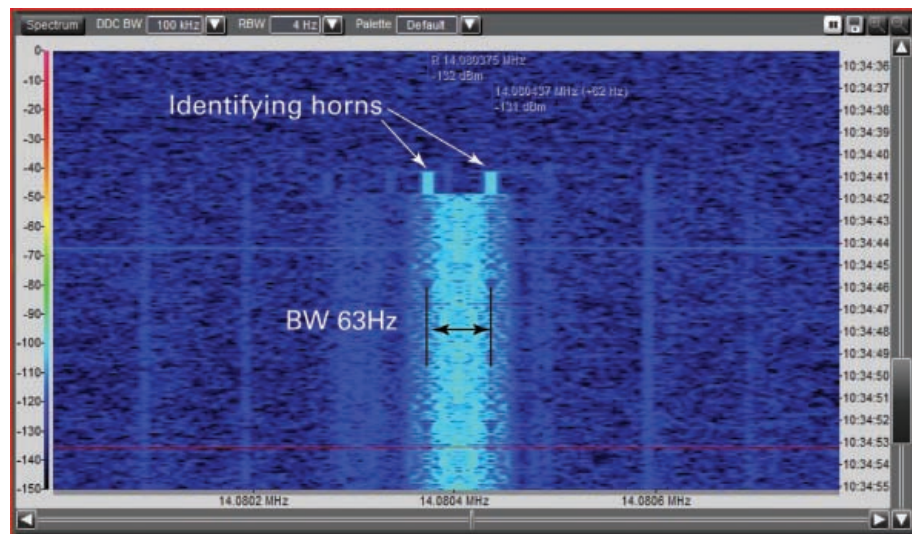


Fig. 4: A PSK-63 signal on the display of a WinRADIo Excalibur Pro receiver.

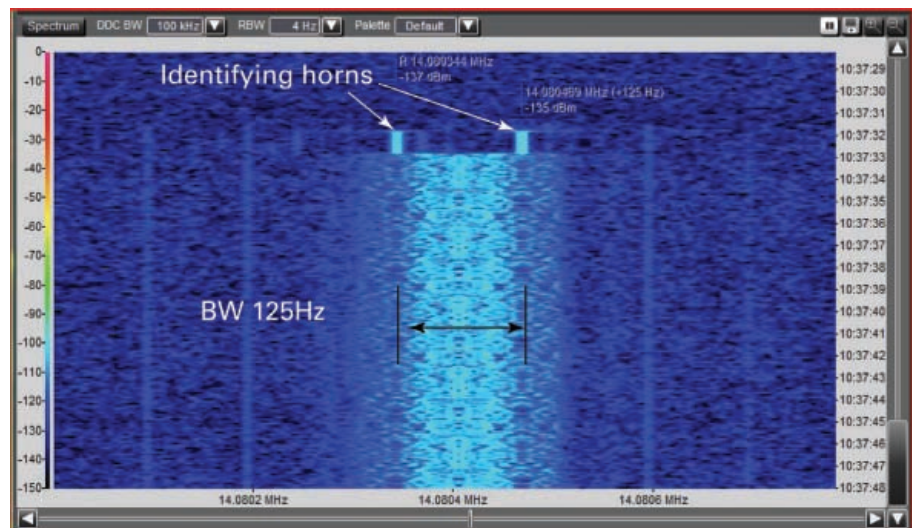


Fig. 5: A PSK-125 signal on the display of a WinRADIo Excalibur Pro receiver.

correspondingly simple trace, showing the two distinct carrier frequencies as in **Fig. 6**. The difference between these frequencies is the shift of the signal which for most Amateur RTTY signals is 170Hz.

The unique identifying feature of

the RTTY signal is the short burst of h.f. tone at the start and end of the each transmission. This corresponds to the 'idle' period before the message transmission starts or stops. The length of the tone burst will vary from station to station.

The FeldHell Mode

Although Feldhell is another very old mode, it's still to be found in regular use on the high frequency (h.f.) bands. The waterfall display for this mode is very similar to Morse, as FeldHell is also a carrier On/Off mode. You will also notice that the signal, **Fig. 7**, is transmitted in short bursts and this can help differentiate it from Morse signals.

There are more modes to consider, but I'll conclude the run through of Amateur digital modes in next month's *Data Modes*. Next, I want to turn to a problem that has been highlighted by several readers who wish to decode signals via software, while using a software defined radio (SDR) receiver.

Digital Interconnections

With the spread of SDR programs, software based analysis tools and decoders, many Amateurs are encountering problems 'connecting everything' together. And while it's possible to bring the audio signals out of the computer via the output of a soundcard and then patch things together, this is an option that brings a few problems.

The first of the problems you're likely to encounter with physically patching signals in (then out and back in again) is you have to buy an additional soundcard plus an array of leads to interconnect everything!

The second problem is that there is also a loss of signal quality. The digital audio signals have to be converted to audio, before being patched into another input for conversion back to digital again in the second soundcard's input.

The 'out-and-back in' physical patching means two unwanted digital conversions, which will inevitably degrade the signal quality and insert additional delay into the signal. The ideal solution would be to make all the connections digitally. Doing it digitally, not only keeps the shack tidy, but avoids the conversion losses.

Unfortunately, the *Windows* sound system is not very helpful in interconnecting signals, as it's primarily designed just to get signals in and out of the computer and not for the interconnection of digital audio within the PC. I've been looking around at solutions and have settled on the use of the *Virtual Audio Cable* (VAC) software package.

Trial Version

The VAC software can be found as a trial version from various download sites or purchased directly from the author for

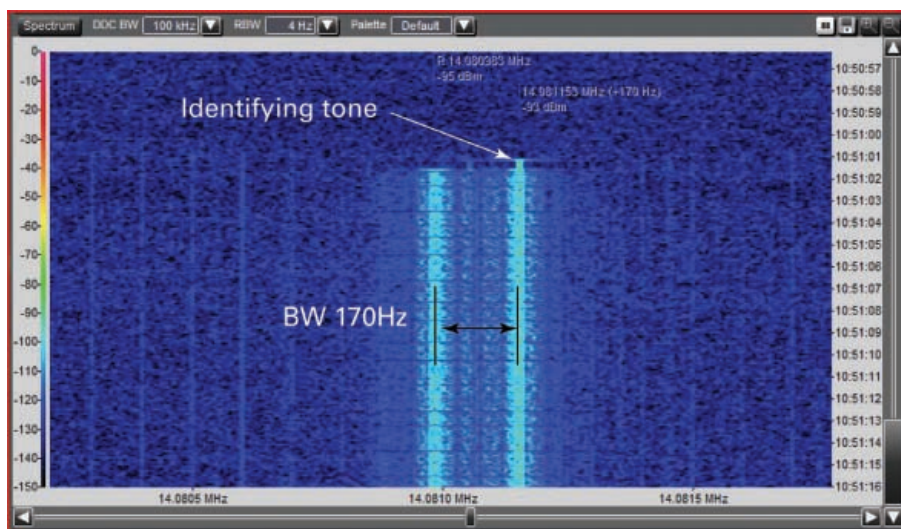


Fig. 6: An RTTY signal with short h.f. tone and 170Hz bandwidth on the display of a WinRADIO Excalibur Pro receiver.

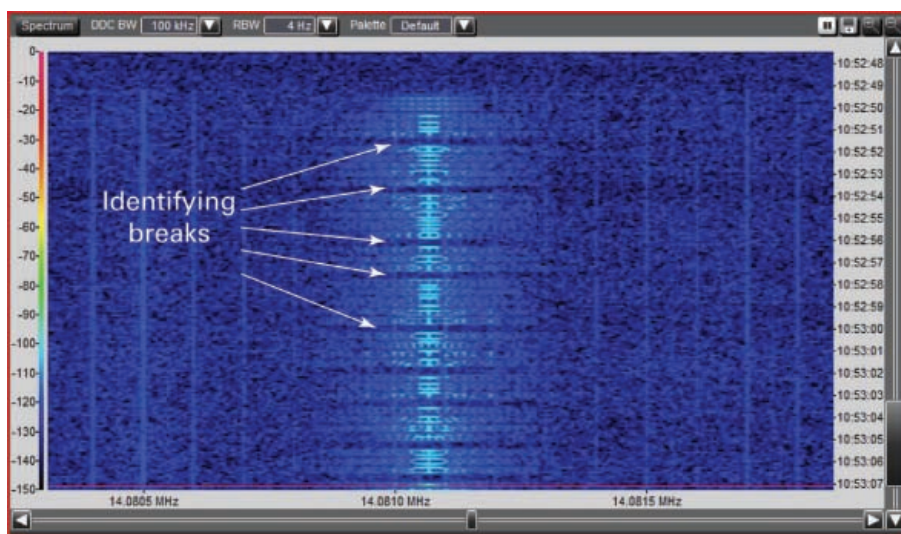


Fig. 7: A FeldHell Signal on the display of a WinRADIO Excalibur Pro receiver.

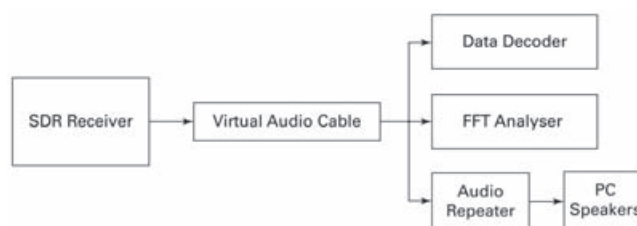


Fig. 8: *Virtual Audio Cable* and *Audio Repeater* interconnections.

a reasonable \$25. You can download a trial version from here: <http://software.muzychenko.net/eng/vac.htm>

There are two main components provided by the package. The *Virtual Audio Cable* software appears as an audio device with inputs and outputs that you can utilise. In an SDR setup, instead of sending the SDR's audio to your PC speakers you route it to *Virtual Cable*.

With the *Virtual Cable* setup, you can then connect multiple decoders, audio analysers or any other items by setting their input source to the *Virtual Cable*. Each device receives a clean, isolated,

digital audio feed so the number of programs you can have monitoring your SDR output is determined only by the processing power you have available in your PC.

The second part of the VAC package is an audio repeater. This audio repeater is used to take an audio 'tap-off' and pass it to an output device such as your computer speakers or any other output device. As with the *Virtual Cable* you can have multiple repeaters running at the same time.

I've shown a configuration example in **Fig. 8** and will provide more detailed operational tips next month. ●

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The new FTdx3000 HF+50MHz 100 Watt Transceiver is another exciting new product that is certain to capture the hearts of determined DXers and Contesters as well as casual operators looking for solid communications. No release date yet - see web.



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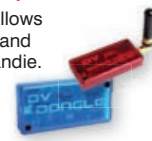


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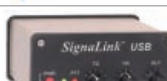


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Beacons, Meteor Scatter & Olympics Restrictions

Colin Redwood G6MXL discusses beacons, provides the latest up-dates on disruptions, and details the changes announced by Ofcom to Amateur Radio frequencies and repeaters due to the Olympic Games.

Welcome to *What Next?* (WN?) where this month, rather than covering one particular topic, I am going to cover a number of smaller topics ranging from beacons to Dual Tone Multi Frequency (DTMF) microphones. I'll also show how easy it is to hear radio signals reflected off the ionised trail of meteors, and remind readers about the restrictions on the 70cm, 13cm and 9cm bands associated with the 2012 Games.

Beacons & Frequencies

Beacons transmit from specific locations on specific frequencies. Those beacons that are some distance away are therefore very useful for assessing propagation between the beacon and where you are listening.

Beacons much closer to you can also be a useful signal source, particularly on bands where there is little activity at the time when you need a signal to test with. On the h.f. bands, there are beacons on just about every band.

The NCDXF Beacons

The Northern California DX Foundation (NCDXF) operates a series of beacons located around the world that take it in turns to transmit on the same frequency. So, by tuning to a particular frequency, it's possible to hear the various beacons one after another. This enables a listener to make a quick assessment of propagation to a number of different locations around the world on the band in question. The beacons can be found on 14.100, 18.110, 21.150, 24.930 and 28.200MHz.

Each of the NCDXF beacons transmits once on each band every three minutes one after another. **Table 1** gives the minutes and seconds of the start of the first transmission for the first cycle in each hour for each beacon on each frequency.

A transmission consists of the callsign of the beacon, followed by four one-

second dashes. The callsign and the first dash are sent at 100W. The remaining dashes are sent at 10W, 1W and 100 milliwatts (100mW).

From time to time, individual beacons are not operational for reasons that can vary from lightning strikes to maintenance of the roof of the UN building in New York! So before you blame your antenna or receiver, it is worth checking whether a beacon really is on the air or not.

The same applies to any beacon, not just the NCDXF beacons. You can check the current status of each of the NCDXF beacons at <http://www.ncdxf.org/beacon/beaconschedule.html>

Beacons On VHF/UHF/SHF

On the v.h.f., u.h.f. and microwave bands there are also a number of very useful propagation beacons to be found. On some of the higher bands, beacons provide almost the only signals likely to be heard outside contests and periods of enhanced propagation.

Indeed the beacons provide a very useful way of detecting enhanced propagation. This is particularly the case now that most of the UK has moved to digital television, which seems to be less prone to the effects of 'continental interference' during tropo openings than analogue television was.

At microwave frequencies beacons are a useful source of signals. In some cases their frequency is extremely accurate – which makes them a useful reference to check that equipment is on frequency. For example my local 10GHz beacon GB3SCX is stated to be on 10368.90500685MHz, which is certainly accurate enough for my purposes!

It's important that we all keep the various beacon frequencies clear of normal transmissions. The idea of beacons is that they transmit all the time at quite low power. Some beacons

may only be audible under exceptional propagation conditions by well-equipped stations.

Donations To Beacon Groups

I would also like to make a plea on behalf of the various beacon groups for donations to help keep them on the air. The cost of electricity and insurance are just two of many significant on-going expenses that most groups incur 24 hours a day, year-on-year on top of the initial outlay to build and install each beacon.

Meteor Scatter

I imagine that some readers of this column may never have heard a radio signal reflected off the ionised trail behind a meteor. Well with the aid of a beacon, this is remarkably easy to do, especially if you know when and where to listen.

To get you started, I suggest listening for reflections off the Perseids meteor shower. This occurs around August 11th to 13th each year, although you may still hear some reflections a few days either side.

I suggest listening for GB3RMK which is on 50.060MHz c.w. (although this is likely to change over the next few years). If you live some distance from the beacon, it is unlikely that you will hear it normally. When its signals are reflected by a meteor, suddenly for a few seconds it will be quite audible.

You may want to just leave your receiver equipment tuned to the frequency and leave it running in the background. You can try the same technique for other 50MHz beacons. A good list appeared on the 50MHz Datacard that came with the May 2012 issue of PW. (Back numbers are available from the PW offices as usual).

If you haven't got an antenna for 50MHz, it's easy enough to put together a dipole. You just need a couple of wires

each about 1.43m in length connected to some feeder (**Fig. 1**).

