

Practical

WIRELESS

Britain's Best Selling Amateur Radio Magazine

TS-590S Review

New all mode transceiver from Kenwood



In Focus

The Weston-super-Mare Radio Society

Buying Second-hand

Chris Lorek G4HCL offers advice on second-hand antennas



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Orderline
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Online Catalogue
www.wsplc.com

KENWOOD TS-590S JUST ARRIVED!



Get £50 Heil Gift Voucher

With this before end of February.

Excellent dynamic range, dual 500Hz and 2.7kHz roofing filters, Built-in auto ATU, 32bit floating point DSP, Digital processing IF chain, USB connectivity. Large display with dual colour backlight screen. This is not an updated TS-570, but a completely new design embodying the very best engineering crafted by Kenwood to compete with the very best. If you are a Kenwood fan, you will love this radio.

160m - 6m with superb receiver inc. dual roofing filters, Auto ATU, 32 bit f/p DSP & USB PC connection. **£1369.95 D**

ICOM

NEW IC-9100

VHF/UHF Satellite + HF + D-Star

£TBA

ID-E880

NEW



- * 2m/70cm 50W Mobile
- * D-Star +D-Star Repeat Mode
- * Extensive GPS Compatibility
- * CTCSS & DTCS + Airband Receive
- * 1000+ Memories
- * Detachable Head

£439.95 D

NEW IC-E80D

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

FREE software on Icom site

In Stock Now

£324.95 D

HF Transceivers

IC-7600 New Low Price!



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 £3199 D

- | | | |
|---------|---|----------------|
| IC-7800 | Deluxe HF / 50MHz All-Mode 200W Transceiver | £8999 D |
| IC-7700 | 1.8-54MHz 200W with built-in PSK-31 + keyboard | £6239 D |
| IC-7200 | HF & 6m DSP 0.005-3335MHz wideband receive with USB port | £839 D |
| IC-7000 | 160m-70cm 100W (hf) Mobile, portable or base station | £1199 D |
| IC-718 | 160m-10m 100W transceiver that brings HF to those on a budget | £539 D |

Other Radios

- | | | | | | |
|----------|------------------|----------|------------------|----------|------------------|
| IC-910H | £1299 D | IC-R6 | £179.95 C | IC-R2500 | £649.95 C |
| IC-2200H | £229.95 D | IC-R20 | £399.95 C | IC-R8500 | £399.95 D |
| IC-R3 | £399.95 C | IC-R1500 | £519.95 C | IC-R9500 | £1099 D |

YouKits HB-1A-MK3 NEW

W&S Appointed sole distributors of the first YouKits HF Transceivers from China.



40m / 20m Model
HB-1A-MK3-40-20
30m / 20m Model
HB-1A-MK3-30-20

Provisional Specification:
Full band coverage
Tx: CW Rx: SSB CW & AM
Filters Crystal for CW & SSB
Keyer Built-in
Power Out 3W dry cells
5W 13.8v
Memories 20 Channels
Volts 9 - 14v
Current Tx 950mA max on Rx 55mA
Internal 8 x AA cells
External 13.8v
Tuning steps 100kHz - 10Hz
Size 140 x 95 x 35 (mm)

Completely self-contained ready built 5W CW transceiver with LCD digital readout and great performance - Look at the price! **£199.95**



TenTec Quality starts at just £1499!

All TenTec now include 5MHz band

The EAGLE has landed
Order yours today!



Jupiter-538

£1499 D

Jupiter-538AT £1799

The Jupiter is TenTec's entry level transceiver. Customers are impressed with the performance of this HF 100 Watt transceiver with full DSP. It includes 5MHz band as standard and has a large clear display. Lovely audio, amazing selectivity and a great receiver front end.

Check out www.hf-transceivers.co.uk



Eagle-599

£1699

Eagle-599AT £1899

This is TenTec's latest 100W HF-6m transceiver. Designed for mobile or portable, it offers full DSP signal processing and produces 100 Watts SSB / CW. It has a large LCD panel with colour control, and a USB socket for easy firmware updates and PC interface needs. Triple roofing filters.

Other models in the range

Omni-VII-588 100W + ethernet control **£2499**
Orion-II-566 with dual receivers. **£3899**

Flex-1500 SSB CW Transceiver

FlexRadio Systems®

Software Defined Radios

PC or MAC!



NEW FLEX-1500 Package
Transceiver plus: SDR Software, Handy mic and "Extras" software Disc.

All this for £599.95! D

All Modes 5W HF - 6m Transceiver
The Flex-1500 offers an amazing package with selectivity down to less the 50Hz and a live panoramic display. A single USB connection to your PC (or Apple Mac running Boot Camp) will get you on the air in minutes. It is also "transverter ready" for VHF - UHF operation. Hear the difference and "see" the signals. "Click" on the signal waveform - you are netted ready to transceive - EASY!!

Flex-3000 100W SSB CW TX



100W All modes with built-in ATU, firewire connection, hand mic and "extras" Disc. **£1399.95 D**

YAESU
Choice of the World's top DX'ers

We still have the largest, most up to date stock of Yaesu in the UK!

NEW VX-8DE



- * Triple Band - 6m/2m/70cm
- * Upgraded APRS features
- * Rugged & Submersible
- * Increased Memory

£369.95 D

VX-8GE 2m/70cm 5W + GPS

£359.95 D

New Mobiles In Stock Now...



FT-1900E
55W 2m Mobile with 200 memories.

£129.95 D



FT-2900E
75W 2m Mobile + 200 memories.

£139.95 D



FT-7900E
50/45W 2m/70cm Mobile + 1000 Memories.

£239.95 D

HF Transceivers

- | | | |
|------------------|--|-------------------|
| FT-2000 | 100 Watt HF - 6m Dual Receive with built-in PSU. | £2389.95 D |
| FT-2000D | 200 Watt version of FT-2000 with built-in PSU. | £2999.95 D |
| FT-950 | 100W HF - 6m transceiver with DSP & Auto ATU | £1329.95 D |
| FT-450AT | 100W HF - 6m with automatic ATU & latest updates | £724.95 D |
| FT-450 | 100W HF - 6m transceiver - great value. | £639.95 D |
| FT-DX9000contest | 200W HF - 6m "formula one" contest machine | £4899.95 D |
| FT-DX9000D | Deluxe fully loaded base station | £8199.95 D |
| FT-DX9000MP | Amazing 400W "legal limit" radio | £8999.95 D |
| FT-857D | HF to 2m mobile, portable or base - up to 100W | £679.95 D |
| FT-817BHIDSP | Fitted with DSP module exclusive to W&S | £629.95 D |

VHF Mobiles & Handhelds

- | | | |
|----------|--|------------------|
| FTM-350E | 2m/70cm Mobile Bluetooth GPS APRS | £479.95 D |
| FTM-10SE | 50/40W 2m/70cm stereo FM | £309.95 D |
| FT-8800E | Dualband Mobile 50W / 30W | £329.95 D |
| FT-8900R | 10/6/2m & 70cm Mobile | £369.95 D |
| VX-3E | 2m / 70cm Handheld Wideband receive | £159.95 D |
| VX-7R | Waterproof dualband handy (silver / black) | £289.95 C |
| VX-6E | 2m/70cm handy, 5W Wideband Receive | £239.95 C |
| FT-60E | 2m/70cm, 5W handy Wideband Receive | £179.95 C |

VX-3E



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

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**Bob Heil's
Pro-Set-6**

NEW



The new Pro-Set-6 headset offers a complete new way of operation. The comfortable earpads give fatigue free listening, whilst the boom microphone can be adjusted for close speaking - just what you need for most ham contacts. But why the Pro-Set-6?

Many of today's modern radios now have EQ (equalisation) controls which allows you to finely tune the mic. pre-amplifier audio response to match your voice and your method of working. Bob Heil recognises this and has designed a wide response mic. insert that gives you the freedom to twiddle those knobs in your transceiver and adjust the response to suit your needs.

Pro-Set-6 £114.95 C
AD-1 Rig adaptor leads £16.95 C

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

KENWOOD HF Transceivers



TS-2000E £1549.95 D

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

TS-2000X +23cm £1799 D

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

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



Handhelds

TH-F7E 2m/70cm 5W (2-pin Kenwood) SMA +FREE Clip Mic £234.95 D
TH-K2E 2m 5W 4-Key Keypad (2-pin Ken) SMA +FREE Headset £164.95 D
TH-K2ET 2m 5W 16-Key Keypad (2-pin Ken) SMA +FREE Headset £174.95 D
TH-K4E 70cm 5W (2-pin Kenwood) SMA +FREE Headset £164.95 D

VHF Mobiles TM-V71E

£299.95 D

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

TM-271E 2m FM 60W mobile. CTCSS, 200 Memories, DTMF Mic £169.95 D
TM-D710E 2m/70cms 50/50W mobile. APRS +EchoLink, DTMF Mic £449.95 D



NES10-2MK3

NEW

DSPKR

10 Watt integrated DSP speaker.

NEIM-1031MKII

An in-line DSP module giving complete noise cancelling control

£109.95 C

£154.95 C

£139.95 C
www.bhi-ltd.com



**We are UK
Distributors**

AR-MINI NEW LOW PRICE!



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

software database for PC loading via
www.aorja.com. £149.95 D

AR-8200-MKIII



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

£439.95 D

AR-8600MKII Base or Portable



£649.95 D

TG-UV2
2m/70cm
Dual Bander



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

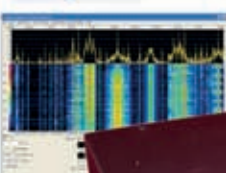


£79.95

RFspace SDR-IQ

**Advanced Receiver
Tunes down to 100Hz!**

NEW



If you have been pondering about buying into SDR receiving, this design may be just what you have been looking for. The SDR-IQ is a high performance receiver covering 500Hz to 30MHz. It is powered directly from PC USB socket & work with Windows or Linux systems. A highly stable unit with dedicated software.

£469.95 D

New IF-2000 SDR IF feed for FT-2000 & FT-950. Feed your transceiver IF out into an SDR receiver at 10.5MHz £219.95

WINRADIO WR-G31DDC "Excalibur"
Receiver 9kHz - 49.995MHz



Meet the new industry standard receiver for serious HF work. Just plug into your PC USB port for a new experience in sensitivity and dynamic range. No hardware design can match the way that signals are extracted, demodulated and both visually and audibly reproduced. Serious DXer or casual operator, you will be amazed.

"It out-performed my 100dB
HP Spectrum Analyser"

£649.95 D

**Watson
Cross Needle Meters**

NEW



These are high quality, accurate VSWR meters with large, clear display featuring X-needle movements.

WCN-200 £69.95 C
* 1.8 - 160MHz * 0 - 30 / 300 / 3000W
* 600W max above 30MHz * 2x SO-239
WCN-400 £69.95 C
* 140 - 525MHz * 0 - 30 / 300 / 600W
* 2x SO-239
WCN-600 £89.95 C
* 1.8 - 525MHz * 0 - 30 / 300 / 3000W
* 600W max above 30MHz * 2x SO-239

**Watson
Power Supplies**

Power-Max-25-NF



Slightly larger than the Power-Mite and ideal companion for any 100W radio. £89.95 C

Power-Max-45-NF



38 Amp cont, 45 Amp Peak, Switch Mode PSU with variable voltage, V/A meters, & noise offset. £129.95 C

Power-Max-65-NF

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

£239.95 D

W-5A 5A Analogue fixed 13.8V £29.95 C

W-10AM 10A Analogue variable £59.95 D

W-10SM 10A Switched fixed £49.95 D

W-25AM 25A Variable PSU £89.95 C

**Butternut
Vertical Antennas**

These antennas are extremely efficient and use no traps. The large, air-spaced coils are the secret, and resonant adjustments 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

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



Turn that "Junk" into CASH! That NEW RADIO is now AFFORDABLE!



That's right, you can now take advantage of our new scheme. We will purchase for cash your old ham radio gear - DEAD or ALIVE! If you want to buy a new radio, then we will allow you even more! Look around you at all those items you no longer need or use. Change them into cash and make a big saving on that new radio you have always promised yourself. All you have to do is phone one of our sales staff or e-mail us and tell us what you have to dispose of and what you want to buy. You could be sitting on more cash than you think! Call 01702 203353 or e-mail: sales@wsplc.com. **Do it NOW!**

WATSON Power-Mite-NF 22 Amps In Your Hands!

