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Britain's Best Selling Amateur Radio Magazine

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With George Dobbs G3RJV

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With Chris Lorek G4HCL

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For Yaesu FT-817, FT-857, FT-897 Transceivers

OPF-Y-CW-300	300Hz CW Narrow	£109.95 C
OPF-Y-CW-500	500Hz CW Medium	£109.95 C

For Icom IC-718 Transceiver

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

ICOM HF Transceivers

IC-7600 FREE USB keyboard!

This HF-6m transceiver is the successor to the IC-756 series. It takes features from the flagship IC-7800 and the more recent IC-7700, putting them into a package that brings the price within reach of many more hams. **£3379 D**

IC-7800	HF / 50MHz All-Mode 200W. A masterpiece of ham radio engineering	£7999 D
IC-7700	1.8-54MHz 200W with built-in PSK-31 + keyboard	£5499 D
IC-7400	160m-70cm 100W base station with large easy to read LCD display	£1339 D
IC-7200	HF & 6m DSP 0.005-3335MHz wideband receive with USB port	£759 D
IC-718	160m-10m 100W transceiver that brings HF to those on a budget	£449 D

IC-7000

100W 1.8-440MHZ all-mode transceiver with 2.5" colour display. An incredibly small package with a quite amazing performance. Phone for deal on external 6" LCD screen. **£939 D**

Receivers & Scanners

IC-R5	*LAST FEW* Handheld scanner 0.15 - 1310MHz	£172.95 C
IC-R6	*NEW* Handheld scanner (see opposite page)	£172.95 C
IC-R20	Handheld scanner 0.15 - 3305MHz	£314.95 C
IC-R1500	PC scanner 1.01 - 300MHz	£449.95 C
IC-R8500	Base receiver 1.01MHz - 2GHz	£1379.95 D
IC-R9500	Base receiver 5kHz-3.3GHz	£8899.95 D

DV-Dongle *D-Star From Your PC!*

This is a "dongle" that you plug in your PC or Mac USB socket. Load up the software and enjoy working through D-Star repeaters all over the world. Great fun for holidays, office etc. **£199.95 C**

YAESU HF Transceivers

FT-2000

The classic HF & 6m 100W transceiver with PEP (performance upgrade) ready installed. Dual receive and fantastic filtering make this an impressive performer. And despite what you may read, we still have the largest, most up-to-date stock of Yaesu in the UK! **£2079 D**

FT-2000D	200 Watt version of FT-2000 with built-in PSU.	£2649.95 D
FT-950	100W HF - 6m transceiver with DSP & Auto ATU	£1099.95 D
FT-450AT	100W HF - 6m with automatic ATU & latest updates	£679.95 D
FT-450	100W HF - 6m transceiver - great value.	£589.95 D
FT-DX9000contest	200W HF - 6m "formula one" contest machine	£4599 D
FT-DX9000D	Deluxe fully loaded base station	£7695 D
FT- DX9000MP	Amazing 400W "legal limit" radio	£8549 D
FT-857D	HF to 2m mobile. portable or base - up to 100W	£574.95 D
FT-817BHIDSP	Fitted with DSP module exclusive to W&S	£549.95 D

bhi RadioMate

New Updated Software Version!

W&S are pleased to endorse this accessory for Yaesu mobile and portable HF radios. Quick & easy band change, Quick & easy modulation selection, Quick memory function, Quick & easy intelligent direct freq. input. PLUS Swap VFO A/B, VFO A=B, Split VFO mode, Tune function. All this for a realistic price. **£79.95 C**

FT-817ND

A great radio, whatever your interest is. With 2.5 watts from battery or 5 watts from ext. 12V, it slips into a brief case or rucksack with ease. Many operators have DX tales to tell with this mighty midget. Offers SSB, CW & FM. **+ FREE CSC-83 Case!** **£439 D**

YAESU VHF Mobiles & Handhelds

FTM-10SE	50/40W 2m/70cms stereo FM	£269 D
FT-2800	2m Mobile 65W wideband receiver	£124 D
FT-7800	Dualband 50W mobile, AM airband	£189 D
FT-8800	Dualband Mobile 50W / 30W	£289 D
FT-8900	10/6/2m & 70cm Mobile	£334 D
VX-3E	2m / 70cm Handheld Wideband receive	£139 D
VX-7R	Waterproof dualband handy (silver or black)	£259 C
VX-6E	2m/70cms handy, 5W Wideband Receive	£199 C
FT-60E	2m/70cms, 5W handy Wideband Receive	£142 C
VX-170E	2m 5W handheld with 16-key pad	£95 C

VX-8E Triple Band

APRS and Bluetooth, plus waterproof housing and barometer! You also get dual simultaneous receive and a GPS option! **£329 D**

KENWOOD HF Transceivers

TS-2000E

The TS-2000E is the classix all-band, all-mode base station covering HF - 70cms at up to 100 Watts. Includes dual channel receivers and DX-cluster monitor with built-in TNC. **£1489 D** **TS-2000X** +23cm **£1749 D**

TS-480HX Ideal for mobile, portable or base station. Gives a massive 200W on HF and 100W on 6m. **£849 D**

TS-480SAT This model gives 100 Watts on all bands up to 6m, but adds a built-in automatic ATU. **£749 D**

KENWOOD Handhelds

TH-F7E	2m/70cm 5W (2-pin Kenwood) SMA **+FREE Clip Mic**	£229.95 D
TH-K2E	2m 5W 4-Key Keypad (2-pin Ken) SMA **+FREE Headset**	£159.95 D
TH-K2ET	2m 5W 16-Key Keypad (2-pin Ken) SMA **+FREE Headset**	£165.95 D
TH-K4E	70cm 5W (2-pin Kenwood) SMA **+FREE Headset**	£159.95 D

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

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Interest Free Credit - No Deposit, No Interest if settled in 12 Months!

See bottom of page for more details...

FlexRadio Systems
Software Defined Radios

FLEX-1500 160m - 6m
Low Cost - Low Power Transceiver NEW

The new 160m-6m software defined transceiver that rocks the world when it comes to price and performance. It's tiny, measuring 10 x 15 x 5cm yet produces 5 Watts out. No souncasrd needed, just plug into your USB port on your laptop. It has an incredible dynamic range, The perect package for your laptop PC. Order yours today for Spring delivery. Price TBA - check www.wsplc.com

Phone for Price

FLEX-3000
160m - 6m
100W Transceiver

The Flex-3000 gives you the full 100 Watts from a package that sits neatly under your laptop. This software defined radio covers 160m - 6m and has a built-in automatic ATU. It offers incredible performance at a highly competitive price, with selectivity that will amaze you. Add to that, its superb receiver dynamic range and distinctive audio quality, and you will see why more and more customers are turning to software defined radio for performance and value. Laptop not included.

£1399 D

NOW IN STOCK!
NEW AIRNAV RADARBOX-3D

RadarBox 3D - The world's ultimate virtual radar system with Google Earth as a map overlay & new 3D aircraft picture library.

Full Package **£489.95 C**

Current owners can upgrade to 3D with RADARBOX-UG for just £89.95 C

Kenwood
VHF/UHF Mobile/Handy

TM-V71E

*2m 70cm
*Wideband Receive
*Built-In Echolink
*Removeable Control Head *CTCSS Encode/Decode
*Supplied w/ DTMF Mic.

£289 D

TM-271E £165 D

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

TM-D710E £429 D

Kenwood's new mobile FM station is great! APRS, Built-in TNC DTMF Mic & Weather Station ready.

Icom
VHF/UHF Mobile/Handy

IC-E208 Dualband Mobile

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

£254 D

IC-910H £1249 D
2m / 70cm 100W Base station all modes with option for 23cm module (UX-910 £359)

IC-910HX £1449 D
As above but with 23cm module ready fitted and a big saving as well.

IC-2200H £199 D
2m 55W FM mobile with rugged construction and with digital option.

IC-2725E £319 D
Dual band 2m/70cm. Easy to operate and install and a lovely detachable head.

IC-E90

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

IC-R6 Scanner NEW

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

Vibroplex USA
Morse Keys

V-ID *Paddle*
Iambic Deluxe Chrome Base. **£199.95**

V-CM "The Code Mite"	£63.95 C
V-CWJ iambic key	£114.95 C
V-SRD chrome base, red paddles	£154.95 C
V-SRS Black base black paddles	£135.95 C
V-ODBK *Original Deluxe Bug	£229.95 C
V-OSBK Standard Bug Key blk	£179.95 C
V-SKD Straight Key Deluxe	£199.95 C
V-SKG Straight Key Gold 24K	£299.95 C
V-VKS Vibrokeyer Standard	£164.95 C

For the complete range of keys, please check our web site. www.wsplc.com

W2IYH USA
Audio Equipment

W2-EDGE
An 8-channel graphic equaliser designed by hams for hams. **£259.95 C**

IPLUS Single controller to route your external audio to 3 radios	£209.95 C
EQPLUS Audio Compressor speech processor & downward expander	£329.95 C
W2-DUO Dual band audio equaliser and noise gate	£154.95 C

We also stock a wide range of leads to match your radio @ www.wsplc.com

Rigblaster USA
Data Interfaces

A range of high performance interfaces.

RB/DU/CUSB DUO Data Mode Soundcard Interface + USB	£329.95 C
RB/PR/CUSBDC PRO Data Mode Soundcard Interface + USB	£279.95 C
RB/PL/C-USBDC PLUS Data Mode Soundcard Interface + USB	£159.95 C
RB/NO/CUSB NOMIC Data Mode Soundcard Interface Passive USB	£79.95 C
RB-CD Software Collection v8.1	£8.95 C

For full details check www.wsplc.com

RT Systems
Rig Control Software

Programming modern radios can take ages, and what if you lose the data? Check out the RT Systems ADMS data programs that get the job done so much faster.

Yaesu FT Handhelds	£44.95 C
Yaesu VX Handhelds	£44.95 C
Yaesu FT Mobiles	£44.95 C

Please state exact model of your radio when ordering.

Adonis
Base Microphone

High quality microphones with a range of leads to suit most radios.

AM-308GBL	£79.95 C
AM-508GBL	£99.95 C
Leads from	£12.95 A

Check www.wsplc.com

Bencher
Morse Key Paddles

Morse Paddles Of Distinction
A range of high quality keys from the USA.

Hex-Paddle Iambic paddle	£199.95 C
BY-1 Twin paddle, black base	£119.95 C
BY-2 Twin pad. chrome base	£139.95 C
BY-3 Twin paddle, gold base	£299.95 C
BY-4 Twin pad. gold parts	£189.95 C
ST-1 Single pad, black base	£119.95 C
ST-2B Single pad, chrome b.	£144.95 C
RJ-1 Straight key, black base	£109.95 C
RJ-2 Strght key, chrome base	£129.95 C

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Rig Control Software

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

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

We stock a wide selection of interface leads, phone for details.

Butternut Verticals

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

HF-2V 80, 40m DX vertical. 9.75m, Easy erect.	£289.95 D
HF-6V 80,40,30,20,15,10m self support 7.9m	£389.95 D
HF-9V As HF-6V but adds 17,12 & 6m. 7.9m	£449.95 D
HF-5B 5-band beam	£449.95 D

Watson
VSWR/PWR Meter

W-420 *SPECIAL OFFER!*

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

Was £49.95 **Now £34.95**

Tokyo Hy-Power
HF Linear Amplifier

HL-45B HF/6m linear amplifier 1.8-28.00 & 50MHz 5W in 45W max out

£469.95 D

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Peet Bros. Weather Stations

These are high quality systems made in the USA to exacting standards. All APRS Ready - compatible with Kenwood TM-D710E & include data software.

Ultimeter-100

Desktop weather station with outside sensors.

£129.95 C

Ultimeter-800 inc. humidity **£169.95 D**
Ultimeter-2100 inc. pressure **£239.95 D**
WSF-10100 rain gauge +cable **£79.95 C**

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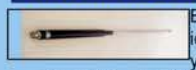
Watson Walk-About Antennas



Base loaded telescopic whips that plug into your FT-817 and give you total HF portability. Add a wire radial for really great performance!

AT-10	10m single band whip	**£19.95 A**
AT-12	12m single band whip	**£19.95 A**
AT-15	15m single band whip	**£19.95 A**
AT-17	17m single band whip	**£19.95 A**
AT-20	20m single band whip	**£19.95 A**
AT-30	30m single band whip	**£19.95 A**
AT-40	40m single band whip	**£21.95 A**
AT-80	80m single band whip	**£21.95 C**

Tigertronics SignaLink Interfaces

Tigertronics Signalink Sound Card Interfaces use a single USB connection. Compatible with EchoLink and all digital mode soundcard software. Radio lead is supplied, state which when ordering. Extra radio leads are available.

SL-USB-4R	4-Pin Round	**£89.95 C**
SL-USB-13PDI	Icom 13-Pin Din	**£94.95 C**
SL-USB-13PDK	Kenwood 13-Pin	**£94.95 C**
SL-USB-8R	8-Pin Round	**£89.95 C**
SL-USB-RJ11	Modular RJ-11	**£89.95 C**
SL-USB-RJ45	Modular RJ-45	**£89.95 C**

Diamond Switch Mode Power Supplies

New Lower Prices!

GSV-3000

**Output voltage: 1 - 15V DC*
**Output current 30A continuous*
**Built-in cooling fan*
**Supply 230V AC 50Hz *Weight 9kg*
**Size 250x150x240mm*

£199.95 D

GZV-2500 **£139.95 D**
Output 25A, 5-15V DC, supply 230V AC Switch mode over volts protected.

GZV-4000 **£189.95 D**
Output 40A, 5-15V DC, supply 230V AC Switch mode over volts protected.

GZV-6000 **£369.95 D**
Output 60A, 1-15V DC, supply 230V AC Switch mode over volts protected.

SoftRock SDR Receivers

We still have a few of these lovely software defind radio kits left. They are quick and simple with the aide of your PC, give amazing performance.

SR-15-Lite	15m receiver	**£15.95 A**
SR-160-Lite	160m receiver	**£15.95 A**
SR-20-Lite	20m receiver	**£15.95 A**
SR-30-LiteMKII	30m receiver	**£19.95 A**

SSB Electronics Mast Pre-Amps

SSB-SP-6

Brilliant German engineering. This 6m receiver pre-amp gives you the ultimate reception & over rides cable losses.

£249.95 C

SSB-SP-2000	2m mast pre-amp	**£239.95 C**
SSB-SP-7000	70cms mast pre-amp	**£249.95 C**
SSB-SP-23	23cms mast pre-amp	**£339.95 C**
SSB-SP-13B	13cms mast pre-amp	**£299.95 C**
DCW-2004	Sequential controller	**£99.95 C**
DCW-2004SHF	Sequential control.	**£109.95 C**
UEK-3000-2	13cm -2m downconverter	**£399.95 D**

Microset Amplifier

27-200T

200W

This new amplifier is ideal for lower powered radios. Drive levels of between 3-125W (switched ranges) give 120-200W output. makes your FT-817 a 100W + radio! For maximum power you need a PSU (like Watson Power-Max-45-NF) that delivers up to 30 Amps. For customers purchasing with PSU, phone for package deal.

£199.95 C

Nissei X-Needle Meters

NEW

A Cross Needle Meter means no more having to adjust for full scale deflection. Instant VSWR and power readings. This new range are amazing value and all have PEP selectors & fwd/reflected average/PEP.

RX-103	1.6-60MHz 20/200W/2kW	**£49.95 C**
RX-203	1.8-200MHz 2/20/200W	**£49.95 C**
RX-403	125-525MHz 2/20/200W	**£49.95 C**
RX-503	1.8-525MHz 2/20/200W	**£69.95 C**

Daily Suprise Bargains - CLICK IT!

eBay

Go to www.wsplc.com then click on the link to our ebay shop.

Hustler HF & Mobile Antennas

Verticals

Hustler verticals are known around the world for their performance and sturdy construction.

6BTV	6 band inc 30m	**£259.95 D**
5BTV	5 band 80-10m	**£219.95 D**
4BTV	4 band 40 - 10m	**£179.95 D**

Mobiles

Base Whip Sections

MO-1	137cm Folds 1/3rd Up	**£38.95 C**
MO-2	137cm Folds Halfway Up	**£38.95 C**
MO-3	137cm Non Folding	**£29.95 C**
MO-4	67cm Non Folding	**£26.95 C**

Resonator Top Section

RM-10	10m	150-250kHz	**£21.95 C**
RM-11	11m	150-250kHz	**£21.95 C**
RM-12	12m	90-120kHz	**£21.95 C**
RM-15	15m	100-150kHz	**£21.95 C**
RM-17	17m	120-150kHz	**£26.95 C**
RM-20	20m	80-100kHz	**£26.95 C**
RM-30	30m	50-60kHz	**£29.95 C**
RM-35	40-30m	7-10MHz	**£29.95 C**
RM-40	40m	40-50kHz	**£29.95 C**
RM-50	60-40m	5-7MHz	**£29.95 C**
RM-60	60m	5MHz	**£32.95 C**
RM-80	80m	25-30kHz	**£32.95 C**

Diamond HF Antenna

BB7V

The small space answer!

** HF 2 - 30MHz Vertical*
** No radials needed*
** 250W PEP 6.7m length*
** VSWR less than 2:1*
** Weight 2.3kg*
** 50 Ohms SO-239*

£325.95 C

Ameritron HF Linear Amp

New Lower Prices!

AL-811XCE

Ideal for UK Licence Limits. Low cost valve replacement.

- *1.8 - 30MHz (Inc WARC)*
- *Output: 600W PEP (800W AL811HXCE)*
- *Valves: 3 x 811A • Weight: 14.51kg*
- *Size: 380x350x210mm*

£899.95 D

AL-811HXCE £999.95 D

AL-800XCE

This linear is a real workhorse and will coast along at normal UK limits. This means that everything is kept very linear. For contests it can be run endlessly and of course the gain available from this linear far exceeds any normal HF beam - you get around 9dB gain!

- *1.8 - 30MHz (inc WARC)*
- *Output: 1.25kW • 3CX800A7*
- *Voltage: 2,300V • Weight: 23kg*
- *Size: 420x369x216mm*

£2159.95 D

AL-800HXCE £3179.95 D

Watson VHF/UHF Antennas

VHF-UHF Verticals

W-30	2m/70cms 3/6dB length 1.15m 150W SO-239	**£49.95 C**
W-50	2m/70cms 4.5/7.2dB length 1.8m 150W SO-239	**£54.95 C**
W-300	2m/70cms 6.5/9dB length 3/1m 150W SO-239	**£74.95 D**
W-2000	6m/2m/70cms 2.15/6.2/8.4dB length 2.5m 150W	**£89.95 C**

VHF-UHF Mobile Whips

W-2LE	2m 0dBv length 0.48m	**£10.95 C**
W-285	2m 3.4dBv L. 1.33m	**£14.95 C**
W-77LS	2m/70cm 0/2.4dBv L. 0.43m	**£14.95 C**
W-770HB	2m/70cm 3/5.5dBv L. 1.1m	**£19.95 C**
W-7900	2m/70cm 5/7.5dBv L. 1.58m	**£31.95 C**
W-627	6/2/70cm 2/4.5/7.2dBv L.1.6m	**£34.95 C**

GAP Antennas HF Verticals for DX

Challenger-DX 8-band HF-VHF

• Bands: 80/40/20/15/12/10/6/2m. • 2kW PEP SSB • VSWR: Better than 2:1 • Height 9.6m (31.5ft) • Radials 3 x 7.6m (25ft) • 3ft drop-in ground socket supplied • Can be mast mounted • Weight 8kg

£299.95 D

Voyager-DX 4-Band LF

• Bands: 160, 80, 40, 20m • 2kW PEP SSB • VSWR: Better than 2:1 • Height 13.72m (45ft) • Radials 3 x 17.4m (57ft) • Requires guys - brackets supplied • 2ft ground pivot assembly included • Weight 13.6kg

£399.95 D

Eagle-DX 6-Band

• Bands: 40, 20, 17, 15, 12, 10m • 2kW PEP SSB • VSWR: Better than 2:1 • GAP centre fed • Height 6.4m (21ft) • 2m (80in) 3 x counterpoises • Support pipe user (31.75mm max) • Weight: 4.9kg.

£339.95 D

WATSON New Range of Coax Switches

These Watson premium grade RF coax switches have been created to fulfil a cost effective need for RF switches that are able to cater for the ever widening commercial RF spectrum.

3-Way Switches

CX-SW3N **£49.95 C**
DC - 1.5GHz 3-way coax switch 1.5kW 3x N-Type Connectors.

CX-SW3PL **£41.95 C**
DC - 800MHz 3-way coax switch 1.5kW 3x SO-239 Connectors.

2-Way Switches

CX-SW2N **£32.95 C**
DC - 3GHz 2-way coax switch 2kW 3x N-Type Connectors.

CX-SW2PL **£26.95 C**
DC - 1GHz 2-way coax switch 2kW 3x SO-239 Connectors.

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

Practical Wireless April 2010

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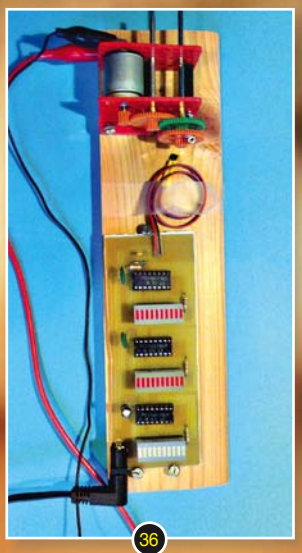

6 **Keylines**
Rob G3XFD's been making friends via PSK31 and extending his v.h.f. horizons.

7 **Radio Waves – Reader's Letters**
Your chance to air your views and discuss topics of interest.

10 **News**
See what's happening and of what's of interest in the world of Amateur Radio.

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Front cover: Our thanks go to Tex Swann G1TEX and the Brownies who visited the North Wales Amateur Radio Society to join in the Thinking Day on The Air with GC100ACD. Photo courtesy NWARS.

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Rob Mannion's

keylines

Rob's been making friends via PSK31 and extending his v.h.f. horizons.

I've been active on the air using PSK31 on h.f. for almost a year now and have come across or heard some very keen Amateur Radio operators using the mode. Indeed, I enjoy using PSK31 because it brings out some charming trends in otherwise reticent Amateurs, who would perhaps hesitate to mention some topics while using s.s.b. For example, in what other mode do we see the age of the operator being freely discussed?

Mentioning your age (and why not?) is a topic we often bring up when we meet face to face – and seems to be the norm while using the truly fascinating PSK31 keyboard mode. Even young lady (YL) Amateurs don't seem to mind mentioning birth dates! However, before moving on from the topic, it's worth mentioning that I've been very impressed with the age range of my PSK31 contacts on the bands. For example, during one evening on 3.5 and 7MHz I had QSOs with Amateurs all over Europe who had ages ranging from their teens to the late 70s and early 80s.

However, what did please me (my Grandchildren think I'm very old) was the number of operators over the age of 75 who were trying the mode for the first time – and thoroughly enjoying it too! This trend is encouraging because sometimes, older Radio Amateurs are seen as being reluctant to try 'different' modes – although I fully accept that the suggestion is often unfair.

One particular Amateur I've been trying – very hard – to work on 7MHz using PSK31 is **Luis De Jesus KP4ED**, who lives in Bayamon County, near San Juan on the Island of Puerto Rico. The Island is a self-governing unincorporated territory of the United States, and is located in the north eastern Caribbean Sea. The Island is beautiful and the people are incredibly friendly – in fact I still remember the hearty welcome we received when the Royal Navy visited in the early 1960s.

Luis KP4ED is an extremely busy Amateur Radio Ambassador for his Island home. Despite suffering a severe stroke some years ago, this indomitable gentleman has forged ahead using keyboard modes so he can make light of his disabilities (see KP4ED on QRZ.com). Luis also uses c.w. and s,s.b. and seems to be active on most h.f. bands as I seem to see or hear his callsign everywhere on the h.f. bands

Recently I had the beginnings of a PSK31 QSO on 7MHz with Luis KP4ED, he came back immediately with the message on my screen showing "Hi Rob G3XFD in England." Unfortunately, before we could start chatting I lost him in very deep QSB. Very frustrating, but I urge readers to look out for Luis and I'm determined to work him on 7MHz myself. Incidentally, I have also already invited him to be a *PW* Amateur Radio Personality – here's to more power to your PSK31 keyboard Luis!

Wider VHF Horizons

I've been busy widening my v.h.f. horizons in the last month or so. Although I've used high gain v.h.f. antenna systems for portable use, in conjunction with my Tennamast Tenna-Tourer 'drive-on' base to support the masts – it has been many years since I've been able to have such antennas at my home QTH. However, that situation has changed and I've now got a lightweight 5-element yagi for 144MHz and a 3-element 70MHz version mounted on my 10m Clarke pneumatic mast.

The mast is pumped up whenever I need it and – to be quite honest – I've been delighted with the results and the extended coverage I get on 70 and 144MHz along the south coast. The new adventures on v.h.f. started when my good friend **Phil Ciotti G3XBZ** very kindly assembled an HB9CV antenna for me and I found myself working down into Devon and Cornwall and also (mistakenly – see *Topical Talk*) thinking I was listening directly to a Dublin repeater!

After my own enjoyment, I'd like to encourage anyone who relies on simple antennas to at least try an HB9CV – I think you'll be delighted to discover just what a little bit of extra gain can achieve!

Rob Mannion G3XFD/EI5IW

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readers' letters

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

I Spy With My Little Eye!

Dear Rob,
It's my habit to read through each month's *PW* as it arrives – picking out the article that really interest me first – and then eventually working my way through the issue. My usual route through *PW* is the contents page, which always seems so enticing a shop window! Secondly, I go to the *Keylines* page and then after enjoying a chat with you (with me listening), I go to the *Letters* pages. Like *Keylines*, there always seems to be something going on in our soapbox!

After the front end I go to *Topical Talk*, to see just what has caught your own eye from readers' letters. By then it's usually time to get on with something else – and I leave the rest of my reading for lunchtime in the potato shed next day. As you might guess – I work in horticulture engineering up here in East Anglia.

Then, over the next few days I work my way through all the articles that interest me. Some I might skip over, others I might mentally mark for lunchtime reading, but eventually over a period of weeks I'll work my way through *PW*, enjoying most of it and planning for the time I'm going to build a project. Sometimes, perhaps after two or three years I will get stuck into building something – but it's alway at least a year or so after they've appeared. Yes, I know we're supposed to be slow up here in Norfolk – but I'm exceptionally slow! Something always seems to get in the way, the car might need some work, my wife wants the kitchen re-done or the kids' bikes and motorbikes need repairing. There's always something!

However, I was reading through my January 2010 issue again recently – I'd picked it up instead of the February issue to take to read during my lunch break – when I found myself reading the letter from **Reg Byres** from Kettering in Northamptonshire again. For some reason, although I had read the letter when *PW* first arrived, I missed the information that the photograph was taken in the **G3XFD** shack! It caught my eye first because my wife **Linda** gave me a similar illuminator/magnifier for Christmas some years ago.

However, it was a case of 'I spy with my little eye' something that really interested me. It was your obvious 'make do and mend' recyling idea by using a cooling fan – taken from a microwave oven perhaps? – being used as an extractor unit, in the background. Judging by the size and location of the centrifugal fan and the white pvc tubing – I think you might be using it to extract soldering fumes as you work Rob? Where does the white tubing go?

Please enlighten us! And, yes, I also use a similar fan in my workshop – mine wasn't purchased new – I rescued it from our microwave oven along with other bits after the cavity magnetron failed. Linda calls me a 'Norfolk Womble' and incidentally, it's rumoured that uncle Bulgaria did come from Wormegay, just down the road from where we live. Well done for recycling – it's not rubbish if it can be re-used or repaired! Best wishes.
Sam Gurney
Blackborough End
King's Lynn
Norfolk

Editor's reply: *Well done Sam! You are correct – the centrifugal fan was taken from our microwave oven after it had failed. It's quite an efficient extractor and I used some odd sections of piping to direct the solder fumes up and along the wooden ceiling of the shack towards the ventilator mounted at the apex at the end. The last foot or so of pipe ends clear of the main roof mounted fan and just blows the fumes towards the main extractor fan (allowing the main fan to also exhaust the air within the main shack, drawing fresh air in through small window vents), which is a bathroom extractor unit (bought new for the purpose). Thanks also to* ***John McGregor*** *from Lerwick in Shetland and* ***Padraig Murphy*** *from Killarney, Ireland for their E-mails, and several other anonymous (but amusing) comments from other readers received by E-mail. What's your best recycling idea readers? You could win the Star Letter prize by sharing it with us!*

Listening To 144MHz VK Amateurs On The M6!

Dear Rob,
I hope that either you or **Tex G1TEX**, or some of your readers (who might have heard similar signals), can shed some light on what I heard today on 2m. I had to attend a business meeting in Birmingham and as I was attending alone and not picking work colleagues up on the way from my Shropshire home as normal, I decided to grab my trusty FT-23R 144MHz hand-held transceiver on the way out as a change of something to listen to. I had to drive from Shropshire taking the A41 and joined the M6 at junction 10a. This would be peak rush hour at around 8.20am and the motorway, complete with on going roadworks, the traffic was true to form – stationary – and it effectively became a car park.

As I considered it was then safe, with the handbrake on, for me to turn on the transceiver I did so and tuned through 145 to 146MHz f.m. – with nothing being received. However, I then tuned below 144MHz and at 144.825MHz I picked out a voice that broke the squelch setting. I could immediately tell from the accent that this was an Australian gentleman and proceeded to listen to the conversation. Although I could not hear everything as there was some

fading I could understand that he was talking about air conditioning in cars and the amount of refrigerant gas in the system and the possibility of that leaking out.

At the end of the over there was a repeater tone then a response from another Australian sounding chap. I listened to this QSO for about five minutes before the first chap said he had arrived home and was signing clear. I found this to be very interesting because both stations were using VK2 callsigns, with no mention of G or M/VK2. etc. Unfortunately I didn't get the suffix for either station for definite – but one was possibly VK2??? Any ideas what I was hearing given my location, near Birmingham,the frequency 144.825 the time 8.20am on Wednesday January 27th 20110? I was only using my old hand-held with its original 'rubber duck' antenna! Regards to you all. I hope you can suggest what could have caused the mystery VK signals?

Gary Ward M3IHC
Whitchurch
Shropshire

Editor's comment: *A truly fascinating occurrence Gary and I can confirm*

Star Letter

Pacemakers & Amateur Radio

Dear Tex,

It was with some interest that I read the item on page 12 of the February issue of *PW*. Like yourself, I am a 'bionic man', having been fitted with a pacemaker some years ago. No, it's not the same one - the original was replaced after four years or so, due to a battery problem. As an amusing aside, when I was taking part in a radio programme, a helpful technician suggested – with a very straight face – that it would not be a problem for him to plug me in for a re-charge!

The reason that I write is that I have come across a number of people who feel that being a pacemaker patient is akin to having been sentenced to an early demise. As you will be aware, nothing could be further from the truth. My life and the lives of my wife and family have been enhanced by the knowledge that the problem has been dealt with and all the anxieties removed.

My early concern centred around my Amateur Radio activities. Would I still be able to go on the air, or would I have to go back to being a listener? Well, after having taking advice, I started with about 1W of c.w. and over a period of several weeks steadily increased the power to a 100W from my lovely old rig. At no point did I have the slightest problem, until I erected an end-fed antenna, all my other antennas having been fed with good quality coaxial cable. A quick check with a field strength meter showed a considerable level of r.f. in the shack, as a result of having about two feet of antenna wire running to my a.t.u.. The a.t.u. was then moved to a position beside the window with only about three inches of wire indoors. The problem then disappeared! There was no measurable r.f. in the shack and no strange sensations in my chest. I did, however, promptly go back to using dipoles!

I am far from being a young man, as you can judge from the fact that I became a short wave listener (s.w.l.) just after the Second World War. I know a number of people who are well into their 80s and are enjoying very active lives, thanks to their pacemakers. However, Tex, there is one very sad case I feel I should mention.

Shortly after having my first pacemaker implant, I was running a club station for a group of Novice hopefuls, when I was seriously – and very publicly – taken to task by a club member who doubted my sanity for using radio equipment, given the fact that I had been given a very expensive device and that I was taking a massive risk in transmitting.

I then carefully explained everything I have mentioned to you – but he would have none of it! He went on to say that he had been offered a pacemaker but that he had refused it, as his hobby was much too important to him! However, in my view, I think it is more more important to be able to provide for those who depend on you for their futures, than to take such a risk in refusing the fitting of a pacemaker as he did. Tragically however, less than three months later we were supporting his wife and children at his funeral.

It wasn't my intention that the letter to you should be published. However, if you can use any of my remarks to help re-assure anyone – who is anxious about their future with a pacemaker – please do so. I personally think that the device is the best thing to happen since sliced bread! Best wishes to you Tex, and to all at the office and I hope you carry on enjoying our hobby as much as I do!

Author's Details Supplied in confidence
c/o *PW* Offices
Broadstone
Dorset

Editor's comment: *This letter was originally addressed to* ***Tex Swann G1TEX*** *because he was specifically mentioned (in the context of being a pacemaker user) in the news item on page 12 of the February issue. Tex was keen to have the letter published, agreeing completely with the author's approach and – as there are many pacemakers users who are active in Amateur Radio – we contacted the writer to discuss it and get permission to publish. For obvious reasons, I have agreed with the author to publish his letter as 'Details provided in confidence' as the author is known to me. We've discussed the letter in full, and everyone involved with publishing the letter hopes that we are providing some encouragement and perhaps a little salutatory caution, just in case that any of us should be given professional medical advice that a pacemaker should be fitted.*

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that you've come across a 144MHz gateway to the Internet Linked Radio Project (ILRP see ***www.irlp.net****) And, by sheer coincidence I've also come across a similar transmission (see* Topical Talk*), which led to this (otherwise very experienced) Editor being totally misled. In fact, I ended up with a dose of red-faced embarrassment and a reminder that we can learn something new everyday!*

Godfrey Manning Suggests CPC For Components Too!

Dear Rob,

First E-mail: *In the* Topical Talk *editorial in the February issue of* PW*, you invited letters for publication that give information on specialist suppliers. Well, I've mentioned CPC (****www.cpc.co.uk****) in the past but you haven't printed much about them! If you saw their catalogue, you'd know immediately why I find them indispensable.*

The CPC catalogue isn't just for the components, there's a vast range of tools, test equipment, soldering requisites, cables and connectors and even more things for general repairs - motoring, plumbing (water, not waveguide!) and 'white goods.' No minimum order charge. Want to know more? Just ask and it will be my pleasure to let you know more!

Second E-mail: *Thanks for your reply Rob. CPC supply equipment, yes. But, components – yes too! They've got a much wider range than the oft-mentioned Maplin. I've also given up making standard audio/video/r.f. leads, the range tat CPC stock is prolific and excellent value. Their latest (2010) catalogue is due out in February and the semiconductor range, in particular, is vastly expanded compared to recently. They also have an enormous section of standard electrical fittings from suppliers offering good value for money.*

Now, trying to get technical sense from anyone on the 'phone (present company excepted!) is difficult these days. I found that this is one occasion where E-mail actually works best. A message to their technical enquiries department gives them time to look up the information you need, alternatively the web-site catalogue might offer the download of a full data sheet - if there is one.

*The other company to keep in mind, of course, is Rapid (****www.rapidonline.com****). They're more component-orientated, also offering some otherwise unusual educational items including laboratory equipment. Again, technical help is easily available by E-mail. Best wishes*

Godfrey Manning G4GLM
Edgware
Middlesex

Having A Ball Since Analogue TV Closure!

Dear Rob,

I'm writing to report that since my area – St. Budeaux in Plymouth – changed over from analogue to digital in September 2009, I'm having a ball on the bands because the TVI problems have disappeared!

In fact, I've dug out a lot of older valved equipment, radios, linear amplifiers, etc. I've got some up and running using specialised power supplies, which have been designed to off-set anomalies in the mains supply.

The change-over from analogue brought me many benefits. Indeed, it was a case of 'Bingo!' At at one stroke there was no TVI from me and no moans from my wife or neighbours. Incidentally, our neighbours are all very friendly – bearing in mind that I'm operating some of the 'horrible TVI creator' in their minds! Unfortunately, my increased Amateur Radio activity has led to a corresponding increase in our electricity bill.

Since the introduction of digital TV in my area I've been able to resurrect an old KW2000A, which after numerous modifications is running again. The receiver noise is unbelievably quiet, in fact there's no noise to speak of and I can only put this down to less interference **from** TV receivers.

I've even felt confident enough to operate an old h.f. linear amplifier again – operating it nearly got me lynched a few years ago because of TVI when the analogue system was still in use!

So, I'm now waiting for the rallies to start – hope to see you at the Dartmoor rally perhaps this year Rob! – to pick up a few more 'oldies' to get them on the air again. I hope to find a low band PMR for use on 70MHz. You never know – my luck might be in – it's certainly gone my way with the introduction of digital TV here in Plymouth! 73.