Once you have heard the meteor 'pings' of signals reflected off the meteor trails, you may like to have a listen to some actual QSOs. The Databcard shows the relevant frequencies.

There's a special procedure to follow if you want to actually transmit. I'll look at this on another occasion. In the meantime, let me know how you get on. You could certainly impress your family, friends and colleagues by telling them what you have done!

Olympic Restrictions

The UK radio frequency regulator, Ofcom, has put a number of restrictions on Radio Amateur use of parts of the 70cm, 13cm and 9cm bands between June 28th and 223rd September. (See the map of the areas affected in **Fig. 2**).

The restrictions on parts of all three bands apply to the whole of the London stretching out beyond the M25. They stretch to include places such as Guildford, Hemel Hempstead, Gatwick, Brentwood, Beaconsfield and Slough.

The restrictions on parts of the 70cm, 13cm and 9cm bands also apply to the Weymouth, Portland and surrounding areas in Dorset and a small area around Hadleigh in Essex.

In addition the areas in the immediate vicinity of a number of major football grounds will have restrictions on the use of parts of the 13cm and 9cm microwave bands (but not 70cm).

On 70cm the restrictions in all restricted locations apply to 431 to 433MHz, 436.25 to 437.25MHz and 438

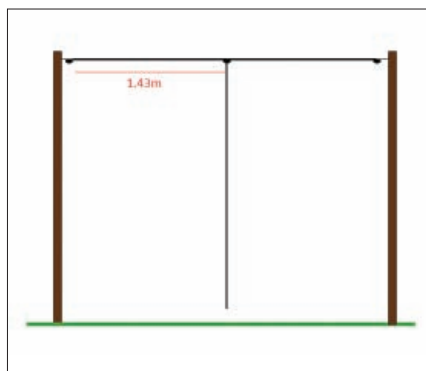


Fig. 1: A dipole antenna for 50MHz is quite compact and very easy to construct.



Fig. 2: Areas of the UK subject to 'Olympic Games' restrictions on Amateur Radio transmissions.

to 439MHz. As a consequence of the restrictions, Raynet will be using 430.225 and 439.225MHz, instead of 430.800 and 438.4MHz for the Games period.

There are some changes to some

70cm repeaters frequencies. The GB3OK repeater in Orpington (in the London Borough of Bromley) has permanently changed frequency to 430.5125MHz input and 439.5125MHz output (a permanent non-standard 9MHz split).

The GB3NS repeater in Banstead (In the Borough of Reigate in Surrey) will have a temporary change of frequency to 430.675MHz input and 439.675MHz output (a temporary non-standard 9MHz split).

The GB3EK repeater in Margate, Kent, will have a temporary reduction of effective radiated power (e.r.p.) to 6dBW for the duration of the Games period.

The GB3OY repeater in East London will be using an input of 430.575MHz and 439.575MHz (a 9MHz split) for the duration of the Games period.

Ofcom have asked Radio Amateurs outside the restricted areas to assess if their transmission is likely to be received in the restricted areas, and if any doubt refrain from using the restricted frequencies.

Effective Consultations

Thanks to the effective consultations and discussions between Ofcom and the RSGB, many UK Radio Amateurs will be largely unaffected by the restrictions. However, the bad news is that over half of the 70cm band including the segment between 432 and 433MHz will be restricted.

The good news is that the segment between 433 and 436.25MHz is unaffected by the restrictions. This means that many, but not all, repeaters will be unaffected.

Table 1

Call	DXCC Entity	Location	14.1	18.11	21.15	24.93	28.2
4U1UN	United Nations	New York City	00:00	00:10	00:20	00:30	00:40
VE8AT	Canada	"Eureka, Nunavut"	00:10	00:20	00:30	00:40	00:50
W6WX	United States	Mt. Umunhum	00:20	00:30	00:40	00:50	01:00
KH6WO	Hawaii	Laie	00:30	00:40	00:50	01:00	01:10
ZL6B	New Zealand	Masterton	00:40	00:50	01:00	01:10	01:20
VK6RBP	Australia	Rollstone	00:50	01:00	01:10	01:20	01:30
JA2IGY	Japan	Mt. Asama	01:00	01:10	01:20	01:30	01:40
RR9O	Russia	Novosibirsk	01:10	01:20	01:30	01:40	01:50
VR2B	Hong Kong	Hong Kong	01:20	01:30	01:40	01:50	02:00
4S7B	Sri Lanka	Colombo	01:30	01:40	01:50	02:00	02:10
ZS6DN	South Africa	Pretoria	01:40	01:50	02:00	02:10	02:20
5Z4B	Kenya	Kariobangi	01:50	02:00	02:10	02:20	02:30
4X6TU	Israel	Tel Aviv	02:00	02:10	02:20	02:30	02:40
OH2B	Finland	Lohja	02:10	02:20	02:30	02:40	02:50
CS3B	Madeira	Santo da Serra	02:20	02:30	02:40	02:50	00:00
LU4AA	Argentina	Buenos Aires	02:30	02:40	02:50	00:00	00:10
OA4B	Peru	Lima	02:40	02:50	00:00	00:10	00:20
YV5B	Venezuela	Caracas	02:50	00:00	00:10	00:20	00:30

The minutes and seconds of the start of the first transmission for the first cycle in each hour for each beacon in the NCDXF network on each frequency.

Table 2

Location	70cm	13cm	9cm
London to beyond M25	Restrictions - See Text	2.39 to 2.4GHz	3.41 to 3.44GHz
"Hadleigh - Benfleet, Essex"	Restrictions - See Text	2.39 to 2.4GHz	3.41 to 3.44GHz
Weymouth and Portland	Restrictions - See Text	2.39 to 2.4GHz	3.41 to 3.44GHz
2km Square centred on Coventry Football Club		2.39 to 2.4GHz	3.41 to 3.44GHz
"2km Square centred on Hampden Park, Glasgow "		2.39 to 2.4GHz	3.41 to 3.44GHz
"2km Square centred on Millennium Stadium, Cardiff"		2.39 to 2.4GHz	3.41 to 3.44GHz
"2km Square centred on Old Trafford Stadium, Manchester"		2.39 to 2.4GHz	3.41 to 3.44GHz
"2km Square centred on St.James' Park, Newcastle"		2.39 to 2.4GHz	3.41 to 3.44GHz

Summary of the areas and bands affected by Ofcom restrictions associated with the Games. On 70cm the restrictions apply to 431 to 433MHz, 436.25 to 437.25MHz and 438 to 439MHz.

Exceptionally, the restrictions are being lifted for the durations of some popular 70cm contests. Full details can be found on the Ofcom web site at http://licensing.ofcom.org.uk/radiocommunication-licences/amateur-radio/ar_spectrum_use/

Notice of Variation

In connection with the Games, don't forget that you can apply for a Notice of Variation (NOV) to you licence – so that you can use the letter 'O' prefix in your callsign. For example I can use GO6MXL ("Golf Oscar Six Mike X-Ray LIMA").

Visit the RSGB web site at www.rsgb.org for more information. This facility is available to all UK amateurs holding Foundation, Intermediate and Full Licences at no cost.

Microphone Without DTMF

Following the article on Echolink in the May 2012 issue, **Richard Newton G0EWH** (not to be confused with **Richard Newton G0RSN** the *PW* author), sent me a long E-mail in which he pointed out that some keypad microphones don't actually generate DTMF codes. Instead they send signals to the transceiver to actually generate the tones. Other DTMF microphones actually generate the DTMF tones within the microphone itself.

Richard gave some examples. The Yaesu FT-100 and FT-847 transceivers require DTMF tones to be generated in the microphone, whereas the Yaesu FT-7800/8800/8900 rigs can use a keypad microphone and generate the tones within the transceiver itself. This is something to bear in mind if you switch microphones between transceivers.

Richard also suggests a visit to the <http://www.echoaddons.com/> site. There are numerous downloads on the site, mainly aimed at Echolink Sysops. There are also a number which might well appeal to others including Apps to enable Echolink to be used on various tablet devices such as Android phones and iPhones and iPads.

Richard suggests visiting the RSGB's Data Communications Committee web site at <http://www.dcc.rsgb.org/> It is the definitive source of up-to-date information on nodes in the UK.

Many thanks Richard – your E-mail was most helpful and interesting!

Tim's QRP in the Country

I'm hoping to get along to the **QRP in the Country** event on Sunday July 15th at **Tim Walford G3PCJ's** farm in Long Sutton near Langport in Somerset. I would be happy to have a chat with *WN?* readers and the event is a great place to meet and chat and compare notes with fellow QRP constructors and operators.

The RSGB QSL Bureau

Don't forget to keep your QSL sub-manager supplied with stamped

addressed envelopes if you want to receive QSL cards through the RSGB bureau. If you have any doubts whether you have envelopes with your sub manager, then I suggest dropping him an E-mail.

If you're not sure who to contact, have a look at <http://www.rsgb.org/qs/list-of-qs-sub-managers.php> For RSGB members there's no fee for using the bureau to send or receive cards. For non-members the RSGB has recently started to charge for receiving QSL cards through the bureau, and RSGB membership is required to send cards through the QSL bureau.

Antenna Analyser

I must say that I find an antenna analyser (**Fig. 3**) a really useful piece of equipment when checking antennas. Above all, it takes away a lot of guesswork when playing with antennas!

After a multi-meter, I really think an antenna analyser is probably the most useful piece of test equipment that I have. An analyser really comes into its own when an antenna is resonant outside an Amateur band. It is easy to see on which frequency it is resonant, so that you know if the antenna is too small or too large. I find the information from the analogue meter and the digital display really useful.

Practical Wireless On CDROM

The latest *PW* CD is now available. This one contains the issues for 2011 and I can strongly recommend the CD not only to newcomers but also to long standing readers.

Every page of each issue is included on the disk. It is so much easier to find articles or adverts than looking through the paper versions. Add to this the saving in shelf space and the fact that there is nothing to put back on the shelf when you have finished with an issue – it seems to me that it is a winner in every respect See you next month!



Fig. 3: Colin G6MXL recommends the MFJ259B Antenna Analyser to readers who like to experiment with antennas.



Rallies

Send your rally info to:

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

E-mail: newsdesk@pwpublishing.ltd.uk

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.

JULY

July 1st

The Ipswich Radio Rally

The East Suffolk Wireless Revival (Ipswich Radio Rally) will be held at The Orwell Crossing Lorry Park, A14 Eastbound, Nacton, Ipswich IP10 0DD. The doors will open at 9.30am and admission will cost £1.00. There will be talk-in on S22, car parking, a Bring & Buy, a car boot sale, special interest groups, GB4SWR HF station, an RSGB bookstall and catering will be available.

Steve M1ACB

Tel: 07711 329624

www.eswr.org.uk

July 1st

The Barford Norfolk Radio Rally

The Barford Norfolk Radio Rally will be held at Barford Village Hall & Green, Barford, Norwich NR9 4AB.

The doors will open at 9.00am and admission will cost £1.50 (under 16s are free). There will be talk-in on S22, free car parking, trade stands and car boot sales, a Bring & Buy, special interest groups and catering will be available. Indoor tables cost £10.00 and outdoor pitches cost £8.00 (traders will have access from 8.00am).

David G7URP

E-mail: radio@dcpmicro.com

www.norfolkamateurradio.org

July 1st

The Red Rose QRP Festival

The 16th Red Rose QRP Festival will be held at the Formby Hall, Alder Street (off High Street), Atherton, Manchester M46 9EY. The doors will open at 11.00am and admission will cost £2.00 (under 14s are free). There will be free car parking, trade stands, a Bring & Buy, special interest groups, catering, a licensed bar and facilities for the disabled.

Les Jackson G4HJZ

Tel: 01942 870634

E-mail: g4hbj@ntlworld.com

July 7th

The Bangor Rally

The Bangor and District Amateur Radio Society Rally will be held at the Donaghadee Community Centre, County Down BT21 0HB. The doors will open at 11.30am and admission will cost £3.00. There will be trade stands, a Bring & Buy, special interest groups, a prize draw and snacks and light refreshments will be available.

Bill G14AAM

Tel: 02891 816707

E-mail: bill.langtry@btinternet.com

www.bdars.com

July 7th

The Stockport Rally

The 3rd Stockport Rally (previously known as the Reddish Rally) will be held at Walthew House, Shaw Heath, Stockport SK2 6QS. The doors will open at 10.00am and admission will

cost £1.00. There will be talk-in on 145.550MHz (G6UQ/P), car parking, trade stands, catering and facilities for the disabled. Tables will be available and will cost £10.00 each.

Bernard G3SHF

Tel: 01625 850088 (Daytime)

Nigel G0RXA

Tel: 07973 312699 (Evenings)

E-mail: info@stockportrally.co.uk

www.g8srs.co.uk

July 8th

The CRAC Rally

The Cornish Radio Amateur Club will be holding the 49th Mobile Rally at Penair School, St Clements, Truro, Cornwall TR1 1TN. The doors will open at 10.30am and admission will cost £2.00. There will be talk-in, free car parking, trade stands, a Bring & Buy and catering will be available.

Steve

Tel: 01209 844939

E-mail: g7voh@btinternet.com

www.cornishamateurradioclub.org.uk

July 15th

The McMichael Rally

The McMichael Rally and Boot Sale will be held at the Reading Rugby Football Club, Holme Park, Sonning Lane, Reading RG4 6ST. The doors will open at 9.30am and admission will cost £2.00. There will be talk-in, free car parking, trade stands, a car boot sale, special interest groups, a prize draw, a licensed bar and catering will be available.

Pete G8FRC

Tel: 01189 695697

www.mcmichaelrally.org.uk

July 15th

QRP in the Country*

QRP in the Country 2012 will be held at Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ. There will be trade stands, special interest groups and family attractions. The event will be held outdoors if the weather is good or inside the farm barns if it's bad.

Tim Walford G3PCJ

E-mail: walfor@globalnet.co.uk

July 27th/29th

The Lithuanian Hamfest

The Lithuanian Hamfest 2012 will be held by the Lithuanian Amateur Radio Society at the Surviliskis Village, Kedainiai, Lithuania.

Rolandas

Tel: 00 370 657 57373

E-mail: ly4q@lrmd.lt

http://lrmd.lt/saskrydis_en.htm

July 29th

The Horncastle Summer Rally

The Horncastle Summer Rally will be held at the Horncastle Youth Centre, Willow Road, Cagthorpe, Horncastle, Lincolnshire LN9 6DZ. The doors will open at 10.30am and admission will cost £1.50. There will be free car

parking, catering and facilities for the disabled. Tables cost £5.00 and power will be free.

Tony G3ZPU

Tel: 01507 527835

E-mail: G3ZPU@yahoo.co.uk

July 29th

Blind Veterans UK Rally

The Blind Veterans UK (formerly St Dunstan's) Radio and Computer Rally will be held at St Dunstan's, Ovingdean, Brighton, East Sussex BN2 7BS. The doors will open at 10.30am and admission will cost £2.00. There will be talk-in, car parking, trade stands and catering will be available.