The famous Power Mite is small, yet rugged. It delivers more than enough power for any 100 Watt radio, is variable up to 16 Volts and has dual meters. But what really sets it apart is its NF (noise function) feature which allows you to remove any residual noise outside the ham band you are operating on. Fits easily inside a brief case or even large pocket! **£69.95 D**



Avair Power & SWR Meters



All models have 12V backlight and include DC Cable.

AV-201 1.8-160MHz, 5/20/200/1kW **£49.95 C**
AV-400 140-525MHz 5/20/200/400W **£49.95 C**
AV-601 1.8-160MHz / 140-525MHz **£69.95 C**
AV-1000 1.8-160MHz, 430-450MHz, 800-930MHz, 1240-1300MHz. 5W, 20W, 200W, 400W **£79.95 C**

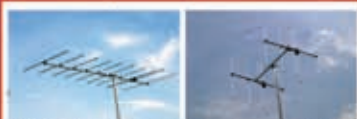


Cross Needle Models Even Lower Prices!

The beauty of these cross needle meters is that they require no zero setting before you measure VSWR.

AV-20 30W / 200W, 3.5-150MHz **£34.95 C**
AV-40 15W, 0-150W, 144-470MHz **£34.95 C**

Diamond VHF/UHF Antennas



A144S5R 5el 2m 9.1dbi 0.95m L **£45.95 D**
A144S10R 10el 2m 11.6dbi 2.13m L **£84.95 D**
A430S10R 10el 70cm 13.1dbi 1.19m L **£49.95 D**
A430S15R 15el 70cm 14.8dbi 2.25m L **£65.95 D**
SB144 Boom for dual 2m Yagis **£24.95 A**
SB430 Boom for dual 70cm Yagis **£19.95 A**
SS144 Stack transformer 2-way 2m **£81.95 C**
SS430 Stack transformer 2-way 70cm **£71.95 C**
KB144 Mast stand-off for vert. polarise **£18.95 A**
KB430 Mast stand-off for vert. polarise **£15.95 A**

Tonna VHF/UHF Antennas



220505 6m 5 el. 10.1dBi gain 3.45m **£109.95 D**
220809 2m 9 el. 13.1dBi gain 3.47m **£74.95 D**
220909 70cm 9 el. 13dBi gain 1.24m **£69.95 D**
220919 70cm 19 el. 16.2dBi gain 2.82m **£89.95 D**
220623 23cm 23 el. 17.9dBi gain 1.75m **£71.95 D**
220725 13cm 25 el. 18.3dBi gain 1.45m **£94.95 D**

Create Rotators



These are hunky Japanese rotators that we recommend for reliability & performance.

RC5-1 **£559.95 D**
RC5-3 **£699.95 D**

MFJ Radio Accessories

MFJ-929



AUTO TUNER
1.8-30MHz 200W
LCD readout, 20,000 memories, long wire & coax, radio interface.
W&S £209.95 C

MFJ-991B Auto atu 150W **£209.95 D**
MFJ-994B Auto atu 600W **£339.95 D**
MFJ-962D 1.5kW ATU **£289.95 D**
MFJ-969 160m - 6m 300W **£209.95 D**
MFJ-971 Portable ATU **£118.95 C**
MFJ-974B Balanced ATU **£189.95 D**
MFJ-986 3kW differential tuner **£349.95 D**

MFJ-993B 300W Auto ATU



A true "Plug & Play" Auto ATU. Covers 160m to 10m. Capable of handling up to 300W - tunes almost any antenna, has X-needle meter & digital data display.

W&S £249.95 D

Build an All-Band Antenna Indoors or Outdoors - Do It Now!

2 legs of wire 25 to 50ft plus some 450 Ohm ribbon & an MFJ Auto ATU

160m to 10m
100W - No traps - No adjustments - Just press PTT!



MFJ-1260 Mic control 1 in/2 out **£99.95 C**
MFJ-1263 Mic control 2in/2 out **£109.95 C**
MFJ-1275 Sound card adaptor **£109.95 C**
MFJ-1625 Window Ant + Tuner **£199.95 D**
MFJ-16B01 Dipole centre SO-239 **£21.95 A**
MFJ-16C06 6x dog-bone insulators **£4.95 A**
MFJ-16E01 300Q end fed SO-239 **£10.95 D**
MFJ-1796 40m-2m vertical **£239.95 D**
MFJ-1798 80m-2m vertical **£299.95 D**
MFJ-1908H 43ft fibre glass mast **£239.95 D**
MFJ-1922 Digital screw driver control **£99.95 D**
MFJ-1924 Prog. screw drv control **£129.95 D**
MFJ-1925 ATAS-100 controller **£72.95 C**
MFJ-202B Receiver noise bridge **£79.95 C**
MFJ-250X 1kW dummy load (x-kill) **£55.95 C**
MFJ-260C 300W dummy load **£44.95 C**

MFJ-998

W&S
£649.95 C



• 1.5kW SSB & CW • Digital & Analogue X-needle VSWR • 1.8 - 30MHz • 20,000 memories • Radio interfaces optional
• Built-in antenna selector • Field upgradeable firmware • Auto bypass protection

MFJ-925 Compact auto tuner **£169.95 D**
MFJ-927 200W remote auto atu **£249.95 D**
MFJ-928 Basic auto atu **£199.95 D**
MFJ-931 Artificial ground **£112.95 C**
MFJ-932 Mini loop tuner **£139.95 C**
MFJ-934 Artificial ground + ATU **£199.95 C**
MFJ-935B Portable loop system **£199.95 C**
MFJ-945E Mobile atu 300W **£129.95 C**

Radio Works Carolina Window Antennas

All windows include WARC bands

CW-160 160-10m 252' L **£159.95 D**
CW-80 80-10m 133' L **£129.95 D**
CW-80LP 80-10m 133' L **£119.95 D**
CW-40 40-6m 66' L **£119.95 D**
CW-40LP 40-10m **£116.95 D**
CW-40PLUS 40-10m 66' L **£139.95 D**
CW-620 20-6m 33' L **£119.95 D**

Baluns

B1-2KPLUS 1:1 2kW **£39.95 C**
B4-2K 4:1 1.5kW **£49.95 C**
Y1-5KPLUS 1:1 1.8-50MHz **£52.95 C**

Tigertronics Signalink Interfaces



New Delivery Expected!

Signalink Sound Card Interfaces do not require the use of a com port to trigger PTT on the rig. Signalink have internal links which make them compatible with most of the rigs on the market. Radio lead is supplied, state which when ordering. Extra mic 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**

Uniden Bearcat

UBC-30XLT

A real bargain whilst stocks last.

Frequency Range:
87.5 - 107.9MHz WFM,
108-136.9875MHz AM,
137 - 173.99MHz FM

The radio has 200 memories, LCD display and can scan at 25 channels per sec.

£59.95 C

Check full spec. of these radios @ www.wsplc.com

UBC-3500XLT

FM FMB WFM AM

Frequency:
- 25-512MHz
- 806-960MHz
- 1240-1300MHz.
2500 memories, RF near signal capture, Quick keys, Scan 100 channels per sec., CTCSS & DCS, Alpha numeric tags, Data skip, Auto store, Display contrast adjust, AC adaptor/charger included.

This is the Bearcat Flag Ship radio. It packs an amazing number of features into a small package. If you are looking for a serious VHF/UHF scanner that covers the entire spectrum and resolves all the popular analogue modes, then this is a serious contender. **£199.95 C**

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

MFJ-269

The Antenna Analyzer has been refined over the years & the MFJ-993B tells you just about everything you need to know about your antenna system - resonance, impedance, reactance & can even measure coax losses & identify the position of open & short circuits. All in a compact unit that covers 160m to 70cms. Can you afford to be without one? **W&S £349.95 C**

* 1.8 - 170 & 415-450MHz
* Frequency Counter
* LCD readout
* SWR & Impedance
* N-socket (Ant), BNC (Counter)
* AAx10 or ext. 12V DC
* Size 103w x 173h x 60d mm
* Weight 750g



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The TS-590S photograph came courtesy of Kenwood Communications UK, design by Steve Hunt!



Rob Mannion G3XFD/EI5IW's

Keylines

The Editor discusses the importance of club magazines and possible pitfalls for Blog writers.

The PW office is an important address for many Amateur Radio Club magazine Editors. Hon. Secretaries and Public Relations Officers (PROs). As a result we receive many paper-format magazines and newsletters from all over the world. Increasingly though, we're receiving a steady flow of electronic-format club magazines, which are distributed via the Internet.

Tex Swann G1TEX and I enjoy scanning through everything sent to us. However, it would be misleading of me to say that I read them all in their entirety! In reality I admit that I 'skim' through all the 'newsworthy' items sent in for our interest. In fact, I often spend part of my lunch break looking at the electronic club newsletters/magazines on-screen while the (mostly A5-sized) paper magazines end up at home for armchair style reading!

As many readers will know, I've always considered the local Amateur Radio club magazine to be of prime importance. Even if a club meets once or twice a week – there's a great deal extra that can be shared with other members via a magazine. For example, there's always someone who can't attend meetings. Additionally (I wonder how many others have come across this?) I often find that one or two of my special friends are so busy during the club evening that we don't find the time to chat to them, or our chatting diverges from the meeting's theme

Of course, we're often find a happy medium to achieve a 'balanced' mixture of activities at the club. **Our clubs are what we make them!** And it's at this point I think a club website, regular magazine or newsletter comes into play. In effect it adds another area for chatting/'virtual' meetings or by providing another medium where our circuit and constructional ideas can be published. And after we've built them, they can either be discussed at the club or via the newsletter, etc.

Finally on the club topic for this time, I remind everyone that we are very keen to see and read your club news. Additionally, if you have a club website that's lively and regularly up-dated – let me have the details and I'll be pleased to mention it in the news.

Don't forget to provide the most important details: where you meet, the full address and **post code**, telephone and E-mail details so prospective members can contact you! All your E-mails on any club topic – are very welcome indeed. But E-mails only please – it's much easier for me to handle electronic mail rather than the traditional letters nowadays.

The Popular Blog

Although I don't get much time to look at the many hundreds of Amateur Radio associated 'Blog Sites', PW readers often draw my attention to them. At times I'm very impressed at the variety of topics discussed by the gifted people that spend much of their valuable time running their Blogs.

However, I must say that the term 'Blog' (a blend of the words 'web' and 'log' according to Wikipedia) seems rather odd to me because (at first) it seems to convey a sense of 'slogging and boring' – whereas most of them aren't!

Readers have often drawn my attention to the interesting and sometimes very controversial topics that have been published by individuals. Published you might ask? Yes, in effect **anyone** operating a Blog is publishing! Like myself, anything they publish in 'black and white' (or any of the sometimes very peculiar coloured text reversals seen on websites!) can be **their responsibility** as the publisher.

Very few Blog, or 'chat' type websites operators seem to be aware of the legal minefields of copyright and publishing law. Indeed, I've seen some comments regarding Amateur Radio personalities/individuals that could easily provide a new Rolls Royce for a Lawyer if a court case was entered into!

Journalists, Editors and others involved in professional publishing have received extensive training, experience and even have special insurance for when things really go wrong. So, my advice to anyone involved in publishing on the Internet is to take care, 'read up' on the legal pitfalls and – if you're likely to be involved in controversial topics – make sure you invest in adequate insurance cover!

Rob Mannion G3XFD/EI5IW

Practical Wireless

PW Publishing Limited
Arrowsmith Court
Station Approach
BROADSTONE
Dorset BH18 8PW
Office opening hours: Mon – Thurs, 8.30am – 4.00pm.