Sandy Pimlott G8IDE
St. Budeaux
Plymouth
Devon

Editor's comment: *Thanks for you comments Sandy! I look forward to seeing you, loaded up with your new found bargains at the Dartmoor Rally in Tavistock on Monday May 3rd. Incidentally, have other readers found digital TV has brought them unexpected benefits? If so, please share the news by writing in!*

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

American LORAN-C System Shut Down

Newsdesk has learned the On February 8th the US Coast Guard shut down the **LO**ng **RA**nge **N**avigation C **(LORAN-C)**. This is a navigation system that has been in use since the Second World War and was developed from the earlier, shorter range British Gee system. The remaining LORAN systems (jointly operated in partnership with the Canadian and Russian Governments, are due to close soon, perhaps as early at mid-year 2010 (subject to confirmation).

The LORAN system made use of a network of low frequency (l.f.) radio transmitters and the receivers used these multiple signals to determine the location and speed of the vessel. It has served mariners and aviators for over 60 years.

The American President, **President Barack Obama,** has called the system "obsolete", saying it is no longer needed in an age in which Global Positioning System devices (GPS) are nearly ubiquitous in cars, planes and boats.

Running LORAN-C is claimed to cost the Federal Government about US$38 million a year but shutting it down means there is no longer a back-up system for GPS.

An American LORAN-C transmitter station on one of the Aleutian Islands.
Photo courtesy of The American Coastguard Service.

Editorial note: The American-based news network CNN have an interesting story – 'Good night, Loran' at **http://edition.cnn.com/2010/TECH/02/08/loran.navigation.shutdown/index.html** Additionally, the excellent Wikipedia web-based encylcopedia features an interesting article at **http://en.wikipedia.org/wiki/LORAN** I have no doubt that many Radio Amateurs in the UK will remember the system, which seemed to spread all over the the upper half of the 1.8MHz 'Top Band' 40 years or so ago! The Wikipedia site also provides information on the new eLORAN, which is coming into service from British Telecom's Anthorn transmitter on the Solway Firth, near Carlisle. **G3XFD.**

Stop Press!

New V For Vectis Prefixes For Isle of Wight?

Radio Amateurs based on the Isle of Wight – an Island located off the coast of Hampshire on the south coast of England – have been keen on gaining special status for many years. *Newsdesk* reports on the latest developments.

Newsdesk has received reports from reliable sources that complex negotiations are taking place between Radio Amateurs on the Isle of Wight – an extremely popular holiday and retirement area – and the Westminster Government, Regional Assembly and the European Union. Our correspondents report that the various parties involved are very close to agreeing the permission for Island-based Amateurs to use the **V** prefix with their callsigns, reflecting the Island's Roman name ***Vectis***. This means that (for example) if the *PW* Editor lived on the Isle of Wight he could use the prefix V after the G, this operating as **GV3XFD**.

Newsdesk had learned that the V prefix will – if arrangements are finalised – only be permitted to be used by Radio Amateurs who live on the Island permanently. An unexpected result of the pending changes are that the Southern Regional Authority (based in Eastbourne, East Sussex) and the EU, are insisting that some form of identifying suffix should be used by visiting Radio Amateurs – to indicate clearly that they are visitors and not residents.

Newsdesk enquired further and discovered that the favoured identifying suffix is **O**. The suffix added to G3XFD would make it **GV3XFD/O**, and would denote that this Amateur is a visitor and isn't resident. Although the Island Amateurs who are promoting the V pre-fix weren't forthcoming regarding their choice of 'O', UK and EU Freedom of Information regulations allowed *Newsdesk* to confirm that the O stands for 'Overner', a term that is often used in conjunction with 'Emmetts', the disparaging name for tourists – mostly used by Islanders who don't rely on tourism for a living.

Map courtesy IOW Tourist Authority

Editorial note: This type of official 'Separation identifier' is already in use in the Channel Islands where hire cars – used by visitors – have to display a prominent **H** on their numbers plates so that their 'Visitor' status can be clearly identified. More news when it's available.

Celebrating 90 years of British Broadcasting, 1920 – 2010

Geoff Watts G0EVW writes: January 15th, 1920 saw the first broadcasts from **MZX** in **Chelmsford** and June 15th will be the 90th anniversary of the recital by **Dame Nellie Melba**, the famous Australian Prima Donna. Dame Nellie Melba gave her historic 30 minute concert from the Marconi New Street works in Chelmsford. The experimental Station MZX transmitted on a wavelength of 2,750 metres using a 15kW transmitter and a 'T' antenna.

Although the Dame Nellie concert, the first by a recognised professional artiste, is generally recognised to have been a turning point in British Broadcasting history, it was not the first broadcast. Two Marconi engineers, **W. Ditcham** and **Captain H. Round** started what was probably the first ever true telephony 'broadcasts' months earlier.

On January 15th 1920 they had transmitted a program of speech and gramophone music from the Chelmsford works using a 6kW transmitter. Hundreds of appreciative reports were received from Radio Amateurs and ships at distances of up to 1,500 miles. This was followed up for a brief period from February 23rd to March 6th 1920 when Ditcham and Round transmitted a regular series of 30-minute programmes from MZX using a 15kW transmitter on a wavelength of 2,750 metres; the same station as was later to be used for the Dame Nellie concert. **British Broadcasting had begun!**

Note: The famous station 2MT at Writtle did not start transmitting until two years later on the 14th of February 1922. Geoff G0EVW.

(Thanks to the South Dorset Radio Society's club newsletter *Cat's Whisker* for this item).

g0evw@g3sds.org.uk

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E-mail: newsdesk@pwpublishing.ltd.uk

New Product From Pro Antennas

Carl Kidd G4GTW contacted *Newsdesk* to update the situation abut his new antenna: "I have been very busy with a new development over the last 12 months and it is almost ready for the retail market. The new antenna is called the I-PRO, will be available shortly".

"The product has been developed over the last year and it is available in the next month or so. The product is called the I-PRO, it will be available to purchase on line: **www.proantennas.co.uk** and through my adverts in *PW"*.

"There's a choice of two versions – the Multi-band I-Pro covering 14, 18, 21,24 and 28MHz (20, 17, 15, 12 and 10m). A 7MHz (40m) version will also be available. There's also the 40m I-PRO covering 7 to 7.350MHz **and** both I-PRO versions stand only 3m tall and are compact resonant designs that do not require an antenna tuning units, radials or grounding".

"The I-PRO is a centre fed half-wave vertical dipole with capacity hat end loading. We have chosen capacity hat loading for a very important reason – to keep the inductive loading to an absolute minimum and therefore minimise losses. The practical results are so impressive and consistent; they could only be obtained from a highly efficient antenna. The I-PRO is making its presence known with groundbreaking performance!" Carl G4GTW.

Recent video footage of Carl G4GTW using both versions of the I-PRO can be seen by visiting **http://www.youtube.com/user/G4GTWantennas**

Carl Kidd G4GTW
Pro Antennas
carl.kidd@ntlworld.com
Tel: **01489 789960**

Stop press: *A review of this system will appear in PW soon.* ***Editor.***

The I-Pro in a larger garden overlooking the sea.

The I-Pro is also suitable for the smaller garden.

The UK Battery Recycling Targets & RS Components

The Corby, Northamptonshire, based RS Components company reports that, "In 2008, the UK only recycled 2.8% of all batteries put onto the market, with the vast majority of waste batteries being disposed of in landfill sites. Most batteries contain heavy metals and are a significant cause for environmental concern. When disposed of incorrectly, these heavy metals may leak into the ground when the battery casing corrodes. This can contribute to soil and water pollution and endanger wildlife. The new legislation has set a target for recycling of 25% by 2012, and 45% by 2016, which RS is committed to helping to achieve.

Already compliant with Part 1 of The Batteries Directive -–The Batteries and Accumulators (Placing on the Market) Regulations 2008, RS is also fully compliant with Part 2, The Waste Batteries and Accumulators Regulations 2009, which came into force on February 1st 2010.

Both parts of the Directive apply to all types of batteries and accumulators, regardless of their shape, volume, weight, material composition or use (industrial, automotive and portable), placed on the EU market on or after September 26th 2008.

Part 1 defines the requirements for placing batteries and accumulators on the market including battery labeling and design, while Part 2, covers the remaining provisions relating the collection, treatment and recycling of waste batteries and accumulators.

Further information from:
RS Components
PO BOX 99
Corby
Northamptonshire NN17 9RS
Tel: **(01536) 209174**
Contacts: **Tracey Taylor**
tracey.taylor@rswww.com
rswww.com/presscentre tracey.taylor@rswww.com

New Home For GB3VHF Beacon

Chris Whitmarsh G0FDZ reports. "After 50 years of near continuous operation at Wrotham, the **GB3VHF** 144MHz beacon will be moving to a new site at Fairseat in Kent (JO01EH). The GB3VHF transmissions have now closed permanently from the former BBC-owned transmitter site at Wrotham, and the beacon was switched off by the beacon keeper – myself G0FDZ – on Monday morning (15th February 15th 2010)".

"Funding for the Wrotham beacon site rental from the RSGB comes to an end on March 30th, and the site would have had to have been cleared and vacated by then. Access to the site has proven to be very difficult over the last year or so, and an opportunity arose to gain access to the site to remove the beacon and all its associated equipment at an early stage and with no cost, hence the service ceasing today. This site access problem is another reason for quitting the present site."

"However, the 'phoenix will rise from the ashes', as I can now announce that after nearly a year of negotiations and planning, I have reached an agreement for a site sharing agreement at a new site only 4km ENE of Wrotham."

"The beacon will be relocated to Fairseat in Kent (JO01EH) and will employ an antenna system that will be identical to that used at Wrotham, with the beam directions exactly the same and the antennas of a similar height above ground level. This will mean that coverage will be nominally the same as that enjoyed in the past from Wrotham. Also, I have obtained suitable coaxial cable for the feeder, which will enable me to maintain the existing e.r.p."

"With the new site at Fairseat being of a similar height to Wrotham and with a good 'take-off', I am hoping that you will notice little change in signal strength.

"The Ofcom licence for the beacon at the new site has already been obtained, so once the antennas at Fairseat are rigged, the beacon will appear on the air just a few days later. Obviously I am now dependent on suitable weather and the work availability of the riggers, to install the antennas and feeder at Fairseat. This may take some time – so please be patient."

"As you can imagine, the relocation of the beacon has come at a price, and rigging and other costs are high. I have been fortunate in that a number of items required have been kindly donated or supplied at a greatly reduced price by friends and colleagues, including the brand new Jaybeam commercial grade yagis and the Andrews LDF550 feeder and fittings".

"The relocated beacon will be independently run and maintained, and will receive no regular funding from any organisation. If you would like to make a financial donation towards relocation and ongoing costs then I would be extremely grateful."

"Donations can be made by PayPal to my E-mail address **chris@g0fdz.com**, and all donations will be acknowledged. Please mark your PayPal donation as 'GB3VHF donation' when it's sent please."

"I still have much work to do on the project, but rest assured I am working to commission the beacon at the new site as soon as practically possible. I will give you further news on developments at the earliest opportunity. Many thanks for your support and good DX".

Chris Whitmarsh G0FDZ
Beacon Keeper GB3VHF
Latest news at **http://www.gb3vhf.co.uk/**

New AO-7 Distance Records

During January 2010 the distance record for the 35 year-old Amateur Radio satellite AO-7 was repeatedly broken. First, on January 2nd, **Luciano Fabricio PY5LF** worked **Pierre van Deventer ZS6BB** over a distance of 7630km. Next, on January 8th, **Luiz Pirajá PS8RF** worked **Andre van Deventer ZS2BK** at 7694km.

Then, on January 18th **Pierre van Deventer ZS6BB** managed to work **Josep Riera EA6SA** at a distance of 7766km. On Sunday January 24th, at 22:52 UTC **Joe Spandler K3SZH** in Harrisburg, Pennsylvania, USA, had a short contact with **Francisco Ramires PY2OV** in São Paulo, Brazil. The distance between the two stations was 7738km and is believed to be the furthest contact within the Americas – but just short of the world record.

The theoretical maximum range of AO-7 is about 7907km so there is still scope for the record to be broken yet again. Pierre van Deventer ZS6BB reports that **Marco Niccolini IW5EJM/5** managed to copy his callsign at a distance of 7902km. although no QSO took place. Video of the K3SZH-PY2OV contact: **http://www.youtube.com/watch?v=gS4MdI-P6X4**
AO7 Log and Resource Site: **http://www.planetemily.com/ao7/**
AO7 Real Time tracking: **http://www.n2yo.com/?s=7530**
AMSAT-UK: **http://www.uk.amsat.org/**

North Wales Amateurs Get WAGGGS On The Air!

As featured on this month's front cover!

Newsdesk heard from **Mark Brady MW0RKB** asking, "Perhaps you could feature our Special Event Station **GG100ACD**, which was run by members of the **North Wales Radio Society** at Nant Y Coed School in Llandudno Junction, over the weekend of February 20th and 21st?" *(Our pleasure Mark. **Editor**)*.

"The station, GG100ACD, commemorates the centenary of the birthday of Lord Baden Powell. On this day each year members of **World Association of Girl Guides & Girl Scouts** (WAGGGS) remember the founders of the movement and take part in various activities to think about their sisters throughout the world."

"We set up three stations, using s.s.b on h.f. a 144MHz station using s.s.b and an h.f. digimode station. Contacts were initiated by members then passed onto the girls for them to send greetings messages. We contacted various stations across Europe into Russia and the USA. We had a Morse desk operating where the girls learned to key their names. The day passed quickly with the girls enjoying themselves, one was overheard telling her friend how someone on the radio told her that in Michigan there was six inches of snow and it was -20°C!"

"The digimode station was particularly popular as a lot of the girls are experts in typing, due to texting their friends and using MSN! We too were well looked after with copious amounts of tea and some very special home made vegetable curry soup! Thanks to Brown Owl!"

"The team, **Rob Sweet GW6STK**, **Clive Wilkinson MW3XXX**, **Gordon Ward MW0GBR**, **Tony Chalk MW0BXJ**, **Ron Roberts GW6ZDH**, **Merv Jones GW1SGG** and **Karl Latham MW6CSS** and myself MW0RKB, worked well and I thank them for giving up their time, lending their kit and running round like the proverbial flies!"

"A great day was had by all – even if the unexpected snow did catch us unawares. We received an E-mail from **Gill Wilkinson** who is District Commissioner for Afon Conwy District Girl Guides, Gill said 'It was great, Thank you so much! Very different – the girls have never done anything like this before! They all left chatting away to their parents about all the places they had 'been' to'!

Altogether, it was an enjoyable day for everyone!"

Mark Brady MW0RKB
Secretary North wales ARS
E-mail **mochdre1@sky.com**
Website **http://www.nwrs.org.uk/**

Mark Brady MW0RKB on the left and Rob Sweet GW6STK calling "CQ" on 7MHz.

Gordon MW0GBR demonstrating PSK31 to the Brownies!

Please check with the organisers that the rally is 'on' before leaving home.

rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations. PW Publishing Ltd. is attending at rallies marked *.

Send all your rally info to

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

March

March 20th

The Lagan Valley Rally
The Lagan Valley Amateur Radio Society Rally will be held in The Village Centre, 7 Ballynahinch Road, Hillsborough. Doors will open at 11.30am and there will be car parking, catering and trade stands.
Jim GI0DVU
Tel: 02892 662270
E-mail: jim.henry@ntlworld.com

March 21st

The Wythall Rally
The Wythall Radio Club's 25th Annual Radio and Computer Rally will be held in The Woodrush Sports Centre, Shawhurst Lane, Hollywood, Nr Wythall, Birmingham B47 5JW (two miles from junction 3 of the M42). Doors will be open between 10.00am and 3.00pm and admission will be £1.50. There will be talk-in on S22, car parking, radio and computer traders, a massive Bring & Buy and catering.
Chris G0EYO
Tel: 07710 412 819
E-mail: g0eyo@blueyonder.co.uk
www.wrcrally.co.uk

March 21st

The Callington Rally*
The Callington Amateur Radio Society Rally will be held in the Callington Community College, Launceston Road, Callington, Cornwall PL17 7DR. The doors will open at 10.00am, admission will be £2.00 and there will be talk-in, car parking, trade stands, catering and facilities for the disabled.
Chris G7UDX
Tel: 0797 3418371
E-mail: g7udz@mac.com

March 28th

The S. Gloucestershire Rally*
The Thornbury and South Gloucestershire Amateur Radio Club along with the Avon Scouts Amateur Radio Club will be holding their second rally for the West Country at the Avon Scouts Activity Centre, Woodhouse Park, Almondsbury, South Gloucestershire BS32 4LX. This is 1.4 miles North on the A38 from the M4/5 junction. The doors will open at 10.00 am and entry will cost £2.00. There will be a talk-in, free parking, a car boot sale, catering, a Bring & Buy and facilities for the disabled. Please note, no dogs other than those providing assistance to the disabled will be allowed in.
Peter Cabban
Tel: 01454 612689
www.avonscouts.org.uk/woodhousepark/location.htm

March 28th

The Spring Hangar Sale
The Spring Militaria, Electronics and Radio Amateur Hangar Sale will take place at the Hack Green Secret Nuclear Bunker, French Lane, Nantwich, Cheshire CW5 8AL. The Bunker is situated just off the A530 Whitchurch Road, a few miles outside Nantwich, 30 minutes from Chester. From Junction 16 on the M6 motorway, follow the signs to Nantwich, then Whitchurch on the A530 (follow the brown Secret Bunker signs). The doors will open at 10.00am and admission will be £2.50.
Rod Siebert
Tel: 01270 623353
E-mail: coldwar@hackgreen.co.uk
www.hackgreen.co.uk

April

April 11th

The Cambridgeshire Rally
The Cambridgeshire Repeater Group Annual Rally will be held at Foxton Village Hall, Hardman Road, Foxton, Cambridge CB22 6RN. The doors will open at 10.00am (7.00am for traders) and admission will be £2.00. There will be talk-in on S22, trade stands, lectures, a Bring & Buy, catering and facilities for the disabled.
Laurence M0LCM
Tel: 01223 654880
E-mail: rally2010@cambridgerepeaters.net
www.cambridgerepeaters.net

April 11th

The Lough Erne Rally
The Lough Erne Amateur Radio Club Annual Rally will be held at The Share Holiday Village, Lisnaskea, Co. Fermanagh BT92 0EQ N. Ireland – there is access from the Erne/Shannon Waterway. The doors will open at 12 noon and there will be car parking, trade stands, a Bring & Buy, catering with a licensed bar, Morse tests and facilities for the disabled.
Iain
Tel: 02866 326693
E-mail: gibbjgbb@aol.com
www.loughernerradioclub.co.uk

April 11th

The NARSA Exhibition*
The Northern Amateur Radio Societies Association Exhibition will be held at the Norbreck Castle Exhibition Centre, Queen's Promenade, Blackpool FY2 9AA. The doors will open at 11.00am (10.45am for the disabled) and there will be talk-in, car parking, trade stands, a Bring & Buy, special interest groups, catering with a licensed bar, Morse tests and facilities for the disabled.
Dave M0OBW
Tel: 01270 761608
E-mail: dwilson@btinternet.com
www.g1gyc.demon.co.uk/narsa

April 18th

The West London Radio & Electronics Show*
The West London Radio & Electronics Show will take place at Kempton Park Racecourse, Sunbury-on-Thames, Surrey. The will be free car parking, the doors will open at 10.00am and there will be talk-in on S22 & V44, trade stands, a Bring & Buy, a flea market, catering, special interest groups and facilities for the disabled.
Paul M0CJX
Tel: 0845 1650351
E-mail: info@radiofairs.co.uk
www.radiofairs.co.uk

April 25th

The Andover Boot Sale
The Andover Radio Club's Spring Boot sale will be held in the Village Hall at Wildhern, which is just north of Andover (postcode SP11 0JE). The doors will open at 10.00am for buyers (9.00am for sellers) and admission will be £1.50. There will be talk-in on S22, catering and facilities for the disabled.
Martin
Tel: 01980 612070
E-mail: martinsmith@kukltd.co.uk
www.arac.org.uk

April 25th

The Yeovil QRP Convention
The 26th Yeovil QRP Convention will be held in the Digby Hall, Hound St, Sherborne, Dorset, DT9 3AA (adjoining the central shopping car park). The doors will open at 9.30am and there will be talk-in on S22 and V44, car parking, trade stands, lectures, a Bring & Buy, catering and facilities for the disabled.
Robert
Tel: 01935 706715
E-mail: robert.farey@btinternet.com
www.yeovil-arc.com

May

May 3rd

The Dartmoor Radio Rally*
The Dartmoor Radio Rally will take place in Tavistock College, Crowndale Rd, Tavistock, Devon PL19 8DD. The doors will open at 10.30am (10.15am for the disabled) and there will be talk-in on S22 and V44, parking, trade stands, a Bring & Buy, catering, family attractions and facilities for the disabled.
Peter M1AYI
Tel: 01822 860277

May 14-16th

The Dayton Hamvention
The world's largest radio show, the Dayton Hamvention, will be held in the Hara Arena, Shiloh Springs Road, Dayton Ohio, USA. It will be open from 9.00am to 6.00pm (8.00am to 6.00pm for the flea market) on the Friday, 9.00am to 5.00pm (8.00am to 5.00pm flea market) on the Saturday and 9.00am to 1.00pm (8.00am to 1.00pm flea market) on the Sunday. Admission will cost $25 for a three-day pass ($20 if bought in advance). There will be talk-in on the local repeater on 146.94 and 146.64MHz and frequencies 223.94 and 442.10MHz will also be monitored. Talk-in will start on Wednesday at noon and run through to Sunday at 5.00pm and it will only be off the air nightly between 11.00pm and 5.00am. In addition, travel assistance will be available on 7.258MHz.

There is no car parking at the arena but there are various free car parks in surrounding areas and buses to the show will be available (tickets $3 per day or $8 for the weekend). There will be hundreds of exhibitors, more than 2,500 spaces in the flea market, special interest groups, lectures, a prize draw, catering and facilities for the disabled.
www.hamvention.org

June

June 6th

The Red Rose QRP Festival
The Red Rose QRP Festival will take place in the Formby Hall, Alder Street (off the High Street), Atherton, Manchester M46 9EY. The doors will be open from 11.00am to 3.00pm and admission will be £2.00 (children under 14 free). There will be a free car park, trade stands, a Bring & Buy, club stands, catering with a licensed bar and facilities for the disabled.
Les Jackson G4HZJ
Tel: 01942 870634
E-mail: g4hzj@ntlworld.com

June 6th

The Spalding Rally
The Spalding and District Amateur Radio Society Rally will take place in the Sir John Gleed Technology School, Halmer Gardens, Spalding, Lincolnshire PE11 2EF. The doors will open at 10.00am and there will be talk-in on S22 and V44, free car parking, a car boot sale, trade stands and catering.
John G4NBR
Tel: 0794 630 2815
Graham G8NWC
Tel: 0794 776 4481
E-mail: rally-secretary@sdars.org.uk
www.sdars.org.uk

June 13th

The Ipswich Radio Rally
The Ipswich Radio Rally (The East Suffolk Wireless Revival) 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 be £1.00. There will be car parking, talk-in on S22, trade stands, a Bring & Buy, a car boot sale, special interest groups, catering and the GB4SWR HF station will be operating.
John G3XDY
Tel: 07710 044858
Steve M1ACB
Tel: 07711 329624
www.eswr.org.uk

June 13th

The Junction 28 QRP Rally
The South Normanton Alfreton and District Amateur Radio Club in association with the G-QRP Club will be holding the 9th Junction 28 QRP Rally at the Alfreton Leisure Centre, Church Street, Alfreton, Derbyshire DE55 7AH (this is just 10 minutes from Junction 28 on the M1). The doors will open at 10.00am and there will be a Bring & Buy, special interest groups, catering with a licensed bar and facilities for the disabled.
Russell Bradley G0OKD
Tel: 01773 783658
E-mail: russell.bradleyG0OKD@ntlworld.com
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MRQ525	2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality)	£19.95
MRQ500	2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality)	£24.95
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MR3 POWER ROD	2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass collinear)	£29.95
MRQ800	6/2/70cm Gain 3.0dBi/5.0/7.5dBdBd, Length 150cm, PL259 fitting (high quality)	£39.95
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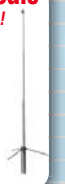

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ATOM-20S	14MHz, Length 130cm, PL259 fitting (compact design)	£24.95
ATOM-40S	7.0MHz, Length 165cm, PL259 fitting (compact design)	£26.95
ATOM-80S	14MHz, Length 165cm, PL259 fitting (compact design)	£29.95

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

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SPX-200S	6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting	£44.95
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ATOM-AT4	10/6/2/70cm Gain 2m 2.8dBd 70cm 5.5dBd, Length 132cm, PL259 fitting (perfect for FT-8900R)	£59.95
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YG11-2	2 metre 11 Element (Boom 185") (Gain 13dBd)	£99.95
YG3-4	4 metre 3 Element (Boom 45") (Gain 8dBd)	£59.95
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ZL7-70	70cm 7 Ele, Boom 70cm, Gain 11.5dBd	£39.95
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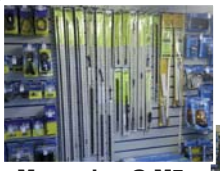
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts £69.95

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

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



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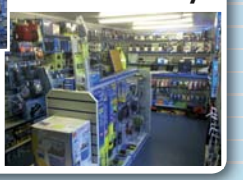

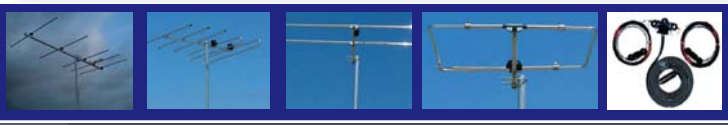

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Tex Swann's

antenna workshop

Taking time off from making or drinking coffee, Tex Swann G1TEX makes use of the tin.

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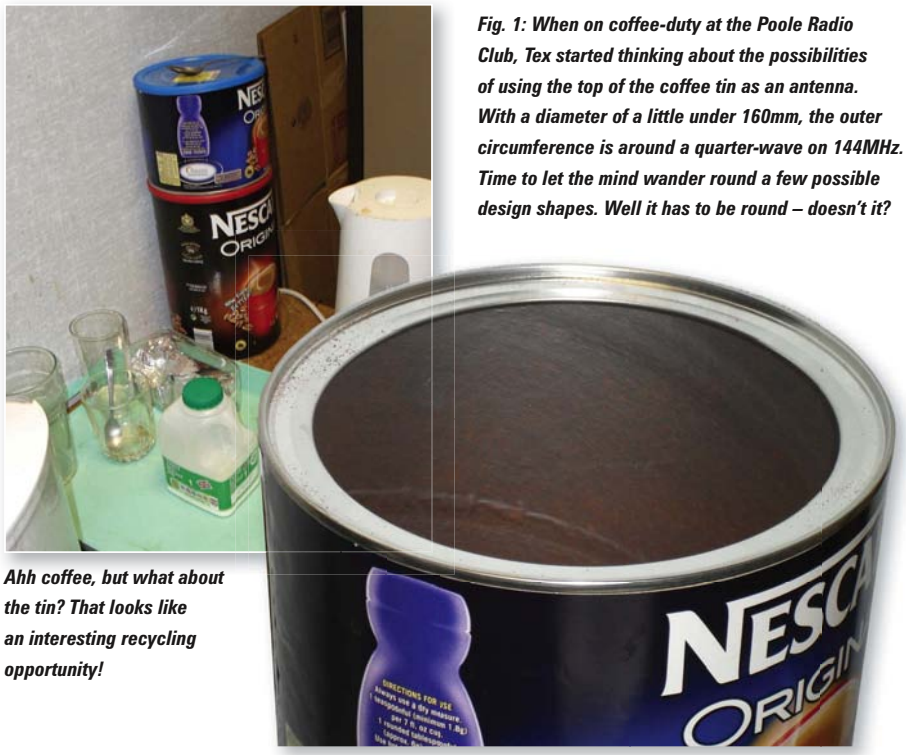
Editorial introduction: Tex's coffee tin antenna is thoroughly practical – I've used one for several years and can recommend it to readers. However, Tex hasn't been entirely truthful about making coffee in the office! In fact, most of his experience in catering comes from running what he calls the 'Tea & Coffee Swindle' at the **Poole Radio Club**. In return for a modest weekly payment (the 'Swindle') we get good tea and coffee, the club makes a nice profit while Tex keeps the empty tins to make antennas! **G3XFD**.



Ahh coffee, but what about the tin? That looks like an interesting recycling opportunity!

Fig. 1: When on coffee-duty at the Poole Radio Club, Tex started thinking about the possibilities of using the top of the coffee tin as an antenna. With a diameter of a little under 160mm, the outer circumference is around a quarter-wave on 144MHz. Time to let the mind wander round a few possible design shapes. Well it has to be round – doesn't it?

Don't Waste That Empty Tin – Make Yourself.....A Coffee Time Antenna!

The *Coffee Time Antenna* that I'm about to describe, started off as I was idly(?) waiting for the kettle boiling as it was 'my turn' to make the coffees in the office. I looked as the rim of the 'tin' holding the coffee. Incidentally, the containers ceased being metal some time ago, the top (**Fig. 1**) and bottom being metal parts clamped onto a cardboard tube to form the container.

The flat ring forming the top was just under 160mm in diameter with an inner diameter of a little over 130mm. A quick calculation gave me the idea that this was a circumference of almost 500mm, which is just quarter-wave on 144MHz. So, would it work as a DDRR antenna?

If you've not heard of a discontinuous direct ring radiator

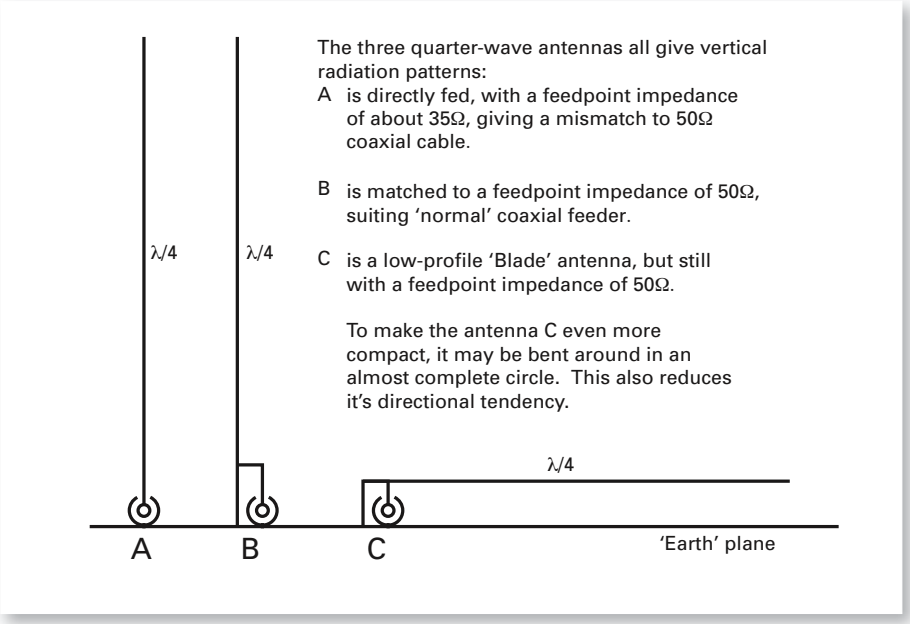
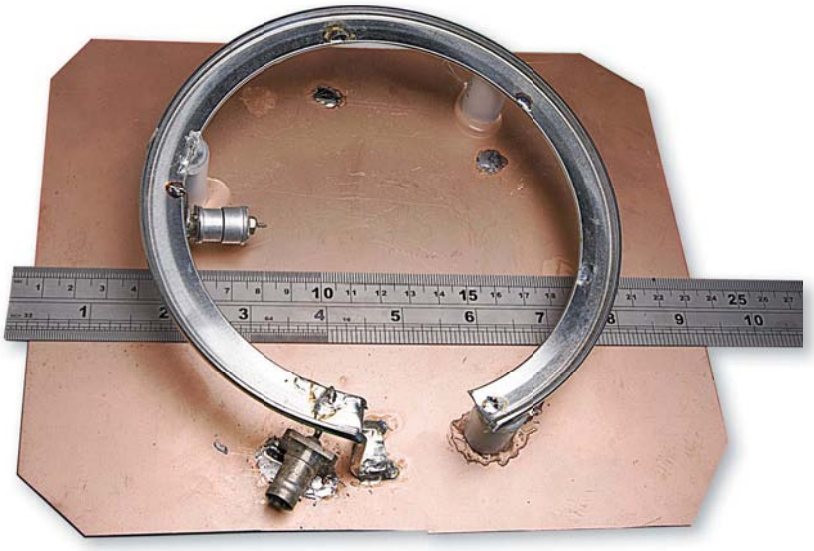


Fig. 2: The derivation of a 'blade' antenna in steps from a simple vertical quarter-wave Marconi antenna. The DDRR type antenna is only a variant of the last step, annotated as 'C'.



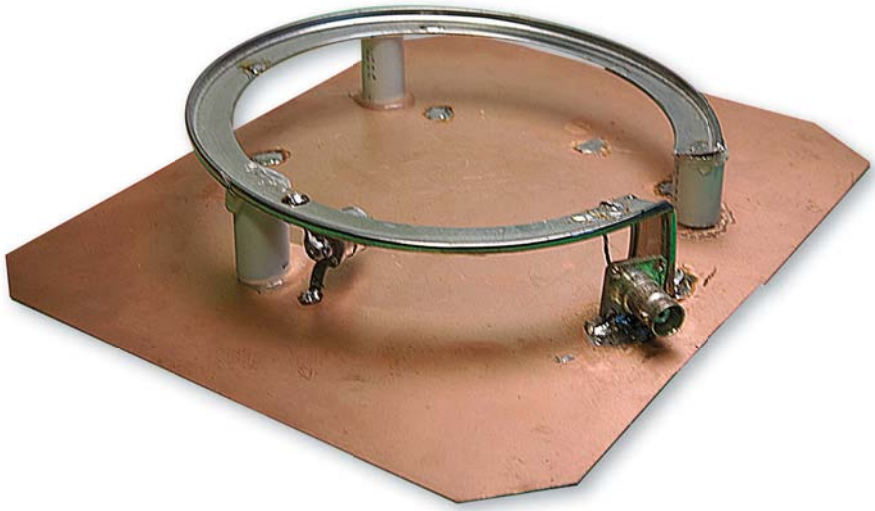


Fig. 4: This three-quarter view shows how the DDRR antenna is assembled on a piece of p.c.b. material slightly larger than the ring itself. Ideally it should be even bigger!

Fig. 3:The finished item with a 300mm ruler for size comparison. The solder 'blobs' around the ring are earlier tuning points that failed to work well – or even at all.

Fig. 5: The ring, split and bent to shape, The 'foot' bend is 6-10mm wide, and the other bend in the opposite direction, to form the 'knee when assembled is 25mm from the foot bend.

(DDRR) antenna before, I've shown how it can be considered in **Fig. 2**, which shows the derivation of a 'blade' antenna from a simple quarter-wave vertical Marconi type antenna. The blade antenna (C in Fig. 2) has a vertical polarisation, but suffers in that it transmit well outwards from the sides of the element, but has little or no radiation off the ends.

By bending the blade antenna in an almost complete circle, the DDRR antenna, **Fig. 3**, has a much more

Fig. 6: The feed-point of the inner of the BNC socket is attached about 12mm from the knee bend of the antenna element. When I build another version, I'll mount the BNC socket from the underside of the p.c.b. material.

omni-directional radiation pattern. Look at the photographs of Fig. 3 and **Fig. 4** and you should be able to see the layout of the antenna I've created.

To form the coffee tin top into the antenna element, make a cut across the ring, and make two bends as shown in the photograph of **Fig. 5**. The 'foot' bend is about 6-10mm wide, and the 'knee' bend a further 25mm around the ring. These bends can be difficult to get lined up and the clamping rim of the ring makes it rather difficult to bend accurately – but persevere!

You'll also need three 25mm lengths of some insulator for supporting the ring to stop it 'flapping around' in use, as this alters the matching quite drastically. In practice, use three short length cut from 15mm plastic water piping. The ends should be clean-cut and 'square'.

As the antenna is in effect a section of transmission line, it needs an 'earth-plane' to form the other 'side' of the line. And for this I used an off-cut of printed circuit board (p.c.b.) material that I had to hand. This material make soldering easier, though you could use almost any metallic material that you can make electrically good connections to. It should be a little bigger than the size of the ring itself!

I made the feed-point from a BNC chassis socket that I had to hand.

Fig. 7: The 'beehive' trimmer is around 30pF at maximum, but only a few picofarads were required to tune the antenna, when mounted around a quarter of the way around the loop as shown here. Moving the position closer to the feed-point would mean more capacitance was needed to achieve resonance.

As it was silver-plated it soldered easily, though an iron with a lot of heat capacity is needed. That should be soldered as close to the 'foot' and 'leg' of the antenna as possible as you can see in **Fig. 6**. The inner of the BNC socket is soldered about 12mm from the 'knee' of the ring. The position of this tapping point affects to impedance matching.

Tuned & Resonant

The next problem is to actually bring the antenna into a tuned resonant state. And to do this a small value of capacitance is needed, it's actual position can depend on several factors. I eventually ended up with a small 'beehive' variable soldered about quarter of the way around the loop from the 'knee' as you can see in the photograph of **Fig. 7**. Just out of focus, around the nearer edge of the ring are two solder 'blob's where I tried earlier attempts at tuning the ring.