Eddie

Tel: 01273 300772

E-mail: eddie@zamboodle.demon.co.uk

AUGUST

August 5th

The Great Eastern Radio Rally

The King's Lynn ARC 23rd Great Eastern Radio Rally will be held at the Gaywood Community Centre, Gayton Road, King's Lynn PE30 4DZ. The doors will open at 10.00am and admission will cost £2.00. There will be trade stands, a car boot sale and catering will be available. In addition, a campsite is available by prior arrangement.

Ray G3RSV

Tel: 01553 849700

E-mail: ray-g3rsv@supanet.com

www.klarc.org.uk

August 5th

The Lorn Radio Amateur Rally

The Lorn Radio Amateur Club Rally will be held at the Crianlarich Village Hall, Main Street, Crianlarich, near Oban, Perthshire FK20 8QN. The doors will open at 10.30am and admission will cost £1.00. There will be trade stands, a notice board for private sales, a prize draw and catering will be available.

GM0ERV

E-mail: gm0erv@sky.com

www.gm0ira.freeuk.com

August 10th

The 19th Mini Rally Night

The Cockenzie and Port Seton Amateur Radio Club 19th Annual Mini Rally Night will be held in the main hall at Port Seton Community Centre, South Seton Park, Port Seton, Prestonpans EH32 0BQ. It's an opportunity to bring along your own junk and sell it yourself. The event runs between 6.30pm and 9.30pm and admission costs £2.00, tables will be available on a first come first served basis.

<http://cpsarc.com>

August 12th

The Flight Refuelling Hamfest*

The Flight Refuelling Amateur Radio Society Hamfest will be held at the Cobham Sports and Social Club

Ground, Merley, Nr. Wimborne, Dorset BH21 3DA. The doors will open at 10.00am. There will be talk-in on S22, car parking, trade stands, a car boot sale, a licensed bar and catering will be available.

Mike M0MJS

Tel: 01202 883479

E-mail: hamfest@frars.org.uk

www.frars.org.uk

August 17th/18th

15th International EME Conference

The UK Microwave Group (in conjunction with the RSGB) will be hosting the 15th International Earth Moon Earth (EME) Conference at Churchill College, Cambridge. Further details can be found on the conference website.

www.eme2012.com

August 19th

The Rugby Rally

The Rugby (Princethorpe) Annual Radio Rally will be held at Princethorpe College, Princethorpe, Rugby CV23 9PX. The doors will be open between 10.00am and 4.00pm and admission will cost £2.00. There will be talk-in on 145.550MHz (GB5RRR) and on Channel RB06 via GB3ME. There will be car parking and catering. Pitches cost £10.00 if pre-booked before August 11th and £14.00 on the day.

Tony G0OLS

Tel: 07759 684411

E-mail: rally@rugbyats.co.uk

www.rugbyats.co.uk

August 26th

The Milton Keynes Rally

The Milton Keynes Amateur Radio Society Rally will be held at Bletchley Park, Sherwood Drive, Bletchley, Milton Keynes MK3 6EB. The doors will open at 9.30am and admission will cost £2.00 (under 14s cost £0.50). Please note there is no on site car parking available for the rally. However, limited on street parking is available locally and there is a multi-storey car park at Bletchley Station. There will be trade stands, a car boot sale, special interest groups, an RSGB bookstall and catering will be available. Why not make this a family day and visit the Bletchley Park Museum too?

www.mkars.org.uk/mkars/rally

August 27th

The Huntingdonshire Rally

The Huntingdonshire Amateur Radio Society Rally will be held at the St Neots Community College, Barford Road, Eynesbury, St Neots PE19 2SH. The doors will open at 10.00am and admission will cost £2.00. There will be talk-in on S22 (V44), car parking, trade stands, a Bring & Buy, a car boot sale, catering and facilities for the disabled.

Clive Burchell G3NKG

Tel: 01480 810473

E-mail: clive.burchell@btinternet.com

Emerging Technology

How Radio Amateurs have again been pioneering advances in emerging professional two-way radio technology

Going Digital

Many two-way radio services are going 'digital' in one form or another. Right now in the UK and mainland Europe, most government emergency services, such as police, etc., have already 'ported' over to Terrestrial Trunked Radio (TETRA). Also, Private Mobile Radio (PMR) users are increasingly going over to modes such as Digital Mobile Radio (DMR).

Often the radio hardware such as the receiver front end, intermediate frequency (i.f.) circuitry, transmitter modulator, radio frequency (r.f.) power amplifier, antenna, battery, case and keypad, display, etc., is very similar, if not virtually identical, between these radios. Amateur radio has also seen an upsurge in D-Star digital radio usage, likewise having similar radio hardware – but using a different type of modulation.

The difference is usually just in the signal processing, i.e. transmit modulation generation and receiver audio demodulation. Recently, I accompanied a colleague of mine to attend a day of technical presentations by a major two-way radio manufacturer, who had just moved into their new UK headquarters in Slough. They'd recently bought out the PMR division of Rohde and Schwarz, and as such they increased the number of their design staff to over 1000.

As such, they're doing plenty of research and development work, and I was pleased to listen to their 'view of future radios' from their Head of Design. As with my very own thoughts, this was in the use of such 'common r.f. circuitry' and common cases, batteries, etc., across a single very wide and continuous v.h.f./u.h.f. band, and to



just use different processing with Software Defined Radio (SDR) circuitry.

I've detailed SDR in earlier columns – but isn't it surprising how we Radio Amateurs have been using this very technology for some years now? It was around 10 years ago when I built my first SDR h.f. receiver on a single circuit board from an Amateur Radio kit, with my PC doing the signal processing!

It was over 25 years ago was when I used my Sinclair ZX Spectrum personal computer to run RTTY on transmit and receive, just coupling this to my transceiver, rather than using a hardware RTTY modem. Could this also have been a very early use of Software Defined Radio digital receiver demodulation and digital transmit modulation? This wasn't a professional product either, it was developed and released by **John Pearson G1FTU** a UK Radio Amateur.

This was also in the days before hard drives or even floppy disks were in common use; the program was loaded into my ZX Spectrum from my cassette tape player. In more recent times, the 'FunCube Dongle' is a wide band v.h.f./u.h.f. receiver, the size of a USB memory stick, with a PC handling the pro-

cessing software. This again was developed by a UK Radio Amateur, **Howard Long G6LVB**. Now, many years later, professional radio manufacturers are following our Amateur pioneering efforts in software defined radio.

Common Hardware Device

The idea is to have a common hardware device – such as a mobile or portable two-way radio, complete with a built-in operating system with a suitable processor in the radio device. This operating system is then 'loaded' with the operating mode, or modes, as and when they are required; like analogue frequency modulation (f.m.), or amplitude modulation (a.m.), or GSM, 3G or 4G, or DMR, or TETRA, or single sideband (s.s.b.), the list goes on!

But for 'universal' use, a common operating system would be needed. We already have plenty of 'Apps' available for various smartphone device operating systems, such as *iOS*, *Symbian*, *Android*, *Windows Mobile*, *Java* and so on, and many smartphone user readers will no doubt be aware of these. However, the day will probably come when your two-way radio will similarly just be programmed with an 'App' to give you the modes and frequency bands to want to operate on!

Project 25

All the news about 'Apps' brings me nicely onto a recent technical news release I read from Objective Interface Systems (OIS) in the US and Communications Research Centre (CRC in Canada) – Project 25, P25 for short. This is a digital two-way radio mode which is widely used by North American govern-

ment security organisations, to give interoperability between users, just as we use TETRA over here on this side of the Atlantic for interoperability between different services.

The organisation has recently ported the P25 standard to an *Android* device, with company executives saying the action proves that public-safety radios can easily adapt to new operating parameters. In addition, they say the port makes it easier for military radios to communicate seamlessly with public-safety radios during homeland-security and other emergency situations.

The company also say that it makes the migration of software-defined radios (SDRs) to physically smaller and more commercial types of equipment a lot easier, which in my mind it would certainly do!



Joe Jacob, the Senior Vice President of OIS, says "In the SDR community, many believe that complex waveforms such as P25 are difficult to port and require digital signal processors (DSPs) and field-programmable gate arrays (FPGAs) to run successfully. But, CRC has proven otherwise!" He and his colleagues are now meeting with public-safety two-way radio manufacturers in both the United States and in Europe 'to walk



them through' these new developments in technology and how it can make a large impact on their base.

He says that smart antennas and battery technology advancements, in conjunction with the ability to combine multiple waveforms on one chip, are coming together. He went on to say: "devices like smart handsets can be built and give the first responders all the features and frequencies they want.

The G4HCL Crystal Ball

Once again, you'll have read about smart antennas, and much on new battery technology, in earlier *Emerging Technology* columns, and it looks like these are now also coming into fruition. The G4HCL crystal ball seems to have been working!

Maybe we'll eventually be using our top-pocket smartphone with its 'Smart Antenna' to make not only phone calls and browse the Internet, but also to chat on a local 144 or 430MHz f.m. channel and a few minutes later have a 14MHz s.s.b. QSO!



Self Healing Circuits

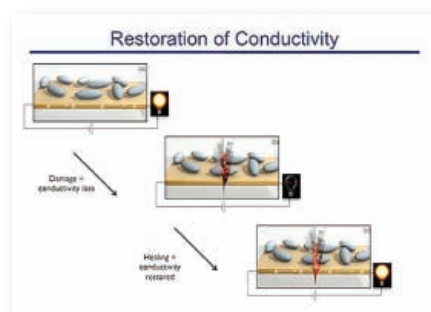
A team of University of Illinois engineers has developed a self-healing system that restores electrical conductivity to a cracked circuit. "It simplifies the system," said chemistry professor Jeffrey Moore, "Rather than having to build in redundancies or a sensory diagnostics system, this material is designed to take care of the problem itself."

Many of us, including myself, have had the frustration a circuit failure, for example from a cracked circuit board or faulty battery pack internal contact after we've dropped a 144/430MHz hand-held or similar, it's even worse when it's an intermittent fault. Maybe now we won't need to suffer any more!

The team had previously developed a system of self-healing polymer materials and they've now adapted their technique for conductive systems. For this it disperses microcapsules, as small as 10 microns in diameter, on top of a gold track functioning as a circuit.

As a crack propagates, the tiny microcapsules break open and release the liquid metal contained inside them. The liquid metal then fills in the gap in the circuit, restoring electrical conductivity.

A failure interrupts the current for just microseconds as the liquid metal fills the crack, and the researchers have recently demonstrated that 90% of their tested samples healed up with 99% of original conductivity. Personally I'm just waiting for the day that my radios will heal themselves!



Using Medium Waves For Power

Many of us have heard the old tale of someone's electric iron, or toaster, picking up strong medium wave a.m. transmissions from a nearby transmitter and detecting and reproducing radio transmissions just like a 'crystal set'. However, researchers in Bedford in the UK, have now created a sys-

tem to use medium wave broadcast transmissions to replace batteries in small everyday gadgets like clocks or remote controls.

Professor Ben Allen and his team at the University of Bedfordshire Centre for Wireless Research believe it to be a world first that could eventu-

ally eliminate the need for conventional batteries. The new technique uses the so-called 'waste' energy of radio waves and it's been developed as part of the university's research into 'power harvesting'. We've had radio-controlled wall clocks for a while now, it looks like we may soon have radio-powered wall clocks soon as well!

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

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Graham Hankins G8EMX's In Vision

92 Sunningdale Road, Tyseley, Birmingham B11 3QJ

E-mail: g8emx@tiscali.co.uk

Going, Going – (nearly!) Gone... The End of Analogue TV!

In his *In Vision* Column, this month Graham Hankins G8EMX tells of the last two analogue TV areas, an idea for Amateur 'broadcasts' and the CQ-TV magazine from the BATC.

Welcome to In Vision and it's a case of "Going....going...*nearly* gone!" In April the Crystal Palace television transmitter site, radiating to the massive population of Greater London, closed down its analogue service as the capital and thus a large proportion of the 'south-east' finally 'went digital', leaving just Tyne Tees and Northern Ireland presently analogue. Actual closedown at Crystal Palace happened at midnight between April 17th and 18th and was obviously such a hugely significant event as to be featured for some minutes on BBC Radio 4's *Today* programme.

In the *Today* radio program it was said that the changeover, of Crystal Palace and its 54 relay transmitters, serving 12 million viewers had "gone remarkably well". The biggest problem had been the large number of households where there was a second TV set, where each had to be retuned. This is not, of course, a 'problem' – just find 'Autotune' or equivalent on the menu, and watch in amazement!

But, with many more channels, are we as a nation watching less telly? What do you think! It was said in *Today* that our "love affair" with TV was stronger than ever: "we need our 'telly', we want our telly"! Viewing is 10% higher than it was 10 years ago and even with so many channels, the main ones of BBC, ITV, Channels 4 and 5 were "holding their own".

The Loss Of Teletext

But the loss of the teletext (Ceefax) service the news and information service – carried in those 'twinkling dots' sometimes seen at the top of analogue picture screens – have also gone. This has been noticed by the media, as a guest on *Have I Got News For You* programme wisecracked that they had finished reading page one but "was still waiting for page two to load."

So, I'm now make one more, final,

appeal to transmitter managers, museum curators, broadcasters and Arqiva – the company that runs the transmitters. Can we please ensure that some artefacts of the analogue, which has entertained and informed us for around 70 years, are preserved for public information, education and appreciation? My information is that items of historical interest have to be offered as donations to museums, as distinct from museums seeking acquisitions.

In the past, I've suggested items a museum could display; an antenna section, a power amplifier stage, a display panel explaining the analogue modulation system. Museums have explained to me their constraints; budgets and storage. I have informed the Department for Culture and Media, but it has insisted that museums are controlled by their individual curators.

However, as we are really now approaching the very 'last chance' to see anything in public, perhaps *In Vision* readers could make their requests? Write to the curator of the National Media Museum in Bradford and to Arqiva at one of the three addresses listed on its web site. The final transmitter, Northern Ireland, closes its analogue transmissions in October.

Regular Correspondent

On to Amateur Television now (ATV) and regular correspondent **Bill Shepherd EI4KB, PA3FDK G0KPR** has a suggestion for increasing ATV activity saying: "The subject of the numbers in Amateur Radio and in ATV in particular is still a matter of concern. I believe a crucial area in gaining and holding members is that of content.

"The typical content seen in ATV is the operator talking sometimes hesitantly to camera. I believe we should widen the scope of video content in accordance with the principle of the hobby, which is To self-train and increase technical

knowledge and skill. Plenty of material is being generated, as witnessed on *Youtube*. Content can be of any aspect of the hobby not just ATV but also construction, theory, installation, contests, rallies, etc.