Tel: 0845 803 1979
Fax: 01202 659950

Editor

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

Technical Editor

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

Art Editor

Stephen Hunt
steve@pwpublishing.ltd.uk

Advertising Typesetting/Admin

Peter Eldrett
peter@pwpublishing.ltd.uk

Advertisement Sales

Roger Hall G4TNT
roger@pwpublishing.ltd.uk

Finance Manager

Alan Burgess
alan@pwpublishing.ltd.uk

Book Orders

bookstore@pwpublishing.ltd.uk

PW Publishing Website

www.pwpublishing.ltd.uk

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

Directors: Stephen Hunt & Roger Hall

Subscription Administration

Webscribe

Practical Wireless Subscriptions

PO Box 464
Berkhamsted
Hertfordshire HP4 2UR, UK
pw@webscribe.co.uk
www.mysubcare.com
☎ 01442 879097
Fax: 01442 872279

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Components For PW Projects

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

Photocopies & Back Issues

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

Placing An Order

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

Technical Help

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



Readers' Letters

Send your letters to:

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

E-mail: pwletters@pwpublishing.ltd.uk

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

Fraudsters & Scam Merchants

Dear Rob,

I'm writing regarding a reader's letters by **Ken Blanshard M0KPB** (*PW* February 2011) and the ever increasing Fraudsters and Scammers using Radio Amateur data bases for their needs. I sympathise with Ken with his harrowing experience not to mention a ruined holiday caused by Fraudsters.

In the last 12 months I have taken the necessary steps to confirm if the calling Radio Amateur is genuine or not by looking through a well known Radio Amateur database and then confirming their name while viewing the details. In October 2010 while monitoring and accessing the database I came across an American Amateur News Blog stating that his detailed information was used in the same way as Ken, and called for tighter measures within the database organisation, regarding the ease of access to non-registered members.

I'd like to take this opportunity in bringing to light another website concern, regarding those genuine Radio Amateur websites that offer free software downloads and links to the Amateur Radio community not knowing that criminal hackers are using a new tactic in corrupting computers through their sites.

I recently updated my *Easy-Pal* program after viewing it a week before on an Amateur Radio website – only to see an alert from my computer's security system stating that a very serious virus had been detected and could not be removed or cleaned. I then immediately broke the link and ran a full system scan – fortunately, with no problems detected.

What concerns me most is the amount of Amateur Radio manufacturers who offer CAV PC remote control software available to download from their websites. I'm concerned virus problems could thus be transferred to the transceiver's CPU,

£20 Star Letter

An Old Luddite Goes Digital!

Dear Rob,

Having originally taken to radio by building one and two-valved radios, using F.J. Camm's circuits in my teens in Sri Lanka – when *Practical Wireless* sold for six of the old pennies – I little thought that I would enter

the world of digital radio in my eighth decade! It all began in March 2010, when I purchased a computer (*Windows 7* with a 20 inch flat screen) that really works.

I was soon into the world of cyber space googling away late into the night. Then came an article by **Mike Richards G4WNC** on data modes in the November 2010 issue of *PW* and I was hooked! My good friend and neighbour **Jason Phillips M0WBC** – who kindly took the photo of me in my shack – brought over a FRG-7700 tuned to 14MHz u.s.b., gave me a 'DigiPan' icon and I was receiving PSK31. What a delight it was to watch that "waterfall"!

Of course I had to purchase an all-mode transceiver. Had I an XYL she would have wanted to know why, when I have a FT-840 in the shack and three antenna masts in the back garden. The answer is quite simple, the shack is downstairs while the computer is in the small front room upstairs facing Jason's house across the road. The reason? With a wireless link I am "piggy backing" on Jason's router – what need for Broadband?

It so happened that I had purchased a FT-8900 from **Waters & Stanton** in May 2009 which for a number of reasons I had not used. Fortunately, W&S was willing to take back the FT-8900 in part exchange for a FT-897 at the November Radio Fair at Kempton Park.

I could do with a fourth antenna mast but how can I get away with it? It was hard enough getting Planning Permission for the three antenna masts in the first place. I had been served with an Enforcement Order by the London Borough of Hounslow.

My three Ward Councillors were less than useful when I approached them. However, the RSGB Planning Advisory Committee with their liaison officer, **Tom Dawson M1DQT**, successfully steered me through the Borough's bureaucratic minefield and everything is now official. However, as the neighbours have become accustomed to my antenna farm the masts have seemingly grown a few inches a year. I put this down to the use of a watering can and a few drops of Baby Bio! It's amazing the effect this has on aluminium masts! But, there is a limit as one of my three Ward Councillors lives in the next road to mine and from his back bedroom window he can see my antenna farm.

Although the Councillor makes a habit of accosting me in the street whenever there is an election, whether parliamentary or local, and asking with feigned concern, "Hello Mister De Silva, is everything alright? No trouble with your antenna masts?", I think it's still wise not to let him into the miraculous properties of Baby Bio!!

Maurice De Silva G0WMD
Hounslow, London

Editor's comments: Congratulations Maurice and what a good friend you have in Jason M0WBC! His actions in helping you demonstrate Amateur Radio at its best in my opinion!



etc. I'm aware that mobile 'phones have a virus detection software installed, which can be up-dated through the Internet. Perhaps a reader could confirm whether or not it's possible for a virus to transfer through and into the transceiver's CPU?

Again we must be vigilant on our operating. One of my main interests is satellite communication and I wonder if a virus could be transferrable through the computer's software? Perhaps this may be the answer to AO-51 dropping out of service and requiring a re-boot occasionally?

Since reading Ken's letter I have taken measures and drafted a statement concerning my own call signs located within the same database clearly advising everyone that I don't buy or sell via the Internet.

Finally, I'd like to congratulate you and the *Practical Wireless* staff for a well informative and edited magazine. Kindest regards.

Ian Donelly 2E0XOD
Boston
Lincolnshire

***Editor's comments:** Thanks for writing Ian - please join me on the Topical Talk page for further comment.*

A Reply To Ben Nock G4BXD

Dear Rob,
I'm writing to you because I simply must respond to **Ben Nock G4BXD's** letter in the January 2011 issue of *PW*, which countered views I expressed in my letter in the December 2010 issue.

Ben G4BXD has been a distinguished contributor to your magazine for many years. His knowledge in the fields of radio may be second to none – but clearly his knowledge in all things at the wheel is not.

We should regard our possession (and use) of both Driving and Amateur Radio Licences **as a privilege** and not a right. We should also jealously guard both and do what is necessary to retain the privileges. The use of both licences is bounded by rules, laws and other regulations. Most of these rules (etc.) have come about **because of the folly of the minority** – after all without regulation the roads would be a death zone and the airwaves would be completely unusable.

Someone of Ben's stature in our hobby should properly represent a decent and law-abiding attitude to road safety and he should not encourage others to follow his example. There

Perhaps DAB+ Later?

Dear Rob

In your Keylines Editorial (January 2011) you further talk about the downside of DAB and particularly the introduction of the service into Band II. All the information I have seen refers to moving all the existing analogue services to DAB on Band III except leaving all community services using f.m. on Band II, or have I been misinformed on this?

I have two receivers one at home using a 5 element beam in the roof space and the other in the car and get very good reception. I fully appreciate that some channels transmit at low bit rates with low quality audio but especially in the car I have the opportunity to listen to stations that would otherwise be unavailable whilst on the move. I would point out that I use DAB to supplement my listening alongside f.m., Satellite (my preferred) and occasionally online. I would hope though that in the future DAB+ would be introduced in the UK although there are no plans at present. It appears that it is a case of not 'will it ever happen' but when. Maybe you will be able to attend the delayed seminar *The future of UK digital radio*, which will now take place in April. Regards.

David Miller G4JHI
Horsham
West Sussex

***Editor's comments:** Thanks for the interesting letter David! Please join me on the Topical Talk page for further comment.*

are many young faces coming into the hobby who should be pointed in the right direction.

Any driver would have failed any driving test if they had used a microphone during the test. It has always been frowned on – nothing new there! Bad enough to do it whilst at work or maybe in an emergency, but it makes no sense to risk lives in the name of a hobby.

Temporarily taking a hand off a steering wheel to change a CD or to adjust heating controls is not the same as holding a microphone for several minutes whilst having a QSO. Keeping a hand on a gear stick whilst driving is frowned on by any driving instructor and would earn a 'fail' in any driving test. Lapsing into poor driving technique is distinct from becoming a danger on the road

We must all safeguard and be ambassadors of our wonderful hobby and drive safely. As Ben has aired his views in public, I feel it is only fair that I now provide my full opinion to your readers for the record too. Regards,
James FLINT G0SDB
South Godstone
Surrey

The BBC Radio 4 'Extra' Service

Dear Rob,
Like most households in this Country, we pay a licence fee for the BBC's output: Like many, 100% of our radio

listening is on the BBC. Is it not then heinous that the BBC should propose a preferential service (described in the *Daily Telegraph* as "Radio 4 extra"), purely to twist our arms up our backs to purchase a DAB radio: How independent channels 'incentivise' their viewers is irrelevant, they aren't public service broadcasters.

If people want to listen on DAB, fine, but not to the detriment of those who wish to listen in f.m. for quality, or uninterrupted reception at home or in cars and economically on battery portables. Regards.

Godfrey Solomon
Sicklinghall,
Nr. Wetherby,
North Yorkshire



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 call sign with your E-Mail. All letters intended for publication must be clearly marked 'For Publication'.
Editor



News & Products

Send your info to:

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

E-mail: newsdesk@pwpublishing.ltd.uk

Thirteen Tones at the Bath Buildathon!

No, it wasn't a musical event in Bath – instead the 'Tones' in this report were the receiver kits provided by Tim Walford G3PCJ – which were assembled at the latest Bath 'Buildathon' organised by Steve Hartley G0FUW.

Keen organiser and constructor Steve Hartley G0FUW contacted Newsdesk:

"The fourth Bath Buildathon saw another very full day of 'practical wireless' in January. This year the project



Zoe Thomas M6ZOE busy at work on her Tone Project.

was the Walford Electronics Tone superhet receiver kit that was featured in PW last year. The Bath Tones were a 'special run' with the basic kit modified by Tim Walford for use on the 14MHz (20m) band.

Builders came from far and wide with no fewer than seven counties represented. Zoe Thomas M6ZOE, and five others used the Buildathon as a means of completing a radio project as part of their Intermediate Licence training.

No fewer than 13 Tones were completed on the day and after the building was finished, five of the Foundation Licence Holders stayed on to complete their Intermediate assessments. A very long day finished with the good news that all five had passed the exam and were now eligible for their 2E0 call signs.

Congratulations go to the Buildathon Crew; Mike Coombs G3VTO and Lewis Thomas G4YTN and Steve Hartley G0FUW who were ably assisted by ex-students, Rob Styles M0TFO, and Ed Penfold M0OSM, with Dan Trudgian M0TGN and Brian Davis 2E0BGD overseeing the examination.

Steve Hartley G0FUW

Tel: (01225) 464394

E-mail: g0fuw@tiscali.co.uk

Hull Man Appeals Against Criminal Conviction

Stop Press: In the February issue of PW, Newsdesk reported details of the Criminal conviction of Clive McMurray, who had been found guilty of offences against Amateur Radio at Hull Crown Court on November 22nd 2010. Newsdesk now has an up-date on the case.

Newsdesk dateline Friday January 21st 2011. Information from Hull Crown Court has confirmed that Clive McMurray, aged 63, from Lambert Street in Kingston upon Hull, is to appeal. No details have been issued as to the grounds of the appeal.

McMurray was convicted of causing deliberate interference to Amateur Radio users in the Hull region between June and November of 2009, and convicted of unlawfully using radio equipment without a licence from Ofcom. The equipment was installed in his van and was driven around the region to interfere with legitimate users of the Amateur Radio frequencies.

McMurray was sentenced to four months imprisonment, suspended for 18 months and a curfew between 7pm and 7am for three months via a means of electronic tagging. Forfeiture of his van and radio transmitters was also ordered by the court.

The Appeal from McMurray is now being considered by Court of Appeal of England and Wales, and will take place later in London during 2011.

Editorial note: Further information on this important case will be published when it's available. We cannot comment any further due to the appeal – as the case is now sub judice. Rob Mannion G3XFD.

Hospital Broadcasting Celebrating 80 Years

Hospital broadcasting, also known as hospital radio, will be celebrating 85 years of service to hospital patients in 2011. The first station started in 1926 in York and hospital radio has been entertaining patients in hospitals throughout the UK ever since.

Norman Bland M0JEC writes: "Hospital radio stations are run by volunteers – including many Radio Amateurs – who give up a few hours of their time each week and also they get involved in their local communities to help promote that station and raise funds

to keep their station on the air.