I did try a variety of other tuning methods including making capacitors up from p.c.b. material and mounting them on a short adjustable 'legs'. But those attempts proved to be very difficult to adjust and keep adjusted.

The 'screen-grab' of **Fig. 8** is the s.w.r. curve of the finished unit as shown in the photographs. The 2:1 bandwidth of the antenna is 144.4 – 146MHz, with the lowest s.w.r., of 1.4:1 occurring at 145.26MHz. No doubt with a bit more fiddling with the matching point and tuning, I could achieve a better s.w.r. but I felt that this was good enough to prove a point!

The antenna does suffer a little from proximity of other objects near the earth-plane, but the antenna was just thought of as an enhancement over the basic 'rubber-duck' antenna of a small hand-held. So, when 'thrown' up on top of a wooden cupboard or wardrobe, it works well, Which was what I aimed at.

Now has that (Poole Radio Club) kettle boiled yet? ●

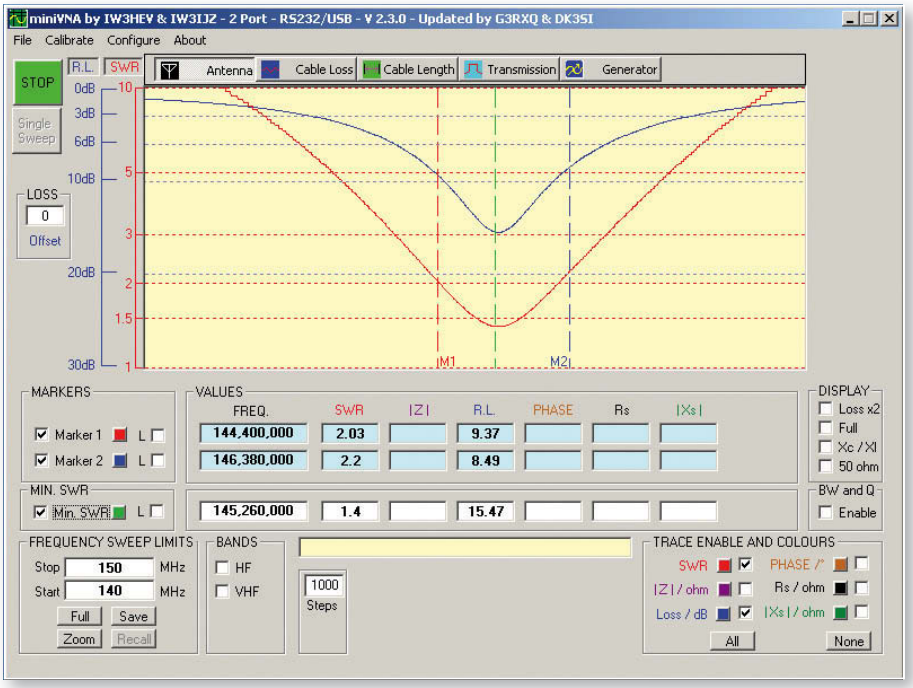


Fig. 8: A 'screen-grab' while using the MiniVNA antenna impedance analyser and its software to tune and check the s.w.r. of the completed antenna. The 2:1 bandwidth is 144.4 – 146MHz, with the best match occuring at 145.26MHz, almost in the middle of the f.m. band section, thus suiting the original idea of a simple and cheap antenna to improve a hand-held radio.

Feature

Buying Second-hand

There are plenty of radio goodies about and Chris will guide you to the best buys.

Welcome to *Buying Secondhand* (*BS*)! My thanks go to the readers who contacted me about the hand-held feature in the last *BH* column a couple of months ago, especially for your ideas and particularly for what you'd like featured for specific models of radios.

This month I was intending to feature dual-band hand-helds, and as you see I'll certainly be keeping to that. But what did surprise me a little was that it seems you'd particularly like information on some 'tiny' hand-helds, such as those with the footprint of a credit card or even less – rather than larger full-powered types.

The interest is possibly because, commencing around ten years ago these tiny radios were 'all the rage', initially single band types and then multi-band versions. But new models don't seem to be in prominence and thus are rarely seen in manufacturer's and dealer's ads. In fact a couple of readers quizzed me about these when they'd read my mention of them in the last column – particularly the Yaesu VX-1R I own and use – as they didn't know such small handhelds even existed!

So I'm providing some information here on four different hand-helds, from four different manufacturers, all of which I've used. I've also often seen these models on the second-hand market recently at quite reasonable prices, apart from possibly the Standard C710 which is a little 'rarer'. But I've included it here for completeness, and because I feel it offers a unique tri-band performance in such a small package.

Note: The only reason I've not included a Kenwood hand-held is that – to my knowledge – they concentrate on larger full-power hand-helds rather than 'credit card' sized radios, although I'm always ready to be corrected!

The Alinco DJ-C5

Alinco were the first manufacturer to bring out truly credit-card sized, single band hand-held transceivers, the DJ-C1 for 144MHz (2m) and DJ-C4 for 430MHz (70cm). These were exactly the footprint of a credit card but with a thickness of just a few millimetres (mm), in fact rather like a wallet-sized calculator with a flat membrane keypad area and a small liquid crystal display (l.c.d.) screen. They didn't have the thickness to house a built-in speaker, you needed to plug in an earphone for reception, and this in my opinion was their only disadvantage, but I had great fun in using them on air.

But just a year later, Alinco managed to squeeze a dual-band 144/430MHz transceiver into a case of exactly the same footprint. They also added a tiny but much-needed internal speaker to the set, to form an ultra-compact portable transceiver.

It uses a neat flexible set-top antenna, although this is permanently attached so you can't remove it and connect an external antenna for use at home. But even so you can indeed fit it into the credit card compartment of many wallets – albeit with the antenna sticking out!

The Alinco set gives you transmit and receive coverage of 144-146MHz and 430-440MHz, and many owners will have had the receive coverage extended to give reception of 118-174MHz – it automatically switches to amplitude modulation (a.m.) across 118-136MHz civil air band reception), plus 380-474MHz on frequency modulation (f.m.).

The radio measures a tiny 56x94x6mm, and has a transmit power output of 300mW. It's powered from a tiny but powerful 3.6V 600mAh Lithium Ion battery, and original sets were supplied with a charger/a.c. adapter 'docking station', which the transceiver body clips onto, an a.c. wall-plug power supply plugs into this.

Note: Make very sure that you get the adapter included when you're buying one. But don't worry too much if the a.c. adapter's missing, as you could easily adapt one of the many readily available and very cheap cellphone chargers – the last one I bought for my Nokia 5800 cost me less than £2 – including postage and packing!

To keep such a low profile there are no rotary controls on the set, instead there are keypad membrane **Up**/**Down** buttons for the operating frequency, plus

Chris Lorek G4HCL gives a few ideas and hints on finding and buying a tiny dual-band hand-held transceiver.

receive volume in eight pre-set steps after a press of the **Vol**/**Sql** button, a further press of this switching to squelch level adjustment in five pre-set up-down steps.

The often-used buttons on the Alinco can sometimes become worn and maybe even intermittent, so check if you can before buying. For repeater access, both the Continuous tone controlled system (CTCSS) and 1750Hz toneburst facilities are included. However, if you're using 1750Hz on 144MHz you may need to get inside to reduce the transmit deviation down to 12.5kHz channel spacing requirements (2.5kHz peak deviation rather than 5kHz), just ask whether the previous owner has done this.

Memory Channels

Operation wise, the set has 50 memory channels to store your commonly-used frequencies into. There's also 2.5mm three-conductor socket on the radio for an external speaker microphone and an adapter is also available to convert this into the 'usual' 2.5mm and 3.5mm two-conductor connectors to use commonly-available external speaker microphones.

Again see whether a microphone is included. However, if not then, in my opinion it's not that important as the set itself is smaller than most speaker-microphones!

When I used the rig, I found that my transmit audio was usually described as 'it doesn't sound like you at all'. This was probably due to the very small size and the correspondingly small-microphone acoustics.

The wide-band coverage I found really useful, although (as I live fairly close to a civil airport) I found strong a.m. signals did tend to distort somewhat, so don't expect too much if you're an aircraft enthusiast using it at an airport. But then it's a tiny set!

Virtually every radio enthusiast – licensed Amateur or not – that I showed the DJ-C5 to while I was using it, thought I was joking when I told them it was a dual-band transceiver coupled with an a.m./f.m. equipped v.h.f./u.h.f. scanner! They usually couldn't believe how a manufacturer could fit so much into a small case size.

The Icom IC-Q7E

The Icom IC-Q7E is another tiny hand-held, again with a 'footprint' of around (or just less) than a credit card – in this case it's a little thicker, at 58x86x27mm. This is because the set uses two AA sized batteries for power, which fit into the rear battery compartment, so you won't need expensive or hard-to get batteries. Just use the commonly-available rechargeable batteries or of course other types such as alkalines for stand-by use or more capacity for a given operating event.

The transmitter provides a transmit power of 350mW on 144MHz and 300mW on 430MHz when it's powered from a 3V supply (i.e. using zinc or alkaline batteries), or just a little less if you're using 1.2V re-chargeable cells.

Note: I measured 291mW on 144MHz and 244mW on 430MHz with fully charged Nickel Metal Hydride (NiMH) cells fitted on the one I used.

An SMA antenna connector is used with a detachable helical whip, so you can connect an external antenna if you wish – for use at home perhaps. The set's front panel has only a few push buttons, together with a click-step rotary knob on the top panel. But don't let the lack of controls fool you, as the radio has no less than 25 different pre-programmable functions to make it extremely versatile.

You can pre-set various user functions like the tuning step, duplex shift and offset, scan settings such as individually programmable pause and resume times. These are provided together with several 'priority watch' modes, dial tuning speed, auto power off, power save and the like. There's full CTCSS encode and decode fitted as well as a 1750Hz toneburst for repeater access. There's even a handy CTCSS 'tone scan' facility to let you find which sub-tone – if any – is present on the channel you're tuned to.

As with the other sets detailed in this article, you may need to get inside the transceiver to reduce the 144MHz transmit deviation down to 12.5kHz channel spacing requirements (2.5kHz peak deviation rather than 5kHz), but again ask if the previous owner has had this done.

There's also wide-band receive coverage built-in, with continuous coverage of 30-1300MHz and the f.m., a.m. and wide-band f.m. reception modes. The **Band** button cycles between 30-90, 90-142, 142-250, 255-383, 383-770, 770-940 and 940-1300MHz sub-band ranges. It automatically brings up the last-used frequency, mode, channel step and so on for you on each band.

There are 200 memory channels fitted plus two **Call** channels, and for scanning for new activity there are 20 'search bands', i.e. lower and upper frequency limits. These you can program into any of the memory channels, for the receiver to then scan between in your programmed variable frequency oscillator (v.f.o.) steps.

The transceiver is also fitted with a 'frequency pass' facility, where if the scan or search halts on some unwanted frequencies, like pager transmissions or

other unwanted signals, they can be programmed to be skipped. A dual-watch 'priority check' also lets you keep and ear open on two frequencies if you wish, for example to periodically check the local repeater while you're monitoring another channel for activity.

When I used this set on air in the past I was quite pleased with its performance, even connecting my rooftop v.h.f./u.h.f. collinear antenna didn't cause many overload problems. I found this result quite surprising for such a small set as many dedicated hand-held scanner receivers I've tried suffer badly here.

A four conductor 3.5mm jack socket is fitted so you can plug in an external speaker-microphone. If your seller is also offering one of these in with the radio – my advice is that you should take advantage of it. Otherwise, you could get a suitable jack plug (Maplin stock them for example) and build yourself up an adapter for use with a normal two-plug speaker-microphone or just wire into a mobile hands-free microphone.

The Standard C710

When it appeared the Standard C710 was, and quite probably still is, the world's smallest tri-band Amateur Radio hand-held transceiver, covering not only the 144 and 430MHz bands but also 1.3GHz (23cm) in the same radio. It measures 58x104x27mm, virtually the size (though not the thickness) of a credit card.

Weighing just 210g the '710 isn't heavy either and won't drag your shirt pocket down. Even so, models bought new came with a screw-on belt clip and hand carry strap – check whether the seller has these if they're important to you. Remarkably for a set of this small size, the front panel features a full numeric keypad with translucent backlit buttons for direct frequency entry as well as eight further control buttons.

The eight extra control button can also act as a DTMF ('touch tone') encoder on transmit. A click-step rotary knob at the top of the set lets you manually tune through the bands in your chosen channel steps, or between your programmed memory channels, of which 200 are available.

The transceiver from new normally covers 144-146MHz, 430-440MHz and 1260-1300MHz, but many owners will have subsequently enabled the wide-band receive option, which will give you receive coverage in five switched bands of 100-200MHz, 300-400MHz, 400-520MHz, 700-1000MHz and 1200-1320MHz. For receiving the a.m. mode is also fitted, you can either manually select this on any frequency or have it selected automatically for you whenever the receiver is tuned to the v.h.f. and u.h.f. air band sections within its wide-band receive range.

Like the DJ-C5, the set is powered by AA sized cells, in this case three cells are used. The radio can operate from a supply voltage of between 3.3 and 5.5V, and with dry cells (i.e. Alkaline 1.5V cells) the set gives a transmit power output of around 1W on 144MHz and 430MHz and 280mW on 1.3GHz, with switchable low power down to 300mW on 144MHz, and 430MHz and 170mW on 1.3GHz. On the C710 I used I measured 1.12W on 2m, 0.98W on 70cm and 0.28W on 23cm with it powered from a 4.5V d.c. supply connected to the battery terminals.

Also, the set I used in the past (when we used 25kHz channels spacing on 144MHz) had over 5kHz transmit deviation on 2m. Again, as with the other sets mentioned here, you may need to get inside to reduce the 144MHz transmit deviation down to 2.5kHz peak deviation, again ask whether the previous owner has had this done.

I really enjoyed used the C710, and appreciated the slightly higher power of 1W on 144 and 430MHz, rather than a half or a third of a watt which other similar-sized hand-held could muster. I even managed the occasional 1.3GHz repeater contact with the set on my travels.

The 'hard trial' of connecting my rooftop collinear antenna did cause some occasional breakthrough from 12.5kHz spaced signals on 144MHz when I was trying to listen to a much weaker signal on the next channel, but a quick lab test showed the rejection was in the order of 30dB and this was around that of other sets I'd tested of that era. Hence it was something to be expected. But in its defence the receiver was exceptionally sensitive on 2m (I measured 0.12μV p.d. for 12dB SINAD) and it pulled in weak signals far better than other similar sets, so that could be the reason!

Being such a small set, the previous owner may well have used the antenna as a carrying handle for lifting the set up, or even worse, for pulling it off their belt when using the belt clip. So check the SMA antenna connector if you get a chance, wiggle the base of this about whilst listening to a weak signal with the set-top antenna connected to check for any intermittent connections. If it does seem to be intermittent, just open up the set by removing the rear panel (take care not to disconnect the battery leads) and check the internal antenna connection, a quick dab with a soldering iron on the coaxial centre terminal will often give a complete cure.

The Yaesu VX-1R

The Yaesu VX-1R is a personal favourite of mine, I still use the one I bought many years ago and three of my friends also use them one. Once again it's a tiny transceiver, with a footprint less than that of a credit card, measuring 47x81x25mm and, with its fitted Lithium-Ion battery, it weighs just 125g.

The transceiver gives you transceive operation on the 144MHz and 430MHz Amateur bands, as well as

wide-band receive coverage across over 76-999MHz with reception modes of a.m., narrow f.m. (i.e. communications) and wide-band f.m. (for broadcast reception).

Additionally, the 'VX-1R also has medium wave reception built in, albeit without direct frequency readout. Instead it uses the receiver's S'-meter bar-graph operating as a small analogue tuning scale. Some users will have had the set modified for out-of-band transmit as well, this modification is a simple case of altering a couple of small internal solder links.

As new, the rig came supplied with a re-chargeable 700mAh 3.6V lithium-ion battery, which gives 500mW transmit power on both the 144 and 430MHz bands. A plug-in wall charger/power supply was also supplied with new radios, and the user manual says that as well as charging the internal battery this can also be used as a base power supply, which increases the transmit power output to around 1W.

If your seller doesn't have the original Yaesu supply (this is a fairly chunky and heavy unit with 'Yaesu' clearly marked on it) but instead a smaller charger, maybe of Chinese origin – don't try to use the radio on transmit with this attached as it won't have the current capability. At best you'll get a mains hum on your transmission, at worst a damaged charger, although it'll probably be fine if kept just for re-charging purposes.

A very handy accessory to look out for, if your seller has this, is the optional Yaesu FBA-20 battery case. This houses a normal AA sized battery and slides in place of the internal lithium pack. It won't give you the capacity of a Lithium pack, but it's useful for short-period receive use and occasional low power transmit operation, giving 100mW output. A handful of AA cells can then last you a weeks worth of listening if you're away from a mains power source, without using the expensive Lithium packs.

The usual 1750Hz toneburst and CTCSS encode and decode are available, with a CTCSS 'bell' pager function to let you know there's been activity on the channel while you've been away, or indeed if you've just kept the volume turned down. There's also a 'CTCSS scan' facility that can let you check which tone is in use on a tuned channel, together with a Digital Code Squelch (DCS) encode and decode feature also fitted, together with DTMF encode using eight 'autodial' DTMF memories.

Once again, as with the other sets here you may need to get inside to reduce the 144MHz transmit deviation down to 2.5kHz peak deviation, I did this myself in just a few minutes – but again ask whether the previous owner has had this done. An SMA antenna connector is fitted to the top panel, so please check that the set-top antenna isn't very loose at the start of its thinner, flexible section. This is a 'strain' point and repeated grabbing of the set using the antenna over the years can cause problems here.

However, a replacement antenna can easily be fitted. As with other small sets, connecting an external rooftop antenna can cause some breakthrough problems, I still do find some with mine, but only to the extent of other similar transceivers.

The radio provides either 52 memories which store simplex or semi-duplex frequencies, including 'odd splits', tone frequency and mode, or if you wish 142 'simplex' memories, which can still have repeater shifts and CTCSS mode (but not the CTCSS frequency). Each memory, in either configuration, can have an 'alpha tag' assigned to it, and you can tune away from the stored frequency of any memory channel using the top-panel click-step.

There are also ten medium wave band memories, plus ten pairs of 'band limit' memories for searching, plus 31 'smart search' memories where the radio can automatically store the frequencies where activity is found at plus or minus 15 channels from the stored frequency.

Talking of memories, a very useful accessory to have, if your seller is offering this, is the VX-1 PC interface lead and remote programming software. Using this will save you much time in programming and alpha-tagging the many channels, or altering the set's memory contents from various pre-stored PC files depending on what you'd like to monitor at any time. Personally. I find it invaluable!

A common fault – at least judging by the fact that two of my friends have had it to happen to them – is that of the VX-1 going off-frequency by around 48kHz from the displayed frequency. Re-soldering the tiny internal chip capacitors connected to the synthesiser reference crystal cures this, as one sometimes goes open circuit and thus shifts the crystal frequency. Unfortunately, it's **a very, very tricky j**ob to do, so if you can check before buying that that the set transmits and receives on the right frequency by using a second receiver or transceiver.

Happy Hunting!

I hope this month's column provides you with a few ideas, and maybe some hints and tips, on what to look out for. Please do let me know what you'd like covered in future articles, the next in this series being in a couple of month's time.

In the meantime you can contact me by E-mail at **g4hcl@rsgb.org.uk** or by post to **PO Box 400, Eastleigh, Hampshire SO53 4ZF**. Cheerio for now! ●

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Diamond quality PSU **£189.99**

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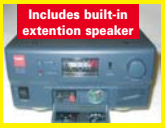

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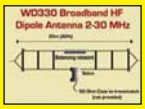

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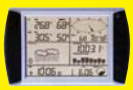

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Copper plated earth rod (4ft).....£14.99 P&P £8.00
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New RF grounding wire (10m pack) PVC coated .....£14.99 P&P £5

METALWORK & BITS (Del Phone)

2" mast-floor base plate.....£14.99
6" stand off brackets (no U-bolts)..... £8.99
9" stand off brackets (no U-bolts)..... £10.99
12" T & K brackets (pair) £18.99
18" T & K brackets (pair) £22.99
24" T & K brackets (pair) £26.99

All bracket measurements are from wall to end of bracket

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

MFJ-1117

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

MFJ-1118 metered

High current distribution unit £99.99

RH-9000 BNC

40cm flexible whip for the ultimate in gain. **£29.99** P&P £4.00
Tx:- 2m + 70cm (Rx:- 25MHz-2.9GHz).

RH-9090 SMA

40cm flexible whip that is ideal as replacement. Tx:- 2m + 70cm.
Rx:- 25MHz-2.9GHz **£34.99** P&P £4.00

Tony Nailer's

technical for the terrified

Tony Nailer G4CFY continues with crystal oscillators and amplifiers that oscillate when they shouldn't!

Welcome to the April edition of *Technical for the Terrified* (*TFT*)! Looking back, I actually passed my Radio Amateur Exam (RAE) in May 1965. However, I really didn't like the problem of getting into radio on 432MHz as it required a leap of technology from my experience with high frequency (h.f.) ex-government radios!

However, the rules changed around 1970 to include 144MHz as the lowest band for G8 licensees, so I took the plunge and obtained the callsign G8ERR. I was quite happy with that – as to err is human!

I purchased a transmit section of a very high frequency (v.h.f) amplitude modulated (a.m.) aircraft transceiver, the SCR522. I 'butchered' it to make it into a 144MHz transmitter and in doing so, learned just how difficult it is to make an a.m. transmitter stable. The envelope of the transmitted a.m. signal follows the waveform of the applied audio – and if any of this gets back to the microphone input the whole system tends to oscillate.

Valved Amplifier Instability

Also I learnt that valved power amplifiers (p.a.) stages have a great ability to oscillate and so, there's a need to use special techniques to 'tame' them. The SCR522 transmitter used an 832 power-amplifier valve, which is a dual tetrode, in a push-pull amplifier circuit.

The way of taming the p.a. stage was to fit a length of 18s.w.g. tinned wire from the grid of one half of the valve, around near to the anode structure of the other valve, as shown in **Fig. 1**. This is an application of negative feedback, called neutralisation, and it worked really well. Later twin tetrodes such as the QQV03-20 and QQV06-40 had the neutralisation wires fitted internally.

Valved HF Amplifiers

A similar problem occurs with valved high frequency (h.f.) power amplifiers, where the small value of capacitance from anode back to the control grid becomes significant at v.h.f. This capacitance can provide a positive feedback path from the anode tuned-circuit to the grid circuit, making the stage oscillate at v.h.f.

The solution to the problem is to include a coil of four or five turns of 1.2mm (18s.w.g.) tinned wire, about 7mm diameter, wound over a low value carbon resistor, and placed close the anode top cap connection. This is known as an anode v.h.f. parasitic stopper.

The coil 'looks like' a high impedance at v.h.f., but has its *Q* destroyed by the low value resistor and at h.f. the coil 'looks like' a short circuit. A typical valved h.f. amplifier circuit is shown in **Fig. 2**.

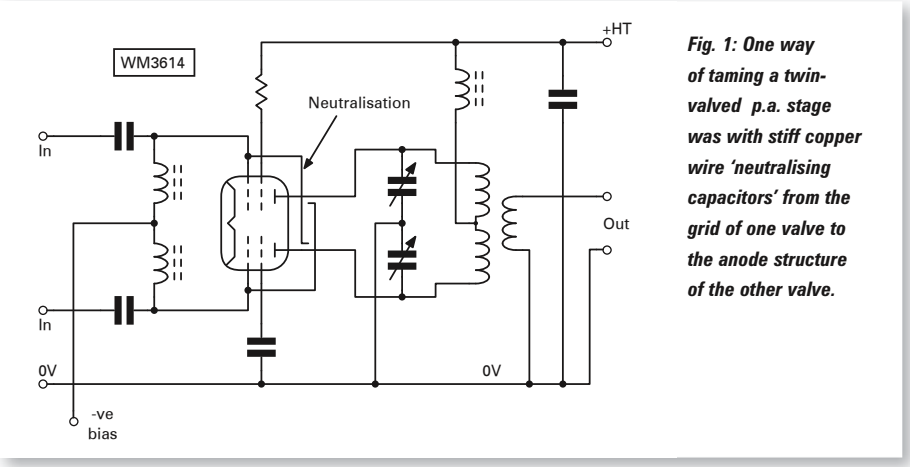

Fig. 1: One way of taming a twin-valved p.a. stage was with stiff copper wire 'neutralising capacitors' from the grid of one valve to the anode structure of the other valve.

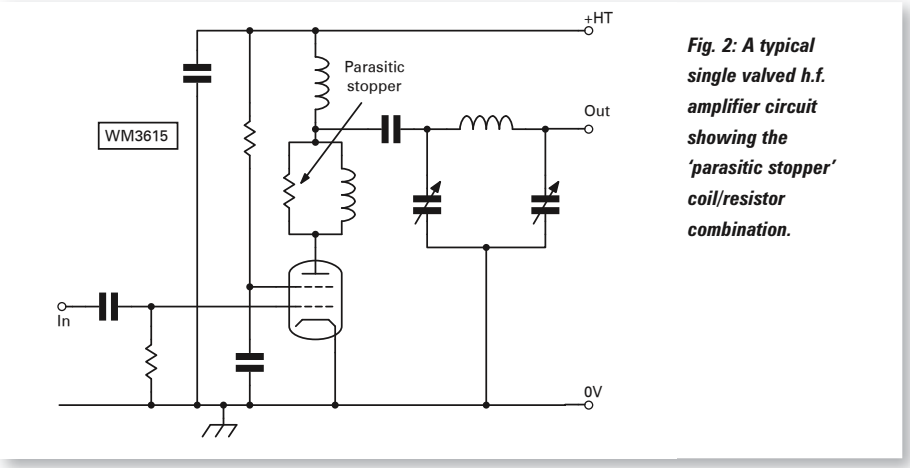

Fig. 2: A typical single valved h.f. amplifier circuit showing the 'parasitic stopper' coil/resistor combination.

An Audio Problem

From the late 1970s onwards, I had a problem – for 20 years! – involving the design and development of an audio speech processor, due to noise and instability. The output of a standard dynamic 600Ω microphone is about 50mV peak-to-peak (p-p) of lowest audio tones, and maybe only 10mV of the higher intelligence carrying tones.

Because of the unsatisfactory audio levels, it's therefore first required to use a high-pass filter with a corner frequency of about 1kHz, to pass the high frequency tones but attenuate the low frequency ones. The signal now has a much better balance of amplitudes of high and low frequency tones, but the overall level will not be more than 10mV p-p.

A pair of back-to-back silicon diodes will clip a sinewave to about 1.8V peak-to-peak (p-p). In order to achieve a clipping factor of 10dB

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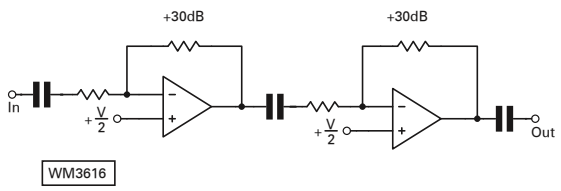


Fig. 3: The circuit arrangement for 60dB of amplification that Tony tried and found wanting!

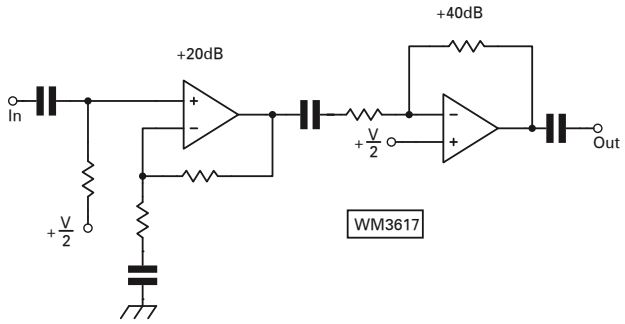


Fig. 4: By setting the gain of the non-inverting stage lower than the inverting one, any unintentional feedback would be more negative than positive.

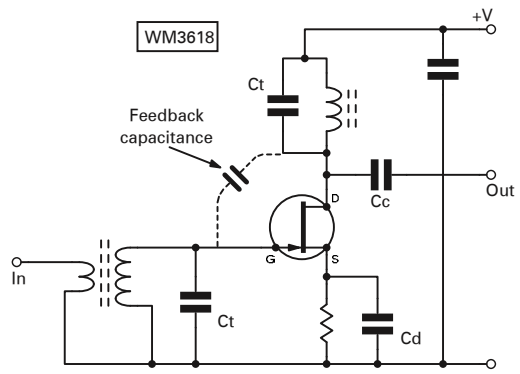


Fig. 5: A single j.f.e.t. amplifier can suffer from the same problems as the single-valved circuit of Fig. 2.

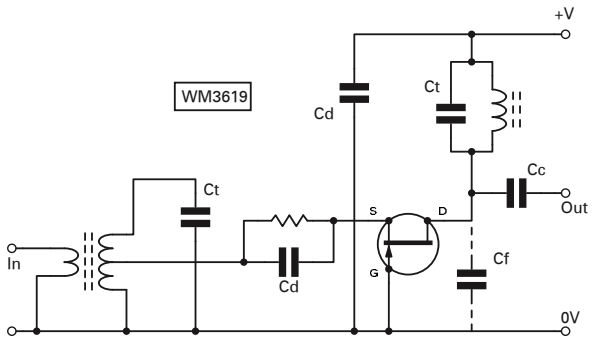


Fig. 6: One method of minimising the problems with the circuit of Fig 5, is to run the f.e.t. in common base mode.

(x3.16), the input signal to the clipper will need to be about 5.7V p-p.

To amplify 10mV of tailored microphone audio to 5.7V p-p requires an amplification of 570 times (about 55dB). As a rule-of-thumb, a gain of 60dB at any single frequency is very difficult to achieve without a tendency for oscillation or instability.

Solving the problem

Attempts to achieve the required gain, using two operational amplifier (Op Amp) stages, always resulted in a high noise level and a tendency to oscillate. The reason was simple; each stage had a phase change of 180°, which meant the output end was now in-phase with the input end. Earth currents, and feedback along the supply rail, of even the smallest amount of signal would cause oscillation. The circuit arrangement is shown in **Fig. 3**.

I tried an inverting Op Amp driving into a non-inverting Op Amp and it was stable, but quite noisy. Then I tried a non-inverting Op Amp driving an inverting Op Amp and things were much better. In particular, by setting the gain of the non-inverting stage lower than the inverting one, ensured any unintentional feedback would be more negative than positive. The arrangement is shown in **Fig. 4**.

Another result of this arrangement is exceedingly low noise. Whereas the cascaded inverting stages produced noise in excess of 100mV, the noise from the latter arrangement produced only 2 or 3mV at the output. (I have no explanation for this, but it's obviously a great benefit).

An HF problem

In about 1972, when studying for my Morse certificate together with **John Goodson G4CFX**, we decided to build an h.f. receiver together. We started with the input radio frequency (r.f.) amplifier stage and chose the 2N3819 junction field effect transistor (f.e.t.). With the Denco coils that we obtained, various circuits were built, and numerous experiments were undertaken.

We found that with the f.e.t. in common source as shown in **Fig. 5**, it had sufficient gain but due to the internal feedback capacitance, it couldn't be 'tamed'. The circuit diagram of **Fig. 5** and subsequent diagrams have the following notations: Ct is a tuning capacitor, Cd is a de-coupling capacitor, Cf is the feedback capacitor, and Cc is a coupling capacitor.

With the f.e.t. in common base, as shown in **Fig. 6**, it will be noted that the feed-back capacitance Cf goes to ground. As a consequence the circuit was very stable, but there was insufficient gain. Unfortunately,

not seeing a way forward, I withdrew from the project.

Advanced FET

A year or so later, the more advanced dual-gate m.o.s.f.e.t., type number 40600, became available at a reasonable price, but it was easily damaged from handling by static. Within a short time a second generation of m.o.s.f.e.t. devices, such as the 3N201, 3N211, and 40673, appeared, with higher gain and internal zener diodes to protect the sensitive gates. The devices were now much more robust and could now be handled much like ordinary transistors and other f.e.t.s.

Gain factors for these newer devices were typically around 12mA/V, which when used with a 2kΩ drain load gives a voltage gain of x24 or 28dB. When these devices were used in amplifiers, particularly at h.f., the stage could oscillate at v.h.f or even u.h.f. The solution to the problem was the same as with valves, to use a 'stopper' resistor (in the drain lead), to reduce the *Q* of the feedback path, shown in a typical circuit of **Fig. 7**.

Third generation m.o.s.f.e.t.s such as BF960, BF964, BF981, and BF984, are designed to work with gate 1 (g1) at source potential, not needing a decoupled source resistor. Combined with improved manufacturing techniques, it resulted in gain factors of typically 24mA/V. This when used with a 2kΩ drain load gives a voltage gain of x48, or 34dB. As with the earlier generation devices, the use of a drain stopper resistor is always necessary to avoid unwanted oscillation in amplifier stages.

The PW *Whitcombe*

In late 2003 I developed the *PW Whitcombe*, a simple 70MHz receive converter which was published in April 2004 *PW*. In this design I used a BF245A, or BF256A f.e.t. in grounded-source as an r.f. amplifier, in a circuit similar to Fig. 5.

Using the simple j.f.e.t. was the weak point of the design, as I had again attempted to use just a single device, in order to get a reasonable amount of gain. The instability problems were discussed in the article, but by damping the input tuned-circuit the problem seemed to be cured. A number of these were sold in both kit and ready-built form and it soon became clear that some were stable and others weren't.

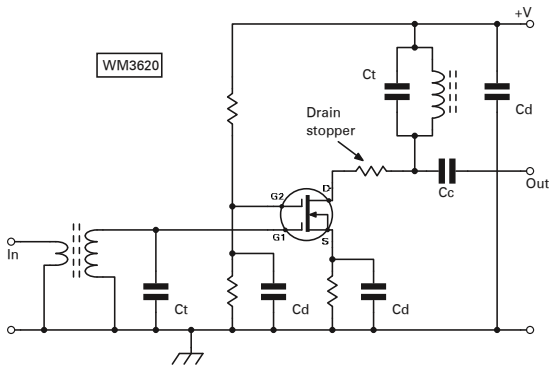


Fig. 7: Another method of reducing the tendency to oscillate is to use a drain stopper resistor, to lower the Q of the feedback path.

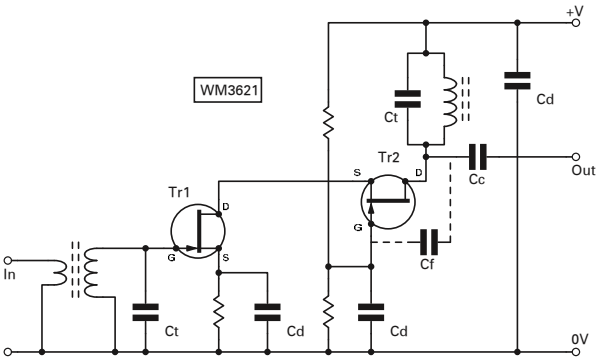


Fig. 8: The best circuit for a 'single frequency' amplifier is to add a second f.e.t. in a cascode circuit, getting the best of both common-source and common-base capabilities.

Cascode Circuit

The solution to the lack of stability problem is the cascode circuit, in which a grounded-source stage drives a grounded-base stage. Essentially this is the same arrangement as a dual-gate m.o.s.f.e.t. The cascode circuit is shown in **Fig. 8**. Note that the feedback capacitance now returns to a point that's de-coupled to ground.

The high impedance input of the gate of Tr1 allows a voltage step up from the input port by either capacitive or inductive impedance transformation. The drain of the first stage Tr1 looks into the very low impedance of the source of Tr2. This gives it virtually no voltage gain but is a large current source.

The grounded-gate stage Tr2 provides the voltage gain. With devices, such as the J309, the gain is comparable with that achieved with the 3N201 or the 40673. Noise performance of the J309 is 1.5dB at around 70MHz.

Transistor RF amplifiers

Small signal transistor radio frequency (r.f.) amplifiers are usually very stable, as the value of internal feedback capacitance from collector to base is much lower than f.e.t.s. Though at large signal levels problems can arise. Such a problem occurred in the unit originally called 'Mixer–VFO', (now known as Mixer–Oscillator), that was used in the *Poundbury* 70MHz s.s.b. transceiver project.

The circuit I tried, was a straightforward common emitter amplifier, as shown in **Fig. 9,** and was used to amplify the 61.0 to 61.5MHz output from the mixer integrated circuit. The circuit was bit temperamental, and whenever the output tuned-circuit was adjusted to the same frequency as the input, the stage could oscillate. (*Such an oscillator was called the 'Tuned-Anode–Tuned-Grid' or TATG in the days of valves!* **Editor**.)

One Solution

One solution to the problem of the oscillation, was to remove the emitter resistor bypass capacitor, to provide

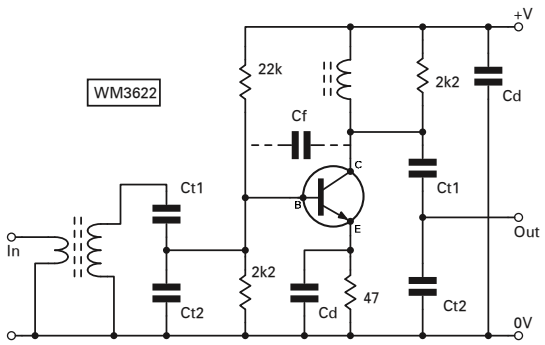


Fig. 9: A straightforward common-emitter amplifier can suffer similar problems to those of Fig. 2 and Fig. 5.