"It could be shown firstly on ATV repeaters, before being used elsewhere so boosting users of on-air activity. This might be described as 'Broadcasting' but only in the same way as the RSGB News, transmissions and would perhaps require a minor variation of regulation guidance. The videos should be submitted to the repeater keeper who would exercise judgement and responsibility that it conformed to guidance and principle.

"The video would run looped with test cards and identification when the repeater is not being accessed. I believe there would be no strong objection from the regulatory authority if this idea were presented in this light". Bill concludes:

"I recently suggested use of one old analogue TV channel to make it easy for beginners to enter the hobby. It seems that in some countries Amateur already have access see link:-

www.southgatearc.org/news/march2012/christchurch_atv_station.htm

The British Amateur TV Club (BATC) produces a very glossy quarterly magazine these days and the March issue of *CQ-TV* arrived, well, in March! In it you'll find news of the Summer Fun ATV contest is from June 9th to June 10th, the International ATV contest on September 8th to the 9th, a new 'App' (Application) for receiving Slow Scan TV on smart-phones and an article *How I got into ATV* by **Andrew Keith Bonney G0KTD**, who basically used the BATC DATV kits and met other local Radio Amateurs and gradually produced some ATV activity.

Well done to him! See you in the September issue!

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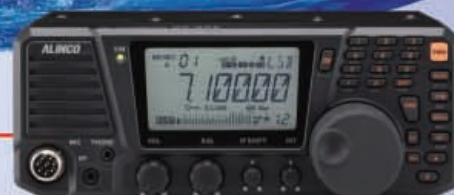
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- 600 channel memories in 3 banks
- Connection for Auto tuner
- ALC for Linear amplifier
- CTCSS enabled for 10 mtr FM repeater access
- Large Cooling Fan with overheat power limiter
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- Dimensions: 240 (w) x 94 (h) x 255 (d) mm
- Weight: 4.1 kg (approx)

- Included accessories**
- EMS-64 Dynamic microphone
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The World of VHF

The Olympic Games and VHF/UHF

The UK regulator Ofcom recently released details about areas of the radio spectrum which need to be protected during the period of the Olympic and Paralympic Games (June 28th 2012 to September 23rd 2012). OFCOM state:

Ofcom has identified a need to have short term access to certain segments within bands to which Radio Amateurs have secondary access. Ofcom has been working with the Radio Society of Great Britain to ensure that Games requirements can be met in some of these shared bands, while maintaining enough spectrum for Amateurs to continue to use.

There are segments within several Amateur bands which Ofcom plans to assign to support the 2012 Games and their preparation; some use will also continue for a short time after the Games to support decommissioning of venues. This use will be in geographically limited areas between 28th June 2012 and 23rd September 2012. The frequencies affected are segments of the 70cm band, and 2.390 - 2.400 GHz and 3.41 - 3.44 GHz.

We do not require use of the whole of the 70cm band but we request that

the following segments are kept free of Amateur signals in the areas identified in Annex A: 431 - 432 MHz, 432 - 433 MHz paired with 436.25 - 437.25 MHz and 438 - 439 MHz.

The microwave frequencies of 2.390 - 2.400 GHz and 3.41 - 3.44 GHz will only be used for the Games in the geographic areas identified in Annex B.

Annex C gives details of some other changes and restrictions that will apply to repeaters and RAYNET use.

Use of radio by Amateurs in the areas defined in Annexes A and B could cause interference to Games applications; it is also possible that higher power transmissions from outside these areas could cause interference. Consequently, to avoid the risk of interference to Games applications, we request that Amateurs do not operate within the frequency ranges identified in the areas defined in Annexes A and B, and that Amateurs ensure that any signals that could be received in these areas are negligible.

Individual Amateurs should assess if their transmission is likely to be received in the defined areas and if in any doubt please DON'T operate within

the frequency ranges identified.

There are a number of Amateur contests that fall within the period of the 2012 Games. We can accommodate these providing the Amateur activity is kept to the dates of 6th - 8th and 10th July, 4th - 5th August and 14th August, 8th - 9th and 11th September.

Ofcom requests that Radio Amateurs observe these temporary restrictions on their use. Ofcom must ensure that all spectrum used for the Games is fit for purpose and will take appropriate action if interference is caused by an Amateur to a Games application. Such action may include variation of the Amateurs licence to remove the right to use the above mentioned bands or a requirement to close down radio equipment.

Ofcom knows that the Amateur Radio community is keen to support the Games. We have arranged special call signs for a number of flagship stations and all UK Amateurs may apply for a commemorative pre-fix to their call sign for the period 21st July 2012 to 9th September 2012

Readers can find the maps on line at http://licensing.ofcom.org.uk/radiocommunication-licences/amateur-radio/ar_spectrum_use/ but broadly speaking, the largest area, defined in Annex A is around London and extends to Maidenhead in the west, Hoddesdon in the north, Tilbury in the east and Horley in the South. There are also smaller areas around Hadleigh Farm and Weymouth/Portland. If you are anywhere close to these areas, please check the detailed maps on line.

GB3OK (Orpington) will change frequency permanently and GB3NS (Banstead) will temporarily change frequency. GB3EK (Margate) will reduce power and GB3OY will be a new, temporary repeater based in East London for the duration of the games. It will use an output of 430.575MHz and a 7.6MHz split.

D-STAR Developments

There have been some welcome developments in D-STAR recently, which are all in the direction of moving towards a more open approach and



Just three of the antenna designs, for 50, 144 and 430MHz, available from the G0KSC website: www.g0ksc.co.uk/

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- New, two touch repeater access
- High Grade body compatible to IPX7 (submersible 1m/3feet for 30min) and rugged body
- 39 CTCSS tone squelch encode + decode settings)
- Large 40 mm internal speaker for great audio
- Highly visible backlit alphanumeric display
- Direct frequency input through illuminated keypad
- 200 memories, plus one call channel and one repeater access parameter memory
- VFO, Memory and scan modes
- Ultra flexible antenna with SMA connector - avoids breakage
- 4 User selectable tonebursts (1750, 2100, 1000, 1450Hz)
- 104 DCS digital code squelch
- Time out Timer
- 9 Auto dial memories easily accessed from the DTMF keypad
- Ni-Mh Battery 7.2v 700mah fitted as standard
- Refresh function for rechargeable battery reconditioning
- Cable Cloning feature
- Frequency step: 5,10, 12.5, 15, 20, 25, 30kHz
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Optional Accessories

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- Transmit: 1.8 - 30MHz Amateur Bands (5MHz Band Transmit is optional with mod)
- TX: SSB, CW, AM, FM
- Power: up to 100W SSB/CW/FM - 40W AM
- QRP Mode: (0.1 to 2.0)W extra low power setting
- RX: 150-29.999Mhz (when optional 5MHz mod is enabled, RX extends to approx 35kHz-34.999MHz)
- Fight QRM with STANDARD features - IF shift, Narrow Filter, Noise Blanker
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(JM49), OE4VIE (JN87), ES5TF and ES5QA (KO38). Next day on April 30th, I found the band open to the south and worked CT1ILT (IN50), EA1VT (IN53), CT1BOH (IM58), EB1BHO (IN73) – short skip at 962km! An hour later propagation had moved to the east and I worked YL2JW. On May 2nd, I caught another Es opening to the east and south east working ES, S5, HA and OE. And just as I was about hit 'send' to send the column off, on the evening of May 7th I caught an opening to the south and was particularly pleased to work CT1FJC (IM57).

Justin Johnson G0KSC (Canvey Island) says that things are hotting up on 50MHz. On May 5th, he was hearing the Z21SIX beacon and then shortly afterwards he was hearing Z21BB at 579, although only for a short period!

The 70MHz Band

Stewart Reeve G1HHO (New Milton) wrote with details of a 70MHz net which takes place every Sunday at 09.00 local time on 70.325 f.m. The net is made up of stations from Hampshire, Dorset, Hayling Island, Isle of Wight, Portsmouth, Winchester, Bournemouth and others. **Ted Fitzgerald G3XUX** (Fareham) is net controller. Well worth a listen if you are in striking distance of the south coast.

Mark Marment CT1FJC had a broken wire on the dipole feed to the 5el yagi, so took the antenna down and rebuilt it to a DK7ZB 6 el design. The antenna seems to be working well, listening to beacons and Mark reports the SWR is superb. Mark is hoping that this improvement may help with Trans-Atlantic signals.

Justin Johnson G0KSC (Canvey Island) found an Es opening on May 2nd. He'd seen beacons from OH and SM on 50MHz and then a spot of the OH5RBG beacon on 70.0335 from G4FUF. Justin could hear OH5RBG but also OH2FOUR on 70.018. OH3DP replied to Justin's call and they made a nice QSO. OH3DP was using 10W and a 6el G0KSC LFA yagi. Justin also worked S51DI later on in the afternoon.

Nigel Head M0DBO (Redhill) took part in the April RSGB 50MHz contest. He remembered that he had a 50MHz halo and managed to mount it at around 5m above ground. He worked 2 of the 4 stations that he was able to hear. Although it is a simple antenna, I am quite sure that it will work well for Es – tropo can be hard going! Nigel is planning to build a full-wave loop for the band.

Jim Rabbetts GM8LFB (Orkney)

enjoyed the Es opening on April 29th, working OE3WBA (JN87), OE3KLU/M (JN88), OE1PMU (JN88), OK1GK (JO70), 9A2SB (JN95), OK2MK (JN79), OK2BGW (JN89), OM2DT (JN88), OK1SI (JO70), OK1FBH (JN79), OM3CQF (JN88), HA5FM (JN97), DL3VDL (JO50), DJ2DA (JO61), OM5MZ (JN97), OK2PVF (JN99), OK2VVD (JN99). An interesting log Jim, and also fascinating to compare with M0PNN's and my own, and see the differences of the stations that we worked.

Here at **G4VXE** I was pleased to make my first Es QSO of the year on May 2nd, working S51DI (JN76) – a reminder that if the propagation is in the right place, you do not need a big station. My 70MHz equipment is about 7W and a vertical antenna.

The 144MHz Band

Jonathan Kempster M5AEO (London E14) notes that GB3EL (East London) is back on the air after an absence of a few years. The output is on 145.600MHz. Jonathan is looking forward to making plenty of QSOs through the repeater from his home in East London. I'm expecting that I will hear the repeater from here in Oxfordshire from time to time. 145.600 is quite a busy channel already, with GB3WR (Wells) and GB3CF (Charnwood Forest) both audible here.

Panis Dadis SV1GRM (Athens, Greece) reports that the Athens QRP group were active on April 8th from their site at Mount Parnitha (KM18). Some interesting QSOs were made using an IC706MkIIg and a 7 el yagi. The worked SV8FMY/P and SV1PKH/P (KM37) on Samos, TA3TTT/P (KM38), SV3PJJ and SV3/SV1FXO (KM18)

Mark Marment CT1FJC says that whilst he was testing his new rotator control box for his moonbounce system, he copied signals off the moon from HA0HO, JH8CMZ, RA6A and HA0MK all calling E2E (OK17) from Thailand. Mark said that he copied E2E on a couple of occasions at -23db. Although he did not call E2E, he was heartened that the system seemed to be working well.

It was good to hear from **Brian Mitchell G4MLI** (Gorran Haven, Cornwall) who is thinking about getting back on v.h.f./u.h.f. after a period of some years. Brian was wondering whether he should go for an f.m. only rig or a multimode one. Particularly given Brian's location on the coast, I advised him that if at all possible, he should go for multimode – as sea paths should yield some interesting

openings which will probably work better with the better weak signal characteristics of c.w and s.s.b. Of course, there is still plenty of interest on f.m. Good luck, Brian and let us know how you get on! Incidentally in the course of our email conversation, it became clear that Brian lived very close to the QTH of my old friend **Cyril James G3VVB**, now SK. Cyril was an excellent engineer and had built some beautiful microwave equipment back in the 1980s.

Ronald Pincho ZB2B (Gibraltar) reports that he has got his new 144LFA7 antenna up. He says that the Gibraltar weather was perfect for spending a few hours on the terrace sunbathing and working with the beam, coax and rotator! Ronald says that he hasn't heard anything yet, other than the CS5BALG beacon on 144.405 but hopes to hear some DX soon.

Philip Oakley G0BVD (Great Torrington) has ordered one of the new Baofeng UV-5R 5W 144/432MHz dual band handhelds and has found it great value for the price (less than £40 including shipping from Hong Kong). Programming the memories manually is not straightforward, so Phil has opted for a programming cable and software to simplify the task.

The 432MHz Band

Nick Plumb found that a High Gain TV antenna that he was fitting at his house worked quite well on 433MHz! The SWR seemed under 3:1. Nick said he didn't try it with a QSO, but found it of interest. An interesting emergency antenna – though I'd be wary of running too much power in case as it's likely that the matching arrangements probably won't cope with too much!

The 1296MHz Band

Reports for the band are not so frequent, so it was good to hear from **Panos Dadis SV1GRN** (Athens, Greece) about the Athens QRP Group's portable activity on the band on April 8th. Panos writes, 'During the QSO Party, the first 1.2GHz QSOs between Athens KM18ud and Izmir KM38op were made. From Athens Costas SV1IXP/P used an IC-910 transceiver and a 19 el. Yagi, while Selim TA3TTT/P from Izmir worked with a TS-2000X and a 11 el homemade yagi. Both of them are Athens QRPNet members. Congratulations!

Well – that's about all we have room for this month. Thanks for all the interesting reports and news. Please keep them coming.

Until next time, 73!



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Old RF Coils and How to Identify Them

“You can identify that Inductor!” is the suggestion from Stef Niewiadomski – our keen constructor author. Stef then describes how readers – with his help – can help you discover just what that old coil is!

If the names Denco, Eddystone, Electroniques, Osmor, Repanco, Wearite, Weyrad and Teletron mean anything to you, you're probably 'of an age'. And those names will bring back memories of the radio equipment you built (or dreamt of building) during the 1950s, '60s and '70s. These companies were the major British manufacturers of coils, chokes and transformers – radio frequency (r.f.), intermediate frequency (i.f.) and audio frequency (a.f.) transformers/inductors, supplying both the professional and amateur markets.

The fact that six major, and two, not so major suppliers of coils (I would include Electroniques and Teletron in this category) existed during this period, illustrates the high demand for these ready-made coils. The use of these coils made designs much more reproducible than if home-made coils had to be wound, especially for the lower frequency bands where more turns are needed. Therefore the coils made home-building of radio equipment more attractive to the average amateur, and it was much more certain that the radio you built would work and cover the intended frequency range!

The aim of my article is to give the reader a 'crib sheet' of the products from these manufacturers. If you then see a coil for sale on the internet www, or at a radio rally, or other radio gathering, hopefully you can quickly identify its intended function from its part number and decide if you want to rescue it and use it yourself.

What's Included & What's Not?