"To support Hospital Broadcasting Week it's planned to run a small number of Special Event stations from near the end of March to the beginning of April. These will be run on behalf of some of the hospital radio stations. If PW readers know of a local hospital radio station and would like to help them to put on such a station, or would just like more information about this planned event, please E-mail me".

Norman Bland M0JEC.

E-mail: m0jec@nadars.org.uk.

Uruguay's Radio Amateurs Celebrate G5RV Centenary

Uruguayan Radio Amateurs are planning to use the special call CW5RV to commemorate what would have been the 100th birthday year of Louis Varney G5RV/CX5RV (1911-2000). Louis G5RV was the inventor of the famous antenna and lived and worked in Uruguay for many years. Resulting QSLs should go to PO Box 6000, 11000 Montevideo, Uruguay. The Radio Club Uruguayo (RCU) was founded on August 23, 1933 and for further details, although the website is in Spanish, see: www.cx1aa.net/

George Dobbs G3RJV To Visit Denby Dale!

Visitors will be very welcome at the **Denby Dale Amateur Radio Society** near Huddersfield – meeting at the Shelley Cricket Club on March 23rd 2011 – when the *PW* author the **Rev. George Dobbs G3RJV** will be talking about his favourite topic – QRP! Further details from Richard Blandford M0RBG via m0rbg@talktalk.net

The International Short Wave League

(ISWL) will be celebrating 65 years of service to Licensed Amateurs and Short Wave Listeners during 2011. The callsign **GB65ISWL** will be active from several locations throughout the year. The QSL Manager is **Herbie Yeldham G6XOU**. Full details on the ISWL website: www.iswl.org.uk



Details can also be sent by post by applying to:

Peter Lewis G4VFG
Secretary ISWL
18 Bittaford Wood
Ivybridge
Devon PL21 0ET.



New Club – The Risca & District Amateur Radio Society

The new **Risca & District Amateur Radio Society** meets every Thursday evening from 7 to 9pm. They meet at the **Risca Leisure Centre, Pontymason Lane, Risca, Gwent NP11 6YY, South Wales.**

The first meeting was held on 13 January 13th 2011 at the Risca Leisure Centre.

Visitors and new members are very welcome. Please see the website for up to date information and from:

**Clive Jenkins GW6JPC Secretary/
Vice Chairman**
**Risca & District Amateur Radio
Society**
Tel: (01495) 309954
E-mail: clivejenkins@talktalk.net
Website: www.qsl.net/mc0rrd

International Marconi Day 2011

Norman Pascoe G4USB co-founder of the **International Marconi Day (IMD)**, contacted *Newsdesk* with an up-date from the **Cornish Amateur Radio Club**: “As you may know, **International Marconi Day** is usually held over the 24 hours of the **Saturday** closest to **Guglielmo Marconi’s birth date in April**. But there’s a problem this year and to preserve family harmony we’ve made some adjustments!”



Norman G4USB continued: “In 2011 the event would normally occur over the Easter weekend. However, we thought it expedient to vary the formula for this year only – to preserve domestic harmony! Easter is, after all, a family orientated weekend and there may be some conflicts of interest within families, meaning that potential operators at the participating stations could have had their permission to operate vetoed by the ‘Station Commander’ in the home!”

“For this reason, we have moved the event to **Saturday April 30th**. As it happens this is quite fortunate as Friday the 29th April has been declared a public holiday – courtesy of the Royal Wedding.

“Next year (2012) will be the 25th IMD event. (Where does the time go?). We must have come up with a good formula as we keep going from strength to strength with plenty of interest from participating stations and award chasers alike. So, we’ll be marking the event in some way – keep an eye out for an announcement in early 2012.

The Award

“As usual, there will be two award types on offer.

- For the transmitting amateur
- For the Short Wave Listener

“A tip for everyone working for the award as a transmitting Amateur is to keep two logs for the day. Why I hear you ask? Well, one log will be your transmitting log containing your contacts made with the participating stations. We hope you work the required number but wouldn’t it be awful to be just one short and waste all that time?

“During the day you will of course hear other participating groups that you fail to communicate with, it always happens. This is where log number two comes in. In this one record the ones worked and heard [including details of station worked]. This will enable you to claim the listener’s award thereby achieving something for your efforts rather than feeling dejected at failure. It is nice, of course, to have both on your wall too!

“We hope to receive a good number of award claims in 2011 especially with the large uptake of the Foundation Licence with M3 and M6 calls abounding on the bands. The IMD is an excellent place to work for an award as it’s **not a contest** – operation should not be too competitive, although, there will always be the high powered station with no ears to contend with of course.

“We encourage our participants to spend a little time with callers and not just exchange a you are 5&9 please repeat your name and QTH style of operation! The 24 hour event is plenty of time to work the award for sure. Be patient and courteous to others, above all listen before you call. In the UK it is perfectly possible to work sufficient stations on 3.5 and 7MHz (80 and 40m) alone. But this year we hope the higher h.f. bands will be a little more active too – opening up even more possibilities with our International award stations. I hope to work many of you on the day”.

Norman Pascoe G4USB
President of Cornish Radio Amateur Club
Co-Founder of International Marconi Day
E-mail: g4usb@btinternet.com

Vortex Antenna Systems Launches

Newdesk was contacted by an enthusiastic Steve Lawman G0UIH to announce the launch of his new company – Vortex Antenna Systems.

Steve reported, "We're very proud to announce that as of December 12th 2010, Vortex Antenna Systems started retailing, following an initial extended period of research and development. Vortex is owned and run by myself, Islands on the Air (IOTA) enthusiast Steve Lawman **G0UIH/VK2IAY/3D2FI** and I'm ably assisted by my wife **Gail** from an office and workshop near to Peterborough."

Vortex state that Initially the line-up will include the '**Tornado**' range of h.f. Yagis and the '**Whirlwind**' range of h.f. delta loops with mono and multi-band variants. The mainstay will be a heavy duty range, but certain products are also available as a lightweight alternative. A section on 6 and 4m antennas is also included. The product list will expand into 2011 to include linear loaded designs and vertical antennas.

Steve G0UIH continued, "During the last 18 months I've been sourcing materials and liaising with a variety of high-end UK manufacturers. We have some good aluminium off-the-shelf stock available in the UK but the constructor is let down by the lack of suitable wall thicknesses. Finding premium grade aluminium together with the correct wall thicknesses, allowing secure element telescoping was of paramount importance."

Vortex state that element clamps are sourced from the oil, gas and hydraulics industry and the element to boom clamps, stainless steel U-bolts and saddles are all our own designs. We also use stainless steel fittings throughout.

Steve concluded, "We hope to be attending some of the UK rallies throughout 2011 and to hopefully include some international events into 2012 but we are primarily an on-line only retailer via www.vortexantennas.co.uk Alternatively, I can be contacted at the workshop."

Steve Lawman G0UIH

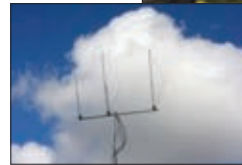
Vortex Antenna Systems Ltd.

44 Barnwell

Peterborough PE8 5PS

Tel: 07943 871 893

E-mail: steve@vortexantennas.co.uk



Tom Withers Back In Business – With the TW MagPad

Already extremely well-known for his popular TW Communicator range of Amateur Radio transceivers – Tom Withers G3HGE has announced he's used his 60 plus years of c.w. operating to produce a new paddle key.

The press release states: "After a gap of ten years, TW is 'back in business' with a brand new product, the TW MagPad". Tom Withers G3HGE says: "The TW MagPad is a precision paddle at an affordable price, manufactured to the exacting standards that you would expect from a long established and respected company."

"In 1960 TW Electronics Ltd commenced the manufacture of a range of v.h.f. equipment for the Radio Amateur. From the outset, quality was paramount and, as winners of two major Manufacturers' Awards, TW was proud of its reputation for innovation, reasonable prices and after sales service."

"The MagPad has been designed by Tom G3HGE, a keen c.w. operator for over 60 years and the driving force behind TW Electronics Ltd and it could be your key to more accurate and



pieces, professionally engineered turned components, micro threading of the contact screws and a

effortless sending. Every paddle is personally tested by Tom and comes with a signed certificate. The pictures above are of the final production version".

Features:

- * Heavy brass finish steel base. Brass chassis, bearing plate, levers and pillars.
- * Micro fine contact adjustment. 4.5mm contacts plated with 3 microns of 24k gold.
- * Tension is provided by Neodymium magnets giving a wide and adjustable range of tension from approx. 10-60 grams.
- * Pivots are 3mm diameter silver steel mounted on four high quality miniature ball races.

"The MagPad has laser cut finger

pouch for the Allen key. It's supplied with its adjustment tool and is covered by a lifetime guarantee. It can carry your callsign on the bearing top plate (no extra charge) and weighs 1 kilogram (2.2lb)."

The price is £98 plus £6 First Class post & packing to a UK address (payment via cheque to **T. H. A. Withers** or cash or via PayPal). Overseas orders, please enquire about post and packing charges, payment accepted only by cash or PayPal.

Further details from: **Tom Withers G3HGE, Woodpeckers, West Stow, Bury St. Edmunds, Suffolk IP28 6ER.**
E-mail: sales@twmagpad.co.uk
Website: www.twradio.co.uk/TW%20MagPad.html

Roger Cooke G3LDI finally gets his hands on the latest offering from Kenwood. The TS-590S has been a long time coming and has been eagerly awaited by Kenwood fans!

It's Here!

The Kenwood TS-590S



The TS-590S is the new high frequency (h.f.) and 50MHz transceiver from Kenwood and has been long awaited. It has been several years since an h.f. radio has emerged from the Kenwood stable and there are quite a number of dedicated Kenwood fans waiting for this one! However, the International nature of Amateur Radio came to the surface when I was unpacking it – as I found a selection of manuals in six different languages to test my linguistic skills!

The new TS-590S employs down conversion for the first intermediate frequency (i.f.), resulting in excellent dynamic range when adjacent unwanted signals are present. It is also equipped with a 32-bit Floating-point d.s.p. featuring advanced technology that enables the rig's unique i.f. automatic gain control (a.g.c.). These, plus other advanced features are what h.f. enthusiasts all over the world have been anticipating.

Typical Kenwood Styling

The TS-590S has a typical Kenwood styling and appearance, with a large liquid crystal display (l.c.d.). This is

adjustable in brightness and also colour selectable, orange or green with a wide viewing angle.

From an engineering standpoint, as can be seen from the photographs, the transceiver is really well put together. There is a predominance of surface mount technology so I would suggest that servicing is not within the normal Radio Amateur's capability.

The main specifications are shown at the end of this article. More details are available on the Internet for those wishing to see a full list. A wide variety of accessories are also available.

The review transceiver was supplied with the voice guide unit, which is invaluable for the visually impaired. However, I'm fortunate enough to have good vision for my age!

There's a wide variety of parameters to set up. A comprehensive menu system is used in conjunction with multi-function front panel buttons. I soon realised it would pay to spend some time with these to become familiar with the various selections that are available.

An important feature to start with is the built-in automatic antenna tuning unit (a.a.t.u.) with 32 frequency ranges that automatically change as you

change the variable frequency oscillator (v.f.o.) frequency. Three antenna inputs on the rear panel allow for two transmit antennas and one receive antenna. A built-in multi-function c.w. keyer caters for the Morse enthusiast. And for those that enjoy remote operation, providing you have two v.h.f./u.h.f. transceivers; the TS-590S is equipped with Sky Command II to enable this function.

Note: Sky Command is a system that allows the operator to remotely control and operate the 'main' rig via Sky Command capable mobile or hand-held rigs. **Editor.**

Like many modern transceivers, the TS-590S transmit section uses a die-cast aluminium chassis, together with a large heat-sink to increase heat dissipation efficiency. The cooling system uses two large 60mm square fans, which enables them to run at a much lower revolutions per minute (r.p.m.) while still providing more airflow. Lower r.p.m. means less noise! This careful type of design feature makes the transceiver eminently suitable for DX-peditions or during contests.

Control & Host Programs

The ARCP-590 Radio control program and ARHP-590 radio host program will

be available as free download from the Kenwood site. There's a growing interest in remote operation over the Internet and I think that this is yet another very different and new facet of our hobby that has an appeal for some operators.