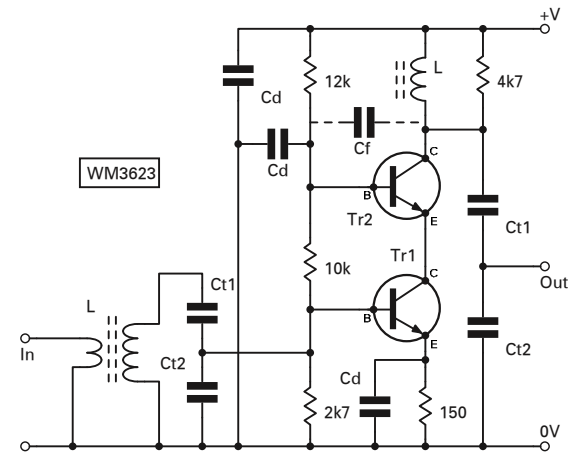


Fig. 10: A bipolar device cascode circuit, (like the f.e.t. circuit, Fig. 8), also achieves high gain and good stability.

negative feedback and reduce stage gain. The penalty was also that the output was now significantly reduced. Any continued tendency to oscillate could be suppressed by adding a 2.2kΩk resistor across the output coil, but again further reducing the stage gain.

The other solution is to convert the stage to a cascode circuit, (like the f.e.t. circuit of Fig. 8), which achieves high gain and good stability. This circuit as shown in **Fig. 10**, and again shows the feedback capacitance returning to a point de-coupled to ground.

By using the technique of the totem-pole bias chain, it simplifies the circuitry, meaning that only three extra components are needed. The mixer–oscillator circuit and printed circuit board (p.c.b.) artworks have been updated accordingly.

The values of bias and supply resistors shown in Fig. 10 will suit devices like BSX20, 2N2369A, BF195, BF199, and BF224. The values of inductors L, tuning capacitors (CT1 and CT2) and de-coupling capacitors Cd, will be determined by the operating frequency, which can be any spot frequency from 455kHz to 150MHz. Values for CT2 should be four or five times the value of CT1.

Final words

Hopefully, this article will help those who also have suffered with amplifiers acting more like oscillators and inspire constructors to resurrect the failed projects and get them running properly. To all my regular readers I hope it has been an education!

Any reader wishing to contact me regarding the contents of this article, please E-mail **tony@pwpublishing.ltd.uk**

The Rev. George Dobbs'

carrying on the practical way

This month the Rev. George Dobbs G3RJV builds a stable regenerative receiver – after his usual appropriate quotation!

"In anything at all, perfection is finally attained not when there is no longer anything to add, but when there is no longer anything to take away...."
Antonine de St. Exupery, *Wind, Sand and Stars*

Welcome to the April edition of to *Carrying on the Practical Way* (*COTPW*), where I'm starting by suggesting that it wouldn't be stretching things too far to say that there's a certain amount of folklore in Amateur Radio construction. For example, circuits and ideas that have been around for a long time, have over the years have been modified and sometimes improved, by what we lovingly call 'tinkering'. Some might even call it 'research'!

Fortunately, Radio constructors are a generous group in sharing their ideas and experiences and when comparing notes on what they are building, there is usually a lot of 'have you tried this', or 'have you tried that'?, type of discussions.

I think that this activity provides the lubrication that keeps the hobby moving and turns over interesting technical 'stones' to find out what's underneath. We aren't perhaps dealing with the cutting edge of modern technology – but **we are enjoying** the personal satisfaction of building something for ourselves and sharing in that pleasure! Many well known Amateur Radio projects have their own stories; often a catalogue of conception, evolution and modification. That is certainly true of my favourite regenerative receiver circuit.

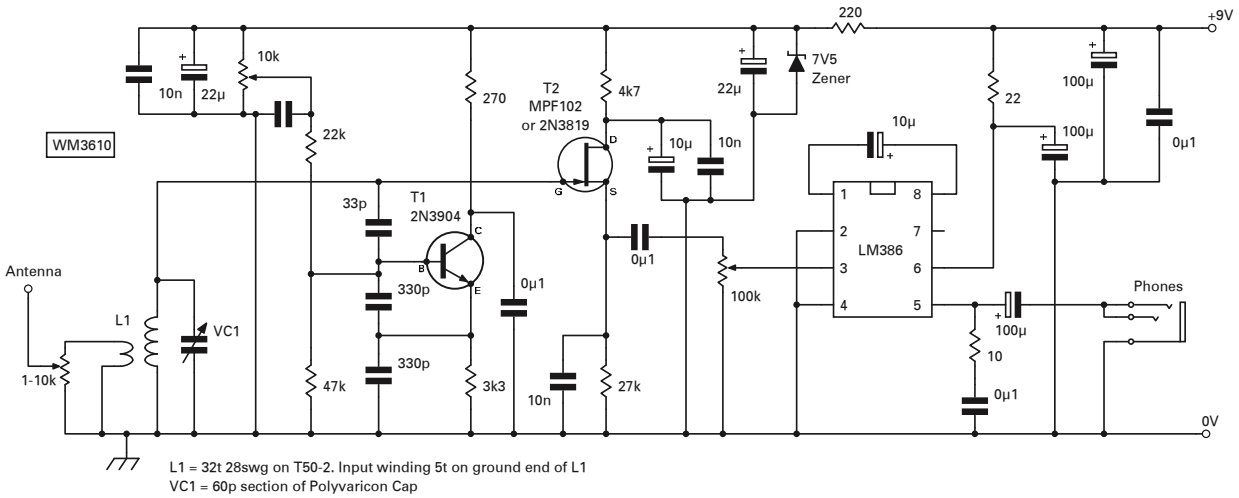
Regenerative Receivers

Regular readers of *COTPW* will know that I'm keen on regenerative receivers and I have described many of them on these pages. It may be my nostalgia for the old days of radio construction or perhaps the repeated proof that these simple receivers perform surprisingly well. As I have said here before, a regenerative receiver is 'all about an oscillator'. This is because at the heart of a regenerative receiver is an oscillator circuit with not quite enough loop feedback to maintain oscillation.

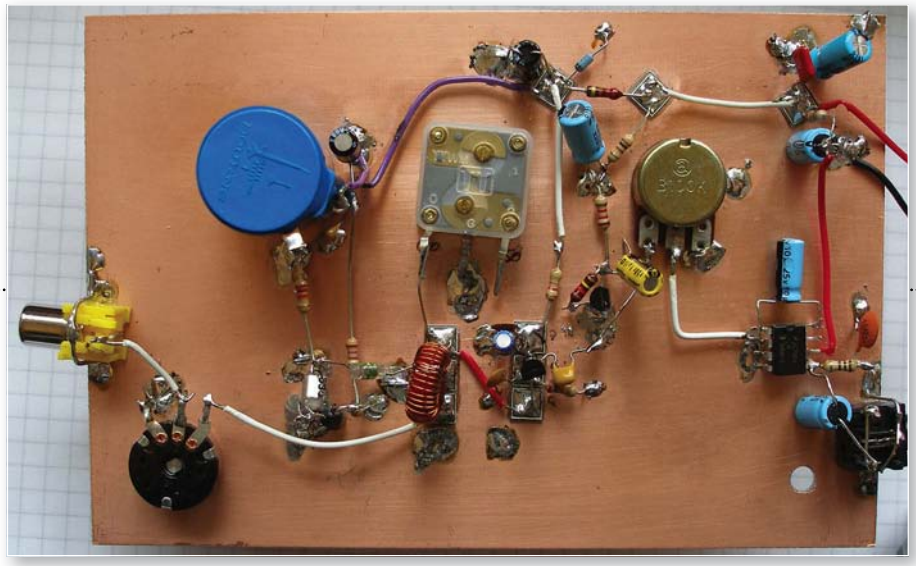
The regenerative receiver's oscillator uses some method to control the feedback to a point just below oscillation to receive a.m. stations – and just above oscillation for c.w. or s.s.b. signals. A sine wave oscillator with insufficient feedback to sustain oscillation becomes a sharply tuned band-pass filter with high gain at the oscillator frequency. Thus the circuit has high amplification (gain) and narrow bandwidth (selectivity) at the chosen frequency – two highly desirable properties for a shortwave receiver.

In the past I've described

Fig. 1: The circuit idea from George G3RJV for a regenerative receiver.



L1 = 32t 28swg on T50-2. Input winding 5t on ground end of L1
VC1 = 60p section of Polyvaricon Cap



All the components are mounted 'dead-bug' style on the rear of the front panel made from copper-coated board, forming an 'earth-plane'. The layout follows the circuit diagram, with the antenna input on the left-hand side, audio output on the right.

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regenerative receivers using Armstrong, Hartley and Colpitts configurations for the oscillator circuit. However, my first choice for a regenerative receiver uses a detector with a tuned circuit augmented by a *Q* multiplier. Perhaps the commercial receiver I enjoyed most of all was the Drake 2B with the addition of its optional *Q* multiplier. (I wish I had never parted with my old Drake 2B!).

The Drake *Q* multiplier circuit features an oscillator on the edge of oscillation, so when it's loosely coupled to the top of the first i.f. (intermediate frequency) transformer of the receiver, it will increase the selectivity (*Q* factor), thereby reducing the i.f. bandwidth. This concept can also be applied to regenerative receivers and results in a high gain, very selective, receiver. I first met the idea in a receiver designed by **Des Vance GI3XZM**, which he designated the 'Blooper'.

Some time later I read a paper called 'An Active Crystal Set' by **Chris Garland G3RJT**, in which he described a shortwave crystal set. He then moved on to a regenerative receiver with an f.e.t. infinite impedance detector and a *Q* multiplier. Chris even produced a complete 7MHz c.w. station based upon his version of the receiver.

Perhaps the best known version of a regenerative receiver using a *Q* multiplier was the 'Nicky TRF' that appeared in the spring 1992 edition of *Sprat*, the journal of the G QRP Club. The 'Nicky' was produced by **Colin Davis G3VMU**, as a simple receiver for his son.

Later, **Doug Gibson G4RGN** then made improvements to the circuit and I designed a printed circuit board (p.c.b.) for my two sons to build the radio – and this was later sold in kit form. This receiver really does have its own history!

Simple *Q* Multiplier

Recently, I thought I would return to *Q* multiplier type regenerative receivers with a view to producing a simple version. As **Antonine de St. Exupery** wrote, *"In anything at all, perfection is finally attained ….when there is no longer anything to take away."* After some ugly-style experiments with the ideas on this theme, I produced the circuit in **Fig. 1** as perhaps the simplest, but viable, version of the receiver.

I have called my project 'A Stable Regenerative Receiver". Not only is the receiver frequency stable in use but when switched off, the next time it's switch on, it will still be at exactly the same frequency – a remarkable attribute for a regenerative receiver.

The circuit of Fig. 1 is easiest to explain by first ignoring the oscillator transistor (Tr1) and its associated components. The input signals are tuned by L1 and VC1. That tuned circuit is connected to a field effect transistor (f.e.t.) detector circuit (Tr2). If older constructors imagine the f.e.t. as a triode valve, they would recognise Tr2 as an infinite impedance detector. Incidentally, the high impedance of Tr2 adds very little loading, and hence very little damping, to the tuned circuit.

The detected output from Tr2 is coupled to a 100kΩ logarithmic potentiometer that acts as a volume control for a simple LM386 audio amplifier. The choice of 100kΩ for the volume control may seem excessively high but the audio output using this value was much greater than the usual 5 or 10kΩ values for the potentiometer.

What I have described so far could be considered to be like an amplified crystal set, where the crystal is replaced by the f.e.t..

We now add the transistor Tr1 to the circuit of Fig. 1. Here, I've no doubt many readers will recognise this as a Colpitts oscillator with capacitive feedback from the emitter to the base. Here, a low value capacitor (33pF) couples Tr1 to the tuned circuit formed by L1 and VC1 that controls the frequency of the oscillator.

The bias voltage on the base of Tr1 is set by a 10kΩ linear potentiometer via the 22kΩ resistor. This provides adjustment of T1 through the point of oscillation. At the point oscillation occurs, the tuned circuit losses are at a minimum – simulating a very sharp and low loss (high *Q*) tuned circuit. So the stage functions as a selectivity control for the tuned circuit and also as a b.f.o. (beat frequency oscillator) for the reception of s.s.b. and c.w. signals.

In my prototype the main (tuning) winding on L1 is 32 turns of 28 s.w.g. enamelled copper wire wound on a T50-2 core. Note that there is a five turn link winding, wound over the ground end of the main winding, to provide an antenna input.

Note: Regenerative receivers can be damped by too much input, so a simple resistive attenuator is provided at the input. This should be a linear potentiometer of any value in the range 1 to 10kΩ.

A normal carbon track potentiometer is required as a wire wound type would introduce some inductance. The variable capacitor for VC1 is a 60pF section of an inexpensive Polyvaricon tuning capacitor – but a proper air-spaced variable capacitor of similar value would be ideal. With these values, the tuned circuit should hit the 7MHz (40m) Amateur band at the low end of the range and may, with luck, hit the 10MHz (30m) Amateur band at the high end of the range.

There are also many interesting broadcast stations just higher than 7MHz – on the 41 metre broadcast band. I used a 10-turn linear potentiometer to provide a very smooth regeneration control. (I realise that 10-turn potentiometers are very expensive so I'll suggest an alternative later).

The oscillator require a stabilised voltage supply for which I used a 7.5V zener diode. The receiver as shown works well and is easier to operate than many regenerative receivers. However, like all such receivers it does require re-adjustment of the regeneration control as the listening frequency is changed with extra adjustment needed for both tuning and regeneration with weak and strong stations. Inclusion of the attenuator control on the input allows it to be used with a short antenna and also with a main station antenna matched to 50Ω.

Remember that you are dealing with an r.f. oscillator and the receiver needs to be within a screened box or metal case. My 'ugly' style built prototype was built on the back of a panel made from p.c.b. material and I found it could be affected by 'hand capacitance' if I placed my hands too close to the edge of the panel. I also found that if it was used with a piece of wire as an antenna without a ground connection, touching the front panel detuned the receiver.

Alternative Pot

The diagram, **Fig. 2**, shows an alternative to using a 10-turn potentiometer for the regeneration control. As I've already mentioned, this control alters the bias voltage on the base of Tr1 to take it in and out of the point of oscillation. In practice, the range of voltage change required is rather low and measuring this over a variety of frequencies and strengths of input signals, I found it was within the 1.5 to 2.5V range.

An obvious way to use a normal potentiometer rather than a costly 10-turn potentiometer is to stretch this voltage range over most of the track. The simple potential divider arrangement shown in Fig 2, enabled me to get a smooth regeneration control over every signal and frequency condition on the prototype receiver. This could vary with some individual examples of Tr1 – or if different frequencies were desired – by changing L1 but it would be simple to measure the voltage range required and change the values shown in **Fig. 2**.

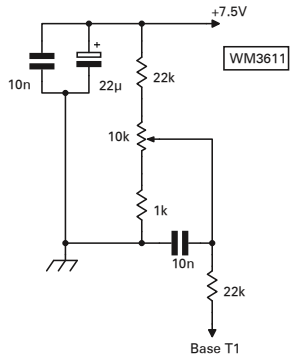

Fig. 2: This circuit provides an alternative to a 10-turn potentiometer for reaction control.

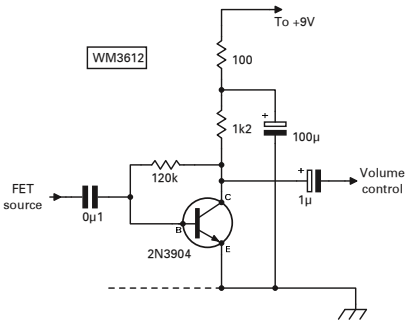

Fig. 3: The circuit of an optional audio pre-amplifier.

The diagram, **Fig. 3**. shows an optional audio pre-amplifier that could be added between T2 and the LM386 audio amplifier. In fact, my first attempt at building the receiver included the pre-amplifier.

In my desire to reduce the number of parts and still retain a viable receiver I by-passed the pre-amplifier and found that I still had enough overall receiver gain especially when using headphones. The photographs of the prototype still show the parts for the pre-amplifier in place but disconnected from the receiver.

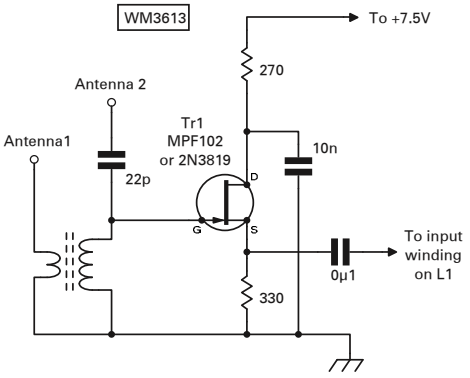

Fig. 4: Adding an aperiodic r.f. stage helps isolate the receiver from the antenna.

The diagram, **Fig. 4**, shows another possible addition. This is an f.e.t. aperiodic (un-tuned) stage to isolate the antenna from the detector circuit and it's a direct copy of the input on the 'Nicky' receiver.

Isolating the antenna from the detector and its associated oscillator can be an aid to stability. It also prevents any of the oscillator signal being radiated by the receiver. Yes – regenerative receivers can also be transmitters but the radiated signal is very low. The connection marked **Antenna 2** is a way of connecting a short antenna, perhaps just a few feet of wire, to the receiver input.

Like all regenerative receivers, operating it does require a little operator skill, but that's part of their charm! For s.s.b. and c.w. signals the receiver is best set at just above the point at which oscillation occurs, while for amplitude modulated (a.m.) broadcast signals just 'back off 'the regeneration control until it's just below the point of oscillation.

Operating Tip

Here's an operating tip – begin with the volume and attenuation control set high. Then set the regeneration control to the point at which oscillation occurs – this will then produce the a distinctive 'rushing' sound of a 'regen' working.

Next, tune in a signal and 'back off' the attenuator until the signal is still strong enough for adequate reception and then re-adjust the regeneration control for the best results. It may sound complicated but after a while it becomes simple to tune signals and even resolved weak s.s.b. stations!

I think it's usually better to use the attenuator as the main gain control, with the volume control set high. Remember the most sensitive and selective setting is just above the point where oscillation occurs. This point will remain constant over a small tuning range but will need re-adjustment over larger tuning ranges and for exceptionally strong or weak signals.

Try this receiver for yourself! It's easy to build and fun to use and you may be pleasantly surprised at how much you can hear with it.

Cheerio for now. ●

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

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Feature

Done to a Turn Part 2

A gentle introduction to practical coil making!

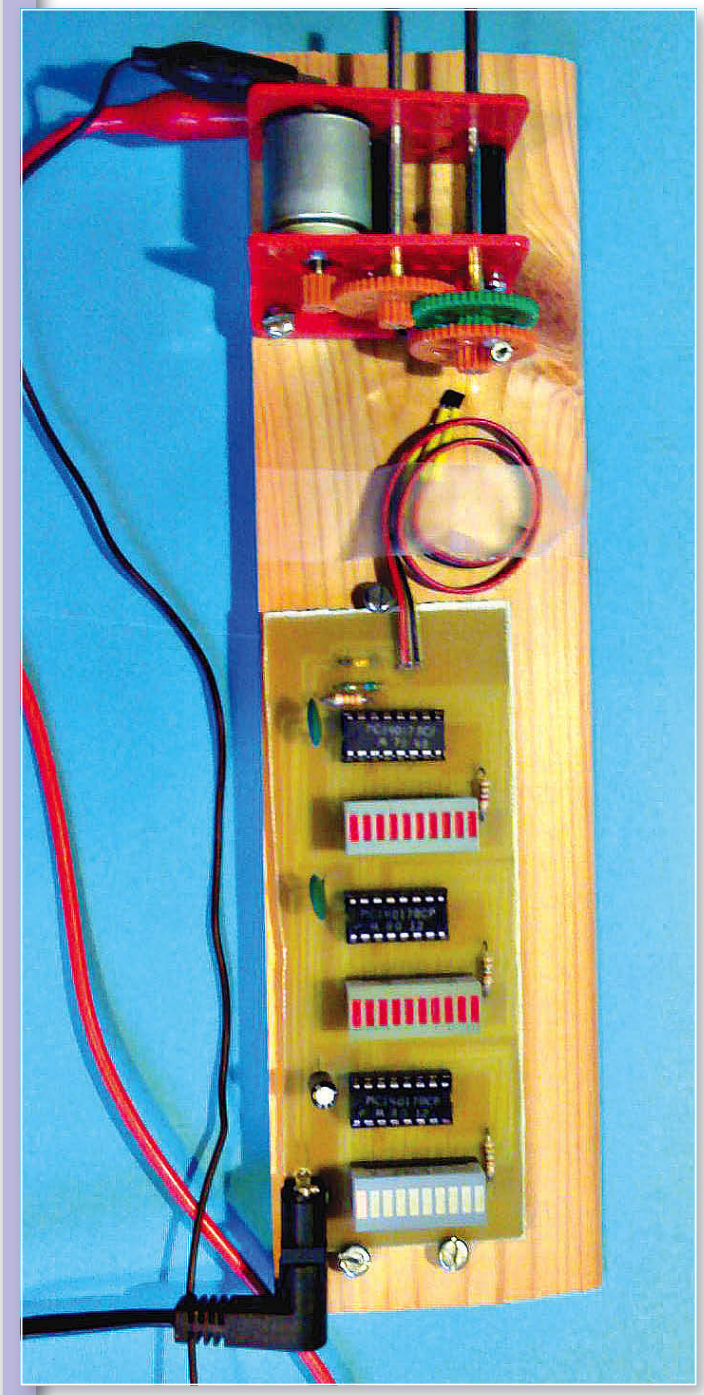


Fig. 6: The coil winder is based on an MFA motor and gearbox.

Welcome to Part 2, where I really am planning to take the toil out of coil winding by using a coil wind machine! However, the main problem you face when winding a coil is counting the turns. It is easy to forget where you have got to, especially if you get distracted by domestic interruptions.

For coils with many turns, boredom sets in, too! Thankfully, it's really easy to make a coil winding machine which can also count the number of turns for you.

Maplin sell small motor/gearbox kits made by MFA. These kits (available in different sizes) have a small direct current (d.c.) motor mounted in a plastic cradle which also supports various plastic gears (**Fig. 6**).

Note: *Figs. 1 to 5 appeared in Part 1 of this article, and the illustrations appearing this month are run sequentially.* ***Editor.***

You can easily re-configure the gears so that the drive shaft rotates at a rate which you find comfortable. The motor in the smallest kit runs at 1.5V so you can power it from a single AA battery.

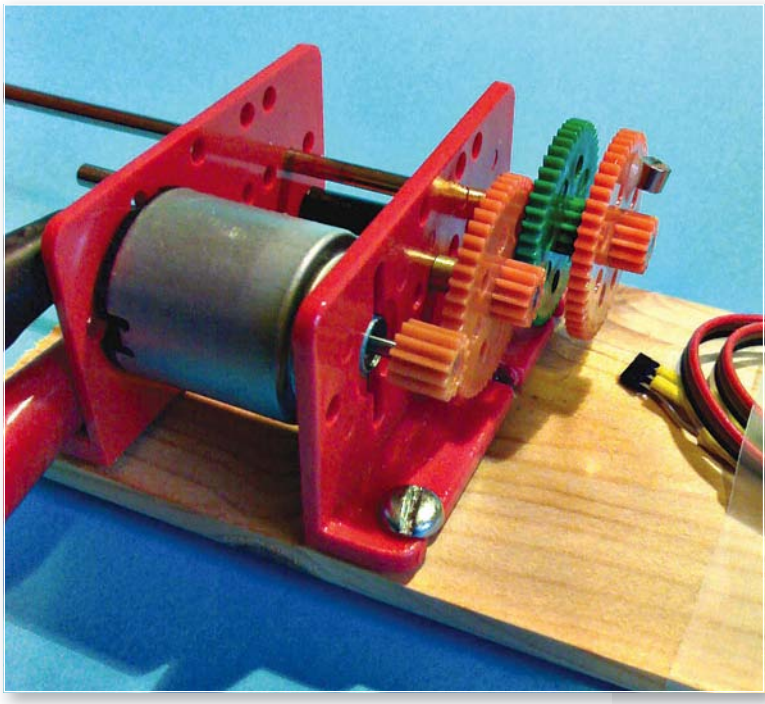


Fig. 7: The gearbox with magnet mounted on the final – far right, orange coloured – gearwheel and necessary sensor IC1, the black 'speck' just to the right of it .

Sam Dick G8OWX completes his article on coil winding and describes a simple winding machine.

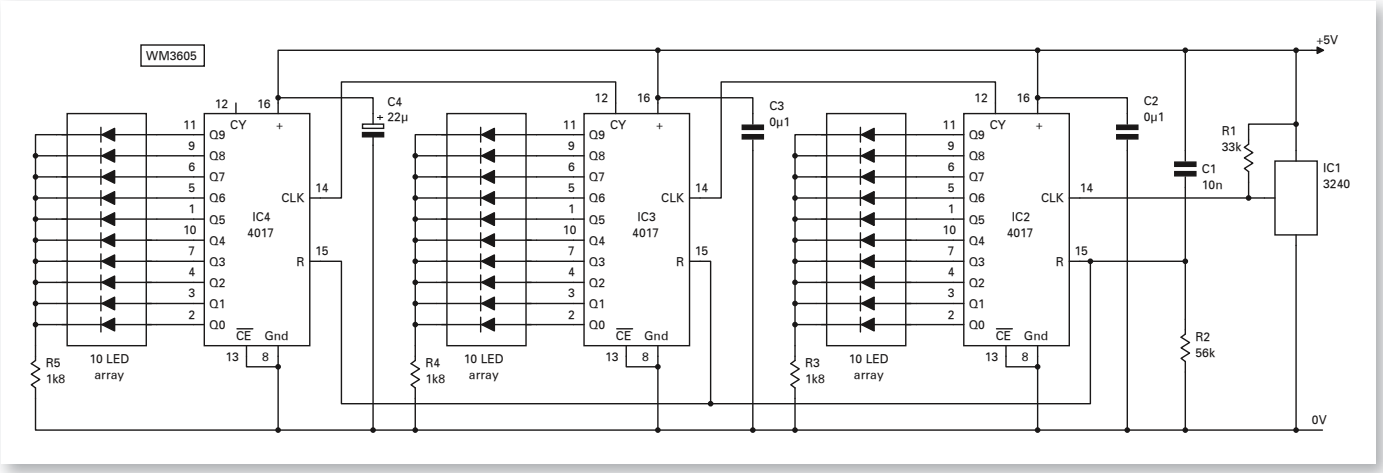


Fig. 8: The circuit diagram of the rotation counter is based on three c.m.o.s. decade output counters.

To control the rotation rate, I found it easier to use a small variable power supply – and with three of the green gears removed, the drive shaft rotated at a few revolutions per second at 1V, taking about 700mA.

To count the number of turns, a simple solution is to mount a small magnet on the shaft-coupled orange gear wheel on the drive shaft and use a magnetic sensor to detect the rotations (**Fig. 7**). I used an Allegro 3240 Hall effect switch as the sensor integrated circuit (i.c.) . It has an open-collector output which is turned on when a magnetic south pole is close.

The on/off output from the Hall effect sensor, which the sensor nicely de-bounces, is fed to a cascade of three 4017 CMOS decade counters. Each of which drives a simple 10 light emitting diode (l.e.d.) bar display to give a 000 to 999 count.

Referring to the circuit diagram of **Fig. 8**, at power-up, C1 and R2 provide a temporary high pulse on the counters' reset line to clear the count to zero. To make the sensor's open-collector output compatible with the input to the first 4017, R1 provides a weak pull-up. Power supply de-coupling is provided by C2, C3, and C4. The three 4017 integrated circuits (i.c.s) (IC2, IC3, and IC4) are cascaded together by linking the Carry-Out signal on one counter to the Clock input pin on the next counter. Also, the active-low Chip Enable pin is grounded.

Each 4017 has 10 output lines (Q0 to Q9) and one of these is 'high' at any instant to indicate the current value of the counter. The 10 outputs are fed to the anodes of the 10 segment l.e.d display bargraph to give visual indication of the count. For each bar, the cathodes are connected in common via a current limiting resistor (R3, R4, and R5) to ground.

Note that each decade of the counter chain is identical. So if you want to add more digits to the counter that would be an easy job.

My version of the counter was built on a small printed circuit board (p.c.b.) – **Figs. 9** and **10**, but I've not provided a layout at all, as it's also possible to build it on Veroboard. The Hall effect sensor, IC1, is connected via a short length of three-core cable to allow it to be moved if a different magnet location is wanted in the future.

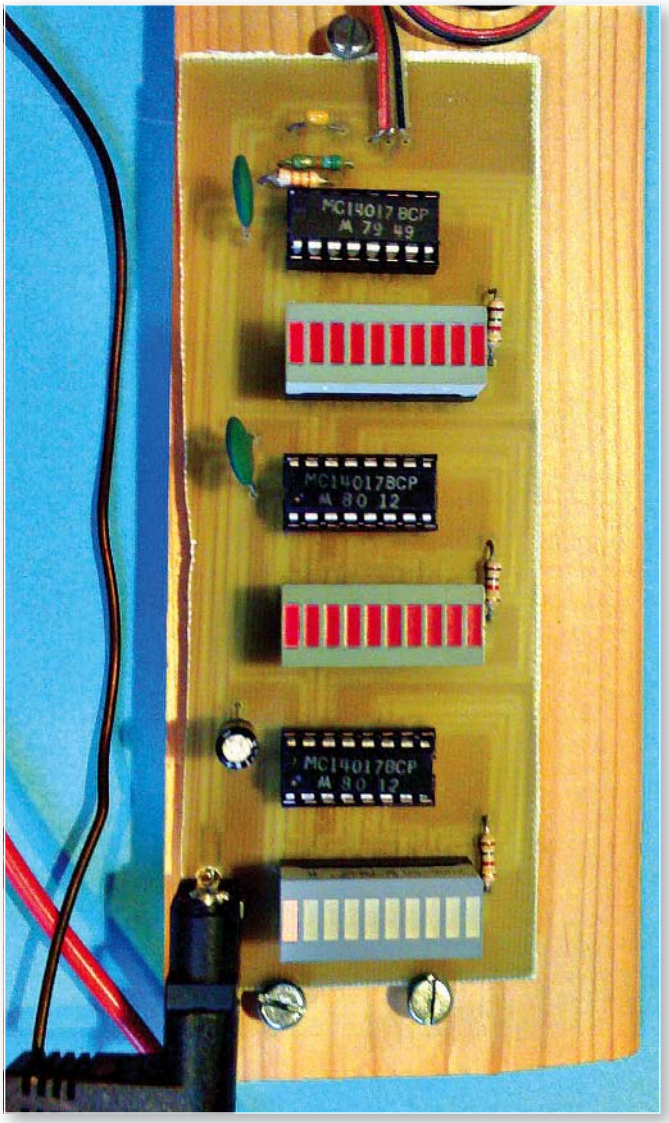


Fig. 9: A closer look at a p.c.b. prototype version of the turns counter.

Length-Less Inductors!

Coils do not have to have a length and do not have to be wound! Instead, you can wind a length-less inductor in the form of a spiral as shown in part-1 and these are commonly known as spider-web coils because they look just like a spider's web. Although spiral coils are not common in commercially produced equipment, many Amateurs have wound their own on formers made from a disk with radial slots cut in it.

Note: Start a 'Google' search using the terms

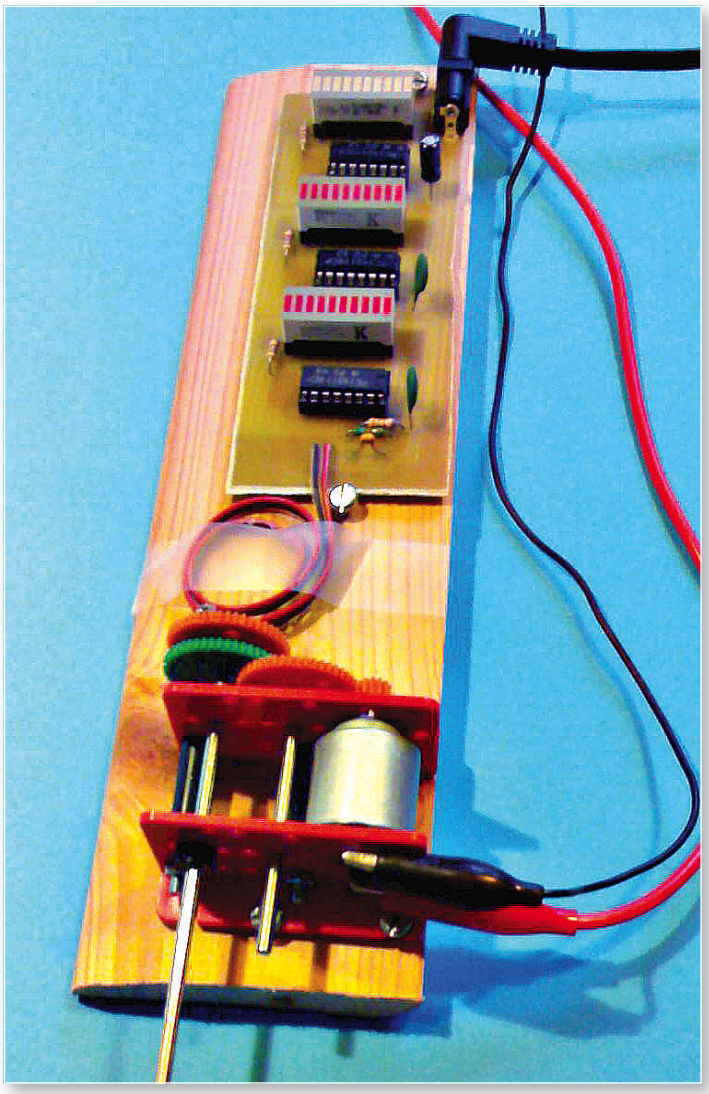


Fig. 10: A view of the completed counter, which can be mounted on a short length of wooden panel.

'spiderweb' and 'coil' to see some elegant home-brew coils. Spiral coils are very useful for small inductors (think nH) at very high frequencies (v.h.f.) and higher frequencies where the spiral can be fabricated on a p.c.b. or even within an i.c..

For a spiderweb, the coil is wound in a single layer and the inductance is given by

$L = r^2 N^2/(27w + 20r)$

where r is the coil's average radius, w is the width (outer radius – inner radius) of the winding (all in cm), N is the number of turns, and L is in μH.

If you are into making your own p.c.b.s, you can easily make a spiderweb coil without windings. I used a drawing package to create a 50 turn spiral which I then printed on to UV-translucent film (available from p.c.b. equipment suppliers like Farnell). I then exposed a 100m by 100m piece of photo-resist p.c.b. using the film as a mask and developed and etched the board in the normal way.

Vitally Important

The key, and vitally important, finishing stage is to check with a magnifier that none of the spiral turns have shorts between them caused by tiny whiskers of un-etched copper. If you see some shorting whiskers, scratch them away with a sharp blade.

My spiral has a 0.86mm pitch which seemed to produce a spiral with reasonable line thickness and a good gap between each turn! If you make the lines too thin or the inter-spiral gap too small this will be harder to etch correctly. The spiderweb inductance formula gives a design value of 68μH and the built coil has a 74μH inductance and d.c. resistance of 12Ω.

So, there you are - all the hard work removed from coil winding! I hope you enjoy making the project and save time and effort in making really good, neat and efficient coils and inductors. ●

Shopping List

Semiconductors
- 1 Allegro 3240 Hall effect switch
- 3 c.m.o.s. 4017B decade counters/decoders
- 3 10 l.e.d. bar displays

Capacitors
- 1 10nF disc ceramic
- 2 100nF disc ceramic
- 1 22μF 25V electrolytic

Resistors (250 mW, 5%, carbon film)
- 1 33kΩ
- 1 56kΩ
- 3 1.8kΩ

Hardware and miscellaneous
- 1 2mm low voltage socket
- 1 5V 100mA plug-in power supply
- 3 16pin DIL sockets
- 3 20pin DIL sockets

The Hall effect sensor is available from Farnell; the other components are usually available from most electronic suppliers, such as RS Components, Farnell, or Maplin.

Wire Table

SWG	AWG	Dmm	Turns/cm	Turns/cm^2	Ω/m
20	19	0.9	10	100	0.03
24	23	0.55	16	270	0.07
28	27	0.38	24	560	0.16
32	29	0.27	34	1000	0.3
36	32	0.2	48	1900	0.6
40	37	0.12	76	4900	1.5

Feature

Emerging Technology

Chris Lorek G4HCL looks at new developments in radio communication and how radio amateurs are again pioneering work in specialised fields.