In the tables I've only included data for r.f. (so-called 'aerial', 'h.f.' and 'oscillator') coils. Some of the companies also manufactured coil packs, complete tuner front-ends, r.f. chokes, ferrite rod antennas, intermediate frequency

transformers (i.f.t.s), audio frequency (a.f.) transformers and chokes. Many produced printed circuit boards (p.c.b.s) and dials designed for valve and transistor circuits. So it's worthwhile looking out for when these items come up for sale.

The Major Coil Manufacturers

In the UK, **Denco, Eddystone, Osmor, Repanco, Wearite** and **Weyrad** were certainly the most popular manufacturers of the period – with **Denco** probably being the most prolific in my early days in radio, the mid-1960s. The Denco multi-coloured plug-in ranges allowed the constructor to re-use coils between projects easily. It also helped to avoid the risk of damaging the coil when soldering it into circuit.

The illustration – **Fig. 1** shows the first page from Denco's DTB.1 *Technical Bulletin*, published in July 1947. As you can see, colour coding had been introduced for the 'Maxi-Q' coils and this scheme was maintained until the end of production in the early 1980s.

Note that the coils were originally available as both plug-in or chassis mounting versions. Although octal plug-in coils appear from time to time (see the photo of an octal blue range 1 coil in **Fig. 2**), chassis mounted ones are very rare today. See **Fig. 3** for what a few of them looked like.

The DTB.1 was eventually replaced by DTB.4 – *Maxi-Q Transistor and Miniature Dual Purpose Coils*. Originals and copies of this Technical Bulletin come up for sale very often, both in paper and in electronic form. Denco also produced a 'General Catalogue of Components' which is a useful reference to all the components they sold.

Shown in **Table 1** is the complete range of Denco plug-in coils, in both octal and B9A formats. I've also shown

a few miscellaneous coils that you might come across. Note that the plug-in coils don't have part number marked on them: they rely on a label on the lid of the packing/screening can and the colour of the coil former to show the coil's function and frequency range.

Note: Occasionally Denco ran out of formers of the correct colour and rather than stop production they used the 'wrong' coloured former and stuck a small label on the former to indicate which colour it was 'pretending' to be.

The coils themselves and even the aluminium can in which each coil was packaged (which could also be used as a screening can in the equipment) are easily recognised and turn up quite often on eBay and at other places. See **Fig. 4** for a photo of a blue transistor range 1T (long wave) coil alongside its aluminium can and the datasheet supplied which held the coil snugly in the can during transit.

Note: More information on the history of the Denco Company can be found at **References 1 and 2**.

Eddystone Coils

Stratton & Co (and **The Eddystone Radio Company**, as they later became), the well-known manufacturer of **Eddystone** receivers, also sold radio components. For example they produced four and six-pin plug-in r.f. coils, chokes and tuning capacitors for radio constructors.

Note: Stratton didn't make the chassis-mounted coils used in their radios available to constructors because, of course, they wanted to sell their completed radios!

Table 2 shows the ranges of early 2¼-inch (57mm), later 1½-inch (38mm) diameter and 'miniature' (about 20mm diameter across the top) type-706 coils. These plug-in coils come up for sale quite

Denco Maxi - Q Coil Data : July 1947	
CODING.	
The following colour code is used :-	
BLUE :-	Aerial coupling coils for use in input circuits whether or not an R.F. stage is used.
YELLOW :-	Detector or mixer grid coils with coupling winding for the anode of an R.F. stage.
RED :-	Oscillator coils for 465 Kcs. I.F. (NOTE:-From Range 6, oscillator coils can be used for a number of I.F.s.).
WHITE :-	Oscillator coils for 1.6 Mcs. I.F.
GREEN :-	As yellow but with additional regeneration winding for T.R.F. detector, etc.
A coil is correctly specified by giving Colour, Range and type (plug in "P" or chassis "C"), e.g., "Blue 2 C".	

Fig. 1: The first page from Denco's DTB.1 *Technical Bulletin*, published in July 1947. As you can see the colour coding introduced then for the 'Maxi-Q' coils was maintained until the end of production. Note that the coils were available as plug-in or chassis



Fig. 2: A Denco octal-based valve 'dual-purpose' blue coil for range 1(long wave).



Fig. 3: Some chassis mounted Denco Maxi-Q coils (picture courtesy of Jim Jobe).

often and so are worth documenting. However, I have to admit that these coils aren't so easy to identify: many home-made coils were wound by amateurs on 'bare' formers and these can easily be confused with factory-wound coils!

The coils themselves don't have part numbers marked on them. Instead, they often have a coloured dot on the top rim that gives a clue to the frequency range covered – but not a full part number. However, if you are lucky enough to have the original cardboard box with the coil – this will have the part number and range covered marked on it.

Table 1. Denco RF Coils						
Octal and B9A Valve Dual Purpose (TRF and Superhet) Coils for use with 300pF Tuning Condensers						
Range	Coverage (MHz)	Blue	Yellow	Green	Red	White
1	0.150 - 0.500	Signal grid Ae coupling	Signal grid inter-valve	Grid coil with reaction	Osc for 465kHz	Osc for 1.6MHz
2	0.515-1.545	Signal grid Ae coupling	Signal grid inter-valve	Grid coil with reaction	Osc for 465kHz	Osc for 1.6MHz
3	1.67 - 5.3	Signal grid Ae coupling	Signal grid inter-valve	Grid coil with reaction	Osc for 465kHz	Osc for 1.6MHz
4	5.0 - 15.0	Signal grid Ae coupling	Signal grid inter-valve	Grid coil with reaction	Osc for 465kHz	Osc for 1.6MHz
5	10.5 - 31.5	Signal grid Ae coupling	Signal grid inter-valve	Grid coil with reaction	Osc for 465kHz	Osc for 1.6MHz
6	30 - 50	Signal grid Ae coupling	Signal grid inter-valve	Grid coil with reaction	Osc for 465kHz	Not available
7	45 - 78	Signal grid Ae coupling	Signal grid inter-valve	Grid coil with reaction	Osc for 465kHz	Not available
B9A only Transistor Coils for use with 300pF Tuning Condensers						
Range	Coverage (MHz)	Blue	Yellow	Green	Red	White
1T	0.150 - 0.500	Aerial RF coil with base winding	Inter-stage RF coil	No transistor green coils were produced	Osc for 465kHz	Osc for 1.6MHz
2T	0.515-1.545	Aerial RF coil with base winding	Inter-stage RF coil		Osc for 465kHz	Osc for 1.6MHz
3T	1.67 - 5.3	Aerial RF coil with base winding	Inter-stage RF coil		Osc for 465kHz	Osc for 1.6MHz
4T	5.0 - 15.0	Aerial RF coil with base winding	Inter-stage RF coil		Osc for 465kHz	Osc for 1.6MHz
5T	10.5 - 31.5	Aerial RF coil with base winding	Inter-stage RF coil		Osc for 465kHz	Osc for 1.6MHz
Miscellaneous coils						
PCC.1 medium wave crystal set coil.						
C2 detector with reaction and C3 aerial coils - two waveband TRF coils.						
C4 medium and long wave coil with coupling and reaction for aerial and TRF circuits.						

Table 2. Eddystone RF Coils									
2 1/4" diameter, 6-pin, 1 winding (Catalogue number 506)					2 1/4" diameter, 6-pin, 3 winding (Catalogue number 506)				
Type	Colour	Range (metres)	Code		Type	Colour	Range (metres)	Code	
4 LB	Blue	12.5 - 28	ACPIS		2 LB	Blue	12.5 - 28	ACPIS	
4 Y	Yellow	24 - 50	ACPIS		2 Y	Yellow	24 - 50	ACPIS	
4 R	Red	40 - 85	ACPIS		2 R	Red	40 - 85	ACPIS	
4 W	White	80 - 170	ACPIS		2 W	White	80 - 170	ACPIS	
4 P	Pink	160 - 270	ACPIS		2 P	Pink	160 - 270	ACPIS	
4 G	Green	260 - 550	ACPIS		2 G	Green	260 - 550	ACPIS	
4 BR	Brown	490 - 1000	ACPIS		2 BR	Brown	490 - 1000	ACPIS	
4 GY	Grey	900 -1800	ACPIS		2 GY	Grey	900 -1800	ACPIS	
1 1/2" diameter, 4-pin, 2 winding (Catalogue number 932)									
Type	Colour	Range (metres)	Range (frequency)	Primary Turns	Grid Turns	Inductance	Code		
BB	Black	9 - 14	33.3 - 21.4Mc/s	3	2 3/8	0.50uH	ACBB		
LB	Blue	12 - 26	25 - 11.5Mc/s	2	3 7/8	1.08uH	ACBE		
Y	Yellow	22 - 47	13.6 - 6.4Mc/s	4 1/8	8 3/4	3.62uH	ACYE		
R	Red	41 - 94	7.3 - 3.3Mc/s	9 3/8	23 7/8	14.24uH	ACRO		
W	White	76 - 170	3.95 - 1.8Mc/s	15	35	45.0uH	ACWO		
P	Pink	150 - 325	2000 - 924kc/s	25	92	0.188mH	ACPI		
G	Green	260 - 510	1153 - 590kc/s	40	138	0.420mH	ACGO		
BR	Brown	490 - 1000	612 - 300kc/s	30	315	1.90mH	ACBR		
GY	Grey	1000 -2000	300 - 150kc/s	140	630	6.98mH	ACGY		
1 1/4" diameter, 6-pin, 3 winding (Catalogue number 959)									
Type	Colour	Range (metres)	Range (frequency)	Primary Turns	Grid Turns	Inductance	Reaction Turns	Code	
6 BB	Black	9 - 14	33.3 - 21.4Mc/s	3	2 3/8	0.50uH	3	EXBB	
6 LB	Blue	12 - 26	25 - 11.5Mc/s	2	3 7/8	1.08uH	3	EXLB	
6 Y	Yellow	22 - 47	13.6 - 6.4Mc/s	4 1/8	8 3/4	3.62uH	4 1/2	EXYL	
6 R	Red	41 - 94	7.3 - 3.3Mc/s	9 3/8	23 7/8	14.24uH	9 1/8	EXRE	
6 W	White	76 - 170	3.95 - 1.8Mc/s	15	35	45.0uH	14	EXWO	
6 P	Pink	150 - 325	2000 - 924kc/s	25	92	0.188mH	35	EXPI	
6 G	Green	260 - 510	1153 - 590kc/s	40	138	0.420mH	40	EXGO	
6 BR	Brown	490 - 1000	612 - 300kc/s	30	315	1.90mH	80	EXBR	
6 GY	Grey	1000 -2000	300 - 150kc/s	140	630	6.98mH	140	EXDO	
Miniature, four pin, 3 winding (Catalogue number 706)									
Type	Colour	Range (frequency)	Inductance		Type	Colour	Range (frequency)	Inductance	
706/LB	Blue	33 - 15Mc/s	0.65uH		706/P	Pink	1.4Mc/s - 720kc/s	300uH	
706/Y	Yellow	16 - 6.7Mc/s	3.45uH		706/G	Green	750 - 300kc/s	1.65mH	
706/R	Red	7.1 - 3.1Mc/s	17uH		706/BR	Brown	370 - 150kc/s	6.5mH	
706/W	White	3.3 - 1.35Mc/s	90uH						

Table 3. Osmor RF Coils				
Part number	Function	Inductance	Application	Bands
QA1	Aerial coil for 450-480kc/s IF (blue foot)	0.6-1.1uH	Mains superhet	13-35m (purple body)
QA2	Aerial coil for 450-480kc/s IF (blue foot)	1.4-1.9uH	Mains superhet	15-50m (yellow body)
QA3	Aerial coil for 450-480kc/s IF (blue foot)	3-5uH	Mains superhet	35-120m (green body)
QA4	Aerial coil for 450-480kc/s IF (blue foot)	17-42uH	Mains superhet	70-230m (black body)
QA5	Aerial coil for 450-480kc/s IF (blue foot)	130-230uH	Mains superhet	190-520m (blue body)
QA6	Aerial coil for 450-480kc/s IF (blue foot)	1800-2600uH	Mains superhet	800-2000m (red body)
QA7	Aerial coil for 450-480kc/s IF (blue foot)	1.4-1.9uH	Mains or battery superhet	18-50m (? body)
QA8	Aerial coil for 450-480kc/s IF (blue foot)	100-170uH	Mains or battery superhet	190-560m (brown body)
QA9	Aerial coil for 450-480kc/s IF (blue foot)	1900-2600uH	Mains or battery superhet	800-2000m (clear body)
QA10	Aerial coil for 450-480kc/s IF (blue foot)	1.3-2.1uH	Mains or battery superhet	18-50m (orange body)
QA170	Aerial coil for 450-480kc/s IF	?	Car radio	Long and medium wave
QHF1	HF coil for 450-480kc/s IF (green foot)	0.6-1.1uH	Mains superhet	13-35m (purple body)
QHF2	HF coil for 450-480kc/s IF (green foot)	1.4-1.9uH	Mains superhet	15-50m (yellow body)
QHF3	HF coil for 450-480kc/s IF (green foot)	3-5uH	Mains superhet	35-120m (green body)
QHF4	HF coil for 450-480kc/s IF (green foot)	17-42uH	Mains superhet	70-230m (black body)
QHF5	HF coil for 450-480kc/s IF (green foot)	130-230uH	Mains superhet	190-520m (blue body)
QHF6	HF coil for 450-480kc/s IF (green foot)	1800-2600uH	Mains superhet	800-2000m (red body)
QHF7	HF coil for 450-480kc/s IF (green foot)	1.4-1.9uH	Mains or battery superhet	18-50m (? body)
QHF8	HF coil for 450-480kc/s IF (green foot)	100-170uH	Mains or battery superhet	190-560m (brown body)
QHF9	HF coil for 450-480kc/s IF (green foot)	1900-2600uH	Mains or battery superhet	800-2000m (clear body)
QO1	Oscillator coil for 450-480kc/s IF (red foot)	0.5-0.7uH	Mains superhet	13-35m (purple body)
QO2	Oscillator coil for 450-480kc/s IF (red foot)	1.1-1.6uH	Mains superhet	15-50m (yellow body)
QO3	Oscillator coil for 450-480kc/s IF (red foot)	2.5-4.8uH	Mains superhet	35-120m (green body)
QO4	Oscillator coil for 450-480kc/s IF (red foot)	10-22uH	Mains superhet	70-230m (black body)
QO5	Oscillator coil for 450-480kc/s IF (red foot)	75-140uH	Mains superhet	190-520m (blue body)
QO6	Oscillator coil for 450-480kc/s IF (red foot)	400-750uH	Mains superhet	800-2000m (red body)
QO7	Oscillator coil for 450-480kc/s IF (red foot)	1.2-1.5uH	Mains or battery superhet	18-50m (? body)
QO8	Oscillator coil for 450-480kc/s IF (red foot)	65-120uH	Mains or battery superhet	190-560m (brown body)
QO9	Oscillator coil for 450-480kc/s IF (red foot)	400-750uH	Mains or battery superhet	800-2000m (clear body)
QO170	Oscillator coil for 450-480kc/s IF	?	Car radio	Long and medium wave
SWQ1	Aerial coil with reaction		TRF	11-31Mc/s
SWQ2	Aerial coil with reaction		TRF	4.5-12Mc/s
QFA1	Flat spiral-wound frame aerial for portables	190uH	Superhet	MW
QL1	LW loading coil: connects in series with QFA1	1800-3000uH	Superhet	LW (red body)
QA11	Aerial coil for TRFs	100-170uH	TRF	MW (brown body)
QHF11	HF coil for TRFs	100-170uH	TRF	190-560m (brown body)
QR11	MW aerial and HF coil, with reaction	100-170uH	TRF	MW
QA12	Aerial coil for TRFs	2000-3000uH	TRF	LW (clear body)
QHF12	HF coil for TRFs	2000-3000uH	TRF	800-2000m (clear body)
QR12	LW aerial and HF coil, with reaction	2000-3000uH	TRF	LW
QA11D	Dual-range aerial coil		TRF	LW / MW
QA12D	Dual-range HF coil		TRF	LW / MW
QR11D	Dual range with reaction		TRF	LW / MW
QA61	Aerial coil for 450-480kc/s IF (blue foot)	1800-2600uH	Mains superhet	800-2000m (red body)
QH61	HF coil for 450-480kc/s IF (green foot)	1800-2600uH	Mains superhet	800-2000m (red body)
QA81	Aerial coil for 450-480kc/s IF (blue foot)	100-170uH	Mains or battery superhet	190-560m (brown body)
QHF81	HF coil for 450-480kc/s IF (green foot)	100-170uH	Mains or battery superhet	190-560m (brown body)
QA91	Aerial coil for 450-480kc/s IF (blue foot)	1900-2600uH	Mains or battery superhet	800-2000m (clear body)
QHF91	HF coil for 450-480kc/s IF (green foot)	1900-2600uH	Mains or battery superhet	800-2000m (clear body)