It's also possible to use the COM port to a v.h.f. or u.h.f. radio and pass the cluster spots to the transceiver, which then moves to the spot frequency. However, using a contest program such as *N1MM*, it's possible to do that with the program connected to an Internet Cluster Node, and it's much faster. (The same could apply to the TS-590S, of course).

Main Attractions

One of the main attractions of the TS-590S design, in my opinion, is the receive side. At 21MHz and below, the transceiver employs down conversion. The first roofing filter at 6kHz bandwidth is directly after the mixer and the second roofing filter is a 2.7kHz wide device after the post amplifier. This gives a good dynamic range and enables the transceiver to deal with strong adjacent channel interference, enabling copy on weak signals that wouldn't be possible in some transceivers.

Optimum operation is again assured by the use of the 32-bit floating-point digital signal processing (DSP) at the i.f. This controls a wide range of features such as the a.g.c. function, channel filtering and noise reduction.

The (already briefly mentioned) pre-set type a.a.t.u. enables quick band changing and it also operates when the TS-590S is receiving. When the transmit frequency changes, the requisite pre-set is loaded into the antenna tuner circuit to ensure that optimum matching is rapidly achieved without having to retune. The operator can configure a maximum of 32 frequency ranges for both v.f.o.s to change the operating mode automatically as the v.f.o. frequency is changed.

The Menu System

To use the menu system efficiently, I had to keep referring to the manual, but this is to be expected – the rule RTFM (Read the Flaming Manual!) applies here! Most transceivers are menu driven these days and they all have a different way of operating the menus. However, after a few trial runs, I soon got used to adjusting various menu items. There are 88 menu selections and these can be set up in two different files, Menu A and Menu B.

The operator can choose to have one

menu for one type of operation and the other menu for something completely different, or even set up the transceiver for two different operators! There are also two programmable keys on the front panel, **PFA** and **PFB**. There's a list of menu items that can be assigned to these buttons, as well as four extra buttons on the desk microphone, an optional extra. Unfortunately, for the review I had the fist microphone and this doesn't have that facility.

The menu number information is in the main display area and in the sub area is the menu item information. This scrolls from right to left. Once the Menu button is pressed the menu number can be selected by using the **MULTI/CH** control. It took me a while to get used to the menu selections until I just followed the orange arrows on the keys concerned.

The USB/COM Ports

Thanks to the addition of a USB port, the TS-590S can be hooked up to a PC with a USB cable, enabling PC control of the transceiver plus transmit/receive audio connectivity. The *ARUA-10* software to control the USB audio system line of the PC can be downloaded from the Kenwood Internet site.

Data can also be transposed from one TS-590S to another or similar Kenwood transceiver by directly connecting the two transceivers by using the COM RS-232 connectors on the rear apron. The built-in firmware is also upgradable on-line.

Repeater & FM Operations

For those that enjoy h.f. repeater use, both narrow and wide frequency modulation (f.m.) is available and when propagation allows, the 28MHz repeaters can be used along with those on 50MHz. Tone access is programmable with a selection of frequencies as is an identifying scan function.

It's also possible to select a Continuous Tone Controlled Squelch

Product

The Kenwood FT-590S h.f. and 50MHz transceiver

Supplier

Kenwood Communications UK

Pros

The TS-590S is pleasant and intuitive to use and once the operator is familiar with the controls/menu, etc., it will hold its own with any of the more expensive transceivers.

Cons

As a mid-price range transceiver the TS-590S doesn't have some of the bells and whistles of a transceiver costing more. However, it does have some bells and whistles that the more expensive transceivers don't have!

Price: £1521

Accessories

HS-5 Deluxe Headphones, HS-6 Lightweight Headphones, MB-430 Mobile mounting bracket, MC-60A Desk Microphone, PS-60 Heavy Duty Power Supply and P-23 External Speaker.

Further Information

www.kenwood-electronics.co.uk/products/comms



The rear panel of the transceiver showing the h.f. and 50MHz antenna inputs.

System (CTCSS) sub-audible tone to concur with someone you only wish to hear, rejecting all others. There's also the amplitude modulation (a.m.) mode available for those who wish to occupy large parts of the spectrum!

The VGS-1 Voice Guide Unit

The VGS-1 Voice Guide unit is an option (it was supplied fitted on the review rig), but is invaluable for the visually impaired. It can be seen in the picture as the small aluminium box on the main printed circuit board (p.c.b.) at the top left corner.

In use the VGS-1 announces the key function and frequencies each time the operators presses a key. You can also record two 30 second long messages in memory channels one and two and two 15 second long messages in memory channels three and four. It's also possible to store the last 30 seconds of an incoming signal to the VGS-1 for later playback.

The VGS-11 also 'speaks' an extensive selection of menu items and their settings, plus the receiver S-meter and transmit power levels – which will be very helpful for visually impaired operators.

Data Modes

Regular *PW* readers will know that I'm a keen RTTY operator and of course, I was interested in trying the 590's capabilities. However, reading the manual it told me that an 'MCP' was needed for RTTY operation. I wasn't sure what this was, so I had to search for it and it turned out it means Multimode Communications Processor. In practice, I think this could mean any data interface as long as it's connected to the ACC-2 13 pin DIN connector on the rear of the transceiver.

There's a pin-out diagram on page 67 of the manual which should help with the wiring of a connecting lead. Selecting FSK from the front panel enables high tones (the standard for FSK) to be used, namely 2125 and 2295Hz, although 2175 is mentioned in the manual as the high tone. However, as much as I'd have liked to, I didn't get the time to try the transceiver on data modes.

Other data, audio frequency shift keying (AFSK) modes are connected to the same port, using the audio input and output lines to either a Terminal Node Controller (TNC) for packet, pactor, PSK31, SSTV and so on. Bandwidth settings are controlled and set by the concentric controls Hi-shift/Lo-width on the front panel. The roofing filter is set automatically for mode and bandwidth and cannot be changed.

Memory Functions

There are the usual features associated with memory functions in modern transceivers, 110 channels in total. 100 of these are for normally stored data, such as skeds, DX monitoring, etc., and **P0** to **P9** are used for programming tuning ranges and scan ranges. All the usual functions are there, including memory recall, transfer from memory to v.f.o. and vice versa, so a study of the book is called for to become familiar with them all.

The operator can assign names to each memory channel, up to a maximum of eight alpha-numeric characters. There's also a scratch-pad quick memory similar to that on the Yaesu FT-1000MP, with a stack of 10, the bottom one of which eventually falls off.

Interestingly, there's an extremely versatile scanning function, which is programmable and can cover either the complete receiver, **VFO Scan**, a **Program Scan**, using the memories in whatever way you wish. Again, reading the book is essential here.

Operating On CW

For the c.w. operator, there is a built-in programmable electronic keyer which is very nice to use and the paddle just plugs into the socket on the rear apron. It has a range of 4 words per minute (w.p.m.) to 60w.p.m. I tried both and will leave it to you to guess which one I found easier! My normal chatting speed of 25w.p.m. is quite adequate. However, for those into contesting, an external contest program would be better as the built-in-keyer has no incremental serial number facility.

The individual operator can, however, program one of the four c.w. memory channels to interrupt the playback and insert their own serial number. The transceiver came with a sidetone of 850Hz (a frequency which I found to very unpleasant) so I quickly lowered this to my usual 400Hz and it was fine. The rise time is selectable in the menu 1,2,4 and 6 and I found 4 to be the most pleasant. The dot/dash weighting is also programmable and there's provision for either full break-in or semi-break-in.

I dislike full break-in for c.w. operations and found there was a distinct thump using that (as there is on my own transceiver). I much prefer semi-break-in with a time constant set to just maintain transmit during a space and again this is adjustable.

The four memories are also easily programmed and each one can store approximately 50 characters. Playback is simple; just push the same memory

channel and off it goes! These can be set to repeat if necessary, a 'CQ TEST' perhaps on one channel.

Additionally, if you really want to make life difficult for yourself, you can even use the **Up/Down** keys on the microphone as a paddle! The usual ability to swap paddle position is also available, reversing dots and dashes and there's also a socket on the rear apron for a straight key.

One nice thing I found when listening to the c.w. end of the band in s.s.b. mode, a menu setting will allow you to use the keyer instantaneously if you want. And it doesn't matter what sideband you are listening to either – very useful indeed for busting a pile-up without having to resort to changing modes and retuning! Another neat feature is the auto zero-beat, which is selectable or not from the front panel. This ensures that you'll be zero beat with the station you're calling.

Editorial note: *David Wilkins G5HY of Kenwood Communications UK updated us on an important modification to the TS-590's internal electronic keyer: David writes, "We asked Japan to add a choice of Mode-A or Mode-B keying to the internal keyer. Earlier models of the transceiver were fixed in Mode-B, which some operators took an intense dislike to – so we regard this new feature as being very much what the customer wants!"*

Other Features

One thing that's not built-into the TS-590S is a separate sub-receiver. However, it also has split operation with the two v.f.o.s. To listen on either frequency would entail swapping, so there's no ability to monitor both frequencies something I do a lot here at G3LDI and I don't think I would like to be without a separate sub-receiver.

The multi-function metering measures six parameters; signal strength, power output, automatic level control (ALC) status, standing wave ratio (s.w.r.), compression and the i.f. filter width.

There are several ways to selecting the operating frequency. You can do it the 'old fashioned' way, i.e. turning the v.f.o. a few or many times, or you can enter it directly from the keypad.

The keypad doubles as the band change buttons. You just have to press **ENT** first and **ENT** again to complete the selection. You can also the **MULTI/CH** control to change frequency in steps of 1MHz. It's also possible to select 100, 500kHz or 1MHz from the menu.

A quick QSY (change of frequency) around the band is again possible with

the **MULTI/CH** control, using steps of 5kHz and again this can be changed in the menu. Fine tuning is also available in 10Hz steps, which is selectable from the front panel. And, as we expect nowadays, receiver incremental tune (RIT) and transmitter incremental tune (XIT) are both available with the offset displayed. A clear button reverts back to original setting.

Beeps are selectable on/off but again these are useful to the visually impaired and a lock function disables some keys and controls to prevent you from changing your favourite settings.

The band change buttons are also triple band-stacking registers. Each one 'remembers' three settings of mode, frequency and other settings. So, if you wanted you could set up three changes on each band, c.w., RTTY and single sideband (s.s.b.) and just a push of the band button would take you there.

Power is adjustable in 1W steps from five to 100W and it would pay to set this for 75W when using the transceiver on data modes. This is because data modes requires 100% duty cycle operation.

To deal with interference, the TS-590S is equipped with very good digital signal processing (DSP) filtering technology. The d.s.p. can control the bandwidth, reduce the noise or take out a carrier. For reducing interference i.f. filtering is selectable from the front panel specifying the bandwidth. This is also shown on the meter display. Using the **LO/WIDTH** and **HI/SHIFT** controls, you can select suitable bandwidths for all modes.

There's an auto notch and a manual notch filter, both of which are very effective and deep. The beat cancel function is also useful in s.s.b. mode and it would pay to play with these for a while to get used to them.

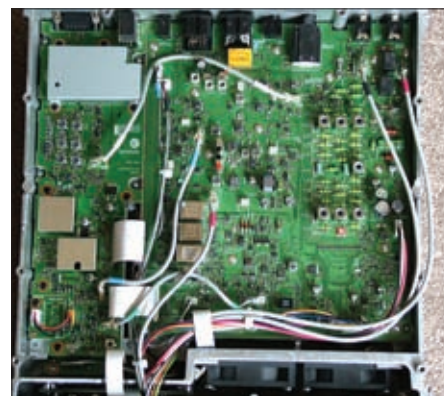
Two noise blankers, or 'reduction functions' in modern parlance, are used to reduce interference and a nearby electric fence was certainly quietened down by these. Electric fence are one of



A pair of slow running 60mm square fans assist the cooling on the TS-590S.



The main r.f. and filter board.



The main board has space for the optional speech unit (top left in the aluminium box).

the penalties of living in the countryside!

A pre-amplifier is also available from the front panel, if needed. There's also a low output for use with a transverter.

On The Air

I completed some setting up of both the audio tailoring and the c.w. keyer and then let it loose on the air to get some reports. My first test was to go onto the Ex-G net that I attend every day on 14.337MHz using my Rhombic antennas (I used the rig intensively on this net during the time I had it on review), to obtain some reports from those regulars that know me well and would give me an instant audio report.