Underground Radio Communication

Many readers will know that normal 'high frequencies (h.f.) and above' radio communication doesn't work very well when you're underground, like when you're in a cave or if you're underwater. Soil, water and solid rock all act as very good r.f attenuators. Submarines have traditionally used e.l.f. (Extremely Low Frequency) bands for communication, with wavelengths in the order or several kilometres rather than tens or hundreds of metres, with long antennas trailing behind them.

For communications between ground level and to those underground, such as caving enthusiasts and more importantly cave rescue teams, special 'cave radios' have been developed and used. These, like submarine communications, use ELF bands with frequencies measured in a few kilohertz or tens of kilohertz.

Typically, the lower the frequency, the better the waves penetrate in the solid or liquid matter, but the required antennas naturally become more wieldly as the frequency becomes lower and lower. Earth rods poked into the ground can be quite efficient for communication with underground cavers; but this is often impractical when you're underground with solid rock all around you, rather that at the surface with soil beneath you.

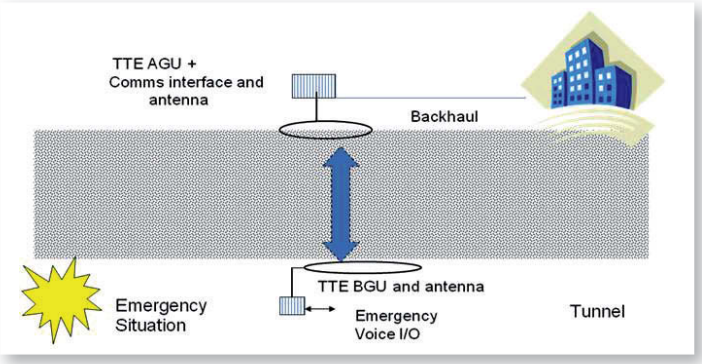
Portable antennas become rather large, and are typically multi-turn wire loops for the very low frequencies involved. The first cave radios used in Europe included the 'Molephone', which used a frequency of 87kHz with u.s.b. (Upper Sideband) for communication, and could reach underground depths of around 150-180m.

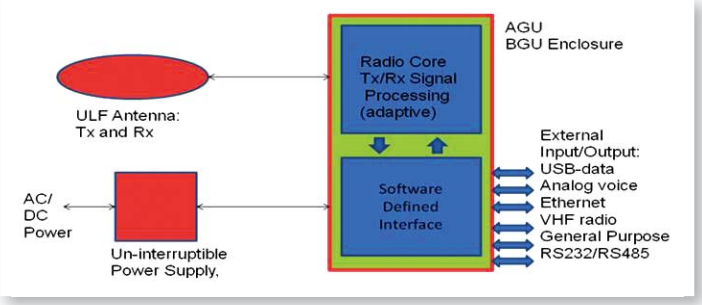
The Molephone was a commercial product, and I'm told it was discontinued some time ago. But then along came John Hey G3TDZ with his 'Heyphone' design, which I understand John kindly released into the public domain so that enthusiasts could build these themselves either from scratch or from a list of parts.

The Heyphone is coincidentally also a single sideband radio, also operating at 87kHz (s.s.b.), the same as the Molephone, and each could happily communicate with each other. The UK's Cave Radio and Electronics Group (CREG) are a division of the British Cave Research Association (BCRA), and I understand they use the Heyphone extensively.

If you're interested, you can find complete technical documentation, including schematic diagrams, p.c.b. layouts and artwork, and a user manual, for the Heyphone at **http://bcra.org.uk/creg/heyphone/documentation.html**

But time moves on, and even the designers of the original analogue radios for underground communications said that digital signal processing techniques would be the 'way ahead' for smaller and lighter equipment. Rescue teams could certainly benefit from even more efficient communication such as cellphone and data links, for medical ECG readings and direct contact with doctors etc. as a rescue





operation get the injured above ground can often take some time, and often precious time can be saved by having medical intelligence when it's needed.

Enter 'CanaryTalk', which is the latest development in underground radio communications. It can be used to provide communications links from either the surface to below ground, or between two 'below ground' locations. The radio equipment itself is equipped with standard audio and data interfaces, which allows it to be connected to a variety of communications devices including sensors, computers, and mobile wireless devices such as cellphones and Internet links.

The CanaryTalk system can provide Through-The-Earth (TTE) communications through up to around 180m of rock strata over a u.l.f. (Ultra Low Frequency) wireless communications link operating in the 2 to 8kHz frequency band. At this extremely low frequency, the long

wavelength of the signal minimizes the signal losses that severely attenuate higher frequency radio waves. The heart of the system is a radio that uses adaptive digital signal processing and noise filtering techniques to improve the range and throughput of the communications link.

Rather than push-to-talk communications like we're used to, it uses time-division multiplexing of the data to allow duplex two-way communications, with a voice compression algorithm allowing analogue speech to be use data rates below 2400 bps. A number of programmable interfaces can be used on the 'Above Ground Unit' (AGU) and 'Below Ground Unit' (BGU) including RS-232 and RS-485 serial data ports, USB, Ethernet, Bluetooth, analogue audio and a general purpose digital interface.

Of course all this, with the result of effective communication and lives being saved, has been directly through the use of emerging technology that was developed following the pioneering efforts of radio amateurs.

The world's smallest radio transceiver?

Radios are getting smaller and smaller, but receivers and transceivers, particularly 'passive RFID' (RF Identification) tags which typically consist of one IC and a printed flat-plane antenna, to be hidden in bar-code labels, are getting increasingly smaller. Now, many of us are used to using tiny slot-in SD and SDHC memory cards for our cameras, MP3 players, and the like. These cards are around the footprint of a small postage stamp, and typically have several gigabytes' worth of memory storage for your photos, music tracks, videos and so on.

You'd normally link your card to your PC to upload and download photos and tracks, either thorough the camera or player itself, or via a plug-in card reader, or directly into a slot on the PC itself – my laptop for example has an SD card slot on it for this very purpose. But yes, you could say 'it had to come'! There's now a range of SD cards available that each have a built-in two-way digital radio transceiver incorporated

The 'Eye-Fi' card is claimed to be the very first wireless memory card. It looks, stores media, and fits into cameras and players, just like a regular SD/SDHC card does. But on top of that, the Eye-Fi card has built-in Wi-Fi radio transceiver that can use a common Wi-Fi wireless network to transfer data such as photos and videos.

Basically, it turns your existing camera into a wireless media 'saving and sharing machine', you can use your home Wi-Fi network with this or link up with other networks. While you're setting up the device, you can specify which networks the card uses to transfer your media.

Altogether you can authorise up to 32 networks for the wireless SD card to use.

After you've done this, the next time your camera or other device finds that it's within range of one of the networks you've specified, it'll automatically connect to the network, and will transfer your data to the site you specify, this can also be a 'file sharing' site if you wish. Fortunately, the card will only send them to the computer and to the sharing site you choose, so hopefully there should be no security issues here!

If you've chosen to allow 'Online Sharing', you also decide where on the Web your photos are wirelessly transferred to. The communication range is typically around 30m outdoors or 15m indoors, and for the 'techies' amongst us the Wi-Fi transceiver system in the card uses 802.11b/g with in-built security of static WEP 64/128, WPA-PSK, and WPA2-PSK.

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

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

FT-817ND

YAESU

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

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

NEW! Yaesu FT-dx5000MP

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

Coming soon! See web for further details.

Yaesu FT-857D & ATAS-120A Package

Still our best selling HF Mobile Radio.

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

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

Yaesu FTM-350E

Latest Dual-Band APRS Mobile from Yaesu!

Available soon. Price TBA.

- High Speed Bandscope
- Optional FGPS-1 Internal GPS Unit
- Optional FGPS-2 External GPS Unit
- Optional FPR-1 Monitor Unit
- 500+500 Alpha Memories
- Bluetooth Ready
- Built in Barometric Pressure Sensor
- Large Dot Matrix Display
- Selectable Eight Color Display
- Extended Receive
- AM & FM, FM Stereo Broadcast Bands
- Easy menu system
- WIRES™ Ready
- 1200/9600 Packet Port [DIN]
- Built-in APRS® TNC
- Remotable Control Head
- Suction Type Control Head Mount
- Line Input Jack on rear panel

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

FT-450 shown with optional Bail Stand.

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

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

Options:

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

Yaesu FT-2000 PEP

Performance, Excitement, Perfection!

The DX choice of 3B7C.
Always in stock. Always on demo. Two flavours, 100W or 200W, you choose.

FT-2000: £1899.95 FT-2000D: £2399.95

FT-2000 Accessories

Yaesu CABPC-YAESU-USB At last we have USB Cables for FT-450/950 & FT-2000. These can be used for programming and Control of these radio's (Note to Firmware update the FT-2000 you will also need the FT-2000-PROG-PLUG at £5.00 inc VAT) £25.49

Yaesu Com Port Control and Programming Kit This allows computer control of the Yaesu FT-2000/FT-950/FT-450 and the programming of firmware updates without removing the feet of the radio. £25.54

Yaesu FT-2000 Memory Stick This 1GB memory stick includes Yaesu control software and the latest (ver.133) firmware update £24.95

MyDEL 9-PD to USB The MyDEL 9-PD to USB is a 9-pin to USB cable which allows you to connect your Yaesu FT-2000 to your Windows XP computer for firmware upgrades £29.96

Yaesu MD-100A8X The Yaesu MD-200A8X is a ultra high-fidelity desk top microphone. £204.30

Yaesu MD-100A8X Yaesu MD-100A8X is a desk top microphone £153.21

Yaesu FH-2 The FH-2 is a Remote Control Keypad built for the FT-2000 ..... £43.89

Yaesu FT-2000 & FT-2000D Mini-Manual. Size, 4.5x8 inches. Twenty high-quality laminated pages, loaded with detailed instructions covering all aspects of using these superb HF rigs £19.99

Yaesu MTU-160 The MTU-160 is an external µ-tuning unit for the FT-2000 on the 160 meter band. This MTU unit requires the external µ-tuning base kit. £449.51

Yaesu MTU-80/40 The MTU-80/40 is an external µ-tuning unit for the FT-2000 on the 80 and 40 meter band. This MTU unit requires the external µ-tuning base kit £449.51

Yaesu MTU-30/20 The MTU-30/20 is an external µ-tuning unit for the FT-2000 on the 30/20 meter band. This MTU unit requires the external µ-tuning base kit £449.51

Yaesu YF-122C 7-pole Collins CW Filter (500Hz/2Khz: -6db/-60db) for FT-817, 857, 897 and 2000 ..... £118.48

Yaesu YF-122CN 7-pole Collins Narrow CW Filter (300Hz/2Khz: -6db/-60db) for FT-857 and 2000 ..... £129.71

FT-950 HF Base Transceiver

Yaesu's "Midship Radio" *All FT-950s supplied by ML&S are latest PEP factory versions!*

Only £1129.95 Available from stock

FT-950 Accessories

CABPC-YAESU-USB
USB Cables for FT-450/950 & FT-2000 ..... £25.49

Yaesu FT-950 (Mini-Manual) £16.99

Yaesu Com Port Control and Programming Kit £25.54

DVS-6 Voice Memory Unit £44.90

MD-100A8X Desk top microphone £153.21

MD-200A8X Ultra high-fidelity desk top microphone £204.30

MTU-160 External µ-tuning unit for the FT-2000 on the 160 meter band. This MTU unit requires the external µ-tuning base kit. £449.51

MTU-30/20 External µ-tuning unit for the FT-2000 on the 30/20 meter band. This MTU unit requires the external µ-tuning base kit. £449.51

FP-1030A Microprocessor-controlled antenna impedance matching network designed to provide all-amateur-band transmitting capability with the FT-897/857 series of transceivers, when used with an end-fed random wire or long whip antenna. £314.65

FH-2 Remote Control Keypad built for the FT-2000. ..... £43.89

Quadra - VL-1000 1 kW, HF & 6M Solid State Linear Amplifier and PSU (VL1000 & VP1000) £3,678.21

SP-2000 Base station external speaker built for the FT-2000. ..... £136.87

YA-30 Broadband folded dipole antenna working between 1.5-30 Mhz, which comes with 30 meters of cable. £250.28

Yaesu VX-8E

Latest 6/2/70 Handie with optional Bluetooth, APRS & GPS £336.95

Buy a Yaesu VX-8E, the FGPS-2 GPS & MH-74 Mic for only £429.95

VX-8E Accessories

Nifty HT Desk Stand mkII
Convenient desk top holder £35.76

Maldol MMG-SM Minimag
Quality, stable, Maldol miniature magnetic mount. £20.39

Yaesu BH-1 Stereo Bluetooth Headset £134.82

Yaesu BH-2 Bluetooth Headset £123.58

Yaesu BU-1 Internal Bluetooth Unit £82.71

Yaesu CD-40 Charger Cradle for BH-1/BH-2 ..... £10.17

Yaesu CD-41 Rapid Charger Requires NC-86U £17.32

Yaesu CN-3 SMA to BNC Adaptor £8.12

Yaesu CSC-93 Soft Case £15.28

Yaesu CT-131 Microphone Adaptor Cable £30.60

Yaesu CT-134 Cloning Cable £36.74

Yaesu CT-136 GPS Antenna adapter for FGPS-2 ..... £27.54

Yaesu E-DC-5B DC Cable with Cigarette Plug £29.58

Yaesu E-DC-6 DC Cable for Handhelds £7.10

Yaesu FBA-39 Dry Cell Battery Case £22.44

Yaesu FEP-4 Earpiece for BH-1 Bluetooth Headset £16.30

Yaesu FGPS-2 GPS Unit Requires CT-136 or MH-74A7A £71.48

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

Yaesu FNB-102LI 7.4V 1800mAh Lithium Ion Battery £61.26

Yaesu MH-74A7A Waterproof Speaker Microphone ..£43.89

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

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

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

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

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

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

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

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

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

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

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

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

Yaesu FT-857D The Ultimate HF Mobile Installation!

Plus ATAS-120D 40m-70cm Auto Antenna
Bundle Price: £CALL (Rig only: £554.95)

Yaesu FT-817ND
The world's only all-band portable transceiver.

Only £449.95 with FREE CSC-83 Carry Case worth £19.95

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

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

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


IC-7000

Icom HF products

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

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

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

Icom V/U Products

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

Icom Receivers

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

ICOM PC Controlled Receivers

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

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

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

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

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

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

Price: TBA

Icom IC-7600

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

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

KENWOOD


TS-2000E

Kenwood HF Products

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

Kenwood V/U Products

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

New! Alinco DJ-G7E
"As used by Howard, G6LVB". Unique 2/70/23cm Handie. Ideal for hand-held Satellite operation.

Special Price! ML&S: £299.95

NEW!

MicroBit Remote Rig Interface

A complete remote control system for Amateur radio

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

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

The previous model is still available.
Microbit-1258 mkI £349.95. Including Lead Set
Microbit-1258 mkII £399.95. Leads included
For more info see **www.hamradio.co.uk/rrc-1258.shtml**
Latest version of the Remote Rig. One version for ALL radio models.
Like the original RRC-1258, the MkII is sold in pairs, assembled and tested but not configured. Included in the package is one USB cable, Power cables (2 pc), Cat 5 cable for making IC-706 cable and a 2xRJ-45 extender.

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

Introducing the next level of professional weather stations

MyDEL VENTUS G730 GPS-LOGGER

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

ONLY £49.95

MyDEL Ventus WX-928-Ultimate

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

Intro offer of only £199.95 - in stock now!

MyDEL Ventus WX-831

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

ML&S Price £119.95.
Options: Additional wireless temperature monitors: £24.95.
PSU to run the WX-831 from 240V: £19.95

ML&S are the sole UK distributor for the Ventus G730 and W-831

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

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

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

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

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

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

Perseus VLF-LF-HF Receiver

only **£699.95**

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

Unlike lower class direct sampling receivers, the PERSEUS RF analog front-end has been carefully designed for the most demanding users. PERSEUS can also be operated in a wide band mode as a 10KHz - 40MHz spectrum analyzer with more than 100dB dynamic range in a 10KHz resolution bandwidth. PERSEUS is a Software Defined Radio and relies on PC software applications to carry out the demodulation process.

The World's Biggest Selling Virtual Radar System

Now includes built-in Airband & FM!

SBS-1eR Pocket Radar

£479.99

HB-1A Ultra Compact 3 Band CW Transceiver

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

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

£249.95. Call or see website for further details.

NOW IN STOCK - very limited quantity.

LDG Auto Tuner Range

AT-100pro	Desktop tuner covering all frequencies from 1.8-54 MHz	£194.95
AT-200pro	Designed for new generation of rigs	£214.95
AT-1000Pro	1kw 160m-6m (1.8-54MHz) High speed Auto ATU, tuning range 6-1000Ohms	£510.95
AT-897Plus	Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too!	£183.95
IT-100	New version of the AT-7000	£159.95
YT-100	NEW AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control	£173.95
Z-817	Ultimate autotuner for QRP radios, including the Yaesu FT-817D	£122.95
Z-100Plus	Ultimate autotuner for Yaesu FT-817D	£143.95
Z-11Pro	Portable compact & tunes 100mW to 125W	£158.95
RCA-14	4-way DC Breakout Box	£49.95
KT-100	Dedicated tuner for Kenwood radios	£173.95
RBA-1:1	Probably the best 1:1balun out there	£35.71
RBA 4:1	Probably the best 4:1 balun out there	£35.71
DTS-6 + 6R	Remote Antenna Switchers. 1.5kW 1-54MHz.	£43.95
FT-Meter	Neat Analogue back-lit Meter for FT-897/857. S-meter, TX Pwr, ALC Etc	£45.95
NEW FTL- Meter	Jumbo version of the famous FT-Meter	£79.95

NEW **AS REVIEWED IN PW December Issue 2009**

CG SB-2000 USB Radio Interface

Only £99.95

- This small self contained beautifully styled box weighing only 400 grams really is a one stop solution to your data and radio control. It employs a CAT/CIV interface as standard and supports CAT with RS232 protocol.
- The MyDEL CG SB-2000 Interface connects to your PC via USB and Sound Card and connects to your radio via Custom leads.
- Once connected and configured you have Computer Control via USB and decoding via your soundcard using HamRadio Deluxe or other packages.
- **Only £99.95** High quality ready-made leads for most rigs available at only £18.95.

Palstar New Product

Palstar Commander HF-2500 1.5kW Amplifier

Palstar are pleased to announce a new range of HF Linear Amplifiers built to the highest standard (As you would expect from the USA Manufacturer). We have started with the "Commander HF-2500" which is available from stock. The 2m & 6m versions will be available during early 2010. ML&S: £3499.95. See web for more details.

AT-500 600W PEP Antenna Tuner	**Special Price £349.95**
AT-Auto Automatic 1500 Watt ATU	**£1099.95**
AT-1500DT 1500W Differential Antenna Tuner	**£449.95**
NEW AT-2KD The AT-1500DT and the AT-1KP have been combined into a new 2Kw Tuner	**£419.95**
AT-4K (2.5kW) Antenna Tuner	**£729.95**
AT-5K (3.5kW) Antenna Tuner	**£999.95**
BT-1500A Balanced Antenna Tuner	**£599.95**
PM-2000AM Power/SWR Meter	**£159.95**
Palstar Dummy Loads	
DL-1500 (1.5KW)	**£119.95**
DL-2K (2kW)	**£229.95**
DL-5K (5kW)	**£349.95**
Palstar R30A Receiver	
Palstar R30A, fitted Collins filters for SSB & AM	**£569.95**
MW550P Active preselector & ATU for AM & 160M reception	**£259.95**
SP30 Matching Desk Speaker	**£69.95**
AA30 Active Antenna Matcher 300kHz-30MHz	**£99.95**

Full range of Palstar now in stock.

See www.hamradio.co.uk for lowest prices!

CG-3000

With 200W and 200 memory channels.

ML&S: £289.95

CG-3000 shown with optional remote switch.

See web for full specifications

CG-5000MkII

At last! 600W PEP High Speed Remote Tuner from MyDEL

ML&S: £559.95

NEW! Remote control for the CG-3000 and CG-5000. £39.95

DV-Dongle

NEW

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

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

In stock, works with MAC or PC. £199.95

Power Supplies

New MyDEL PS-30SW11

Latest high performance switch mode PSU. Die-cast Alloy chassis, full over-voltage protection and short circuit design. RRP £119.95. ML&S only £84.95

SPS-8250	25A continuous, fully metered power supply	£79.95
MP-9626	120A, 13.8V DC power supply	£299.95
MP-8230	13.8V DC, 25A power supply	£69.95
MP-925	Linear 25-30A, 13.8V DC power supply	£99.95
MP-9600	60A switch mode power supply	£179.95
MP-6A	13.8V DC, 6A power supply	£29.95

Mini VNA PC Controlled Antenna Analyser

The mRS miniVNA is a compact 100kHz to 180MHz antenna analyser interface that is operated via a PC powered by a single USB connection. You can see at a glance where the antenna is resonant, what the SWR and the return loss is. The best (minimal) SWR frequency is automatically found and displayed. An optional internal RS232 connection is also available.

ML&S: £259.95

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

Feature

Making Home-brew Transistors in the 1950s

In this article I'm looking back over 55 years to when my Physics Master at Stowe School was John Osborne G3HMO, who was (and still is!) a very practical and inventive man, **Fig. 1**.

At Christmas 1953 John G3HMO demonstrated a home-made point contact transistor, to members of what is now the Association for Science Education (Ref.1).

In March 1955, their journal *School Science Review* published his article on *Making Your Own Transistors*. John wrote, "*The only English [transistor] available to the public is the GET-1 at £3...RCA transistors are priced at £6 to £12...and require a licence to import. So there is a lot to be said for making your own transistors!*"

He started with a radar receiver diode and created two junctions **very** close together, using phosphor-bronze wire which had first been 'pointed' by electrolysis in potassium hydroxide solution.

The photograph, **Fig. 2** shows one of John's home-made transistors, a 'Three-penny-bit' (a three old pennies) coin, and a commercially available GET1 transistor. In the early days the GET1 cost £1 to £3 of 1955 money, so experimenters were a bit stuck, especially as the transistors 'ran away' thermally so easily and blew before any fuses which might be in the circuit for protection!

The illustration, **Fig. 3** shows how the phosphor-bronze 'whiskers' are given a sharp point. But first they need to be soldered to copper wire – John advised 20s.w.g. (0.914 mm), for ease of manipulation and securing. The gauge of phosphor-bronze wire to use is $^{5}/_{1000}$ inch, or a near metric equivalent (0.125 mm). It can be bought in economic lengths from many suppliers of science teaching equipment.

An uncovered Petri dish of 'caustic potash' (concentrated potassium hydroxide solution) would not be popular in a modern school laboratory! However, electrolysis was then the only practical way of imparting a sharp point, rather like a tiny pencil, to the phosphor-bronze whisker.

The diode which is to be modified used to cost from

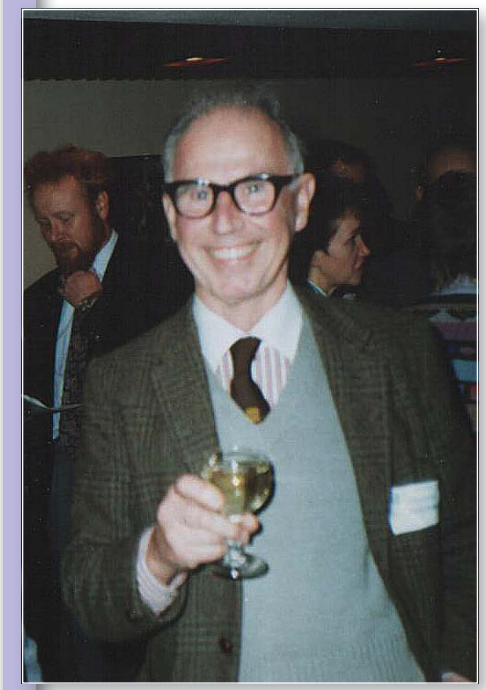

Fig. 1: John Osborne G3HMO, who was (and still is!) a very practical and inventive man was a Physics Master at Stowe School in Buckinghamshire.

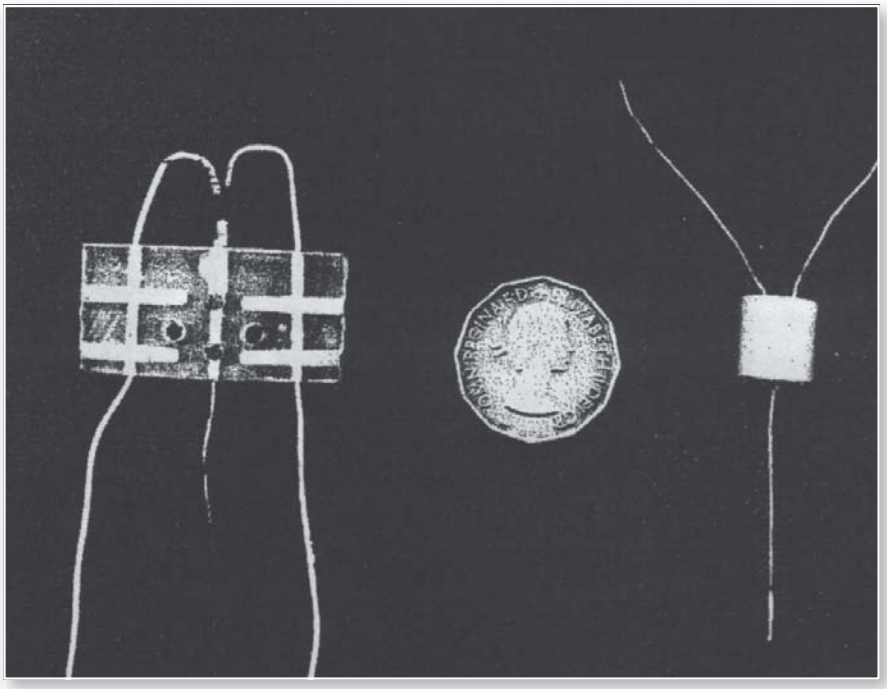

Fig. 2: One of G3HMO's home-brewed transistors compared to an old 'Thrupenny bit' 3d coin.

Bill Jarvis GM8APX looks back to his 1950s schooldays where he had a physics teacher who was also very practical!

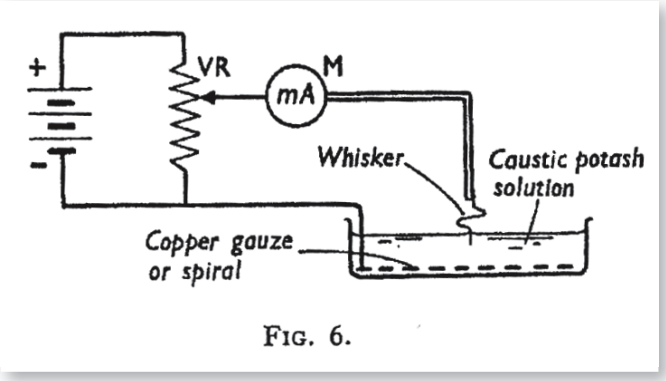

FIG. 6.

Fig. 3: How the phosphor bronze 'whiskers' were made.

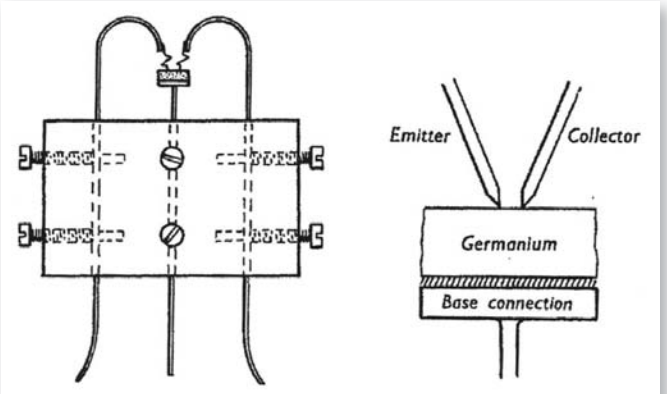

FIG. 8.

FIG. 8.—Assembling the Home Made Transistor.

Fig. 4: Making the Perspex slabs.

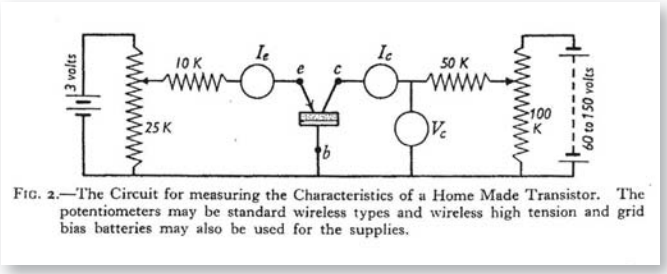

FIG. 2.—The Circuit for measuring the Characteristics of a Home Made Transistor. The potentiometers may be standard wireless types and wireless high tension and grid bias batteries may also be used for the supplies.

Fig. 5: A simple test circuit used for evaluating the transistors.

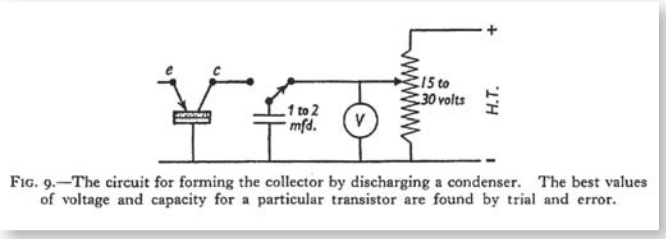

FIG. 9.—The circuit for forming the collector by discharging a condenser. The best values of voltage and capacity for a particular transistor are found by trial and error.

Fig. 6: Another test circuit, which can provide test curves.

1s. 6d (in old money, in 1955, on the surplus market). This is a saving compared to buying a GET1!

The illustration, **Fig. 4** shows the Perspex 'slab', about 6mm thick and 50 x 80mm (the exact dimensions are not important), drilled and tapped (8 BA size, which is just under 4mm) to take the three wires which support the base and the 'whiskers', which are about to become emitter and collector connections. Alongside (in the illustration in Fig. 4) is a diagrammatic representation of the three electrodes.

Current Amplification

The Perspex slab holds the two whiskers in place – but it will be necessary to test for current amplification. A circuit such as that in **Fig. 5** (Fig 2 *School Science Review* page 241) is suitable. At this stage the current amplification will be about 0.2 if the whiskers are very close together, but not touching. If it's too near to 1, you probably have an emitter-collector short circuit!

Note: It helps to check the forward and reverse resistances of the new junction as you go along. A common analogue or digital multimeter is used. Forward resistance should be about 200 to 500Ω, and reverse should be 200kΩ or more).

Next John writes of an 'electric shock' to the home-made junction. This needs to be applied when you have achieved a satisfactory current amplification (let's say) 0.2, the transistor can be 'formed' by discharging a one to two Farad (yes that big!) capacitor, charged to 15 to 30V, through the collector junction which you have just created.

Note: It is important to connect the capacitor + to the new whisker, and the – to the base, because this seems to drive some phosphorus into the crystal, modifying considerably the electrical characteristics in the immediate vicinity of the point. It also forms a tiny spot weld between whisker and crystal, helping to keep the transistor's characteristics reasonably constant. See **Fig. 6** (Fig 9 *School Science Review* page 247) for a test circuit that will provide curve-tracing facilities.

Next, using again the test circuit, the current amplification could well be found to be between 1.5 and 5 times. If not, experiment with moving the collector whisker and repeating the forming procedure. (5x is very good and better than most commercial germanium transistors of those days.)

Forming the junctions can be tried with a smaller capacitance C and higher V. For example, 100nF charged to 100 V has given satisfactory results.

If you are going to keep the new transistor, it's important to protect it from damp and other contamination. A thin varnish can help, e.g. celluloid dissolved in acetone, or Perspex in chloroform (further worries for Health and Safety here I'm afraid!). Or you can just keep it in a clean bottle with silica gel. Commercially available transistors are, of course, hermetically sealed.

Test Oscillator

Apart from the curve-tracing circuit already mentioned, a neat way of testing your transistor was to construct the circuit of **Fig. 7**, which keeps the LC circuit oscillating by virtue of the negative resistance portion of the base-emitter junction when current is flowing also between base and collector. An audio oscillator powered by only a selenium photo-voltaic cell was also successfully constructed.

Oscillators of the feedback type were also built by G3HMO and his students. Morse transmissions with a proven range of up to 56km (35 miles) were made on the 1.8MHz (160m) Amateur band, using a power input of the order of 20mW.

Even better, the Director of the National Physical Laboratory at the time, **Sir Edward Bullard,** approved

the publication of an account of John's daylight-powered transmitter, a representative (Mr. A J Garratt) having witnessed Amateur Radio (c.w., i.e., Morse Code) contacts using 2mA at 4V as supply, with stations 12km (7.5m) and 24km (15 miles) away. That's a d.c. power input of 8mW!

In an appendix to John's article, he explains very clearly the theory of electron and hole conduction, the effects of impurities and temperature, and the various ways the point-contact transistor can be tested and used. Graphs plotted during the testing process agree very nicely with theoretical predictions, and the theory has not changed over subsequent years.

John used the now familiar analogy of a row of houses, of which No. 1 is vacant until the family from No. 2 moves into it, to illustrate the concept of 'holes' moving in a semiconductor. He went on to illustrate the idea of **minority carriers** by saying that it's possible for holes to exist in *n*-type germanium, and free electrons in *p*-type germanium. He also mentions "research" into the use of silicon instead of germanium, which had at that time well-known advantages.

John also wrote, "*New circuits will be evolved and a new line of approach to electronics will be developed in which many of the operations now performed by valves will be performed by transistors at lower powers, thus saving in power, weight and space.*"

John The Teacher

To say a little more about John the Teacher (although not about making transistors), if you asked an appropriate question in class, he would sometimes say, "Well, can **you** think of a way to **find** the answer?" This encouraged a lot of inventiveness; and classes often ended some distance from the classroom – e.g. during an eclipse of the sun – and the day we tried to repeat Foucault's Rotating Mirror experiment to find the speed of light.

It was fortunate that we had access to an 'avenue' with a clear view over 4.8km (3 miles) from end to end; also that we had our Army Cadet Force 18 sets to keep contact between the parties at each end!

The necessary 'rotating mirror' was a chip from a pocket mirror, mounted on a dentist's drill. This was sealed in a glass flask, with a very fine tube leading air at atmospheric pressure into the flask and onto the mirror. The flask was constantly evacuated to a very low pressure by a vacuum pump. I think we got that mirror spinning at a very high r.p.m. – turbine type speed.

Back in those days, we pupils took copious notes (often in our own *ad hoc* version of shorthand) from what John said and what he wrote on the dusty old blackboard. (What a boon dustless whiteboards are to mirror galvanometers!)

In taking notes, facts went in by eye or ear (sometimes both) and came out by writing. This made it really difficult to suffer a lapse of attention; nor was there time for bad behaviour. Also the progress of information – whether facts, theories or formulae – through several parts of the brain helped fix things in the memory. I think the modern practice of handing out worksheets and notes, instead of letting pupils make their own notes, is a great step backwards in education – and not just in Science!

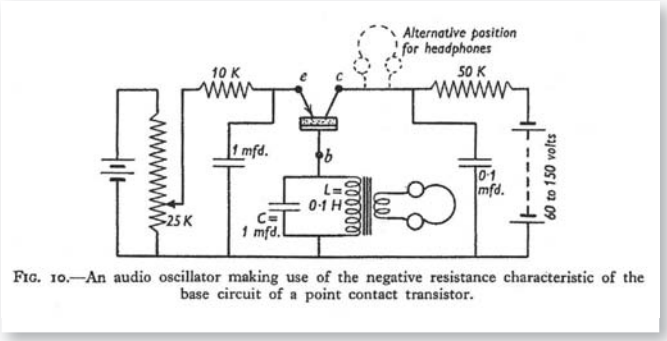

FIG. 10.—An audio oscillator making use of the negative resistance characteristic of the base circuit of a point contact transistor.

Fig. 7: A test oscillator.

The other big advantage of the Olden Days of Education, to my mind, is the present-day obsessive need for the teacher to hand to the Headmaster, at latest the day before any class, a synopsis of what you will be doing, together with a risk Assessment for any practical work. We were so lucky, in 1955, that our teacher could digress at any time into talking about a topic of immediate interest – be it local or international.

For example, a boy came into class with an inductor he had taken from a faulty fluorescent light fitting. He wanted to know what it was, what it was **for**, and why he could get a short sharp shock from it using only a 9V battery! We spent a whole 40 minute period discussing induction and 'back' e.m.f.s, and covered several topics from the syllabus. In later tests and exams the pupils showed a good grasp of striplights and the components in the holder. It was fun, not pain.

John initiated many Physics projects. I remember his radio telescope with a home-made Yagi and a modified converter for receiving ITV; and how he received the first f.m. stereo signals from the Wrotham (Kent), in spite of being some 64km (40 miles) beyond the official service area (Stowe school is in Buckinghamshire). To do justice to the new service, he built a Williamson audio amplifier. (It's worth looking up 'Williamson amplifier' on Google.)

Leading Light

After teaching at Stowe School, John went on to Westminster School, and continued to inspire and create pupils there and was a leading light in the Nuffield-Esso science teaching proposals. He presented films for the training and updating of teachers of Physics. Obviously, I should also mention that it was John who coached several of us for the Radio Amateurs' Examination. I think his success rate was 100%.

I'm very grateful to John G3HMO, and to the Association for Science Education(1), for permission to quote from and reproduce parts of his March 1955 article for this latest article.