Table 4. Repanco RF Coils

Part number	Function	Application	Bands
DRM3	Matched pair dual range coils	TRF receivers, with reaction	LW / MW
SH4	Long and medium wave band superhet pair (aerial and oscillator coil)	Superhet receiver (465kHz IF)	LW / MW
DRR2	High gain dual range coil with reaction	TRF receivers	LW / MW
DRX1	High gain dual range crystal set coil	Crystal sets	LW / MW
For use with 500pF tuning condenser:			
RA1	Iron dust cored aerial coil	Superhets with 455-465kHz IFs	800-2000m (LW)
RA2	Iron dust cored aerial coil	Superhets with 455-465kHz IFs	190-550m (MW)
RA3	Iron dust cored aerial coil	Superhets with 455-465kHz IFs	70-230m (SW)
RA4	Iron dust cored aerial coil	Superhets with 455-465kHz IFs	15-50m (SW)
RHF1	Iron dust cored inter-stage coil	Superhets with 455-465kHz IFs	800-2000m (LW)
RHF2	Iron dust cored inter-stage coil	Superhets with 455-465kHz IFs	190-550m (MW)
RHF3	Iron dust cored inter-stage coil	Superhets with 455-465kHz IFs	70-230m (SW)
RHF4	Iron dust cored inter-stage coil	Superhets with 455-465kHz IFs	15-50m (SW)
RO1	Iron dust cored oscillator coil	Superhets with 455-465kHz IFs	800-2000m (LW)
RO2	Iron dust cored oscillator coil	Superhets with 455-465kHz IFs	190-550m (MW)
RO3	Iron dust cored oscillator coil	Superhets with 455-465kHz IFs	70-230m (SW)
RO4	Iron dust cored oscillator coil	Superhets with 455-465kHz IFs	15-50m (SW)

Table 5. Wearite RF Coils

Part number	Function	Inductance	Bands
PA1	Aerial coil for 465kc/s IF and 500pF tuning condenser	2200uH	700-2000m
PA7	Aerial coil for 465kc/s IF and 500pF tuning condenser	310uH	250-750m
PA2	Aerial coil for 465kc/s IF and 500pF tuning condenser	170uH	200-557m
PA6	Aerial coil for 465kc/s IF and 500pF tuning condenser	37.5uH	91-261m
PA5	Aerial coil for 465kc/s IF and 500pF tuning condenser	5.5uH	34-100m
PA3	Aerial coil for 465kc/s IF and 500pF tuning condenser	1.2uH	14-47m
PA4	Aerial coil for 465kc/s IF and 500pF tuning condenser	0.5uH	12-35m
PHF1	HFcoil for 465kc/s IF and 500pF tuning condenser	2200uH	700-2000m
PHF7	HFcoil for 465kc/s IF and 500pF tuning condenser	310uH	250-750m
PHF2	HFcoil for 465kc/s IF and 500pF tuning condenser	170uH	200-557m
PHF6	HFcoil for 465kc/s IF and 500pF tuning condenser	37.5uH	91-261m
PHF5	HFcoil for 465kc/s IF and 500pF tuning condenser	5.5uH	34-100m
PHF3	HFcoil for 465kc/s IF and 500pF tuning condenser	1.2uH	14-47m
PHF4	HFcoil for 465kc/s IF and 500pF tuning condenser	0.5uH	12-35m
PO1	Oscillator coil for 465kc/s IF and 500pF tuning condenser	390uH	700-2000m
PO7	Oscillator coil for 465kc/s IF and 500pF tuning condenser	144uH	250-750m
PO2	Oscillator coil for 465kc/s IF and 500pF tuning condenser	35uH	200-557m
PO6	Oscillator coil for 465kc/s IF and 500pF tuning condenser	27.45uH	91-261m
PO5	Oscillator coil for 465kc/s IF and 500pF tuning condenser	4uH	34-100m
PO3	Oscillator coil for 465kc/s IF and 500pF tuning condenser	1.15uH	14-47m
PO4	Oscillator coil for 465kc/s IF and 500pF tuning condenser	0.5uH	12-35m

Table 6. Weyrad 'H'-Type RF Coils

Part number	Function	Bands
HA1	Aerial coil for 465kc/s IF and 500pF tuning condenser	800-2000m
HA2	Aerial coil for 465kc/s IF and 500pF tuning condenser	250-800m
HA3	Aerial coil for 465kc/s IF and 500pF tuning condenser	200-550m
HA4	Aerial coil for 465kc/s IF and 500pF tuning condenser	90-250m
HA5	Aerial coil for 465kc/s IF and 500pF tuning condenser	33-100m
HA6	Aerial coil for 465kc/s IF and 500pF tuning condenser	16-50m
HA7	Aerial coil for 465kc/s IF and 500pF tuning condenser	12-35m
HH1	HF coil for 465kc/s IF and 500pF tuning condenser	800-2000m
HH2	HF coil for 465kc/s IF and 500pF tuning condenser	250-800m
HH3	HF coil for 465kc/s IF and 500pF tuning condenser	200-550m
HH4	HF coil for 465kc/s IF and 500pF tuning condenser	90-250m
HH5	HF coil for 465kc/s IF and 500pF tuning condenser	33-100m
HH6	HF coil for 465kc/s IF and 500pF tuning condenser	16-50m
HH7	HF coil for 465kc/s IF and 500pF tuning condenser	12-35m
HO1	Oscillator coil for 465kc/s IF and 500pF tuning condenser	800-2000m
HO2	Oscillator coil for 465kc/s IF and 500pF tuning condenser	250-800m
HO3	Oscillator coil for 465kc/s IF and 500pF tuning condenser	200-550m
HO4	Oscillator coil for 465kc/s IF and 500pF tuning condenser	90-250m
HO5	Oscillator coil for 465kc/s IF and 500pF tuning condenser	33-100m
HO6	Oscillator coil for 465kc/s IF and 500pF tuning condenser	16-50m
HO7	Oscillator coil for 465kc/s IF and 500pF tuning condenser	12-35m

Fig. 6: For a couple of years around 1954, Osmor liked to adorn their adverts with an amusing cartoon. Here's an example from *Practical Wireless* for February 1954.

screws and the other by rivets.

But if you're winding your own plug-in coils maybe the provenance of the coil former doesn't matter too much. On the other hand if you're building up a collection, then it probably does.

Bases for Eddystone Coils

The Eddystone four-pin coil former fits into a standard B4 valve base. So there should be no problem in finding a suitable base if you want to re-use some of these formers in a new project. The base for the six-pin former is a different story and

The photograph, **Fig. 5**, shows a photo of four similar-looking 1½-inch (38mm) coil formers that I have in my collection. But which ones are genuine 'Eddystones'? For me, it's the two in the middle, with the separate bases, one held on by



Fig. 4: A Denco B9A blue transistor range 1T (long wave) coil in front of its aluminium can and the datasheet supplied which held the coil snugly in the can during transit. The can could also be used to screen the coil, held in place by the valve socket that the coil was plugged into. Note the wave-wound coils, that are practically impossible to reproduce at home.



Fig. 5: Four Eddystone-like six-pin formers, plus an Eddystone 'Microdenser' tuning capacitor for company. But which ones are the real Eddystone components?

it's a rare beast these days.

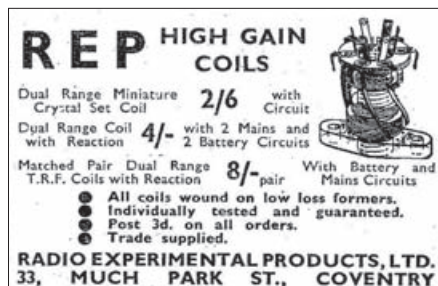
More information on Eddystone coils can be found at **References 3** and **4**. A detailed history of the Stratton company and the Eddystone brand name can be found on the Eddystone User Group website at: www.eddystoneusergroup.org.uk/.

Osmor Data

Next, it on to Osmor and **Table 3** shows the **Osmor** data I've assembled. Original Osmor data is difficult to find and some of the data I've used here has come from the *Henry's Radio Catalogue* for 1967.

Osmor advertised regularly in the popular radio magazines and for a couple of years around 1954 they liked to adorn their adverts with an amusing cartoon – **Fig. 6** shows an example from *Practical Wireless* for February 1954.

The range of 'High-Q Coils' were physically very small (not much bigger than ½ inch long) and they were supplied in a small clear plastic cylindrical container, as may be seen in **Fig. 7**. Hopefully, if you find an Osmor coil today, it will still be in this container, otherwise it may have suffered damage if it has been floating around in a 'junk box' for many years.



Repanco Wearite & Weyrad

Data for Repanco, Wearite and Weyrad coils are shown in **Tables 4, 5 and 6** respectively.

A Radio Experimental Products advert from *Practical Wireless* for March 1954 is shown in **Fig. 8**. This seems to be prior to use of the **Repanco** brand name and **Fig. 9** shows a Repanco (Radio Experimental Products Ltd) RHF3 coil perched on its box, which is shown placed on the applications sheet (normally packed inside the box). The photograph, **Fig. 10**, shows a Repanco DRR2 'high gain dual range coil with reaction'.

A **Wearite** PO2 oscillator coil, standing alongside its cardboard box, is shown in **Fig. 11**. As with many older coils found today, they often become separated from their boxes but the part number is conveniently printed on the coil former. These coils are air-cored, and therefore rather big, when compared to iron dust-cored coils.

The 'Wearite' name is printed 'round the other side', so positive identification is very easy. Hopefully, you can see the small brass bar running across the coil former, just below the PO2 labelling. A threaded 6BA hole in the bar allowed the coil to be mounted on a chassis.

The illustration, **Fig. 12**, shows a **Weyrad** advert from *Practical Wireless* for November 1957. The 'Weyrad' brand is clearly derived from the company that made the coils, the Weymouth Radio Manufacturing Co Ltd. The coils were mounted via 6BA threaded studding protruding from the bottom of the coil.

The Teletron Range

I've included data of the **Teletron** range of coils in **Table 7**. These coils appear

Fig. 7: Osmor's 'High-Q Coils' were supplied in a small clear plastic container, as can be seen in this advert. Osmor coils were very small, something like ½-inch long.

Fig. 8: A Radio Experimental Products Ltd advert from *Practical Wireless* for March 1954. This seems to be prior to the use of the 'Repanco' brand name.

occasionally, although I must admit Teletron was a 'niche' manufacturer and not a name I recall from my early radio days. In the early transistor era, Teletron supplied oscillator coils and i.f. transformers for the unusual i.f. of 315kc/s (nowadays 315kHz). Even a reduction of the i.f. by 150kc/s or so (from 470kc/s for most valve radios) helped compensate for a short while for the low 'high frequency' gain of the frequency changer transistors of the day. This i.f. was even used in some early commercial transistor receivers, including some Pye models. Within a year or two better transistors appeared and the i.f.s of transistor radios returned to, and settled down at around 460-470kc/s.

Brush-Clevite

Although they're not coils – and therefore not strictly covered by the title of this article – I remember the appearance of the 'Transfilter'. They were a fixed-tuned ceramic equivalent of an i.f. transformer for transistor superheterodyne (superhet). radios and I specifically remember an article entitled *A Transfilter Portable* in the July 1967 issue of *Practical Wireless*. The transfilters were manufactured by **Brush-Clevite**. You may see some transfilters on the surplus market – so I've summarised their part numbers in **Table 8**, so you can see which intermediate frequency they were set to.