Much to my surprise, there wasn't one comment, so I had obviously set it up fairly well! However, when I asked for comments, the same comments came from two members of the net, that there was a lack of bass. So, I quickly made an adjustment to that and the ensuing comments were favourable.

I also worked a number of USA and Canadian stations, one in ZF1, Grand Cayman Island, ZL50VK in New Zealand and an OY and a UA9 on 1.8MHz. The Top Band QSOs were on c.w. using a 1.8MHz inverted V dipole with the apex at 90ft on my tower.

The TS-590's high contrast main display.





Using the processor made a considerable difference too, although care should be taken on the level of processing. I was using the first microphone, so other microphones would need adjusting too and would probably provide a better response for DX working. I was using the radio with the built-in speaker, and whilst this is quite adequate, I think an external speaker would enhance user satisfaction.

Morse Mode Nice!

Operating in the Morse mode was quite nice to use, a pleasant side-tone (once lowered to 400Hz!), and I had quite a nice surprise on 1.8MHz. I used the transceiver on this band to compare the noise level with my own FT-2000. At the time I tried it, I was pleasantly surprised to find an S-3 noise level. I thought that 'Mr. Murphy' must still be on his Christmas holiday!

I worked two new countries, **4L40** (Georgia) and **Gabriel Mardiros OD5NJ** in Lebanon. Using semi-break in makes for a seamless Morse experience and coupled with the ability to filter down to 50Hz if necessary, with minimal ringing, makes the TS-590S a very worthy c.w. transceiver.

I think that the TS-590S, with a price of £1521, is a mid-price range transceiver and as such it doesn't have some of the bells and whistles of a transceiver costing a few hundred more.

However, the TS-590S does have some bells and whistles that the more expensive transceivers don't have! I did a few tests to compare it with my Yaesu FT-2000 and to be frank it was difficult to tell any difference at all. The TS-590S is pleasant and intuitive to use and once the operator is familiar with the controls/menu, etc., it will hold its own with any of the more expensive transceivers. My thanks go to **David Wilkins G5HY** from Kenwood Communications for the loan of the radio.

PW

Manufacturer's Specifications

General

Receiver coverage:	130kHz to 30MHz, 50-54MHz.
Transmitter coverage:	All Amateur bands including 5MHz.
Modes:	a.m., c.w., s.s.b., f.m., f.s.k.
Sensitivity	<0.2µV.
Selectivity	12, 6, 2.2kHz, 500Hz.
Frequency stability	±5 p.p.m.
Minimum-maximum power output	5 to 100W (low output available for transverter).
Amplitude modulation power output	Max. 25W minimum 5W.
Power supply	13.8V d.c. (±15%).
Current consumption	20.5A max on transmit. Receive (no signal) 1.5A or less.
Antenna impedance	50Ω
Antenna tunable impedance	
auto-tune range	16.7 to 150Ω
Dimensions	108x280x335mm (HWD) 4.2H x 11W x 13.2D 7.4kg (16.3lb)
Weight	

Transmitter

Modulation type:	s.s.b. balance modulation, f.m. reactance modulation, a.m. low power modulation.
Maximum frequency deviation (f.m.):	Less than ±5kHz (wide). Less than ±2.5kHz (narrow).
Spurious responses:	1.7 to 40MHz less than -50dB. 40MHz or more less than -60dB.
Carrier suppression:	More than 50dB.
Unwanted sideband suppression:	More than 50dB.
Transmit frequency response:	-6dB 400Hz to 2.6kHz.
Microphone impedance:	600Ω.
Variable XIT range:	±9.999kHz.

Receiver

Circuitry design:	Double superhet
1st intermediate frequency:	11.374MHz.
2nd intermediate frequency:	24kHz.
Triple Superhet	
1st intermediate frequency:	73.095MHz.
2nd intermediate frequency:	10.695MHz.
3rd intermediate frequency:	24kHz (except f.m. which is 455kHz).

Fitted items

SO-3 Hi-stability Crystal Oscillator	Fitted.
VGS-1 Voice Guide and Storage unit	Fitted (supplied with review model).

Optional extras

HS-5 Deluxe Headphones
HS-6 Lightweight Headphones
MB-430 Mobile mounting bracket
MC-60A Desk Microphone
PS-60 Heavy Duty Power Supply
P-23 External Speaker



Ben Nock G4BXD's Antenna Workshop

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

The QRM Buster

In this Antenna Workshop, Ben Nock G4BXD describes a receiving antenna that can help cut out local noise.

It seems that more and more of us are suffering from QRM these days. In other words, mostly man-made interference of one sort or another. I'd not really noticed what has been a gradual increase in my background noise when listening to the 3.5MHz band. That was until I started to notice that while I was getting 5 and 9 reports on my signal I was only giving out 4&6 or 5&7 reports to the received stations.

While I was in conversation with a

friend on the 3.5MHz band, he pointed out that it may not be the fact I'm receiving a 5&7 signal but that due to the higher background noise it only sounds like a 5&7. My friend also had problems with various noises, television line timebase noise, the dreaded power line transmission (PLT), and even broadband devices such as the BT Home Hub.

Some of the solutions described in the conversations we had, included filters and a device called a 'Null

Steerer' which combines wanted signal and an out of phase received noise in an attempt to reduce the overall received noise. He had also contacted the relevant agency, Ofcom, and instigated a formal enquiry into his local noise problem.

One contributing factor to the noise problem here in my shack, and probably with many other listeners is, I suspect, the end-fed long wire antenna that I use at this QTH. Unfortunately due to space limitations it's exceedingly difficult to use any form of dipole or other balanced antenna. Another suggestion that was suggested, was to try a loop antenna.

A Loop Antenna

A loop antenna has a very useful property in that it can be rotated to greatly reduce, even completely null out, any unwanted signal. As this seemed an easy option to try, I decided to experiment further.

The kind of loop I am discussing here is not the physically larger or 'Mag-loop' types of antenna used for transmitting, and currently finding a great deal of popularity amongst those amateurs with small gardens, but rather the framed receiving loop for indoor use. Many broadcast station listeners will be familiar with frame loop antennas, as these have been used for many years on those bands where very long outside wires are just not possible.

A search on the world wide web threw up hundreds of pages on loops and their use and operation. Indeed there really was too much information to get a clear idea of the best type of loop to use or try. But after reading a few basic facts and ideas, I decided to plough on though and give it a try.

While giving thought to the loop construction I remembered I had a spare loop antennas as used with the R1155 installation on the Lancaster bomber. This loop, **Fig. 1**, is constructed from a coil of 15 turns, covering a 60mm length and with a diameter of some 273mm. This seemed an ideal starting point and I first tried the simplest of loop types. Connecting the loop across a length of coaxial cable I attached it to the receiver.

Amazingly, while stations were considerably weaker there was the great satisfaction in the fact that as I rotated the loop around the vertical axis the noise did indeed drop with the loop in one particular direction. This proved



Fig 1: The R1155 receiver and its loop antenna.

the loop could indeed 'null' out an unwanted signal and gave great faith in further research.

Using the whole of the loop as an untuned loop or simple coil is one way to use the antenna. Another way is to use a tuned loop, that's one that is resonant on the frequency being listened to and which has a further coupling loop to feed the receiver with the signal captured by the tuned loop.

Luckily, with the R1155 loop I found that a variable capacitor of around 20–100pF connected across the loop allowed the loop to resonate within the 3.5MHz band. I added a further single turn loop around the outside of the main coil and connected this to the coaxial cable and hence to the receiver.

Now, while listening to the background noise on the receiver the variable capacitor is rotated to peak the noise, there was a very pronounced peak as the capacitor was rotated. Once again, by rotating the whole loop assembly I could find a considerable dip in the noise being received thus indicating the local QRM was coming from a definite direction.

The received signals were better than those received using the untuned loop, but of course were still considerably down on those received from the main antenna. Some sort of radio frequency (r.f.) amplifier was called for between the loop and the receiver and another web search was undertaken.

The Antenna Circuit

After viewing many web sites I decided to try the circuit in **Fig. 2**. The original circuit used an untuned loop and acted as a broadband amplifier, or active antenna, for general short-wave listening. I intended to use the tuned R1155 loop with 1 turn coupling to give a degree of selectivity.

The only addition I made to the circuit is the pair of back to back diodes across the inputs to the amplifier. If I transmitted with the loop attached to the amplifier I felt the signal pick up by the loop would be enough to damage the transistors.

I constructed the amplifier, 'Manhattan-style' on a small sheet of copper clad board, **Fig. 3**, forming the connection points by using small pads cut from another piece of board and then glued to the main board. I connected the single turn pick up loop winding to the amplifier input and the output via a length of coaxial cable to the receiver.

The little circuit certainly increased the sensitivity on receive with reception during the evening being especially

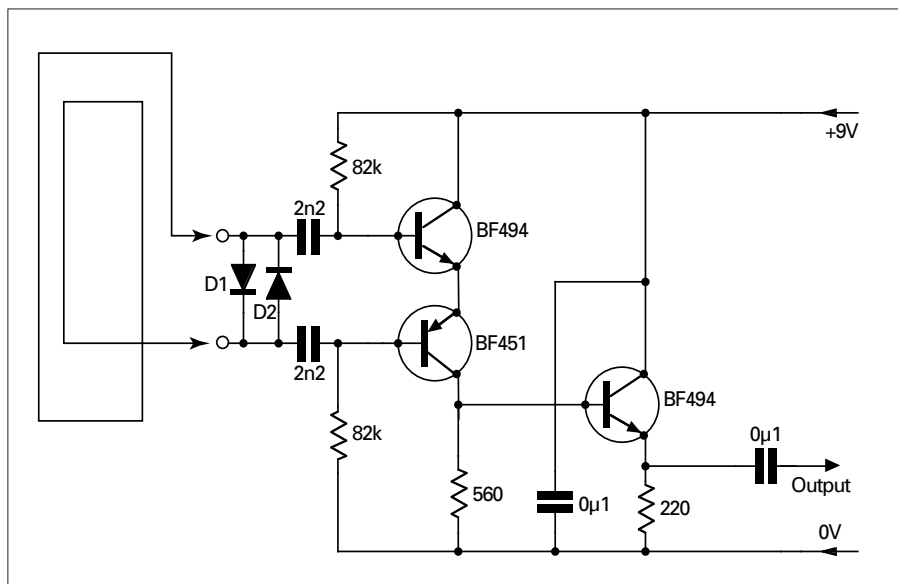


Fig 2: The circuit of the loop amplifier.

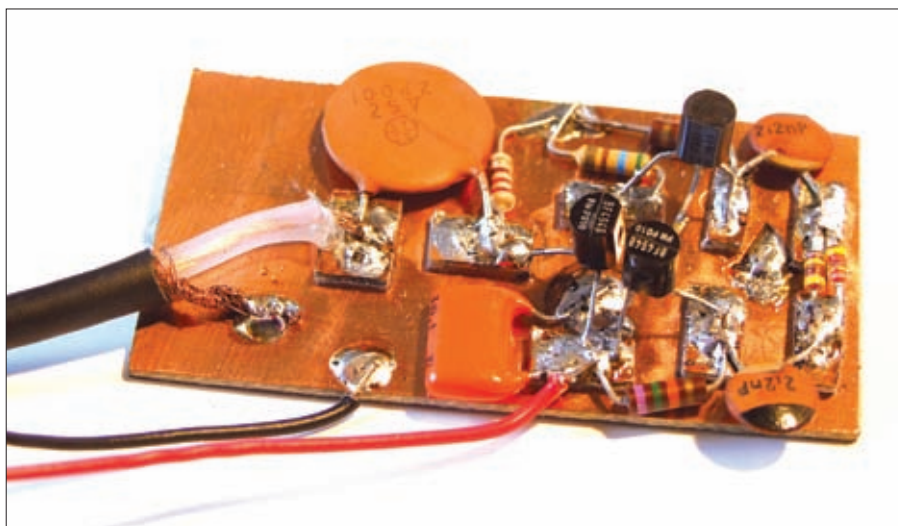


Fig 3: Showing the construction of the amplifier in best 'kitchen-table' method.

good. The directivity of the loop allowed the signal to be either peaked for maximum reception but more effectively the unwanted noise could be very much reduced to increase readability.