Articles by G3HMO also appeared in the March and April 1954 issues of *Short Wave Magazine* and in subsequent issues. An article also appeared (*Home Made Transistors)* in *Wireless World*, January 1954. John advised his readers to consult this for additional information and alternative suggestions. What a Scientist and great Radio Amateur he is! ●

References

(1) Association for Science Education, College Lane, Hatfield, Herts, AL10 9AA.
(2) *Short Wave Magazine*, March 1954.

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Kenwood TL-120 HF Amplifier £129.00
Analyzers + SWR meters
Daiwa CN-103L Meter £59.00
YW-3 SWR meter £30.00
Antenna Tuners
Yaesu FC-20 Antenna Tuning Unit £175.00
Yaesu FC-30 Antenna Tuner Unit £169.00
MFJ-989C MFJ 3kW ATU, £299.00
Vectronics VC-300D Tuner with LED PEP Meter £199.00
Antennae
Hi-Sierra Spurs Unit £35.00
ATAS-120A Active Tuning Antenna System for FT-897, F £249.00
Sidekick-black Compact Motorised Mobile HF Antenna £299.00
Set top TV antenna £3.00
Ex-Army Self Locking Antenna £25.00
EZ-TUNE-7000IBOX High Sierra Control box for £85.00
Baluns
Receive Long Wire Balun £15.00
Books
Icom IC-R20 manual in Italian £5.00
CB
Midland 38 UK £45.00
Zetagi BV-131 Amplifier £65.00
Ranger RCI 2950DX 10 - 12m Transceiver £179.00
Harrier CB-HQ Home Base FM CB £99.00
DAB Radio
Roberts RD-21 DAB/FM radio, black £49.00
Gemini 49 Digital Radio £40.00
Gemini 46 Digital Radio £39.00
Pure Evoke-1s DAB radio - Maple £65.00
Data Comms
Kamtronics KAM Multimode TNC £129.00
DC/Cig adapter/chargers
BC-135 Desktop Rapid Charger for IC-R3 £40.00
NC-386 Ni-Cd Battery Charger £20.00
Duplexer / Triplexer
Revex D24 duplexer 1.6-150 MHz £22.00
TSA-6001 Duplexer £25.00
Comet CF-416B 144/430Mhz PL/NP Duplexer £25.00
Filters (various)
Bremi BRL-10 - TVI Low Pass filter 27MHz £10.00
ABF-125 - Airband Filter £29.00
Comet CF-50MR - Low Pass Filter (HF + 50MHz) £35.00
AEC LP-30 - Low Pass Filter £15.00
Frequency Counter/finder
CUB Optoelectronics MINI Counter £119.95
Handheld Transceivers
Yaesu VX-7R Silver Tri-band Handy £189.00
Yaesu FT-41R £79.00
Icom IC-T7E Dual Band Handy £139.00
IC-E91 Icom 2m/70cm Handheld Transceiver £209.00
Alinco DJ-V17E £105.00
HF Transceivers
Yaesu FT-920AF HF / 6M Base £899.00
Alinco DX-70TH HF & 6m transceiver £399.00
Yaesu FT-920 £799.00
Yaesu FT-767GX £599.00
Kenwood TS-570DG/E HF transceiver £599.00
Kenwood TS-850S /AT £699.00
Yaesu FT-1000 "CLASSIC" HF Transceiver £1,399.00
Yaesu FT-900/AT HF Transceiver £475.00
Icom IC-718 HF All Band Transceiver £389.00
Icom IC-746 HF/6m Transceiver £699.00
IC-7400 HF, 6m & 2m transceiver £950.00
Yaesu FT-857D Multi-band Mobile £425.00
Midland Alan 98 Plus CB Tranceiver £49.00
Yaesu FT-690R II £275.00
Mics and Speakers
Kenwood SP-430 Speaker £59.00
NES-10-2MKII bhi DSP Noise eliminating Speaker £79.00
Yaesu MD-100 Desktop Microphone £99.00
Kenwood MC-60A £89.00
Icom SP-21 loudspeaker £54.00
Yaesu MH-29 Speaker Microphone £49.00
Adonis AM-303 Microphone £39.00
HM-133 Remote Control Mic for IC-E208 £44.21
Alinco EMS-8 - Speaker Microphone £10.00
extension speaker £9.99
Alinco EMS-14 £49.00
EMS-47 Remote Control Hand Speaker/mic direct VFO in £15.00
Yaesu SP-102 Speaker £75.00
ICOM SP-10 Mobile Speaker 5W 4 Ohms for IC-2725, IC- £30.00
Yaesu FSP-2 Speaker £25.00
Yaesu MH-32 Speaker-Mic £15.00
Morse keys / tutors
Kent Straight Key £59.00
Morse Key £89.00
Bencher Twin Paddle Key £79.00
NATO Morse Key £199.00
Enclosed Kent Twin Paddle Key £55.00
Ex-Army Operators Unit £39.00
Bunnel Morse Key £59.00
Other
IF-232C RS-232 Interface for TS-50 £69.00
YF-112A 2nd IF AM 6kHz Crystal Filter for FT840 £38.26
AKD 6001 6m FM Trx £115.00
M/Mods 144/100 £149.00
Yaesu SP-767 £69.00
Alinco DJ-X3 £89.00
Comet CF-BPF 6
EDC-16B adapter £9.99
Icom BC-156 Desktop Charger for IC-R20 £45.00
CSC-83 Soft Carry Case for FT-817ND £15.00
Yaesu YO-100 Monitor Scope £199.00
SGC MAC-200 Antenna Controller Auto-Tuner £220.00
MFJ-461 Pocket Morse Reader £69.00
Bhi NEIM-1031 Noise Eliminating In-line Module £89.00
Microset SR-200 2m 200w £319.00
AOR ARD9000 Digital Voice Interface. £129.00
Yaesu SC-1 Station Console £89.00
MB-17A Quick Release Mount £25.00
Dee Comm Dummy Load £69.00
MFJ-1817 2m/70cm Telescopic Rubber Duck 36.8cm long £22.00
KSC-14 Fast Charger for TH-22E £68.51
N-Type 50 Watt Dummy Load £35.00
MB-62 Mobile Mounting Bracket (Main) for IC-706, IC- £10.00
EM-8200 External Memory Card for AR-8200-8200-S2 £40.00
FT-290 MK2 Carry Case £10.00
Kenwood YG-455CN-1 - CW Crystal filter £100.00
Kenwood / Trio BPF-2A HF filter £25.00
YF-114CN 2nd IF Filter 8.2/250Hz for FT1000MP/FIELD £45.00
Kenwood YK-88CN CW Filter £50.00
SC-45 Soft Case for TH-G71E £10.00
CASE FOR KENWOOD TH-47 £10.00
ALINCO ESC-28 £10.00
010-10117-02 Garmin GPS New Carry Case £5.00
FT-290/790MKI Carry Case £15.00
HS-800/PRO High Sierra Standard Control Box for 180 £75.00
BP-206 Lithium Ion Battery Pack for IC-R-20 & IC-R3 £30.00
HPS-900 934-935mhz POWER-SWR Meter £40.00
universal scanner/handheld desk stand £10.00
Icom IC-E7 cover/carry case £10.00
IC-MB5 mounting bracket £25.00
KT-790 Carry case £15.00
HMC-3 Vox Headset £20.00
Host Master II £20.00
IC-R5 cloning cable £15.00
Eton S-350 Field Radio £65.00
CX-401 £35.00
Yaesu FT-817 tilt stand £12.00
CSC-88 Soft Case for VX-7R £10.00
Bremi BRL-5 - 3-way switch with 5Watt dummy load (52 £20.00
JD Model 151 - TVI Low Pass Filter £10.00
Archer Antenna Discharge Unit £15.00
Mizuho KX-2 antenna coupler £59.00
CP-163X-II MOBILE LINEAR AMPLIFIER £99.00
BRV-1 Mirror Mount £10.00
8-BAND W2IHY Audio Processor with Noise Gate £199.00
Kenwood RM-1 Remote Function Keyboard £44.95
IC-7200 19 Inch Rack Mount With Speaker £99.00
PMR446
Uniden PMR-825 Hand-Helds (pair) £25.00
Power supplies
Bnos 20AMP PSU £89.00
Microset PT 135 PSU £149.00
Icom PS-55 Power Supply £99.00
Adonis AM-708E £89.00
Icom PS-15 20A power Supply £119.00
PT-1012 Microset 12A 13.5 PSU £110.60
GSV-3000 Diamond 25A Supply £129.00
Maplin XM-21 - power supply 7-9A £20.00
Seif PS-134,DC power supply £20.00
Farnell G-12 £59.00
W-5A Watson 5A 13.8V fixed power supply unit £24.00
Sharman PS-5 - 5 Amp psu £20.00
Icom IC-PS15 Power Supply £89.00
Receivers
Icom IC-R72 Receiver £399.00
Yaesu FRV-8800 RX inc Converter £299.00
Realistic DX-394 £129.00
Magellan GPS 315 Receiver £129.00
Icom IC-R5 Receiver £129.00
AOR AR-3000A Wideband Receiver £450.00
Kenwood R-5000 Communications Receiver HF £549.00
Alinco DJ-X30 Scanning Receiver 100KHz - 1.3GHz £140.00
Icom IC-R1500 Receiver £375.00
Kenwood VC-20 VHF Converter £175.00
Roberts R-809 £45.00
Scanners
Bearcat UBC-278 CLT Scanner £99.00
Bearcat UBC-9000 Scanner £179.00
Yupiteru MVT-7000 £131.80
Yupiteru MVT-7100 £140.00
GRE PSR-214 FM Base Scanner £99.00
Realistic Pro-43 Scanner £89.00
PSR-282 GRE Handheld Scanner £50.00
UBC-785XLT Uniden-Bearcat Base Scanner 25-1300MHz £189.00
Uniden UBC-180XLT scanning receiver £99.00
Alinco DJ-X7E - Handheld scanning receiver. £139.00
UBC-800XLT mobile scanner £229.00
VHF/UHF Transceivers
Icom IC-490E 70cms Mobile £250.00
Icom IC-910HX 2 / 70 /23cms Base £1,150.00
Kenwood TS-271E £165.00
FT-290RMKI 2m Multi mode £150.00
Yaesu FT-8100R 2m / 70cms Mobile Transceiver £220.00
IC-7400 HF, 6m & 2m transceiver £999.00
Kenwood TM-G707E Dual Band Mobile £189.00
Yaesu FT-290MkII 2m Multi-mode £250.00
Yaesu FT-690R II 6m transceiver £275.00
Yaesu FT-857 Mobile Transceiver £425.00
Yaesu FT-480R 2m Transceiver £220.00
Yaesu FTV-901R 2m / 6m Transverter £275.00
Kenwood TS-790E Dual-Band Base / Mobile Transceiver £999.00
Yaesu FT-817ND HF 6m VHF UHF 5W Transceiver £359.00
Kenwood TH-22E compact FM transceivers £69.00
Icom IC-910H 2m/70cms base 100w £999.00
Yaesu FT-897D Multiband Portable Transceiver £529.00
ICOM IC-2200H 144–146 £175.00
The TINY-2 MK-II - With Open Squelch Board £109.00
Kenwood TM-741E - VHF/UHF transceiver 144-146 / 430- £229.00
Yaesu FTM-10E Transceiver £199.00
DR-635E Alinco 2m/70cm FM Dual Band Mobile T £230.00
Radioshack HTX-252 2-meter FM transceiver £89.00
Alinco DR-620 remote cables

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ANEM amplified module. .....£124.99.
1042 6-way switch box.....£20.49.
NEDSP-1061-KBD DSP module..£101.95.
NEDSP-1062KBD Noise Module..£106.95.
NEIM1031 Noise Module.....£132.95.
NES10-2 MK II speaker.....£101.95.
1090 Radiomate Keypad.....£91.95.

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Feature

Valve Numbering Systems Part 2

In the second article of the series Stef Niewiadomski continues unravelling those mysterious valve identification numbering systems!

Welcome to Part 2 of the series, where I'm trying hard to unravel the mysteries of valve numbering systems. However, this time I'm posing a question! What's an equivalent? So, having asked the question – I'd better start providing the answer!

Surprisingly many valves were produced by several manufacturers, with pretty much exactly the same parameters and it's worth asking how this happened. You might suppose that when a new valve appeared then a competitor took one apart and 'reverse engineered' it so that they could copy it, albeit probably with a different part number. But I don't think this was the way it actually happened.

What was more likely, was that manufacturers had 'second source' or 'cross licensing' agreements with each other and exchanged design and manufacturing data as new designs were produced. This had the advantage that since many end-users would not design anything using a valve with only a single source, several sources made these users comfortable that a valve wouldn't suddenly disappear, maybe because of production issues or lack of demand.

Any cross licensing agreements would no doubt include price maintenance clauses, which were formal or informal, legal or not-so-legal, depending on the country and exact time they were agreed.

The USA Coding System

The **Tables, 8** and **9**, show the coding systems that identify the vast majority of valves originating originating in the USA and include valves we're likely to come across, such as the good old 6V6, 12A6, and so on. This is the Radio Electronics Television Manufacturing Association (RETMA) or Radio Manufacturers' Association (RMA) coding system.

The coding system gives some very precise and useful information, such as the valve's heater voltage; some information on the envelope construction; and a strange 'number of useful elements' code (which is a rather ambiguous quantity that I'm not convinced really gives you any useful information). So, let's look at this quantity in more detail.

What constitutes a useful element? In the specification for the code, the following are defined as useful elements:

Table 8: US RETMA / RMA Receiving Valves

First element: Heater voltage. For tapped heaters, the figure indicates the voltage with the sections in series	
0	Cold cathode (e.g. voltage regulator valve)
1	0.1 - 2.0
2	2.1 - 2.9
3	3.0 - 3.9
n	n.0 - n.9
Second element: Sequence code	
	One or two letters to indicate the sequence code Note that U-Z generally (but not always) as the only character, or last character, are used for rectifiers
Final element: Valve 'useful element' count	
	Number of 'useful elements' in the valve (see text)
Additional element: Letters	
A	Controlled heater warmup time. Can also be used to denote increased ratings
B	Improved ratings/performance
C	Improved ratings/performance
G	Glass envelope
GT	Glass tubular
M	Metal-coated glass envelope
W	Ruggedised (eg military) version
X	Low loss ceramic base
Y	Low loss phenolic base
Examples	
6SH7GT	Heater rating is between 6.0 - 6.9V (actually 6.3V), SH = sequence code, 7 elements, glass tubular envelope
6V6GT	Heater rating between 6.0 - 6.9V (actually 6.3V), V = sequence code, 6 elements, glass tubular envelope
12AU7	Heater rating is between 12.0 - 12.9V (actually 12.6V), AY = sequence code, 7 elements (double triode)

Table 8: USA RETMA RMA receiving valve codes.

- Metal valve envelopes, lock-in metal bases and internal screens on separate and exclusive terminals.
- A filament or heater, whether single or tapped, counts as one, unless there are unequally tapped sections, which are counted individually.
- Combinations of elements connected to the same pin count as one.
- In octal-based glass valves, pin number 1 counts as an element, even if it's unconnected.

Next, I'll look at a couple of examples and see how this works. Our friend the 12AX7 (equivalent to the ECC83) has two independent triodes, each having three elements, so that makes six: then add in the single element of the centre-tapped filament, so we get a total of seven, hence the digit '7' at the end of the

Table 9: US RETMA / RMA Special Purpose Valves

First element: Heater rating in Watts

1	Cold cathode / no heater
2	Up to 10W
3	>10W to 20W
4	>20W to 50W
5	>50W to 100W
6	>100W to 200W
7	>200W to 500W
8	>500W to 1000W
9	>1000W

Second element: Letter indicating type of device

A	Single element (ballasts, etc)
B	Diode
C	Triode
D	Tetrode
F	Hexode
G	Heptode
H	Octode
J	Magnetically controlled (magnetron)
K	Electrostatically controlled (klystron)
L	Vacuum capacitor
N	Crystal rectifier (later used for all solid-state devices)
P	Photo-emissive
Q	Cavity
R	Ignitron
S	Switch
T	Storage, radial beam
V	Photoflash tube
W	Travelling-wave
X	X-ray
Y	Thermionic converter

Serial number:

**	2-digit number assigned seqentially, starting at 21

Examples

2J42	Heater rated at 6.3V at 600mA, ie 3.78W. Magnetron capable of high power pulsed output
4D22	Heater rated at 25.2V at 800mA, ie 20.16W. Beam tetrode power amplifier
1N34	Germanium diode (ie 0V heater crystal rectifier)

Table 9: USA RETMA RMA special purpose valve codes.

code. Of course, what the code doesn't tell you is what the elements actually do!

Look for example at the 6J7 which is a pentode (giving five useful elements), with a filament and an internal shield (brought out to pin 1), making a total of seven, so that's why it also has a '7' at the end of its code. Clearly the 12AX7 and the 6J7 are completely different beasts, whereas you might infer that the '7' indicates some functional relationship. Not so! I think the European designation of ECC83 for the 12AX7 is much more useful. (You sometimes see valves helpfully labelled with both codes).

Note: As an aside, in 1957 RETMA was responsible for introducing the 10, 12, 15, 18, 22, 27, 33, 39, 47, 56, 68, 82 and 100 sequence of standard values for 10% tolerance resistors, capacitors and inductors, and other familiar sequences for components of higher and lesser tolerances.

Mullard Transmitting & Industrial Valves

Mullard had its own system for numbering transmitting and industrial valves and these are shown in **Table 10** (old system) and **Table 11** (new system). The 'old' system is where you will find favourites (to the 'older' Radio Amateurs amongst you) such as the QQV-series of v.h.f. r.f. power tetrodes.

The illustration in **Fig. 2** shows a Mullard advert for three of these valves which were used in many Amateur transmitters for the 144MHz and 432MHz bands in the days before suitable transistors became available. They were, of course, also used in many commercially-built transmitters.

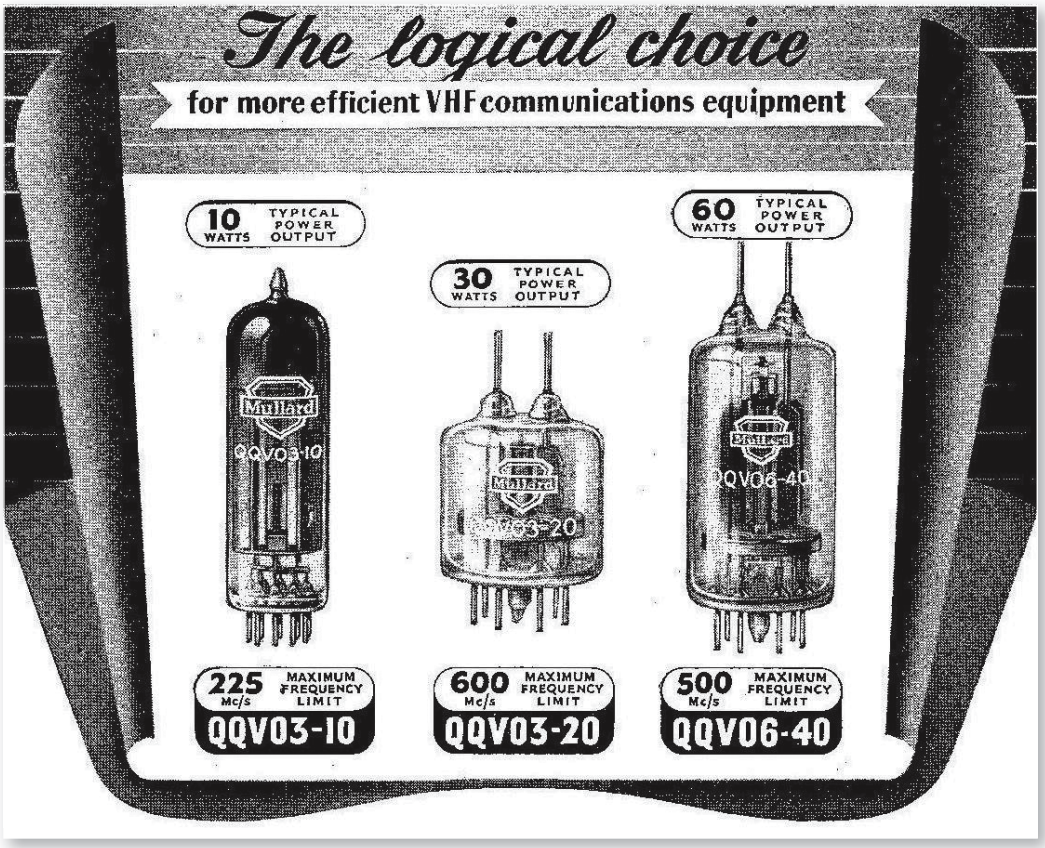

Fig. 2: Mullard advert for the QQV-series of valves which were used in many Amateur and professional transmitters.

Special Quality Valves

Manufacturers often produced valves which were electrically similar to a standard type but had improved mechanical construction, for example for reduced microphony and less prone to vibration-induced failures, but still not to military specification.

The coding systems commonly used are shown in **Table 12**, for European and US manufacturers. Some of these systems result in an all-numeric code (such as the 6057 equivalent to the 12AX7) and so aren't very helpful when it comes to identification.

The best advice I can give is that when you're on the lookout for a particular valve, make sure you also have its 'special quality' code(s) jotted down so you can spot one if you are lucky enough to come across one. You may well get a better quality valve for a lower price!

Voltage Stabilisers

A wide range of numbering systems have been used over the years for gas-filled stabilisers, and **Table 13 (shown in part three next month)** shows the most commonly encountered numbering systems. As you can see, in the UK alone at least three systems have been used, and the same number (at least) in the US.

Common JAN & VT Valves

You may have seen valves with code numbers beginning with the letters 'CV'. In fact, CV stands for 'Common Valve' and is a numbering system that came into use by the British Military in 1944, and took over from the previous Army, Navy and RAF valve numbering systems described earlier. The CV system was also used by the GPO where 'high reliability' valves were needed.

For a valve to be allocated a CV number it had to have a comprehensive design and test specification associated with it. This normally went beyond the normal commercial specification, to guarantee reliability over the more onerous storage and operating conditions it was likely to encounter in military service.

The CV number isn't really a code, in that you can't work out what the valve is meant to do simply by looking at its number, and you have to look up the number on a list (or of course on the internet these days). Thinking about it, maybe this was deliberate so that if a piece of military equipment fell into enemy hands, it wasn't easy to work out exactly what each valve did just from its type number!

I'm not going to reproduce the CV list here – it would

Fig. 3: Photograph of the JAN-6V6 valve showing how this code appears on the base of this valve.

Table 10: Mullard Transmitting Valves (old system)

First element: Functional type

B	Backward-wave valve
D	Rectifier
J	Magnetron
K	Klystron
L	Travelling-wave valve
M	LF amplfier or modulator triode
P	RF power pentode
Q	RF power tetrode
R	Power rectifier
T	RF power triode
X	Large thyratron

Note: two letters may be used for multiple functions in one envelope.

Second element: Structural property

A	Backward and travelling wave valves, output <1W
B	Backward and travelling wave valves, output >1W
D	Disc-seal construction
G	Mercury vapour filled
H	Hydrogen filled
N	Magnetron (external magnet)
P	Magnetron (packaged magnet)
R	Inert gas filled
S	Klystron (reflex type)
T	Klystron (multi-resonator)
V	Indirectly heated, oxide-coated cathode
X	Directly heated, tungsten filament
Y	Directly heated, thoriated-tungsten filament
Z	Directly heated, oxide-coated cathode

Third element: Rating (1)

*	Approximate anode voltage in kV for transmitting valves and rectifiers
*	Approximate PIV in kV for thyratrons
*	Approximate operating frequency in GHz for microwave valves

Fourth element: Rating (2)

*	Approximate maximum anode dissipation in W for transmitting valves (total for all sections in multiple valves)
*	Maximum Ipk in Amps for pulse transmitting valves, prefixed by P
*	Output power in mW or W for backward and travelling-wave valves
*	Pulse output power in kW for magnetrons
*	Output power in mW or W for klystrons
*	Output current in mA for rectifiers
*	Maximum Imean in mA for thyratrons

Additional element: Letter

*	Letter (A, B, C, etc) signifying a later design or development

Examples

QQV03-20A	Double beam transmitting tetrode, indirectly heated, 300V anodes, 10W output per section (20W in total). 'A' indicates a design change on the non-A version
QY2-100	RF power tetrode, directly heated, 2kV anode voltage, approx 100W output (equivalent to the 813)

Table 10: Mullard transmitting valve codes (old system).

Fig. 4: Photograph of a 956 acorn valve, with its JRC-956 and VT-238 numbers helpfully printed on the valve itself and on its box.

take up many pages of the magazine and the Editor wouldn't thank me for it! – but when you look at a CV list (see reference 3 or on-line at: **http://www.tubecollector.org/cv/1963/**) you can see that related valves were often given sequential CV numbers. For example, the range CV1929-CV1958 covers the 6H*xx*, 6J*xx*, 6K*xx*, 6L*xx* and 6N*xx* variants in sequence of their non-CV numbers.

Most CV numbers are completely unmemorable, but a few famous valves are worthy of remembering: for example the EF50 (sometimes referred to as 'the valve that won the war') is the CV1091 (and the CV1578, ARP35, VR91 and VT250). The 807 is the CV124 (and also the CV1060, CV1364, CV1374 and CV1572, all having (presumably) with slightly different specifications than the CV124.

The United States Military used a JAN (Joint Army Navy) valve numbering system, and this uses totally different numbers for almost all common valves. For example, the 12AU7 in a military number may be referred to as a 6189, or a 5814A, and they are functionally identical to a 12AU7, but with higher specifications associated.

Military valves will usually have 'JAN' printed on the valve along with its original number, or, may also have the letters 'WA' following the valve number – for example 12AU7WA. See **Fig. 3** for a photograph of the JAN-6V6 for how this code can appear on the base of this valve. This valve also has its VT number printed on its base.

Before the JAN numbering system came into being, the US Army numbering system began the valve number with 'VT'. The lists I've seen seem to go up to the VT-289, and again I'm not going to list all of them here with their commercial equivalents (when they had one).

Like the CV codes, the VT system is a serial number technique, rather than a logical coding system. This numbering system is very old and even has a few de Forest triodes amongst the early entries! If you want to impress your friends, remember that a VT-100 is the familiar 807, and a VT-74 is a 5Z4 rectifier (also a CV1864).

The illustration, **Fig. 4**, shows a 956 acorn valve (one of the truly historic v.h.f. and u.h.f. valves, which is just as well known as the EF50), with its JRC-956 and VT-238 numbers helpfully printed on the valve itself and on its box. For a complete list of VT valves, see reference 10 and on-line at: **http://pages.cthome.net/fwc/VT.HTM**

Table 11: Mullard Transmitting and Industrial Valves (new system)

First element: Functional type	
X	Photo-sensitive valve
Y	Vacuum valve
Z	Gas-filled valve
Second element: Construction	
A	Diode
C	Trigger valve
D	Triode or double triode
G	Miscellaneous
H	Travelling-wave valve
J	Magnetron
K	Klystron
L	Tetrode, pentode, double pentode or double tetrode
M	Cold-cathode indictator or counter valve
P	Photo-multiplier or radiation counter valve
Q	Camera tube
T	Thyratron
X	Ignitron, image intensifier or image converter
Y	Rectifier
Z	Voltage stabiliser
Third and subsequent elements: Serial number	
****	A group of 4 digits. The final digit '0' indicates the basic valve, and 1, 2, 3, etc indicates variants
Example	
YL1011	Metal-ceramic transmitter tetrode for use up to 250MHz in SSB and broadcast TV transmitters

Table 11: Mullard transmitting and industrial valve codes (new system).

Table 12: Special Quality Valves

Mullard numbering systems	
System 1:	Uses the Pro-Electron code, but with the figures for the base type and serial number reversed, placed after the letter for the heater rating. For example the E88CC is a special quality ECC88.
System 2:	An initial letter 'M' followed by a 4-figure serial number. For example the M8097 is a special quality EAC91.
Marconi-Osram system	
	The prefix 'Q' is added to the standard type number. For example the QZ77 is a special quality Z77.
USA system	
System 1:	A 4-digit reference number. For example the 6057 is a special quality 12AX7
System 2:	The RMA system followed by the suffix 'W', indiacting a military type. For example the 12AU7WA is a special quality 12ATU.
UK Military	
	Tend to use the 'Common Valve' (CV) numbers in the CV4000 series.

Table 12: Special quality valve codes.

Next month, in the third article of the series Stef Niewiadomski looks at Russian and new valves.

David Butler's

vhf dxer

Share your news, views and reports with fellow readers. Reports to David by the last Saturday of each month please.

This month David Butler G4ASR looks at winter propagation on the 50MHz band and pays tribute to Norman Fitch G3FPK.

Welcome to the world of Amateur Radio above 30MHz where surprisingly, January was a very interesting month – particularly if you were active on the 50MHz band! The Sun finally perked up and as a consequence there were a number of Auroral-E (Au-Es) openings with c.w. and s.s.b. QSOs being made into the Scandinavian and Baltic region.

There was also one auroral (Au) back-scatter opening during January although this was restricted to stations situated in Scotland. In addition a number of winter-period Sporadic-E (Sp-E) openings were reported with many contacts being made with stations in southern Europe. Confusingly, a number of mixed-mode openings were also observed with the northerly Au-Es events linking into the southerly Sp-E conditions.

Auroral-E Propagation

Auroral-E (Au-Es) is similar to the more familiar temperate-zone Sp-E although it's generally found at higher northerly latitudes. Scottish stations will experience it quite frequently whereas operators located in the Channel Islands (GJ, GU) will usually hear only the stronger events.

The phenomenon is occasionally observed on the lower v.h.f. bands (50 and 70MHz) at night as well as during the day and at other times besides the summer period. This is because the ionisation originates from incoming auroral particles rather than solar ultra-violet radiation. Hence the time and place of Au-Es tends to follow that of the aurora.

Usually Au-Es is formed from the ionisation remaining after an auroral storm and its associated geomagnetic disturbance have subsided. It can however precede an aurora if sufficient ionisation is already present from particle precipitation. The mechanism that concentrates the ions into a layer sufficiently dense to reflect v.h.f. signals is probably wind-shear, the same process that exists for conventional summer Sp-E openings.

Unlike signals propagated via the auroral curtain which exhibit very rough T1 or tone-A pitch, Au-Es signals sound pure or T9 pitch. In this respect they are similar to Sp-E propagation except that paths are normally restricted to higher latitudes. Although this is most common, after a really big geomagnetic storm the ionisation will spread southwards and become accessible at mid-latitudes. For example during the huge aurora of March 13th 1989, 50MHz Au-Es signals from Scandinavia appeared in the UK as the auroral oval was still expanding and passing overhead.

Olof Karlsson SM6PU (now a Silent Key) reported that he contacted 100 s.s.b. stations in England, Isle of Man, Northern Ireland, Scotland and Wales. In 1989 Swedish 50MHz stations were not allowed to transmit during television hours (0630 - 2230UTC), which meant that Olaf could not come on the band until 2243 hours.

During the large-scale event in 1989 the first authenticated 50MHz transatlantic contact via Au-Es was recorded. **Dave Newman G4GLT** spent most of his time looking westward for North American contacts and was rewarded by hearing the station of VE1BPY (Canada) peaking 559 between 2153-2157UTC. The station of VE1YX was then heard briefly on s.s.b. a few minutes later but signals were quite weak. Finally, at 2234UTC the 50MHz station of G4GLT contacted KA1MFA (USA) for a two-way QSO with reports of 579/559.

The auroral opening in March 1989 spread so far south that intense Au-Es formed in traditional temperate-zone Sp-E territory. This produced almost T9 (pure tone) signals on the 144MHz band from stations in Italy (I), Yugoslavia (YU) and Bulgaria (YO) and surrounding areas. At my QTH (Herefordshire IO81) station activity concentrated on the 144MHz band.

A total of 186 c.w. QSOs were made with stations in 18 countries and 74 locator squares. My furthest auroral contacts were made with the stations of UK5KY (Ukraine KO31) at 2029km and RB5PA (KO21) at 1916km. Other c.w. contacts included 10 stations in Yugoslavia (YU), 12 in Hungary (HG), 17 in Poland (SP) and 27 Czechoslovakian (OK) operators. Six Italian stations were also worked showing just how far south the auroral propagation reached.

Large propagation events like that experienced over 20 years ago will return in the next few years as the Sun becomes more active. However, I wonder whether the c.w. activity levels will ever be the same? I certainly hope so – but I'm somewhat concerned that many new v.h.f. DXers appear to be content just to sit in front of a computer using digital transmission modes rather than becoming proficient in the use of Morse code.

The 50MHz Band Report

As I've just mentioned, the 50MHz band was refreshingly active during January with a number of Sp-E, Au-E and Au openings being reported. The year kicked off on New Year's Day, January 1st, with a Sp-E opening between 1650-1730UTC.

The first to spot the opening was the Italian station **Fabio Franci IK5YJY** who heard the GB3BAA beacon (50.016MHz) coming in strongly with 599 signals. Then stations located in southern England and Wales reported making c.w. and s.s.b. contacts with IZ0GYP (JN61), I3QDK (JN65), IK4JQO (JN64), IZ4GWE (JN64), IK5YJY (JN53) and I7CSB (JN71). The beacon

Fig. 1: The 50MHz station of Jorge Santos CT1FMX

David Butler G4ASR
Yew Tree Cottage
Lower Maescoed
Herefordshire HR2 0HP
Tel: (01873) 860679
E-mail: g4asr@btinternet.com

stations of IW3FZQ (50.002MHz), IQ4AD (50.057MHz) and I5MXX (50.008MHz) were also heard during this short opening.

The first major meteor showers of 2010, the Quadrantids, were encountered in the period January 1st to 5th with a sharp rise in activity being reported on January 3rd. Among the stations worked via meteor scatter (m.s.) during this period were CT1FJC (Portugal), EA3LL (Spain), HA8FK (Hungary), HB9HFN (Switzerland), IK1JLL (Italy), LA4YGA (Norway), OE1SMC (Austria), OH6KTL (Finland), OK1RD (Czech Republic), OZ1MFP (Denmark), SM0TSC (Sweden), S57TW (Slovenia), YU1KY (Serbia) and 9A5CW (Croatia). The club station T70A (San Marino) was active on January 9th some days after the shower had peaked, but they still managed to make a few s.s.b. contacts with UK stations via transitory meteor trails.

The first of a number of Au-Es openings was reported on January 11th primarily by stations in Scotland and the north of England. Actually, the day started with a brief Sp-E event around 1000UTC with southern England stations hearing the Portuguese station **Jorge Santos CT1FMX** (shown in the photograph, **Fig. 1**) and the beacons CS5BCP (50.031MHz) and CS5BLA (50.076MHz). This was probably some form of pre-auroral enhancement as within 30-minutes the Au-Es opening had commenced.

The event was to last until 1215UTC and enabled stations that included MM0AMW, GM4WMM, GM8LFB and GW8ASD to make s.s.b. QSOs with OH1LWZ (KP11), OH2TP (KP03), OH3MF (KP20), OH6LBK (KP03) and OH6KTL (KP02). At the same time, a few German stations that included DK1MAX (JN58), DK2EA (JO50) and DL7DF (JO62) reported hearing the Lerwick beacon GB3LER (50.064MHz).

Towards the end of the event – around 1200UTC – the station of **David Gillies MM0AMW** (Argyll IO75) reported hearing the CS5BCP, CS5BLA and EA4UW beacons over 1600km distant. This was a mixed-mode propagation path with the northerly Au-Es linking into the southerly Sp-E path.

Another Au-Es opening was reported on the following day, January 12th between 1700-1930UTC with contacts being made from Scotland into continental Europe. **Stuart McMillan GM4WMM** (Orkney Islands IO89) reported working the stations of G3USR, G3VYF, F6GEX (France) and ON4JM (Belgium). This event did stretch somewhat to the south as **Ken Osborne G4IGO** (Somerset IO80) reported hearing the beacon stations GB3LER (Shetland Islands) and OY6BEC (Faroe Islands) both with T9 signals.

The 50MHz band then remained devoid of any significant openings until the evening of January 18th when an exciting five day period of various propagation modes commenced. Around 1630UTC on the 18th a number of UK stations reported a Sp-E opening into southern Germany. This event only lasted for 20 minutes before fading out but at 1715UTC another path formed to the south. This enabled Sp-E contacts to be made for around an hour with stations located in Italy and Spain.

On the following day, January 19th, there was a tremendous Au-Es opening that occurred between 1115-2100UTC. This event, actually there were two distinct phases, very much favoured stations in Scotland. However, 50MHz contacts were being made from as far south as Cornwall (IO70) and Guernsey (IN89) so it was quite a widespread and long-lasting event. The first phase was observed between 1115-1315UTC with contacts being made from the UK with DX stations such as DG5AAG (Germany), ES2QN (Estonia), OH3MF (Finland), OK1RD (Czech Republic), OY9JD (Faroe Islands), SA5K (Sweden) and SQ9IAU (Poland). The second phase of the Au-Es opening on January 19th was reported to have occurred between 1545-2100UTC, again favouring stations located in Scotland.