Table 7. Teletron RF Coils

Part number	Function	Bands
HAX	Triple wound crystal set aerial coil	MW
HAX/L	Triple wound crystal set aerial coil	LW
TRFA/HF	Grid and HF transformer	200-2000m
TRF AD?	Grid and HF transformer, with reaction winding	200-2000m
D/R	Detector coil with aerial and reaction winding	
EO4	Electron coupled oscillator coil	15-63m
EO2	Electron coupled oscillator coil	200-750m
HFA4	High Q RF transformer for use with 500pF tuning condenser	10-30m
HFA3	High Q RF transformer for use with 500pF tuning condenser	15-50m
HFA7	High Q RF transformer for use with 500pF tuning condenser	50-200m
HFA5	High Q RF transformer for use with 500pF tuning condenser	200-750m
HFA1	High Q RF transformer for use with 500pF tuning condenser	700-2000m
HFA9	High Q RF transformer for use with 500pF tuning condenser	2000-4000m
HA1	Aerial coil for use with 500pF tuning condenser	750-2000m
HA2	Aerial coil for use with 500pF tuning condenser	180-550m
HA3	Aerial coil for use with 500pF tuning condenser	15-50m
HA4	Aerial coil for use with 500pF tuning condenser	10-30m
HA7	Aerial coil for use with 500pF tuning condenser	60-220m
HF1	HF coil for use with 500pF tuning condenser	750-2000m
HF2	HF coil for use with 500pF tuning condenser	180-550m
HF3	HF coil for use with 500pF tuning condenser	15-50m
HF4	HF coil for use with 500pF tuning condenser	10-30m
HF7	HF coil for use with 500pF tuning condenser	60-220m
HO1	Oscillator coil for use with 500pF tuning condenser	750-2000m
HO2	Oscillator coil for use with 500pF tuning condenser	180-550m
HO3	Oscillator coil for use with 500pF tuning condenser	15-50m
HO4	Oscillator coil for use with 500pF tuning condenser	10-30m
HO7	Oscillator coil for use with 500pF tuning condenser	60-220m

Table 8. Brush-Clevite Transfilters

Part number	Function	Application	Frequency
TO-01A	Resonant tuned Transfilter	IF strip	455kc/s
TO-01B	Resonant tuned Transfilter	IF strip	465kc/s
TO-01C	Resonant tuned Transfilter	IF strip	470kc/s
TO-02A	Anti-resonant tuned Transfilter	IF strip	455kc/s
TO-02B	Anti-resonant tuned Transfilter	IF strip	465kc/s
TO-02C	Anti-resonant tuned Transfilter	IF strip	470kc/s
TF-01A	Emitter-bypass Transfilter	IF strip	455kc/s
TF-01B	Emitter-bypass Transfilter	IF strip	465kc/s
TF-01C	Emitter-bypass Transfilter	IF strip	470kc/s



Fig. 9: A Repanco RHF3 coil perched on its box, which in turn sits on the applications sheet shipped inside the box. The applications sheet shows Repanco's address as: 116-117, Much Park Street, Coventry. Some adverts show the address as 33, Much Park Street.



Fig. 9: A Repanco RHF3 coil perched on its box, which in turn sits on the applications sheet shipped inside the box. The applications sheet shows Repanco's address as: 116-117, Much Park Street, Coventry. Some adverts show the address as 33, Much Park Street.



Fig. 10: A Repanco DRR2 'high gain dual range coil with reaction'.



Fig. 11: A Wearite PO2 oscillator coil by its cardboard box. You can see that the PO2 part number is also printed on the coil former. The name 'Wearite' is printed 'round the back'.

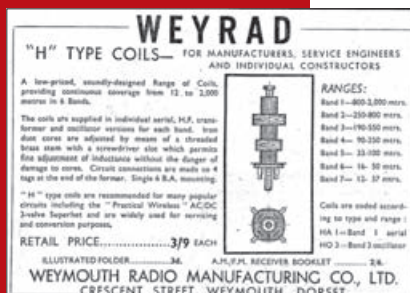


Fig. 12: A Weyrad advert for their H-type coils from *Practical Wireless* for November 1957. 'Weyrad' is clearly derived from Weymouth Radio Manufacturing Co. Ltd.

Electroniques

I remember being impressed by the **Electroniques** 'Coilmax' range of valved (the GC166 and QP166 - EF183/ECH81 based) and transistor (the GC166T and HB166T) general coverage and Amateur bands front-ends which appeared in the late-'60s/early-'70s. Very occasionally you see one of these front-ends come up for sale, when they can command a high price!

The company also sold coils under the 'Stabcoil SQ' and 'Coilmax QM' brand names and a wide range suitable for transistor and valved circuits was available. Because these coils appear very rarely these days I haven't included here a table of their part numbers and details.

However, if you have a copy of the *Electroniques Hobbies Manual – supplies and ideas for the electronic and radio enthusiast* you'll find details of these coils and many other radio components. At 10/6d (52.5p) in 1967, this wasn't a cheap catalogue, but today its 600-odd pages form an Aladdin's cave of the radio and electronics technology of the era.

The illustration, **Fig. 14** is the photo from the 1967 *Electroniques Hobbies*

Manual showing the Stabcoil and Coilmax coils. You can see that the Stabcoil has a built-in temperature compensated adjustable capacity trimmer.

Identification Now Possible

Hopefully you will now be able to identify from their part numbers and appearance most of the British designed and manufactured r.f. coils used over a long period in Amateur-built equipment. The sheer number of manufacturers and the extent of their ranges show that there must have been a vast demand for their products. You can see from the tables that these manufacturers produced very similar ranges for common coil types such as 'aerial', oscillator and inter-stage coupling applications.

The coils I've been discussing are an irreplaceable asset to the hobby. So, if you're having a shack or workshop clear out, or thinking about 'skipping' some old home-built equipment, be sure to take a careful look at the coils, remove the interesting ones and if possible make them available to the rest of us!

References

Reference 1: *Memories of Arthur Allwright and Denco Radio* by Ronnie Allwright. Published in *Radio Bygones* No.33 (February/March 1995).

Reference 2: *A History of Denco Coils* by Stef Niewiadomski. Parts 1 and 2 published in *Radio Bygones* issues 123 (February/March 2010) and 124 (April/May 2010).

Reference 3: *And Tomorrow the World! Short wave straight receivers – 3 Miscellany* by Tony Harwood, G4HHZ. Published in *Radio Bygones* issue 62 (Christmas 1999).

Reference 4: *Eddystone Coils and How to Identify Them* by Stef Niewiadomski. Published in *Radio Bygones* issue 125 (June/July 2010).

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Dual wave type FRD, 8" x $\frac{5}{16}$ "	12/9

BAND III CONVERTER COIL KIT
Complete set of coils, with wiring diagram and alignment instructions, 15/- . A two-valve converter for use with TRF or Superhet TV receivers.

The Teletron Co Ltd

266 Nightingale Road London N9

HOW 2527

Trade enquiries to sole distributor
S. Mozer, 95 Kendal Ave NI8 EDM 7707

Fig. 13: An advert for Teletron coils, from *Radio Constructor* for August 1955. The coil shown at the top looks rather like a Repanco coil, with the connection tags arranged around an insulating ring at the top of the coil, but there's no indication of scale to gauge its size.

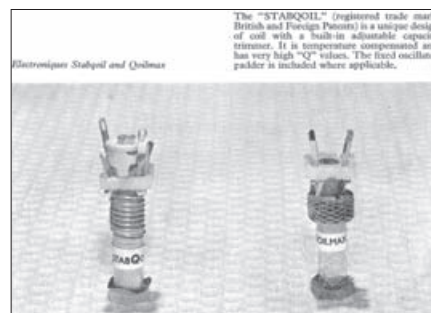


Fig. 14: The photo from the 1967 edition of the *Electroniques Hobbies Manual* showing the Stabcoil and Coilmax coils. You can see that the Stabcoil has an integral built-in temperature compensated adjustable capacity trimmer.

Radio Spectrum under threat!

As users of the Spectrum, the issue is simple: PLA devices are causing interference and if we don't do something now we might not have a hobby take part in – it's that serious. We have created a Spectrum Defence Fund – not just to fight the PLT issue but other threats as and when they come up.

The Spectrum Defence fund is made up from donations from individuals and organisations with an interest in protecting the Radio Spectrum from noise, interference, and other issues that may affect licensed Amateur Radio Operation and Short Wave Listening. It is used to cover the cost of challenging the regulators of the spectrum (Ofcom, EU etc) over threats to spectrum noise level.

We are looking to our administration (Ofcom) to protect our interests, which it is their statutory duty. There are other challenges ahead and the fund will be used only to protect the Spectrum when and where we need to do so. This is a long term project and all monies donated will be 'ring fenced' for these actions alone.

If every amateur in the UK pledged £10 to the Spectrum Defence Fund we'd probably have enough to fight the cause and so we need your donations (no matter how small) to help us meet the threat.

Please help amateur radio and the radio spectrum by donating to the fund today!



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Please donate online at

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You can also donate by post by sending a cheque payable to 'The Spectrum Defence Fund' and sending it to: Spectrum Defence, RSGB, 3 Abbey Court, Fraser Road, Priory Business Park, Bedford, MK443WH. The 'Spectrum Defence Fund' is a secure and independently audited fund, the proceeds of which will only be used in defence of the radio spectrum.



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CRYSTALS 10X TYPE 6MHZ @ £1.50 EACH.

FETS MPF 102 @ 3 FOR £1, BFW11 @ 3 FOR £1, 6C734 @ 3

FOR £1, J304 @ 6 FOR £1, 2N3819 @ 45p, J111 @ 6 FOR £1,

TS14 @ 6 FOR £1.

www.zyra.org.uk/birkett.htm



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Catching Up With QSLs

Carl Mason GW0VSW presents his round up of your activities on the bands and provides the news on the DXing scene. Don't forget – all reports to Carl by the 15th of each month please!

It has taken me a while, but I finally caught up with my paper QSLing this month, which included a good number of direct cards. Visiting my local Post Office I could not believe how much the cost of sending direct cards has risen over the past few years! You really do have to want a card badly to follow the direct route which makes the RSGB's QSL bureau a much more attractive bet if you enjoy exchanging cards. It doesn't take long to regain your membership cost alone when you use their bureau service for your cards!

Recently there have been one or two changes to the RSGB's QSL bureau. Volunteers now do their best to despatch all available incoming cards to members and pay-to-receive users on a quarterly basis. They have sent out their last batch of cards to non-members, returned unused collection envelopes and included details of how to access the new scheme.

All members with more than one active callsign, especially those in the M3, M6, 2 and M0 series, urgently need to visit the RSGB website and update their membership details, if they have not already done so.

To avoid envelopes being returned incorrectly and cards lost, the up-dated information is vital. It would be most helpful if those who do not collect traditional QSL cards change the

wording of any QRZ.com entry to include the wording "No bureau cards".

Please note that all Notice Of Variation (NOV) holders of GB Special Event and abbreviated single letter callsigns must

be registered to a valid member or affiliated Society in order to continue sending and receiving cards. To update your information visit www.rsgb.org/amend or telephone RSGB headquarters.

Please remember that the QSL bureau is a volunteer service and it isn't necessarily the quickest way of sending and receiving cards – but it certainly is the cheapest option. The RSGB QSL Bureau processes more than 1.5 million cards a year which makes it one of the busiest QSL sorting facilities in the world.

Although the sending of QSL cards through the QSL bureau is a 'members only' benefit the society does offer a 'card receive facility' for non-members

which allows you to collect incoming cards (but not to send them) for an annual fee of £11.99. The subscription covers all the UK callsigns you hold but these are restricted to a single UK address for receipt and the callsign must be registered to you.

Further details can be found at www.rsgbshop.org/acatalog/RSGB_QSL_Receive_Service.html

The QSL Database

To help with QSL information there is a new online database called QRZCQ.com. Registering is free of charge and takes only a minute and short wave listeners (s.w.l.s) are also welcome. The site is easy to use and includes a callsign search, DX Cluster with mapping, greyline, time zones, DOKs, Prefixes, Oblasts and lots of information, as well as a contest calendar and Amateur Radio videos. You can find it at <http://qrzq.com/>



Fig. 1: The QSL card from PD2MZ following a 7MHz QSO with Eric Masters G0KRT.

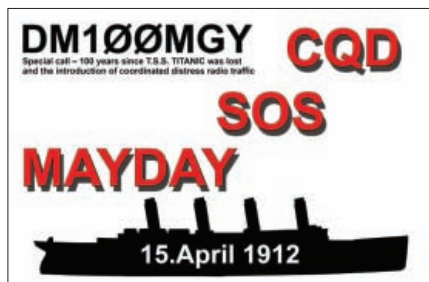


Fig. 2: George Davis G3ICO worked DM100MGY on 7MHz, a station commemorating the loss of the RMS Titanic.

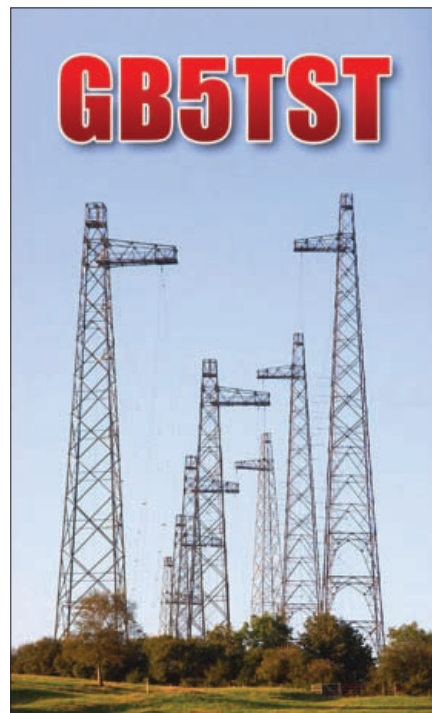


Fig. 3: Special Event operation for John Wakefield M0XIG who used the callsign GB5TST for Toller Down Shutter Telegraph near Rampisham, Dorset.



Fig. 4: John M0XIG's mobile QTH – his Mercedes van.

The DX News

On to this month's DX news now and **Simon Luttrell HS0ZIB** splits his time between Thailand and Myanmar each week working in Kawthaung as a volunteer English and Thai language teacher at the local primary schools. Simon has been granted permission to be active as **XZ1K** but the authorities have asked for a 'low-key' style of operation with no team of operators, no large antennas and no high power.

Simon plans to begin with the 28MHz band s.s.b. then 14MHz using s.s.b. and PSK and possibly 7MHz s.s.b. and PSK later. Simon adds, "I need to build some wire antennas for the low bands and c.w. operation may follow this when my Morse is adequate. Activity on the bands will have to fit in with my work and trips and please remember this is not a DXpedition! I intend to work in Myanmar as long as I can so there should be plenty of time for a QSO".

All QSL card requests can be made via the online QSL request system, OQRS (<http://df3cb.com/oqrs/n2ool/>) as there's no direct mail, bureau, LOTW or eQSL support. Please visit www.xz1k.org for further information

The special callsign **5P12EU** is in use until June 30th to celebrate the Danish Presidency of the Council of the European Union. Bureau cards can be requested by sending an E-mail to qsl@5p12eu.dk and the QSL route for direct requests is via OZ0J. The logs will be uploaded to LoTW and eQSL. Check www.5p12eu.dk for further information, including details on the relevant award (see illustration) which is gained by working the station on three different bands for bronze, five for silver and seven bands for gold regardless of the mode used and is available free by E-mail.

Finally, another special event station **LZ12FDAY** will be active until July 22nd to promote the LZ HF QRP Field Day competition which is



Fig. 5: John M0XIG (using GB5TST) worked Brian Tansey EI5HV in Midleton, County Cork on 7MHz. And yes – Brian does work at the Jameson's distillery!

organized by the Bulgarian Federation of Radio Amateurs (BFRA) and will be held in Pravets on July 20 to 22nd. See www.lzhfqrp.org for further details and QSL via bureau to LZ1BFR.

Your Reports

On to your reports now and once again it's the logbook of **Eric Masters G0KRT** in Worcester Park, Surrey who starts us off with 7MHz. An s.s.b. QSO at 100W was made with (Fig. 1) PD2MZ (Netherlands) at 1314UTC using a Kenwood TS-570 and modified W3EDP antenna tuned with an SG-230 smart tuner.