I felt though that the small size of the R1155 loop was rather a draw-back so, a slightly bigger loop was constructed. The new loop is a compromise between signal pickup (the bigger the better) versus manageability in the shack to experiment with. I settled on a loop diameter of 600mm (about 2ft).

Using a length of Pine strip some 18x6mm, from the local d.i.y. store I fabricated a hexagon frame, see **Fig. 4**, on which to hold the loop. I chose flat strip but dowel would work equally well, it's just easier to work with flat strip than round. The mounting points were simply drawing pins pushed into the soft wood. A single turn of single core hook-up wire was wound around the pins and anchored to the main arm with more drawing pins.

The Tuned Loop

The tuned loop shown in the photograph, consists of three turns of the same single core pickup wire terminated by wrapping around two more pins and I soldered the wire to them for good measure. A small plastic bracket was pinned to the main arm and a variable capacitor mounted on the plastic bracket then wired across the three-turn loop contacts.

The small variable loop-tuning capacitor came out the junk box but it must be capable of covering some 20–150pF. The small amplifier used on the R1155 loop was pinned to the mast, **Fig. 5**, and connected to the one-turn coupling loop.

With this set-up completed the cable from the amplifier was connected to the receiver and with the set tuned to the 3.5MHz band the capacitor was rotated looking for a peak in noise. Amazingly, even though the turn count and capacitor selection had been guesswork the loop actually peaked on the band at around the middle of the capacitance swing.

If you construct the loop and can't find a 'peak' on the 3.5MHz band – you should tune your receiver to around 5MHz and try again. If there's still no peak try 7MHz. With a three-turn loop of about 600mm and a capacitor around 50-80pF or so there should be peak somewhere between 3 and 7MHz.

If your loop does peak at say 5MHz with the turns and capacitor selected then you'll need to do one of two things. Either add another turn of wire to the tuned loop side or increase the capacitor value. The easiest way is an additional fixed capacitor across the variable, which will now hopefully peak in the 3.5MHz band. Once you have the loop tuned you can investigate the noise in your location.

Camera Tripod

I mounted the assembled loop on a camera tripod head. This gave me the ability to rotate the loop around the vertical axis and to tilt the loop at the same time. With the loop connected to the R1155 receiver, I proceed to 'DF' my local noise.

I found that at a certain heading the noise dropped considerably and that, by tilting over the loop to around 20° from the vertical, I found an even deeper null in the noise. With the reduction in noise, weak signals suddenly appeared where before there had just been noise! Indeed I was now able to hear my old problem, TV line time-base harmonics, that I hadn't heard for quite a while. (My shack is in the attic of the house and I have the usual Velux window in the roof.

I mounted the loop through the open window whilst listening to a QSO on the 3.5MHz band and noticed a marked improvement in signal strength

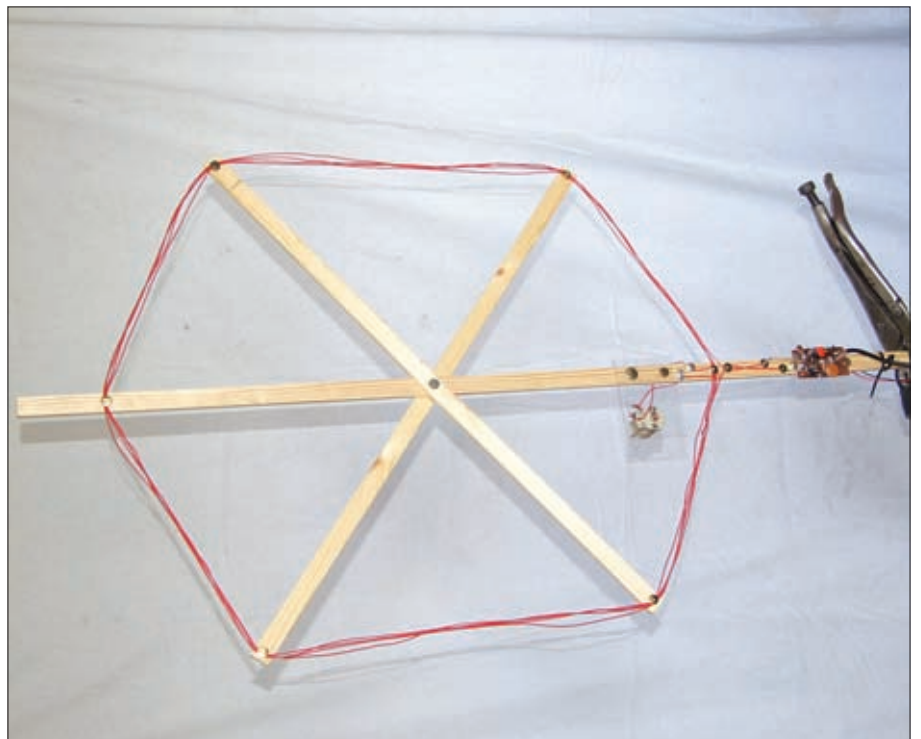


Fig. 4: How the loop and its frame fit together.

received with the loop outside and above the roof line. With the reduction in noise, when moved outside the building and the need to rotate the loop itself, this implies that the best place to mount the loop would be fitted on the chimney with a rotator.

Revised Version

With the success of the prototype, I'm now working on a revised version, possibly made from plastic piping to enable a waterproof version to be constructed. Further experimentation in loop diameter, turns and capacitance ratio and tuned or untuned amplifiers could be undertaken.

I shall also try and locate the source of my local noise but connecting the

loop to one of my h.f. manpacks while walking around the local streets. I have the bearing on the noise from the shack, if I take a couple of further bearings from different locations I might be able to pinpoint the source.

What has been apparent though throughout this project is the fact that the noise problem on the bands is increasing and we might not just realise it. I was quite convinced the bands were just in a poor state of 'fettle' and that was the reason I was hearing so little. Once the noise was reduced it became clear the bands were working but that signals were simply being masked by this persistent noise problem. Good reception to you all!

PW

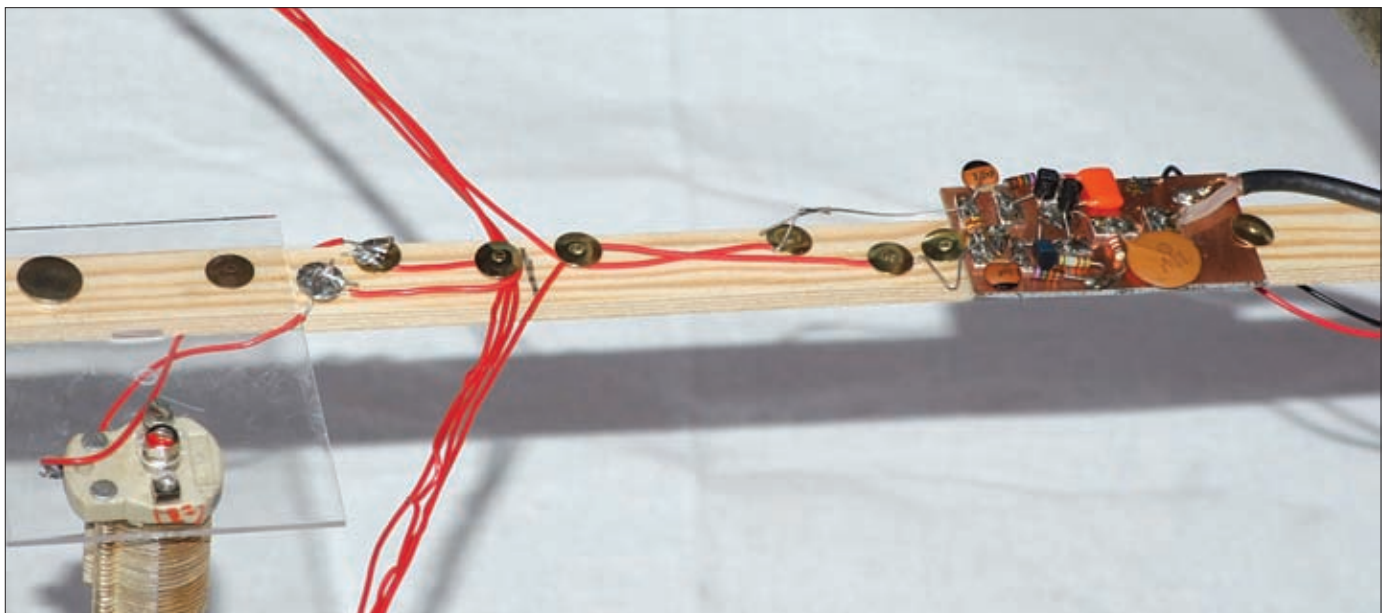


Fig 5: Mounting the amplifier, that's built Manhattan-style on a piece of p.c.b. material.

KENWOOD

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Accessories

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Base

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VX-6E Dual band 2/70cm RX 1.8-222/420-998MHz, 5 Watts output **£239.95**
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VX-3E Dual band 2/70cm RX 0.5-999MHz, 3 Watts output **£159.95**
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FT-270E Single band 2m, 144-146MHz, 137-174MHz Rx **£99.95**



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FTM-10E Dual band 2/70cm, 50 Watts output **£349.95**
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FT-2000D HF/6m All mode 200 Watts transceiver RX: 30kHz - 60MHz **£2,999.95**
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FT-950 HF/6m 100 watt transceiver with DSP & ATU RX 30kHz - 56MHz **£1,299.95**
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FT-450 Compact transceiver with IF DSP, HF+6m 1.8-54MHz, 100 Watts output **£619.95**

Accessories

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ZL12-2 2 Metre 12 Ele, Boom 315cm, Gain 9.5dBd.....	£99.95
ZL7-70 70cm 7 Ele, Boom 70cm, Gain 11.5dBd.....	£39.95
ZL12-70 70cm 12 Ele, Boom 120cm, Gain 14dBd.....	£49.95

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HLP-6 6 metre (size approx 800mm square).....	£39.95

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

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G5RV-DSS Standard Double Size Enamelled Version, 204ft Long, 10-160 Metres.....	£54.95
G5RV-HSH Half Size Hard Drawn Version, pre-stretched, 51ft Long, 10-40 Metres.....	£29.95
G5RV-FSH Full Size Hard Drawn Version, pre-stretched, 102ft Long, 10-80 Metres.....	£34.95
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G5RV-FSF Full Size Original High Quality Flexweave Version, 102ft Long, 10-80 Metres.....	£39.95
G5RV-HSP Full Size Original PVC Coated Flexweave Version, 51ft Long, 10-40 Metres.....	£39.95
G5RV-FSP Full Size Original PVC Coated Flexweave Version, 102ft Long, 10-80 Metres.....	£44.95
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Accessories

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MOONRAKER Trapped Wire Dipole Antennas

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MTD-3 (3 BAND) FREQ: 40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts.....	£129.95
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(MTD-5 is a crossed di-pole with 4 legs)

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

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

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

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Diamond performance from the superb Diamond factory

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

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

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

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MR777 2/70cm, Gain 2.8/4.8dBd, Length 150cm, 3/8 fitting.....	£17.95
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MR2 POWER ROD 2/70cm, Gain 3.5/6.5dBd, Length 50cm, PL259 fitting (fibreglass colinear).....	£24.95
MR3 POWER ROD 2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass colinear).....	£29.95
MRQ800 6/2/70cm Gain 3.0dBd/5.0/7.5dBd, Length 150cm, PL259 fitting (high quality).....	£39.95
MRQ273 2/70/23cm Gain 3.5/5.7/5.8dBd, Length 85cm, PL259 fitting (high quality).....	£49.95

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

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

HUSTLER HF Verticals

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

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Hustler 5-BTV 5 Bands 80-10m 1000W Length 7.64m Weight 7.7kg.....	£219.95
Hustler 6-BTV 6 Bands 80-10m 1000W Length 7.30m Weight 7.5kg.....	£259.95



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One That Didn't Work!

In this Carrying On The Practical Way, the Rev. George Dobbs G3RJV remembers the many circuit ideas developed by the late Walter Farrar G3ESP and – unusually – he's been unable to get one of G3ESP's projects to work!