Amongst those heard were MM0AMW (IO75), MM0JMK (IO86), MM5DWW (IO89), GM0GOV (IO75), GM4DZX (IO88), GM4ILS (IO87), GM4WJA (IO87), GM4WZL (IO75), GM4ZMK (IO75) and GM8LFB (IO88). **Ron Adam GM4ILS** (Morayshire) mentions that he had just re-assembled his 50MHz station after returning from holiday in Australia. He was pleased to notice that the band was wide open and reports making Au-Es contacts with the c.w. stations of DF1HF (JO43), DL5XJ (JO54), DL8BTL (JO73), OK1FBS (JN79), OK1FML (JO79), OK1FPR (JO80) and OK1MP (JO70).

Other DX contacts made from the UK during the evening phase included stations located in Austria (OE4VIE), Denmark (OZ3ZW), Estonia (ES6DO), Finland (OH8HTG), Germany (DL5DX), Lithuania (LY2BAW), Netherlands (PE1IWT),

Norway (LB9YE), Poland (SP3GCL) and Sweden (SM2CKR).

There was a confusing mixture of propagation modes on January 20th with Au-Es, Sp-E and Au back-scatter all being reported between 1130-2030UTC. The day started off with an Au-Es opening, consisting of three distinct phases between 1130-1540UTC. These phases are quite common and just indicate the waxing and waning (growing larger, getting smaller) corresponding with the magnitude of the pulsating ionospheric particle input.

During the openings I've discussed the 50MHz band was open to the Faroe Islands (OY), Germany (DL), Poland (SP), and Switzerland (HB9) and also for contacts between Scotland and southern England.

Between 1540-1605UTC there was a mixture of northerly Au-Es and southerly Sp-E propagation. The specific path depended on whereabouts you were situated in the country and in some locations you could make actually QSOs via either mode. Contacts via Au-Es were reported to have been made with stations in Austria, Germany, Hungary and Poland.

The more southerly Sp-E path enabled contacts to be made into southern France, Italy and Spain. At 1700UTC **Jim Rabbits GM8LFB** (Caithness IO88) reported hearing the OY6BEC beacon (50.035MHz) peaking 54A (the 'A' indicating tone-A or aurora). The beacon was heard at his QTH for over three hours as was the Shetland Islands beacon GB3LER.

Propagation on January 21st was far less confusing with two conventional Sp-E type openings, the first between 1200-1230UTC and the second later in the day between 1630-1800UTC. The brief midday event saw GM-stations making transitory contacts into Belgium, Switzerland and Italy.

The evening opening was a much more consistent affair with G and GW operators making many c.w. and s.s.b. QSOs with stations in Austria, Hungary and Slovenia. However, the primary path was to northern Italy (JN54) with stations such as I5IAR, I5TAT, IK5GQK, IK5RLP and IK5YJY.

On the following day, January 22nd between 1430-1830UTC, there was a significant Sp-E opening with stations as far south as Jersey (GJ) and as far north as central Scotland making numerous DX contacts into southern Europe. **David Rumbold G4RYV** (Surrey IO91) reported working the s.s.b. station of EA7/G1WUU (IM76) and the c.w. station of EC5KB (IN99).

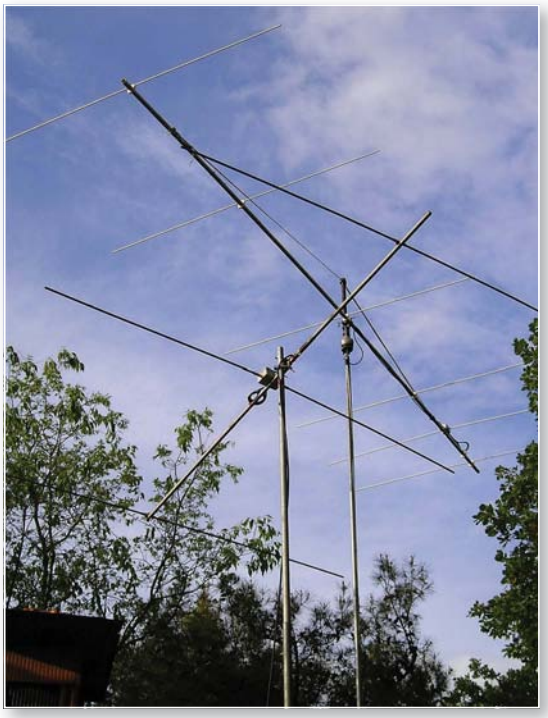

Fig. 2: The 50MHz antennas at the station of Patrik Hrvatin 9A5CW

Other DX stations contacted by UK operators included EA5GPQ (Spain), EA6CA (Balearic Islands), F5VFO (France), HA8AR (Hungary), IK8NII (Italy), LZ1AG (Bulgaria), SV2AVP (Greece), S51DI (Slovenia), YO7LGI (Romania), YT2AAA (Serbia) and 9A5CW (Croatia). The 50MHz antennas at the station of 9A5CW are shown in the photograph, **Fig. 2.**

The final opening of the month, on January 31st between 1650-1810UTC, was yet another European Sp-E event. Stations in England and Wales were heard making QSOs into Austria, Germany, Hungary, Italy, Poland, Serbia, Slovenia and Ukraine. **Ivan Dobnik S51DI** (Slovenia JN76) reports that between 1720-1733UTC the maximum usable frequency (m.u.f.) reached the Four Metre band. He made five s.s.b. contacts on 70.200MHz with G-stations located in IO82, IO90, IO91, IO92 and JO01.

Norman Fitch G3FPK Silent Key

It was with great sadness that I learnt of the untimely passing of **Norman Fitch G3FPK** who died at his home in Purley, Surrey on Friday January 29th 2010. Norman was a fellow author writing the v.h.f./u.h.f. column in the Radio Society of Great Britain's (RSGB) *Radio Communications (RadComm)* monthly journal since 1989 when he took over from **Ken Willis G8VR**. Norman wrote that column in every monthly issue of *RC* for the last 21 years and his knowledge and creativity will be greatly missed. Norman was a natural writer and prior to writing for *RadComm* he had also written the the *VHF Up* part of the *On The Air* section of *PW* up until June 1989 (having taken over from **Ron Ham** a few years earlier.) and also the *VHF Bands* column in *The Short Wave Magazine* – providing excellent coverage of v.h.f. events at that time. He also wrote many v.h.f. orientated articles both in *SWM* and *Practical Wireless*.

First licensed in 1949 the station of G3FPK was particularly active on the v.h.f. and u.h.f. bands and Norman could often be heard chasing operators up and down the bands after an opening to find out what stations had been worked! He clearly had an enthusiasm for DX operating and was always willing to assist newcomers onto the v.h.f. bands. As a member of the RSGB's VHF Committee, Norman was a regular attendee at the VHF Convention (held at the Winning Post, Twickenham and Sandown Park Racecourse) where he was always keen to meet the operators that had been regularly writing to him.

Norman G3FPK was a real gentleman who made a very large contribution to Amateur Radio over many years and will be sadly missed. Rest in Peace my friend.

Deadline Time!

That's it again for another month and thank you for your reports. Please keep sending them in, preferably by E-mail to **g4asr@btinternet.com** by the last Saturday of each month.

Good luck with the DX and see you again next month!

73 David G4ASR

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Thank you to those readers of *In Vision* who have written in agreement with my views that the **British Amateur Television Club** (BATC) seemed to be reducing its support for radio frequency (r.f.) transmitted ATV while promoting its video 'streaming' service over the internet. This was not, my correspondents considered, 'true' ATV as they had always regarded the hobby. Before I close correspondence on this and move on to fresh topics, a final letter from **Eric Edwards GW8LJJ** and a 'right of reply' letter from **Brian Summers G8GQS**, BATC secretary. (I've had to shorten each so, apologies to both gentlemen).

Sadly, Eric has decided that, after over 40 years of BATC membership, he'll not be renewing his membership: He says that, "...this action is not a reflection on the club but more on our 'modern' world of television. There is nothing in the BATC's magazine *CQ-TV* that holds any interest for me any longer other than nostalgia from some of the articles, and I suppose I see it more as a club journal for broadcast personnel and retired engineers along with camera operators. I joined the BATC back in the 1970s and was very active with home brew gear. All of it had to be built then because either it was too costly to buy or not available anyway."

The Joy Of ATV

To Eric GW8LJJ, 'home-brew' was the joy of ATV, as he went on to say: "The 'fun' part of the hobby, for me, was building all the equipment from a flying spot scanner using the 931A photo-multiplier tube along with TVs with locked timebases to a fully synchronised colour TV station albeit in the shack of 10ft by 8ft. The 405 line and later 625 line cameras were home-made too, the first one being the one published in *CQ-TV* and indeed that magazine was the inspiration of my construction work."

"Building solid state cameras and sync pulse generators, I expanded the hobby into building effects units with t.t.l. 'chips'. It was by building of this type of equipment that I learnt about integrated circuits. The magazine was a mine of information and there was always something to build from the circuits supplied by enthusiast authors and I too, contributed several articles."

Eric believes that ATV pictures should come from cameras, not computers saying, "I was not, and I'm still not, interested, in computer generated pictures, whether it is fast or slow scan. The last ATV contest I attended with the locals on top of a mountain complete with a high force gale, I asked a 'contact' to send some live pictures as all we received were **computer-generated** numbers" (the numbers are a requirement of the contest rules).

"A reply came back on the talk channel stating that a camera was not available! That was the last contest I attended and with computer generated pictures and 'virtual' television it made up my mind to pack in Amateur television. Thank you, BATC for the past help and to having kept the interest for me going for as long as it did. I wish you the very best, well into the future. There is, of course, still a lot that can be 'pioneered' out there, but it's not for me."

Brian Summers' Reply

After the letters published last time I hosted *In Vision*, BATC secretary Brian Summers G8GCS was invited to respond: "Thank you for your thoughtful comments, you raise a number of good points. It's true that the BATC started as a non transmitting club, but that was because transmitting was not allowed under the terms of the Amateur licence. The records show that it was actually the BATC that was instrumental in having the licence changed to allow television to be transmitted and the club continues to fully support r.f. transmission. The BATC supports the advancement and practice of television, in all of its (now) diverse forms. That's now quite a long list! Yes we do support the use of the internet and the 'sound bite' from the meeting should not be taken in isolation – it would be a long speech to describe all the objectives of the BATC.

"The new streaming facility is just another new method of transmission, it does not replace r.f. or any other distribution system, it adds to it. Streaming does, however, have its limitations in relation to repeaters. In the context of the suggestions in the letter, the BATC and the RSGB are of the opinion that the transmissions of even copyright-free recordings of Amateur radio interest 'would be considered broadcasting', whereas test cards and identification signals are not. This statement does not affect the content, within the terms of the licence, of communication established directly or via repeaters. However, the reverse is allowed and many repeaters from all over the world have their outputs on the streamer."

Brian reminds us of the known constraints on all radio transmission saying: "Part of the difficulties that the r.f. world is facing is the demand for more spectrum space, even within an Amateur band there are conflicting demands from all the different modes and traditional ATV is in a difficult position here due to its bandwidth requirements. One of the challenges now and for the future is to develop the digital modes that need less bandwidth, and it is hoped that this will allow a resurgence of activity on 70cm (435MHz was used for ATV), which is already happening in some parts of the UK."

"We must move forward with the times, but keeping what is good in current use. The club's journal, *CQ-TV*, tries to publish a balance of articles on all aspects of television, all contributions for publication are welcome and it is your chance to change what is published!" 73 **Brian G8GQS**.

Moving On

With Brian's reply, I think it is time for *In Vision* to move on, but I will give myself the privilege of the 'last word'! Brian states that transmission of Amateur Radio recordings via repeaters would be considered as 'broadcasting'. Well, the RSGB's GB2RS News is carried by some ATV repeaters...that would be considered as 'broadcasting', would it not? Next time, I'll be asking what's going on with Digital ATV? See you all next time! **Graham G8EMX.**

Carl Mason's

hf highlights

Carl Mason GW0VSW presents his round-up of your activities on the h.f. bands. Reports to Carl by the 15th of each month please!

Welcome to *HF Highlights* (*HFH*) where I'm remembering it's now ten years ago since the callsign GKA was heard for the last time. Portishead Radio, callsign GKA, in Somerset was a well known radio station that provided worldwide maritime and long-range aeronautical communications from 1928 until 2000. It was the world's largest and busiest radiotelephony station which at its peak in 1974 had 154 radio operators handling well over 20 million words of traffic per year.

In 1998, British Telecom Maritime Radio Services made the announcement that it was to close Portishead Radio and so the long-range services on the h.f. bands (3-30MHz) ceased at midnight on the August 31st 1999, while the the short-range v.h.f. maritime band (156-174 MHz) services closed at 1200 on Sunday April 30th 2000 and the medium-range services, using medium frequencies (m.f.) 1.6-3.0 MHz, stopped at 1200 on Friday 30th June that year, bringing to an end a long and successful station.

In September 2004 Somerset's Sedgemoor District Council passed a plan for a housing redevelopment that included the site of the former radio station. A year or so later in October 2007, permission for a development of 190 houses and flats on the site was granted and the old station buildings were finally demolished.

For most of us though, GKA remains the most famous maritime radio station in the world. In fact, just a mention of that call will no doubt bring back some interesting memories for all those who used the Portishead's services.

To mark the 10th Anniversary of its closure a special callsign **GB10GKA** will be activated for a period of April 30th to May 27th. Several former GKA Radio Officers will activate the special call and operation will be primarily using c.w. – working on all the h.f. bands. A special anniversary QSL card will be produced to mark this historic event and confirmation will be available through the eQSL system.

A certificate will be given, via E-mail, for contacting GB10GKA on more than four h.f. bands – at no cost to those who qualify – through **Tony Roskilly G3ZRJ** at **g3zrj.morsekey@btinternet.com** Further information about Portishead Radio can be found at **www.gka.btinternet.co.uk**/

The DXNews

As space is tight this month there are just a couple of news items and they're both for calls based here in the UK. The first is **GS2MP** which will mark the **Yaesu Heritage Year 2010**. During each calendar month until December **Chris Tran GM3WOJ** and **Jim Fisher GM0NAI** will be operating as GS2MP using different models of vintage Yaesu radio to make all their contacts. This month it will be an FT-DX-401, April's will be an FT-101E and May's an FT-DX100.

You can look for the call to be aired mainly on the 7 and 14MHz bands using both c.w. and single sideband (s.s.b.). Every QSO with the vintage station, located near Inverness, will earn points towards an award. Bonus points can be earned if you are also using a vintage Yaesu radio – but you'll need to confirm this with a photo of you and the radio you are operating! More information on how to claim the award will be given at a later date.

Chris and Jim say, "Working a pile-up with a 40 year-old radio will be tough, so be prepared for some frequency drift and we won't be able to work split with some of the radios (but the old separates will be fine, Hi!). We might be using a hand microphone but hope to key the radios with our computers rather than with a hand-key and we intend to use linear amplifiers and good antennas to make things easier for you to work us. We are very grateful to Yaesu (UK) Ltd for sponsoring us with special QSL cards, small trophies and an overall prize to be awarded at the end of the year."

Thank you Gentlemen! Incidentally, both Chris and Jim suggest that we keep our eyes on **www.gm7v.com**/**yaesu2010.htm** for further details.

The second operation will be from the Island of Skye EU-008, situated off the West coast of mainland Scotland the largest and perhaps the best known of the Inner Hebrides and sometimes referred to in Gaelic poetry and song as *Eilean a' Cheò* or *The Misty Isle*. The island is well known for its beautiful scenery, history and wildlife and it is from here that *PW* reader **Geoffrey Pendrick**

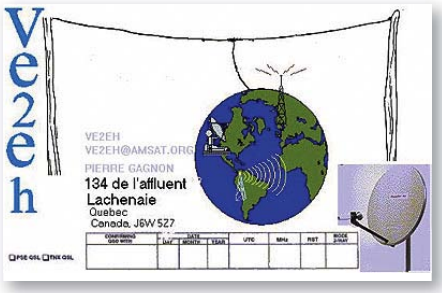

Fig. 1: The VE2EH QSL for the contact by Robin Trebilcock GW3ZCF on 14MHz PSK.

Fig. 2: The R900DM Special Event QSL, resulting from the QSO with Tom Hutton G0HUT on 14MHz using PSK.

Fig. 3: The SP2BUW QSL, from the QSO with John Reynolds M0RJH on 14MHz using PSK.

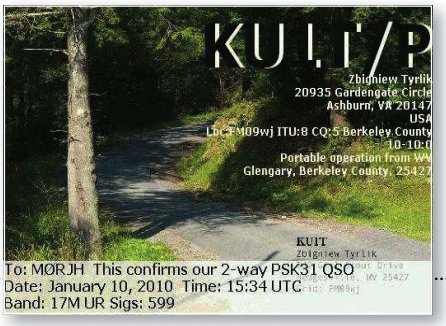

Fig. 4: The KU1T QSL, received after the QSO with John Reynolds M0RJH 18MHz using PSK.

Fig. 5: The DR20EBM QSL, that arrived after the QSO with Martin Addison 2E0MCA on 14MHz, using s.s.b.

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M5GAC will take a well earned holiday and operate as MM5GAC/P from WAB grid square NG53 on the 3.5, 7 and 14MHz bands during early mornings and late evenings from May 10th to the 21st. Further details and updates can be found on Geoff's page at **www.sheilap.co.uk/**

Your Reports

On to your reports now and the first is from **Eric Masters G0KRT** in Worcester Park, Surrey who tried 3.5MHz working c.w. stations DJ2IA (Germany) 0623, DL9CE 0751 and DK1HW 1626 followed by F6FTB (France) running just 1W from a Yaesu FT-817 and home-brew modified W3EDP antenna at 84ft long with counterpoises tuned with an SGC SG-211 MINI-Smartuner.

In East Finchley, North London **Martin Addison 2E0MCA** used his Yaesu FT-2000 and 50W to a G5RV antenna to work s.s.b. calls PA0QRS (Netherlands) 0737, DO6SD (Germany) 0746, ON5PV (Belgium) 0750, LA0EOA (Norway) 2058, EW3EW (Belarus) 2129, SM0MLZ (Sweden) 2149, F8CHM (France) 2137 and OZ2SPACE (Denmark) 2205. The last was a special call to promote a local Danish rocket and space project called 'Copenhagen Suborbitals' (see **www.copenhagensuborbitals.com**) QSL via OZ7AKT.

Also on the band was **Bill Ward 2E0BWX** who lives in Edwinstowe, Nottinghamshire. Bill's log included EI9JU (Ireland) EU-115 at 1155, HG3X (Hungary) 1815, OE3K (Austria) 1923, OZ3FD (Denmark) 2015, PI4DX (Netherlands) 2030, HB9FAX (Switzerland) 2130, DJ8OG (Germany) 2131, and S51ST (Slovenia) 2200. All contacts were made using an Icom IC-7400, 50W s.s.b. to a SRC X65 end-fed wire antenna.

The 7MHz Band

On to the 7MHz band now, and we start with a welcome to new reporter **Mike Dwyer 2E0BTK** in Wilmslow, Cheshire who has only been back on the h.f. bands since January after rebuilding his home-brew Cobweb antenna. The rig Mike uses is a Yaesu FT-897D and the antenna is tuned via an LDG AT-100Pro antenna tuner. The first QSOs were with PSK31 on 7MHz and included EA3GJA (Spain) 2143, IZ4OUL (Italy) 2201, EA4FSR 2255, OK2BPU (Czech Republic) 2351. Mike had one voice contact with EA6DX (Balearic Islands) EU-004 at 2220UTC.

Another new reporter, from Solihull in the West Midlands, is **John Reynolds M0RJH** who said in his letter, "I was a keen s.w.l. in my teenage years and had short wave broadcast band logs published in *Practical Wireless* in 1977! The hobby was put on the back burner for about 32 years until I went along to the **Wythall Radio Club** in Worcestershire in April 2009. Through the excellent courses and tuition available at the club I was pleased to pass the foundation exam in May, the Intermediate in June and became a full licence holder in December". (Well done John – and to the club for running the courses!).

John said that despite having the full licence he still regards himself very much as a beginner – though he did very well going from s.w.l. to M0 in only months! John goes on to say, "I've been using BPSK31 on h.f. and I'm comfortable with it as I'm used to E-mail and it is possible to make contacts using this mode with relatively low power. I think it's a great way of familiarising yourself with the short wave bands and their propagation patterns." (I'm sure there are many who would agree with John!).

John's log includes S58X (Slovenia) 2042 and ON5PO (Belgium) at 2111 while a change to 10MHz found UR4CU (Ukraine) 1028, SP2BUW (Poland) 1053, OE6HTG (Austria) 1517, RW3DQC (European Russia) 1552 and DK1IO (Germany) at 1623UTC using an Icom IC-7000 and a Comet CHA-250BX vertical antenna as he only has a small garden.

Fig. 6: The QSL card sent by UR4CU following the QSO with John Reynolds M0RJH on 10MHz PSK.

Fig. 7: Geoff Pendrick M5GAC operating from the Isle of Arran as MM5GAC/P.

Fig. 8: Mike Dwyer 2E0BTK's h.f. station.

Incidentally, the Wythall Radio Club is currently one of the most active in the West Midlands and meets every Tuesday evening at 2000 at the Wythall Community Association, Wythall Park, Silver Street, Wythall B47 6LZ, where it has been able to build a both a permanent shack and an h.f. to u.h.f. antenna system mounted on a 19.5m Versatower. The club operates many special events including Mills on Air, JOTA and participates in various contests. Take a look at **www.wythallradioclub.co.uk**/ for further information, course dates and latest news.

The s.s.b. of Bill 2E0BWX found DL8EDD (Germany) 1030, HB0/DL2OBO (Liechtenstein) 1700, EA7GAK (Spain) 1930, 9A3AGS (Croatia) on the Isle of Brac EU-016 at 1938, OH5NQ (Finland) 2145, ES5JR (Estonia) 2230UTC using his end-fed wire.

The 14MHz Band

On to the 14MHz band now and it has been a while since **Robin Trebilcock GW3ZCF** in Bishopston, Swansea, South Wales, has sent in a report. Unfortunately major surgery has prevented Robin access to his loft space shack so he has been using an Icom IC-7000 and 19.5m end fed long wire downstairs for his h.f. operating since December. However, he's doing well with this set up and using the keyboard mode PSK31 logged KT4SA now AC0Y (USA) in Orlando, Florida at 1437, SV2GJV (Greece) 1513, CN8OY (Morocco) 1520 and VE2EH (Canada) in Lachenaie, Quebec at 1533UTC. (Welcome back Robin and I'm sure we all wish him a speedy recovery!).

Even though he has been spending, "too much time on the beach" the log from **Peter Leng ZL4TE** in Cambridge, New Zealand continues to grow since his move down under. His s.s.b. contacts included YJ0MM (Vanuatu) OC-035) at 0754, P29TL (Papua New Guinea) OC-034 at 0830, OR0A (Belgium) 0831, JR6AP (Japan) 0835 and HB9RDE (Switzerland) 0909UTC using power levels of 200-500W from his Yaesu FT-1000MP MkV and Cushcraft AV-3 three-band vertical antenna.

Also spending some time on the band was **Tom Hutton G0HUT**

Fig. 9: John Reynold M0RJH's h.f. station operating PSK31.

in Farnborough, Hampshire who used PSK31 again working UE3LAN (European Russia) 0934, UN1L (Kazakhstan) 1142, IY1Y (Italy) 1142, a special call for the Marconi Nobel prize QSL via IK1MDF. ES0IC (Estonia) 1135, Z33MM (Macedonia) 1212, R900DM (European Russia) 1312. The last station being a special call to mark the blockade of Leningrad and '900 days of courage' shown by the Soviet people during the Second World War, QSL via RX1CQ. (I suggest that you look this call up on QRZ.com as it contains some interesting facts and photographs that were taken during this period). Then came TF3IGN (Iceland) EU-021 followed at 1407 and HB9AAQ (Switzerland) at 1427UTC using a Tigertronics USB interface and Yaesu FT-450AT with 30W into a Cobra 14MHz vertical antenna.

The band also provided Bill 2E0BWX with his first PSK31 contacts when he worked IV3VOU (Italy) 1349, EA3GOM (Spain) 1410 and RZ3DC (European Russia) at 1620UTC using an USB interface from ZLP Electronics and 50W to a Diamond CP-6 vertical antenna.

Martin 2E0MCA on the other hand, used s.s.b. again, logging EH7JR (Spain) 0951, 3Z02PGA (Poland) 1220 a call to celebrate the 2nd anniversary of the Polish Gmina Award QSL via SP2FAP. Then came E74EE (Bosnia & Herzogovina) 1228 and ZB2CM (Gibraltar) at 1344UTC.

The 1W QRP c.w. from Eric G0KRT found HB9TJV (Switzerland) 0840, then at 1156 came YQ5Q (Romania) – a contest call (QSL YO5KIP). Next, came OH7QR (Finland) at 1205, YL3DX (Latvia) 1322, UA3TW (European Russia) and finally, SP/OE3WYC (Poland) at 1515UTC.

The 18MHz Band

On to the 18MHz band now. The only report here was from Robin GW3ZCF who used PSK again contacting VE3NOO (Canada) in Bath, Ontario at 1410. This was followed by several stateside stations including W1ZE Phippsburg, Maine at 1510 and AB1KW in Merrimac, New Hampshire 1544 and Z21LS (Zimbabwe) 1520UTC QSL via DE1ZHB.

Signing Off

There was a lot to fit in this month especially from our reporters whose logs have shown that there is plenty of activity on the lower bands. Thanks for your logs and also to **Mauro Pregliasco I1JQJ/KB2TJM**, the Editor of the *425 DX Newsletter* for all the DX information. Until next month I wish you all good DX.

73 Carl GW0VSW.

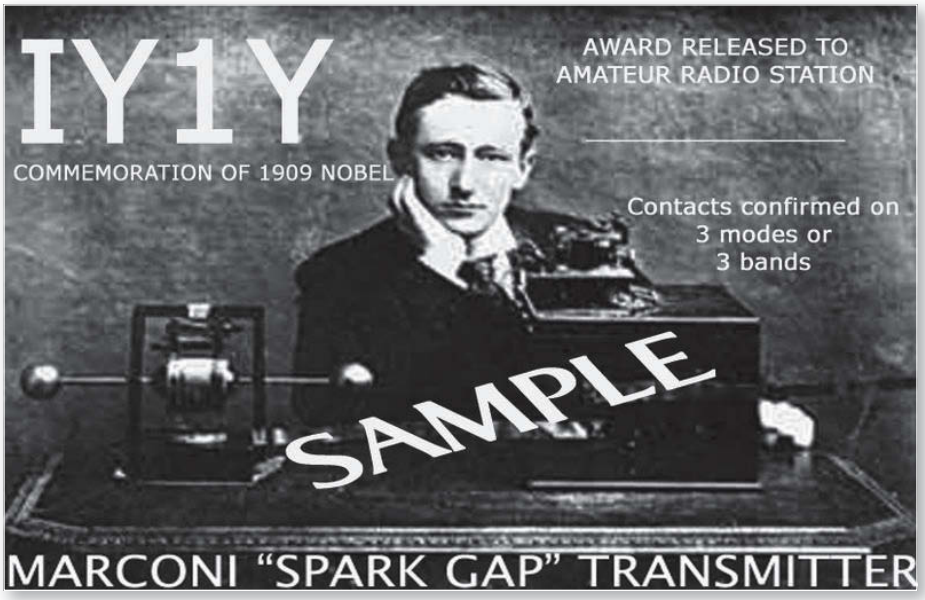

Fig. 10: The QSLcard from IY1Y, following the QSO with Tom Hutton G0HUT on 14MHz PSK.

Colin Redwood's

what next?

This month Colin Redwood G6MXL looks at various ways of keeping up to date with DX activity on the bands.

Welcome to the April edition of *What Next?* (*WN?*). Having spent the last few months looking at getting on the air and providing instructions for some basic contacts, I think it's time to move on and look at some of the tricks of the trade for keeping up-to-date with information about DX stations.

To be quite honest, I think it's quite difficult to come up with an all encompassing statement of what DX is! Generally, it's a station that most Amateurs would consider 'rare' in some respect. For most high frequency (h.f.) bands, it probably won't be a station in the same continent as you. For example, your local club net certainly isn't DX!

No matter how much time you can devote listening to the Amateur bands, it's easy to miss some DX by listening on the wrong band at the wrong time. Fortunately, there are numerous sources of information that can help the avid DX chaser to make the most of the time in their shack. Nowadays, most, but not all, of these sources are Internet based.

Reading *HF Highlights*

The *HF Highlights* monthly column in *PW* is a useful source of information, and has the big advantage of you being able to read it 'off-line'. The long-serving column author, **Carl Mason GW0VSW**, often includes details of forthcoming DXpeditions to rare and exotic countries in the column.

There are also many web sites that have links to various sources of DX information. One, which I find particularly impressive, is **www.ng3k.com** This has links to many useful sources of information, including the well established *425 DX Newsletter* at **www.425dxn.org/**

Contest Calendar

The Contest Calendar maintained by **Jan-Eric Rehn SM3CER**, at **www.sk3bg.se/contest/ (Fig. 1)** is a really good way of keeping up to date with the various h.f. contests that take place throughout the year. Even if you are not a great lover of contests, they do provide opportunities to work many stations in a short time. So if you only have limited time available to 'play radio', then an hour giving away points in a contest can be a quick way of working a number of stations.

If you really dislike contests, then don't forget that the World Amateur Radio Conference (WARC bands), 10, 18 and 24MHz) are all contest-free. These can all produce good results when propagation permits.

The DX Cluster

One of the most useful and certainly most up-to-date information sources of current activity on the bands is the DX Cluster system. I find it so useful that I am devoting the rest of this month's *WN?* to looking at it in some depth.

In the past, 30 years or so ago, rare-country hunters organised local 70, 144 and 430MHz networks, or would even telephone each other as soon as an h.f. DX station appeared on the air. I remember using a local 144MHz net in the mid 1980s to chase squares on the v.h.f. bands particularly, as 50MHz became available to more European countries. Over the years the DX Cluster system has replaced these techniques.

So, just what does the DX Cluster do? To answer the question, Amateurs who work a rare DX station enter details of the contact (termed a Spot) into the DX Cluster computer system. Other Amateurs look at the DX Cluster to know what stations are on which bands, etc., to help them to know which bands are open to where.

Packet Radio

In the early days the DX Cluster system was achieved by linking numerous stations, running the DX Cluster software, by a network of Amateur packet radio stations world-wide. In the UK these stations had call signs in the GB7+three letters series, and often had DX as part of

Fig. 1: A typical page listing some of the contests in January 2010 from www.sk3bg.se/contest/ – there are certainly plenty to choose from!

Fig. 2: The main spot screen on the DX Cluster at www.dxsummit.fi/

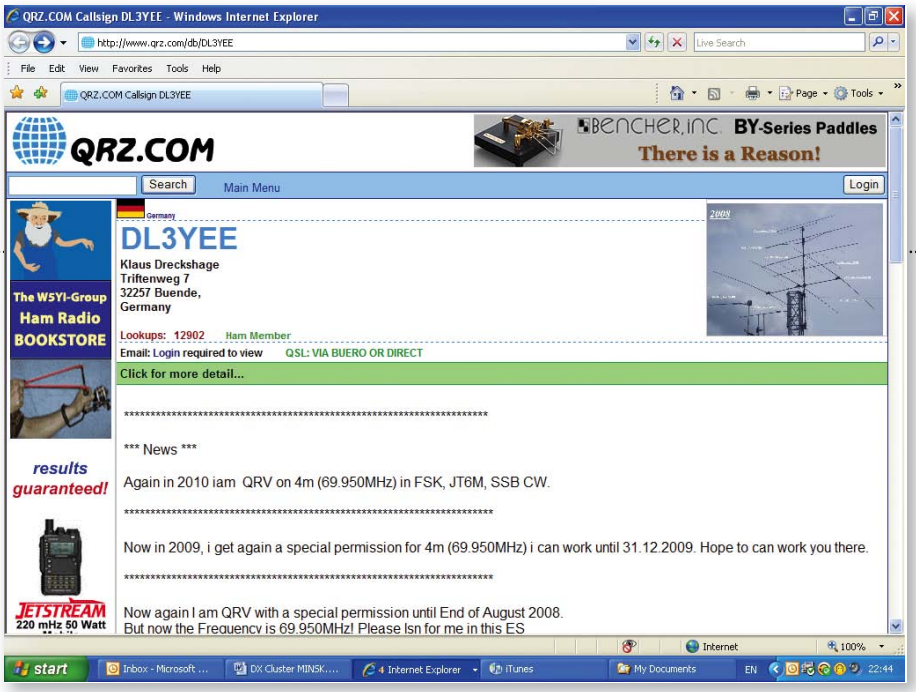

Fig. 3: The QRZ.com entry for DL3YEE.

their callsign to distinguish them from 'normal' packet radio bulletin boards.

Connecting from home to a local cluster station was for most Amateurs via a 1200baud packet radio link, often via several intermediate nodes. When a station somewhere in the world worked some DX, they entered details into their nearest DX Cluster and this was then relayed world-wide.

The main drawbacks of using the packet radio network were the speed and reliability of the links between the clusters via numerous intermediate nodes. Nevertheless, the system worked quite well within Europe, where generally node to node links at very high frequencies (v.h.f.) and higher frequencies were reliable, although rather slow.

As the Internet became more available and affordable, a slow transition started from using Amateur Radio band packet radio to connecting to the DX Cluster, using the Internet. The main problem with packet radio had been 'overload' on the 1200baud local links, which were shared by many local stations for all their packet radio activities.

Broadband Internet

In recent years, with the advent of fixed price broadband Internet, the packet radio system in many countries, including the UK, has declined, with parts of the country becoming almost isolated from the rest of the packet radio network.

Fortunately, the availability of broadband has enabled the DX Cluster system to move to the Internet. In some places, access is still possible using packet radio links, although this is becoming less reliable and hence less common.

So, (you may ask!) how do you use the DX Cluster? To answer the question I've chosen to illustrate this by means of one of the most popular DX Cluster web sites namely **http://www.dxsummit.fi/** This site is maintained by the **Radio Arcala Club OH8X**, in Northern Finland. By the way this is a club of very serious DXers with seven permanently installed towers, one of which is 100m tall (330ft) that supports a 3-element beam for 1.8MHz (Top Band) and a 5-element beam for 3.5MHz (80m)!

The DX Spots Tab

Initially, I'm going to concentrate on the **DX SPOTS** tab. By clicking on this, you'll see the most recent 25 spots made by stations around the world reporting DX they've worked or heard **(Fig. 2)**. Unfortunately, the columns are not headed, so I'll explain each of them in turn from left to right.

The first column on the left-hand side of the screen is the callsign of the station that made the spot. Some callsigns have an odd looking suffix, such as '-@'or '-3'. These are from stations using the packet radio network to submit their spots. The next column is the frequency on

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which the DX station was worked or heard. Note that on the DX cluster the **frequency is always shown in kHz** (not MHz), even for microwave frequencies!

The third column is the callsign of the DX station worked or heard by the station in the first column. The forth column includes any comments entered by the station entering the spot. Typically this might be a locator, a Summits on the Air (SOTA) reference or an Islands on the Air (IOTA) reference.

The fifth column is the date and time in UTC. This is automatically added by the DX Cluster software when it receives a spot. Finally the sixth column is the DXCC country of the DX station. This is automatically determined by the DX Cluster software based on the callsign of the station in the third column. If you use a different DX Cluster, this last column may not be present.

If you click on any of the callsigns you see, you'll open up another window with whatever details are held on the **www.qrz.com/** Internet call book database **(Fig. 3).** Incidentally, I suggest that *WN?* readers check that their details on QRZ.com are correct, especially if they have moved house since they were first licensed.

Selecting Spots

Most Amateurs aren't interested in seeing every spot and select those that are of interest. For example, some Amateurs might only want h.f. spots, c.w. (Morse) spots, or v.h.f. spots depending on their particular interests. The DX Cluster makes it easy to select relevant spots - just click on the appropriate link.

As an alternative, clicking on the **Custom Spots** tab reveals numerous links so that spots can be selected for any one band between 137kHz and 47GHz. Note that the list here includes bands that may not be available in every country including, for example, 70 and 220MHz.

There are also a few options which select spots based on the text in the

Fig. 4: Entering a spot on the DX Cluster is easy. But remember to only spot 'real' DX!

Fig. 5: Some 70MHz spots on the DX Cluster. Note that there appear to be some 7MHz spots which have been mis-keyed with one extra digit!

comments field such as QRP, IOTA, and satellite. A lot depends on the accuracy of the text and sometimes this can result in a misinterpretation of the spot by the DX Cluster software.

Using The Information

Let's now look at how we can use the information. When a rare DX station is spotted on the DX Cluster, many DX chasers will immediately tune to the frequency and try to work the station in question.

If you're lucky, you might work it – but if there are many stations calling, you may be unlucky. However, you do know that the band in question is indeed open between the spotting station and the DX station.

However, if you are reasonably close to either the spotting station or the DX station, you can put this information to your advantage. Because the band is almost certainly open for you, – you could look for other stations in the same area, or try calling "CQ".

In addition to Spots, some stations also enter announcements. These might be the start of, or a late change – to a DXpedition for example.