This band provided **George Davis G3ICO** in Yeovil with some contacts once again as he worked DM100MGY (Fig. 2) with a special call to mark the loss of the Titanic at 1830, TM27UFT (France) with a special call to mark the 27th Annual meeting of the Union Francaise des Telegraphistes held in Vineuil at 2116 QSL via F6ICG and EI1MGY (Ireland) EU-115 with another call remembering the RMS *Titanic* disaster at 2128 QSL via EI6IZ on the key using an Elecraft K2 at QRP at 5W to a doublet antenna.

Last month saw another special event operation for **John Wakefield M0XIG** who used the call **GB5TST** (Fig. 3) for Toller Down Shutter Telegraph near Rampisham, Dorset. John said "When I started this special event there was a contest on until midnight which



Fig. 6: Tom Ruddled 2101JR worked VK5PAS (Australia) on the 14MHz band.



Fig. 7: Peter Leng ZL4TE worked XR6T (Chile) and received this QSL card.



Fig. 8: Tony Fitzgerald GW4YMJ received this QSL from 9A202GA (Croatia) celebrating the 20th anniversary of the 9A prefix.

meant that I wasn't likely to get many s.s.b. contacts but in the end I made a total of 1052 contacts of which 148 were c.w. The station was set up about 200m from the original location of the shutter telegraph at about 248m (812ft) above sea level".

"As before the station was a Yaesu FT-1000MP MkV, Acom 1000 amplifier running between 300 and 400W and the antennas were either a Butternut HF6V vertical with 100 10m radials or a WA2NAN G5RV antenna inverted with centre at 10.8m (35ft) and ends at about 8m (25ft). Just as an overview I had contacts with Uruguay, Panama, Venezuela, Brazil, US states, Canada, Antarctica, Japan, Chagos Islands, Mauritius, Kenya, South Africa, New Zealand, Tasmania, Australia, Kazakhstan, Taiwan, Russia and Asiatic Russia, Jeddah, Israel and Turkey on four bands 3.5, 7, 14 and 21MHz.

"You will see that I now operate from my Mercedes Van (Fig. 4) rather than the tent as previously as I've had some work done to convert it".

John's 7MHz log included PE1KQP



Fig. 9: Peter Walton MW0RSS was working in Carmarthen recently so decided to take his Yaesu FT-817 with him. His antenna was just a 10m piece of wire – but it proved successful.

(Netherlands) 1408, DF5EM (Germany) 1419, F1SKR (France) 1438, HB9AFI (Switzerland) 1450, IZ2GMF (Italy) 1454, OZ3FS (Denmark) 1523, ON7TZ (Belgium) 1525, HA3OK (Hungary) 1529, ES1IP (Estonia) 1600 **Brian Tansey EI5HV (Fig. 5)** in Midleton, County Cork in Ireland, at 1609UTC.

The 14 & 18MHz Bands

On the 14MHz band in Portadown, County Armagh **Tom Ruddell 2I0TJR** used his Kenwood TS570DGE and 50W s.s.b. into a home-brew vertical antenna 3.7m (12ft) above ground to work **(Fig. 6)** VK5PAS (Australia) OC-001 in Adelaide at 0653, ZL2JBR (New Zealand) OC-036 at 0828, HS0CZE (Thailand) 1812, HZ1BL (Saudi Arabia) 2040, PY6RT (Brazil) 2044, 9K2OD (Kuwait) 2053 QSL via EA7FTR, 8R1PY (Guyana) a new country for Tom at 2217 QSL via PY2WAS, LU4VL (Argentina) 2218, HK4CZE (Columbia) 2243 also via EA7FTR, F8ATS/6W (Senegal) 2301, VA3YP (Canada) in Hamilton, Ontario at 2312 and K7MX (USA) in North Port, Florida at 2335UTZ.

In Cambridge, New Zealand **Peter Leng ZL4TE** decided to try s.s.b. QRP using 10 watts from his Yaesu FT-1000MP MkV with a Cushcraft AV-3 antenna and logged VK9JA (Norfolk Island) OC-005 at 0707, **(Fig. 7)** XR6T (Chile) at 0946 and KE3X (USA) in Washington, DC at 0950UTC.

On 18MHz **Tony Fitzgerald GW4YMJ** in Porthcawl has been trying out a new mode, PSK31 on a new band using a Trio TS-530SP and 5W to an SRC X80 vertical which is working well judging by his logbook. Stations worked included YO4FKO (Romania) 0918,

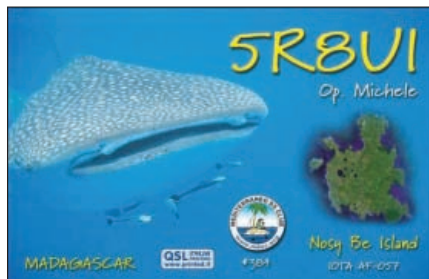


Fig. 10: Terry Martin M0CLH received this QSL following a QSO with 5R8UI in Madagascar on 21MHz.

(Fig. 8) 9A202GA (Croatia) celebrating the 20th anniversary of the 9A prefix at 0927, RZ3BQ (European Russia) 0938, SM7HZK (Sweden) 0955, EA7GUL (Spain) 1012, UR7IM (Ukraine) 1034, HA8QJ (Hungary) 1037, LA5JK (Norway) 1051 and ES7FU (Estonia) 1055UTC.

The 21 & 24MHz Bands

The 21MHz band was used by **David Bambrook 2E0DAB** to work s.s.b. stations IT9ZIV (Italy) 1325, UY7MM (Ukraine) 1440, K3LR (USA) in West Middlesex, Pennsylvania at 1500 and VE3TA (Canada) 1515UTC using a Yaesu FT-747 at 40W and home brew sloping dipole with loading coil.

Also on the band was **Peter Walton MW0RSS** who found himself working in Carmarthen recently so decided to take his Yaesu FT-817 with him **(Fig. 9)**. His antenna was just a 10m piece of wire “thrown out of the window” and his log included RU0A (Asiatic Russia) 0824 in Krasnoyarsk about 7506km (4665 miles) away and a 1000 miles per watt (m.p.w.)

qualifier, LY1NM (Lithuania) 0829, EW1TZ (Belarus) 0912, UE3AR (European Russia) 0921 and YU2NZ (Serbia) 0959 which is very good considering the band conditions and only 2.5W c.w.

In Wantage, Oxfordshire, **Terry Martin M0CLH** managed to catch a few stations using his Cushcraft R8 vertical but with full legal power from his IC756 Pro and SPE 1K-FA linear amplifier. His log included YO5AMF (Romania) 1030, CX2DK (Uruguay) 1039, PW2D (Brazil) at 1100 with a special event call licensed to the contest station PY2DM QSL via M0OXO, PZ5P (Suriname)

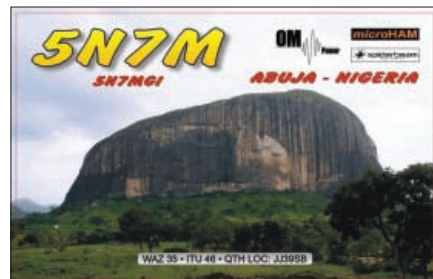


Fig. 11: George G3ICO received this QSL card from 5N7M (Nigeria) following a QRP QSO on 24MHz.

1132 QSL via UA4LU and **(Fig. 10)** 5R8UI (Madagascar) on Nosy Be Island AF-057 at 1600UTC QSL via IZ8CCW.

There was some activity on the 24MHz band as George G3ICO used QRP again on the key to work XW3DT (Laos) 1348 and **(Fig. 11)** 5N7M (Nigeria) at 1804 QSL via OM3GCN while Eric G0KRT worked 4X4DZ (Israel) at 1436 with c.w. and **(Fig. 12)** CT3MD (Madeira Islands) AF-014 at 1514 (QSL via CU7MD) with s.s.b.

The 28MHz Band

The 28MHz band was also open occasionally and several reporters operated here. Tom 2I0TJR found HZ1SK (Saudi Arabia) at 1434 and W3DIY (USA) in Bluemont, Virginia at 1455. Eric G0KRT used s.s.b. at 100W to reach RA6ALS (European Russia) at 1601 while George G3ICO used QRP again and managed 4Z5NX (Israel)



Fig. 12: George G3ICO used QRP to work CT3MD (Madeira Islands) on the 24MHz band.

1529 and PR7AR (Brazil) at 1529UTC using the key.

Signing Off

Well, that is it for another month and it's good to see that most bands are open for a time now during the day on a fairly regular basis. Lets hope band conditions continue to improve. 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.

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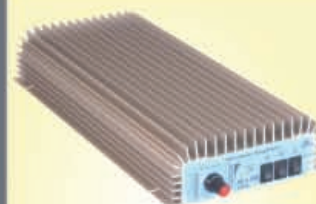


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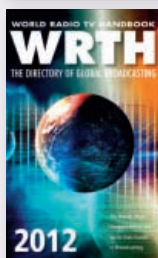
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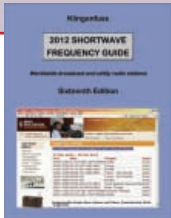
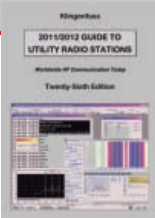
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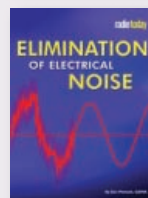
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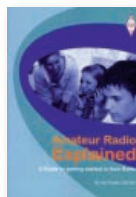
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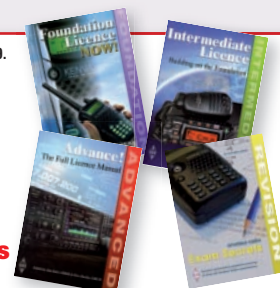
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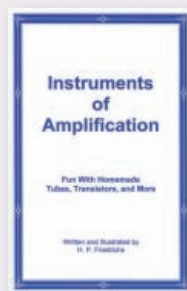
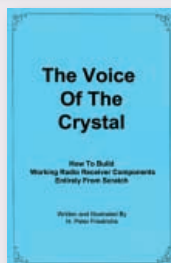
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Rob Mannion G3XFD/EI5IW's

Topical Talk

The Editor reflects on topics raised by readers in their letters to *PW* – published this month. Topics this month include the ‘coolness’ of Amateur Radio and copyright.

It's been my pleasure to comment occasionally that some of the correspondence that comes my way “cheers me up” but the letter from **Chris Knight G8IPZ/ ZL4WHO** gave me a real ‘boost’. Chris, judging by his G8 callsign – has been ‘under the influence’ of Amateur Radio for many years and it's wonderful that he's been drawn back into the hobby!

What Chris achieved, while sitting in an armchair was pretty impressive technology-wise. However, I have no doubt that there will be readers who aren't so impressed by the modern technology that enabled Chris – from his temporary abode here in the UK using computers and the Internet – to contact someone in America for information.

However, although I'm (in many respects) a ‘traditional’ Radio Amateur in that I enjoy working ‘on the air’ using the h.f. and v.h.f. bands. I enjoy operating on c.w. (Morse) single sideband (s.s.b.) and the PSK31 data mode – but I'm not against modern innovations using computers, telephone lines and the Internet.

My friends and colleagues at PW Publishing Ltd. have managed to cope with my (“very” says my wife **Carol!**) annoying habit of repeating statements frequently. Despite this – I'm going to repeat a statement I've issued many times – “There are many rooms in the ‘Amateur Radio house’ and there's room for all of us! I couldn't claim this as being original anyway because it's quoted in a famous book that plays a fundamental role in my life. It's an interesting parallel

though because our pastime is remarkably diverse.

Long Suffering Friends Steve Hunt and Tex Swann G1TEX are long suffering friends of mine at PWP Ltd. and they both know the dangers of mentioning the word “Railways” anywhere near the *PW* Editor. Indeed, it's a long standing joke with my friends (I can imagine **Phil Ciotti G3XBZ** grinning behind his beard as I mention this) that I'm a compulsive railway fan – desperate to share my interest with others!

Tex G1TEX and I often chuckle about one particularly journey together in my car. I had foolishly promised not to mention railways, closed railways or signal boxes in the first 100 miles of our journey north to an Amateur Radio event. However, we were both in near hysterics by the time we reached the Oxford area – my safety valve was literally ‘blowing’ as I tried to ‘hold back the pressure’ and point out an interesting bit of railway line or where a signal box or junction had once stood. I fully realise I'm irrepressible in that respect!

My interest in railways enables me to make an amusing comparison with Amateur Radio because (despite what my non-railway enthusiast friends think!) the subject of railways (and the interest shown by enthusiasts) is as diverse as Amateur Radio. And coincidentally, there's a great deal of misunderstanding between railway fans regarding the many differing aspects of the railway hobby – just as there is in Amateur Radio!

Of course, (no doubt about

it in my mind!) I'm an open-minded type of chap who can understand and appreciate that my love of the London & South Western Railway routes in Devon and Cornwall may not appeal to the Great Western Railway enthusiasts. But my ‘open mindedness’ doesn't stop me thinking that people who collect timetables and who delight in finding out what time the 9.35 a.m. train from Salisbury stopped at Templecombe in July 1934 – are a little strange!

But what of it? If an aspect of railways and railway history interests somebody – why should I consider it peculiar? That person is getting pleasure and knowledge from their hobby and interest (I must admit I have one or two historic timetables myself!) And surely – the same applies to the Amateur Radio hobby?

Copyright & PW Articles

I was very pleased that **Graham Dobson M0PTD** politely raised the question of re-printing copyrighted articles for training purposes in his letter. Very few people ask permission before they ‘re-publish’ material – especially on the Internet

When we are approached by someone asking permission to copy articles from *PW* for training/ club purposes I'm always pleased to help. We consider each case individually and much appreciate the polite approach, such as Graham's. Don't forget – I'm only an E-mail away from you!

Rob Mannion G3XFD/EI5IW

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Roger Cooke G3LDI has the ideal QTH for evaluating linear amplifiers – no close neighbours and a great antenna farm! He takes a look at the latest product from RM in Italy, which is imported by Nevada in Portsmouth.

Have Fun In Space!

David Dix G8LZE encourages other Amateurs to ‘launch’ themselves into Amateur Radio in orbit. David passes on his expertise – and enthusiasm – to get you off the ground!

The Story of Bakelite

Geoff Keeling shares the story of Bakelite – one of the original plastic materials. Once found literally everywhere – and especially in radio receivers – Bakelite has now become a collectible ‘neo-antique’. So, don't throw that old radio cabinet away!

Fractal Antennas

John Heys G3BDQ takes a look into the fascinating world of fractal antennas. Making antennas smaller has become a science and John has really enjoyed the challenge offered to the Amateur Radio antenna designer.

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Stuart Craigen G4GTX describes his simple approach to operating on ‘Top Band’. If you're limited for space – Stuart's shunt-fed 1.8MHz antenna could help you get onto this often neglected band.

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