Sending A Spot

It's very easy to send a spot. You just simply select the **Send Spot** tab, then enter your own callsign, the DX station's callsign, the frequency (in kHz) and any appropriate comments **(Fig. 4)**. Please don't get carried away with this facility – DXers around the world really aren't interested in your club's local 144MHz net or that you worked a QRO Italian station on 14MHz (20m) from the UK! Instead, please stick to spots that really are DX on the band in question that you've either heard or worked.

What To Spot

For the purposes of the DX Cluster, spots should certainly be something a little out of the ordinary or rare for the band in question. It's unlikely for example, that working another station in the same country or nearby country would be considered DX on any h.f. band – but if a band such as 50MHz (6m) suddenly opens to another continent – then by all means enter an appropriate spot.

However, there's little value in numerous stations spotting the same DX station on the same band. Likewise, once two or three stations in one particular square have been spotted on 6m – what's the point of spotting another?

Self Spotting

If you are operating on a 'rare' band (for example one of the microwave bands), then there is generally no objection to self-spotting – the practice of entering your own callsign as the DX station, to let everyone else know that you are looking for contacts. It would not be considered good etiquette to self-spot on the main h.f. bands unless you were operating from a particularly rare country or island for example.

Be careful before using the DX Cluster in contests and in particular self-spotting in contests. Many contests prohibit this in their rules, and may also take a dim view of nearby club members spotting a club station for example.

Hints & Tips

Some countries have different frequency allocations on bands such as 7MHz (40m). Just because you see a spot on 7.220kHz (don't forget it is only shown in kilohertz (as 7220) on the DX Cluster) doesn't mean that **you** (If you live in the UK) can transmit on that frequency, as this is outside the UK 7MHz Amateur allocation, which extends from 7 to 7.2MHz.

So, be careful when entering the frequency that it's in kHz and not MHz. Also, be particularly careful with the number of zeros entered. Errors here, for example, can give rise to a station in the 7MHz (40m) band being shown as spotted in the 70MHz (4m) band. **(Fig. 5).**

For v.h.f. and higher 'spots' entering the relevant locator squares in the comments can be helpful, for example IO80 <> JN36 to indicate that you are in IO80 square and the DX station is in JN36 square. If a station isn't using s.s.b. or c.w., it is useful to enter the mode (e.g. RTTY) in the comments. Remember the purpose of the Cluster is to help others work DX, so it really does make sense to provide information which may help.

Using Your Ears!

Despite all the numerous sources of information in magazines and on the Internet, I still believe that the most useful source of information is actually to listen on the bands!

Finally, remember that there are many other sources of DX information. If you have any particular recommendations, please let have details so that I can pass them on to other readers. ●

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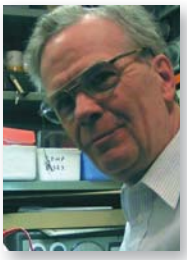

Harry Leeming's

in the shop

Harry Leeming G3LLL starts off this month by asking a question and ends up increasing $1 to $100!

The shop is open again and I bid you a welcome – with a question! How much electricity are you using? You know the feeling, the electricity bill drops on the mat, you wince, and then someone points a finger and says – "It's your radio equipment!"

Ross Bradshaw G4DTD, a *PW* author and reader, contacted me and has been doing some checking up. Ross sent me the following details: First he tried operating his FRG7 receiver from a 12V car battery to reduce mains interference, and with the pilot lamps switched off it took just under 0.1A (1.2W). Even switching the lights on only increased it to just under a quarter of an amp – 250mA, which is about 160 hours use on a 40Ah battery.

Next, running his FT-101 and FT-101ZD from the mains Ross checked their consumption. Both transceivers took less than 40W with the heaters off, and 50 and 60W respectively with the heaters on. In the transmit mode the power consumed increased to around 150W with 10W output and about 240W on speech peaks at full power.

Most of us spend much more time listening than transmitting, hence the average consumption – even with the heaters on – isn't likely to exceed 100W. As that equates to reading a book with a nice bright old fashioned bulb in the standard-lamp, it looks like Ross and I should be able to operate with a clear conscience!

How Long Will It Last?

Next, how long will it last? Everything has a weak link, the famous AR88 communications receiver was built like a battleship and after the odd repair, quite a few are still performing well after nearly 70 years.

Some AR88s however, had to be rewired when they were fairly new, due to the breakdown of the insulation on the rubber and cotton covered wiring. And moving on a few years – the Yaesu FT-101 has one capacitor, appropriately numbered C13, which breaks down and causes a lot of damage.

The weak link in the FT-101ZD is the mains transformer. In fact, loads of these rigs have had to be scrapped because the fuse was a little too large and a minor fault then 'blew' (burnt out) the transformer. Manufacturers simply cannot look into the future! Who for example, would have dreamed that after 10 to 20 years that the glue that they were using could cause the problems I'm about to discuss?

The FDK-700EX

'Tony' dropped in to see me with an FDK-700EX, **Fig. 1**, which he wanted to put back into use. The 700EX is a simple-to-operate reliable 20W f.m. only base or mobile 144MHz (2m) unit, which was very popular around 20 years ago.

Tony's unit worked satisfactorily from 144 –145MHz, but was 'dead' in the top half of the band. Once it was on my bench, a quick check showed that the voltage controlled oscillator (v.c.o.) was dropping out of lock when the rig was tuned to the top half of the band. So, after first carefully noting its existing setting, I gave the v.c.o. trimmer an experimental tweak. Up came the missing half of the band, and, after experimenting a little, I found a setting of the trimmer where the complete band could be tuned, irrespective as to whether the set was hot or cold.

If you look at the photograph of the underside of Tony's rig, **Fig. 2**, you'll see that some of the components in the v.c.o. stage have been coated with a rubbery glue (one of my pet hates I've mentioned before in *PW*!). Something happens to this substance over the years and I was in no doubt that it was a change in the characteristics of this, that had thrown the v.c.o. off frequency, and hence the phase locked loop synthesiser (p.l.l.) was out of 'lock'.

However, I was afraid that trying to remove the glue might damage some components, and so I explained the situation to Tony, and showed him the location of the v.c.o. trimmer. I told him that if the rig should drift off again, he could easily correct it by adjusting the trimmer.

Problems with the v.c.o. going out of lock at one end of the tuning range are quite common with ageing Amateur Radio equipment, and service manuals usually give details as to the 'approved way' of resetting the v.c.o. trimmer, which usually involves adjusting it for a specific voltage at a test point. As equipment gets older, and component values drift off, this approach doesn't always work out and my practice is to adjust by trial and error for reliable lock as I mentioned above.

Fig. 1: Tony's FDK-700EX 144MHz rig worked satisfactorily from 144 –145MHz, but was 'dead' in the top half of the band. Find out what Harry did to resurrect it!

That Glue Again!

Malcolm Constantine G0MIC, sent me an interesting E-mail about his FT-726, which (with his permission) I quote, "It was one of those days

Fig. 2: The underside of Tony's rig, you'll see that some of the components in the v.c.o. stage have been coated with a rubbery glue (it can just be seen between the end of the pencil tip/red wire and the yellow coil former) which is something that Harry has come to hate!

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when everything seemed to go wrong and I had turned to my old favourite, the Yaesu FT-726R to give me some entertainment and allow me to have a dabble in a 2 metre contest. But alas, I found that I had no reception or transmission in the s.s.b. or c.w. modes. f.m. was still okay – but very people few ever work f.m. in contests, so I then checked the other bands as they use separate modules, and found that I had no s.s.b. or c.w. on them either."

"The FT-726R is a multi-band transceiver having a common transmit /receive section that works to an intermediate frequency of 10.7MHz and drives modules for each of the bands provided. The circuit diagrams revealed that the oscillator that provides the underlying r.f. signal for s.s.b. and c.w., resides on the transmit board that is sandwiched between the receive board and the satellite unit."

"Removal of the satellite board and the screening cover gave access to the transmit board so that further fault diagnosis could be made. A few tests soon revealed that there was no signal being generated by the oscillator, which also did not appear to be taking any current. Since there is only one transistor involved, Q17 a 2SC460B, this was the most likely culprit."

"In order to provide mechanical stability Yaesu bonded a number of components together in the oscillator with some brown glue and this was carefully cut away to allow removal of the 'faulty' transistor. It only required two of the legs of the transistor to be de-soldered before it fell out and the cause of the fault became obvious. The middle leg, the collector, had been corroded away by the brown glue."

"Unfortunately the remainder of the collector lead attached to the transistor was too short to attach an extension to repair it and, of course, I did not have a direct replacement in my spares box. Not wanting to be beaten, and have the set out of use until a spare could be obtained; I resorted to some cannibalisation with a 'Junior' hacksaw. Making four cuts in a square around the centre pin of the transistor into the plastic of about 1mm depth, I was able to reveal enough of the lead to be able to attach a piece of wire to extend the lead so that it could be reattached to the board."

"The base and emitter leads were also re-tinned where there had been some surface corrosion. Once the transistor had been re-soldered in the board the brown glue was replaced with hot melt glue, taking care to keep it away from the leads, and the assembly allowed to fully cool before testing and re-aligning the oscillator."

"I suspect that the same brown glue has been used by Yaesu in many of their sets, and may cause similar problems if it has dribbled onto the interconnecting wires. I have to say though, Harry, that this is the only occasion that I have seen this particular effect!"

Well thanks for that Malcolm! As equipment gets older it looks like we're going to hear more and more about these 'sticky' problems.

Won't Transmit!

Many rigs have turned up in my workshop for repair with the complaint, "Won't transmit" when the user had not even tried another microphone, had a good read of the instruction book, or looked for the obvious possibilities.

'**Terry**' made a 150 mile trip to view an FT-902 and the owner let him try it on air. As it worked well and looked immaculate Terry bought it. However, when he got it home it wouldn't transmit and he felt rather sick! After a couple of phone calls to '**Joe**', the previous owner, he was no nearer to solving the problem and eventually he turned up in my shop looking rather dejected.

A quick glance at the back of the set was all that was necessary to diagnose the fault, the 11 pin auxiliary plug was missing! On nearly all the older Yaesu rigs the heater circuit to the power amplifier (p.a.) valves is completed by a link in this plug. Unfortunately the auxiliary plug is also used to make the necessary connections to other equipment such as a linear amplifier, or a transverter, and so when Joe had disconnected it from his linear he had unthinkingly disabled the rig's heater supply.

Unfortunately, I didn't have a spare plug available and so I advised Terry to solder a link between pins 1 and 2 of the auxiliary socket. He was also advised to remember to discharge the 900V supply before poking his fingers in (see later), as some 101s have one pin of the auxiliary socket connected to this and (as I've discovered more than once!) if you accidentally touch it – it bites!

No Heaters Part 2

Next, it's on to 'no heaters' part 2! Have you ever looked under an FT-101ZD and wondered what the relay mounted on the 'Rectifier A' board, shown in **Fig. 3**, does?

To answer the question, let's look back a few years. The original FT-101Mk1 was developed as a portable h.f. rig, in the days when normal home equipment was just too bulky and heavy to carry around. Although the sales literature promoted it with the words "*Car, camper, trailer, boat, aeroplane, suitcase, or the home base, the FT-101 fits them all*". Indeed, the very first FT-101s seemed to be aimed mainly at the American who

wanted a second rig for mobile or portable use. As a result the receiver overloaded pretty badly if used with a full size antenna system.

Possibly, it was only when large numbers of European Radio Amateurs started to use the the '101s as base stations, that Yaesu realised what a potential big seller they had. But whatever happened to change their minds – they started to upgrade the receiver.

All the early '101s could be operated from the mains supply, or from a 12V battery, but as more and more of the rigs were purchased for home use, Yaesu decided to make battery operation an optional extra. In the case of the rigs such as the FT-101EE, fitting the d.c. option required a bit of soldering, but the FT-101ZD was designed so that the add-on d.c. unit could be plugged in, without any work being necessary. (For some odd reason, late production units didn't have the necessary socket fitted so, back to square one!)

All versions of the FT-101 use the mains transformer as part of a power oscillator when operating from a d.c. supply, and so, quite a lot of switching is require when changing over to a.c. mains operation. In the original '101s the power lead ended in a 12-pin socket, which had links between various pins. When the a.c. power lead was plugged in these links made the correct connections for mains operation, and plugging the the d.c. lead operated the connections needed when the rig was wired to 12V. (And yes, you guessed correctly, someone did manage to write off their rig by fitting a 13A plug to the d.c. lead)

For some reason Yaesu stopped using the 12-pin connector when they introduced the FT-101ZD and this left them short of the heavy duty links needed to switch from a.c. to d.c. operation. Their answer to this was the relay on the 'Rectifier A board'. This relay is fitted in all versions of the FT-101ZD, and it's there to switch the heater supply to the correct source when changing over from one source of power to the other.

If the contacts on this relay become worn or oxidised the heater supply will fail, and while it can be cleaned, if the rig is not to be used on d.c. it's probably best shorted out. In this case you should put a note on the back of the rig to this effect, in case someone tries to fit a d.c. unit to operate from a car battery. Quite apart from bad contacts on the relay, it's quite common for the heater supply to fail due to a fused strip of printed circuit under the rectifier board, or a bad joint on one of the terminal pins feeding the relay.

Remember The High Voltage!

Do remember when working around the relay that the board also carries the 900V supply! It should discharge itself if you switch off and give it a few minutes, but even then it's better to short it out and be sure, *PW* and I don't not want to lose any readers!

Finally, because of a typo introduced at the *PW* office during sub-editing (*sorry Harry, it was me! **G3XFD***) please note that in bit about Heathkit last time. In fact Heathkit weren't mean – the amount paid to me was $100, and not $1 as was published! See you – hopefully – next month! ●

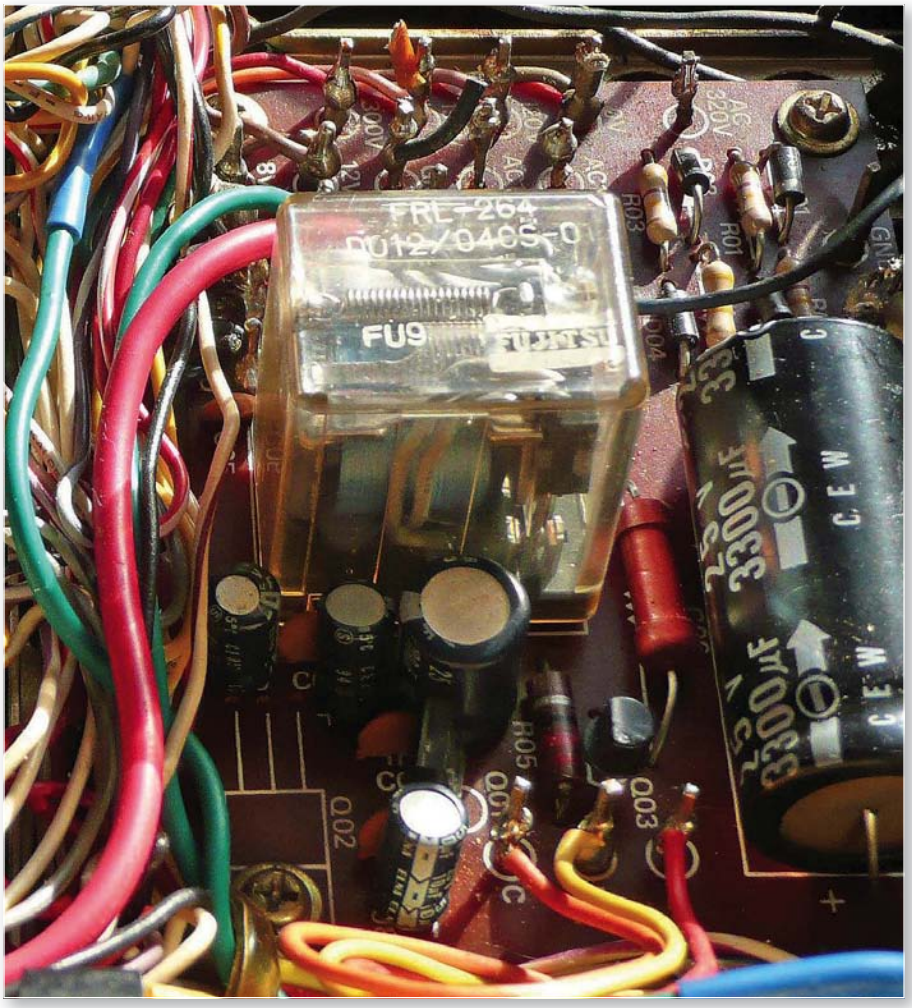

Fig. 3: Ever wondered what the relay mounted on the 'Rectifier A' board, shown here does? Well it controls the power source for the valve heaters.

Problems

I like to hear about problems with older equipment, particularly pre-1990 Yaesu rigs. Please email me, (please add some radio related term in the subject heading, to differentiate against spam), or write and enclose a stamped addressed envelope. Remember that electricity is dangerous, if you are not familiar with safety precautions you must never work on your equipment while it is plugged into the mains. (Switching off at the wall socket does not necessarily make equipment safe).

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DISCLAIMER Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. ***Practical Wireless*** advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The publishers of ***Practical Wireless*** wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

For sale

X-tals 100kHz-250MHz. Std 10.106, 10.245, 10.7, 11.155MHz @ £1.50. Callg 3.56, 7.030, 14.060, 28.060MHz @ £1.50. 1.7468MHz X-tal Clansman 321 ex-stock p.o.a. 10.7MHz 10kHz filter @ £5.75, 1.4MHz SSB filter p.o.a. P&P £1.50 + VAT. IQ Electo
Tel: 0208 391 0545.
E-mail: vincentvoy@hotmail.co.uk

Antenna Analyzer WE-030A 0.3-30MHz, graphical, fast, small and hand-held. £195.
www.rfequipment.co.uk

Voice Keyer, as featured in PW March 2010. PCB and all parts available.
For details email:
barryhorning@btconnect.com

Valves

VALVES AND ALLIED COMPONENTS IN STOCK Ring for free list. Valves/ books/ magazines wanted.
Geoff Davies (Radio).
Tel: 01788 574774.

TOP PRICES PAID
for all your valves, tubes, semi-conductors and ICs.
Langrex
Unit 4, Daux Road, Billingshurst, W. Sussex RH14 9SJ
TEL: 01403 785600. FAX: 01403 785656.
www.langrex.co.uk

Repairs

REPAIRS TO ALL AMATEUR AND VINTAGE Rx/Tx Cost effective service. Phone or call in for details. Kent Rigs, 52 Salisbury Road, Chatham, Kent ME4 5NN. Tel: 07903 023437.

RELIABLE REPAIRS for all amateur and vintage equipment. Professional service, reasonable rates. Tel: 01807 580376.
E-mail: radiorepairs@btconnect.com

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

QSL cards

FULL COLOUR QSL CARDS for all your QSL needs. Shirts and caps with callsigns and also ham cartoons by GW3COI. For free samples contact Chris M0DOL.
E-mail: qslers@aol.com
P.O. Box 184 Northampton NN3 9JH.

Aerials

GAREX ELECTRONICS VHF/UHF accessories and aerials, TVI Filters, 4m & 6m Transceivers.
Tel: 07714 198374
www.garex.co.uk
PO Box 52, Exeter EX4 8WX

G-WHIP ANTENNAS Mobile, base, backpacker and commercial models. WWW.gwhip.co.uk or telephone 02380 445212 after 6pm.

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PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979, Fax: 01202 659950.

Please insert this advertisement in the ..... **issue of *Practical Wireless*** (if you do not specify an issue we will insert it in the next available issue of *PW*) for ..... insertion/s. I enclose Cheque/P.O. for £.....(42p per word, 12 minimum, please add 17.5% VAT to total).

Name: .....

Address:.....

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Telephone No.:.....

Box Number @ 70p: Tick if appropriate

Category heading:.....

Please photocopy this form or write on a separate sheet if you prefer

BARGAIN BASEMENT

SEND YOUR ADVERT TO:-

PRACTICAL WIRELESS, BARGAIN BASEMENT, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW

For your advert in Bargain Basement please remember to include your dated, coloured corner flash from this page along with your entry.

BARGAIN BASEMENT RULES - £4 per advert

Please write your advert **clearly** in **BLOCK CAPITALS** up to a maximum of **30 words**, plus **12 words f**or your contact details on the form provided and send -it together with the dated corner flash and your **payment of £4 (subscribers** can place their advert **free of charge** as long as they provide their **subs number and corner flash),** cheques should be made payable to **PW Publishing Ltd.**, credit card payments also accepted.

Send your advert to **Bargain Basement, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or E-mail your advert to **peter@pwpublishing.ltd.uk** (If you don't want to include your credit card details on your E-mail, just 'phone us on **0845 803 1979**.

Please help us to help you by preparing your advert carefully. Any advert which contains **??** marks indicates that the advertiseing dept. could not read/interpret the wording.

Please avoid FAXing your advert - it could delay publication.

Advertisements from traders or for equipment that it is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. **No responsibility will be taken for errors and no correspondence will be entered into on any decision taken by the Editor on any of these conditions.**

You should state clearly in your advert whether equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

FOR SALE

30 AMP PSU (PS-304), £60. Boxed, de-luxe Versa tuner, MFJ-949D, £75. Vertical antenna, very good condition, 20/15/10, £60. RTTY/Digipan gear, £30. All plus carriage. Tel: 01745 570538 (North Wales).

1155 FITTED PSU heater fault. V55 looks like 1155, working. BC-348 mains converted 1 valve loose base hambander, working. HRO working PSU + coil packs, valves 1920s-1960s, all types. Tel: John 01634 817846 (Medway, Kent).

KENWOOD SEPARATES for restoration. Model T-599s SSB transmitter with fault. Matching receiver JR-599 custom special in working order. Conneting cables with original manuals but no boxes, £120. Kenwood TS-770E VHF/UHF all mode dual-bander. Faulty meters but works OK. Boxed with manuals, £50. Buyer collects. Tel: Dave 01443 683912 (South Wales).

PIRATE RADIO 1960s, 1970s. Sounds, pics of Caroline, London 270, Scotland, City, 208, Manx Radio RNI transferred from tapes from 99p. Real memories of the offshore stations in jewel case. Tel: Dave 01244 316673 (Chester). E-mail: g8zre@hotmail.com

TEN-TEC ARGONAUT II mint, £325. Kenwood TM-421E 2 metre mobile, £70. Kenwood TS-530S low output, hence £100. MFJ-9456 ATU, £70. FRG-7700 communications receiver, £100. Tel: 01937 844197 (West Yorkshire).

UNIDEN RADIO SCANNER model 105XLT. 100 channels including aircraft, public services, etc. Rechargeable AA batteries. New condition with box and instruction manual, £45 plus £5 postage. Tel: 01525 860912 (Bedfordshire).

WANTED

ATTENTION valved trawler-band radio Woodsons of Aberdeen. NR6M 'Mini Clipper' or similar, many still around. Please look in your attic. Will collect any distance. Will pay realistic price. Tel: Brian 01843 594732 or 079444 18259.

HAS ANYONE GOT a Plessey MB (Miniature Bayonet) type 2CZ138277 (straight) or 2CZ111370 (right-angle) line socket Tel: Godfrey G4GLM. 020 8958 5113. Write to 63 The Drive, Edgware, Middlesex, HA8 8PS. E-mail: cgmm2@btinternet.com

OLD HALF INCH FERRITE RODS must be half inch, 12.7mm, in diameter and be six inches long or more. Will pay very good money for the rods. Tel: Peter Tankard 0114 2316321 between 9am and 9pm (Sheffield).

PACOMM TINY-2 with manual at reasonable price. Good working order. Tel: Ken 0151 348 1233 (Cheshire).

Bargain Basement order form

Please insert this advertisement in the next available issue of Practical Wireless.

☐ For Sale ☐ Wanted ☐ Exchange

PLEASE NOTE: as a security measure, you must include your house number and postcode.

Name ..... *PLEASE*

Address ..... *WRITE*

..... *IN*

..... *BLOCK*

..... Post code..... *CAPITALS*

Telephone Number .....

CARD NUMBER

Signature..... Security number

LAST THREE DIGITS ON THE BACK OF THE CARD

Switch issue number (if on card) .....

Start date of card..... Expiry date of card.....

My Subs Number is.....(or mailer label) .....

		(30)	

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B.B. Apr '10

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NEW IN STOCK NOW

RADIO LISTENERS GUIDE 2010
£5.95

- Frequencies and transmitter information for all BBC and commercial radio stations, plus DAB digital transmitter details.
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- Analogue Radio switch-off Information about plans for FM and medium wave switch-off.
- Digital Radio (DAB) The latest news and information.
- Sky, Freeview and Freesat radio information and channel lists.
- Advice How to get the best from your radio.

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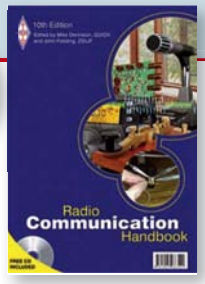
RSGB COMMUNICATIONS HANDBOOK



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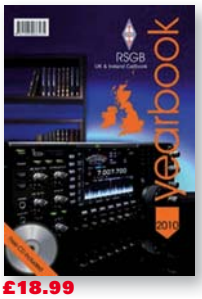
Following a major revision the RSGB Radio Communication Handbook is now the biggest edition ever and even better than before! 64 pages bigger than the previous edition, the 10th edition of the RSGB Radio Communication Handbook is now packed with even more material than ever before. The contents have also had the biggest revision ever and to make way for all the new material some chapters have even been moved onto the accompanying CD.

The CD-ROM version of the RSGB Yearbook 2010, but with a lot more besides!

£15.99

RSGB YEARBOOK 2010



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Bigger and better than ever before!
The newly expanded RSGB Yearbook 2010 contains 528 pages and over 1.25 million words. Now with over 200 pages of information it remains the most comprehensive guide to amateur radio in the UK and worldwide.
FREE CD
Packed with bonus material the RSGB Yearbook CD is a great extra benefit of buying this great book.

AIR TRAFFIC CONTROL 10th EDITION

Since the last edition of abc Air Traffic Control in 2005, there have been many changes in the air traffic control industry in the UK and UK-related airways.

IN STOCK NOW

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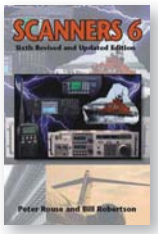

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The Scanners books, originally created by Peter Rouse, have been consistent best sellers. They are the UK's leading guides to the short wave radio equipment employed by enthusiasts to monitor the VHF/UHF frequencies used by airfields, the maritime and emergency services and many other users. Scanners 6, the sixth revised and updated edition, includes up-to-date frequency listings and information on the latest digital technologies, mobile radio, using PCs (home, laptop and palm) with radio receivers, shareware/freeware software for monitoring and decoding and radar-style displays on palmtop computers.

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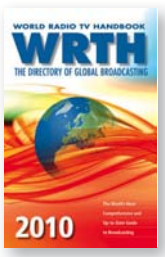

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The 64th edition of the best selling directory of global broadcasting on LW, MW, SW and FM.
The Features section has a stimulating introduction to the art of FM DXing, reviews of the latest equipment and a fascinating account of visits to five All India Radio stations.

The remaining pages are, as usual, full of information on:
- National and International broadcasts and broadcasters
- Clandestine and other target broadcasters
- MW and SW frequency listings
- Equipment reviews and articles
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- Extensive Reference section

and much more!

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	Pages	Price
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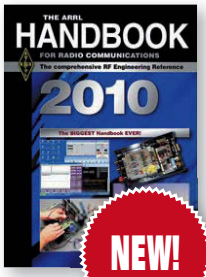

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ARRL HANDBOOK 2010

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87th Edition. **The BIGGEST ARRL Handbook EVER!**

At over 1250 pages, the 87th edition of the ARRL handbook is the biggest since it was first published in 1926. More than 60 authors and reviewers contributed over 70% NEW or completely revised content to this edition.

The ARRL Handbook 2010 is both reference book and tutorial, woven together with practical applications and solutions. The Handbook provides both a useful introduction to radio communication and features the most current material on electronics and Amateur Radio.

This edition has been reorganised into five major sections, making it easier than ever to find exactly what you are searching for: Fundamental Theory, Practical Design and Principles, Antenna Systems and Radio Propagation, Equipment Construction and Maintenance and Station Assembly and Management. Each chapter has been designed to be either an encyclopaedia of current practices and technology or focuses on techniques, designs and projects.

SPECIAL OFFER - Whilst stocks last! Purchasers of this book will recieve the hardback version of this book at no extra charge.

CD-ROM
The book's accompanying CD-ROM inside the back cover once again includes a searchable PDF version of the entire book, including graphics. Construction information and PC board templates for all projects are included, as are the original QST articles. There is a powerful filter design and analysis software, Elsie, as well as other useful applications.

NEW!

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£9.99

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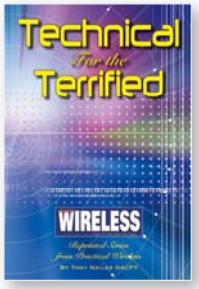
Contents include; The UK airspace system, The legal position, How the System works, What can I hear?, Choosing a scanner, Antennas, High frequency radio, Virtual radar systems, VHF and UHF receivers, Airline callsigns, Airfield directory, En route frequencies, Worldwide high frequency coverage, Weather broadcasts and Useful addresses.



NEW!

TECHNICAL FOR THE TERRIFIED

This book started out as a series of articles by Tony Nailer G4CFY in *Practical Wireless* aimed at introducing the more technical aspects of the hobby to readers who, unnecessarily perhaps, felt that it was beyond them. It is aimed at bridging the gap between basic understanding, as gathered by students of the Intermediate and Advanced Radio Amateur courses and other – more project-based articles. Aimed at the less-experienced radio enthusiast, the articles are of a general nature, written to remove the fear of technology/techniques and theory.
As Tony says, when it gets technical, there's no need to panic!
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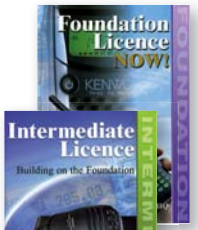

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The second course book in the RSGB's series is structured to progressively obtaining an Amateur Intermediate Licence. It contains practical exercises, broken down into half-hour worksheets. The ideal companion book for all Amateur Radio Intermediate Licence students. **£6.99.**

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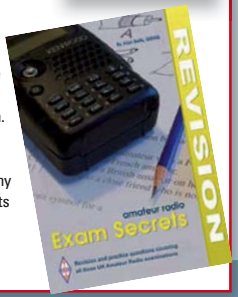
Amateur Radio Exam Secrets provides the ideal training course companion for both candidates and tutors. If you are studying for any level of the amateur radio examination, Amateur Radio Exam Secrets provides the ideal revision aid and quick reference book.
104 pages, **£12.99**



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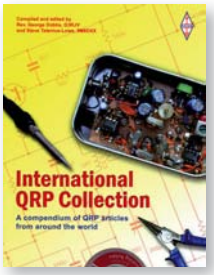

NEW IN STOCK NOW

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A Compendium of QRP articles from around the world.

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QRP (or low power) operating is practiced by many radio amateurs across the globe. Much is published by these QRP enthusiasts detailing great designs, best practice and much more. The authors of the International QRP Collection have scoured the world for the best of these and compiled them for you, into this great scrapbook.

£11.00

NEW EDITION! POCKET UK & IRELAND AIRBAND FREQUENCY GUIDE 14th Edition

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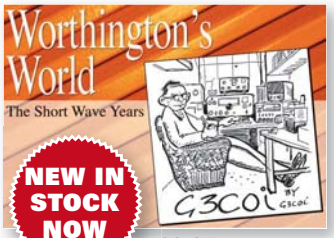

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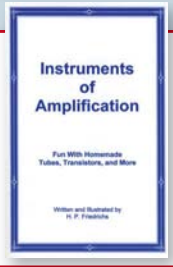

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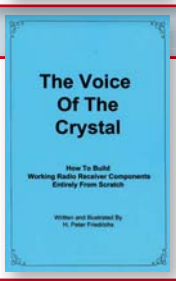

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Rob Mannion's

topical talk

Rob Mannion G3XFD reflects on a reader's letter, discovers Internet linked radio on 144MHz and admits he's been caught out!

In *Keylines* this month I briefly mentioned that I've erected some really decent v.h.f. antennas at my home QTH. With help from friend and *PW* author **Phil Ciotti G3XBZ** – much more dexterous than I am nowadays – I started off with a fairly low-gain HB9CV 2-element lightweight antenna, which was an ideal type to play around with on my equally lightweight 10m Clarke pneumatic mast.

The Sunday afternoon I chose to try the system out after commissioning the system was absolutely ideal – although the weather was very cold it was very clear and crisp there was a very nice tropo 'lift' on 144MHz! I soon found myself chatting to stations on the Isle of Wight and over towards Brighton in East Sussex – up to 160km away – using f.m. Not bad really, considering that my home is only about 40 metres above sea level and situated in a little hollow, with many of the area's famous fir trees sheltering us from the on-shore gales that we often get. However, even at 400 metres or so back from Bournemouth's dramatic clifftops – the winds can still be incredibly strong at times!

Later on, I worked stations farther down the coast, into Devon and Cornwall and was very pleased indeed with the results on 144MHz. My 3-element antenna for 70MHz also proved to be effective.

Later on in the afternoon I found myself listening to a QSO between an Exeter station and an Amateur in the Dublin area. Both stations were using hand-held transceivers – but despite my efforts I couldn't get into what I thought was a repeater. However, when I checked the frequencies for the various Irish repeaters – I couldn't match them up with the frequency I was tuned to!

Eventually, I decided to write to the Amateur in Exeter to advise him that I was fascinated to be able to listen in to the QSO between himself and the other station, who was working from his own home in the north of Dublin City. In my letter I politely asked for details about the 'repeater' they were using.

In The Meantime!

In the meantime, while back at work in the *PW* offices I received a very interesting E-mail from **Gary Ward M3IHC** (*Letters* this month). Gary had found himself listening into a QSO between two Australian Amateurs while he was stopped on what he described as the longest car park in the world (the M6 motorway in the English Midlands – although I think that the longest car park is reputed to be London's M25!).

As I hadn't received a reply from the Amateur in Exeter, I suggested that Gary had heard a QSO that was being re-transmitted – rather naughtily! – from someone using Internet linked radio, but I would do some research! By this time, I had been discussing my interesting DX reception with Phil G3XBZ, who seemed to vaguely recognise the frequency I had mentioned.

Later, during another chat to Phil (fortunately, this QSO was via the telephone!) he remembered that the frequency I had heard the Exeter Amateur using to chat to the Irish Amateur was used by an Internet gateway! Suddenly, as realisation dawned, I felt my face going a deep red with embarrassment! Never having heard the Internet gateway station before – due to my previously poor antenna – I had been fooled into thinking I was listening directly to a 144MHz repeater, being received by the enhanced tropo!

Gary M3IHC's listening period – perhaps – wasn't long enough for an identifier to be transmitted. On the other hand, during several prolonged listening sessions of the Internet gateway station I heard – no identifier seems to be transmitted. (15 minutes maximum between identifiers is the required interval set by Ofcom).

A few days later I received an E-mail from the Exeter Amateur who kindly explained that he was using a hand-held rig into his local Internet gateway and gave full details of the EI operator he'd been working. With my face still glowing a shade of red, I explained that I had discovered my mistake and thanked him. Oh well, despite my acute embarrassment it shows we're never too old to learn something new in the hobby!

Rob Mannion G3XFD/EI5IW

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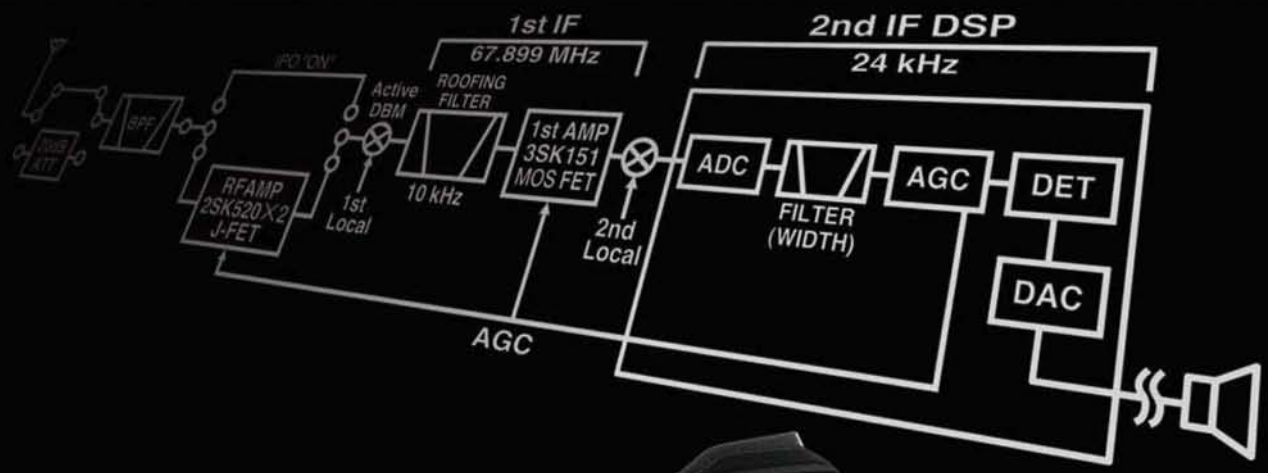

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