*To live in hearts we leave behind
is not to die.*

Thomas Campbell, Hallowed Ground

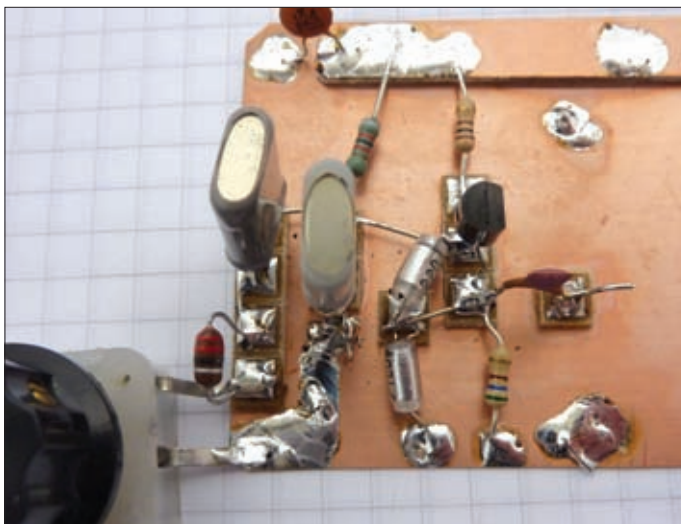
I found the *PW* tribute, by the Editor Rob G3XFD – in the December 2010 issue – to the late Walter Farrar G3ESP, a very fitting and touching memorial to a fine Radio Amateur, in the true sense of the term. 'Amateur' comes via French from the Latin *amator* – to love. Walter was certainly a lover of radio and shared that love with others. He led a full and long life; dying peacefully just five hours before his 91st birthday.

Many older readers of *Carrying on The Practical Way* (CoTPW) may recall his articles in *PW* and members of the G QRP Club remember, and still use, many of his circuits and ideas in the club journal *Sprat*. In fact, I suspect he would have been better at this monthly column than I am. He was an expert at simple, novel and utilitarian circuits with practical applications.

First Meeting

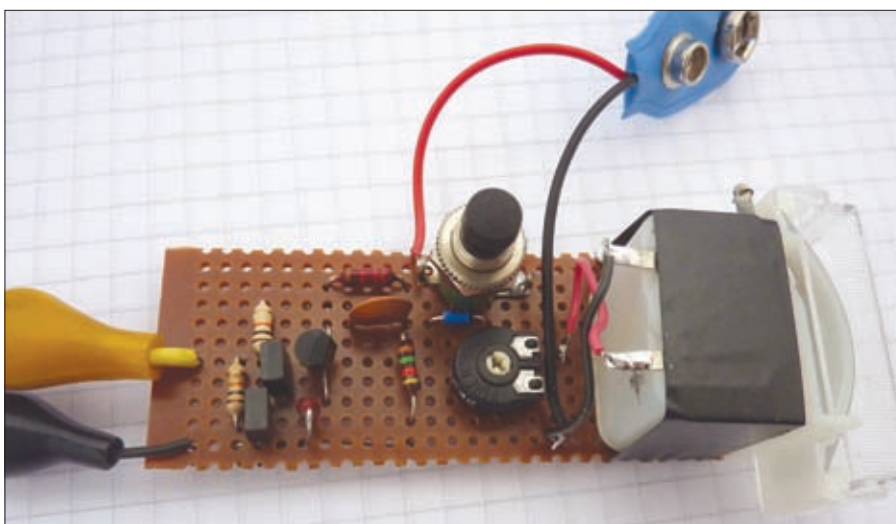
I first met Walter when I did a talk for the **Pontefract & District Amateur Radio Society** (P&DARS) many years ago. I already knew him through his submissions to *Sprat*. I used his power modification on my trusty old FT-7 transceiver for many years. Then, for several years, I met Walter annually at the G QRP Club Convention in Rochdale. He was an avid supporter and attendee until it was no longer possible for him to be present at the event.

It was always enjoyable to discuss home-built radio projects with Walter. I remember an animated discussion about the 'Super VXO' circuit. It may have been the last time I spoke to him, although I'm not sure. The Super VXO (variable crystal oscillator) was invented by **Tadashi Okubo JH1FCZ** and **Mr.**



George hasn't managed to get the dual-crystal oscillator to produce the desired output at 1.8MHz yet.

George found the versatile crystal checker by Walter G3ESP to be very useful.



Smimizu JA0FAS (now a Silent Key). It first appeared in the August 1980 issue of *Fancy Crazy Zippy*, a Japanese radio construction magazine produced by JH1FCZ that gained its title from his callsign!

The Circuit

The circuit of the Super VXO is shown in **Fig. 1**. Using a variable capacitor and an inductor in series with a crystal in an oscillator circuit is the common way to move the frequency of the oscillator a little.

The capacitor varies the frequency of the oscillator upwards and the inductor brings the frequency downwards. This frequency shift is relatively small but JA0FAS and JH1FCZ discovered that if two crystals of the same frequency (X1 and X2) are connected in parallel the frequency shift is greater. Considerable debate has ensued about why this is so – but it certainly does work!

My special interest in this circuit is partly influenced by having met and been entertained by Tadashi during my visit to Japan in 1999. He and his wife

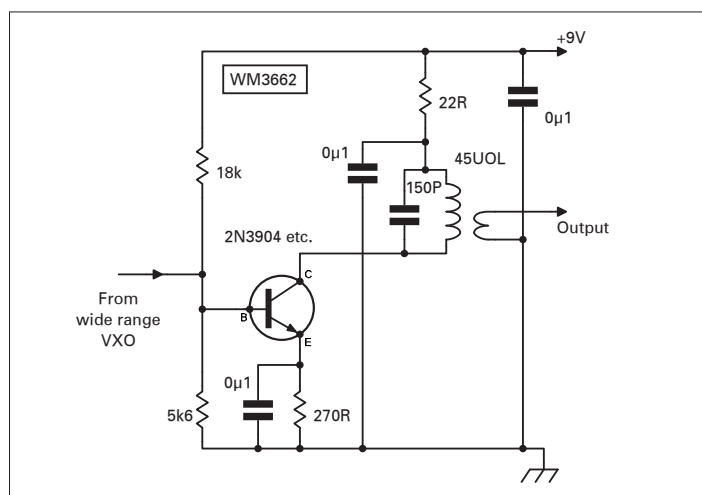
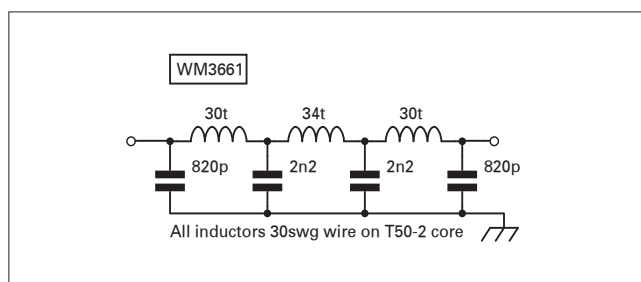
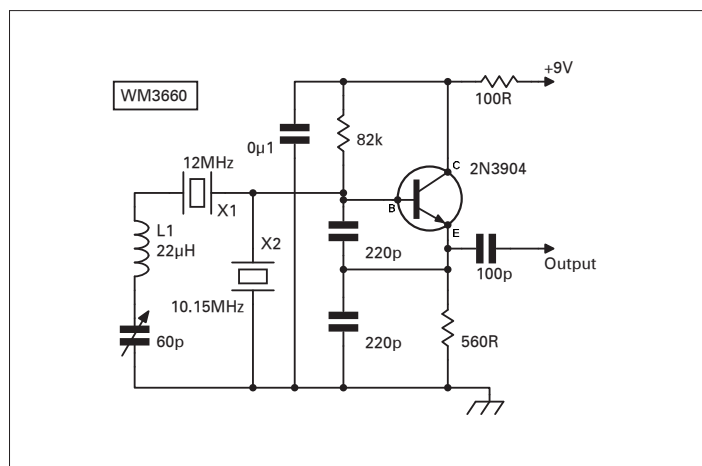
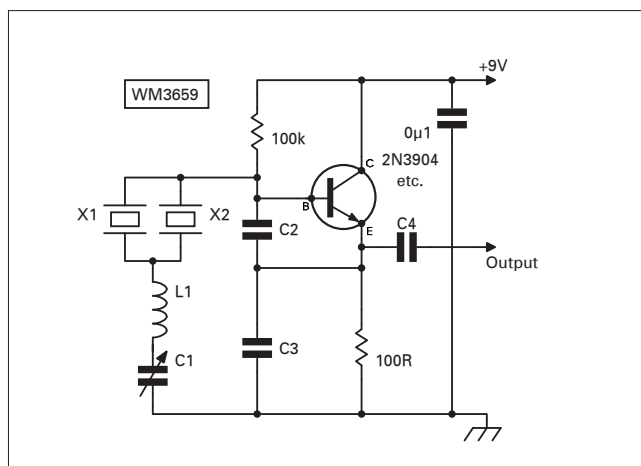


Fig. 3: A suitable low-pass filter for the 1.8MHz band from the range of standard value capacitor (s.v.c.) filters developed by Ed Wetherhold W3NQN.

Fig. 4: A simple tuned amplifier to 'pick-out' the 1.8MHz difference signal from the oscillator of Fig. 2.

were generous hosts. His wife spent a whole afternoon producing taster samples of traditional Japanese food for me to try. Tadashi gave me a tour of his interesting and extensive workshop and described several projects he had the bench.

Since then, I have maintained my contact with Tadashi not only in Amateur Radio but also in the other hobby we share of pen and water colour sketching (see picture). Naturally I have followed the progress of the Super VXO during its many appearances in later designs and I have also used it several times in these pages.

As we talked about the Super VXO, Walter G3ESP reminded me of his circuit in *Sprat* 95 called 'A wide range VXO'. This used with a very innovative method of varying the frequency of a crystal oscillator on the lower bands. The circuit of the G3ESP wide range VXO is shown in **Fig. 2**. Walter was attempting to increase the frequency shift on the 3.5MHz (80m) band.

The lower the frequency of the crystal, the larger is the piece of quartz that produces the oscillation and the less the frequency shift that can be obtained in a VXO circuit. In the 3.5 MHz range the shift is usually only in the order of 2 to 3 kHz. Higher frequency

crystals can be moved much more (frequency wise) in a VXO circuit.

Walter suggests taking two high frequency crystals, one at its fixed frequency and the other in a V XO arrangement, mix their frequencies and (by subtraction) produce a low frequency generator with a larger frequency shift. Readers will probably know that mixing two frequencies produces four basic products: the two frequencies being mixed, the sum of the two frequencies and the difference between the two frequencies.

Walter had crystals with frequencies of 14.060 and 17.642MHz. The difference between the two crystals is 3.582MHz; right in the 80 metre c.w. band. So, using the circuit with these two crystals, Walter was able to obtain an output with a frequency shift of 3.509 to 3.587MHz. This is a very useful frequency range for the 80m band c.w. operator.

What you may find unusual in Walter's circuit is that both crystals are used in the **same oscillator circuit**. In the article he pointed out that the transistor oscillates simultaneously on the frequencies of X1 and X2 and the

difference between their frequencies can be taken from the emitter of the transistor. The circuit in Fig. 2 is just the bare bones system and the output requires filtering to remove the unwanted products of the frequency mixing. I'd never tried the G3ESP wide range VXO circuit – so I thought I might offer it to *PW* readers as a tribute to Walter

Alternative Crystals

I didn't have the same crystals as Walter but I did find two useful alternatives. My stock of crystals offered me 12 and 10.15MHz. The difference between the two is 1.85MHz in the middle of the 160 metre Amateur band.

It's very difficult to get much VXO shift at such low frequencies. The 12MHz crystal was chosen for the VXO being the higher frequency. Walter used a 2N222A transistor for his original version but I used a 2N3904. I'm quite sure that any similar *npn* devices should work in the circuit.

Initially it's a good idea to try the crystals separately in the circuit to ensure that they both oscillate. I was able to use plug-in crystals so this was

easy. The 10.15MHz crystal had a plug-in HC25U casing but the 12MHz crystal was wire ended so I fabricated a socket using d.i.p. header sockets. Both crystals oscillated well in the circuit when used alone.

Plugging them both into the circuit produced a complex output on the oscilloscope although the frequency counter gave the output frequency as 10.15MHz. As Walter pointed out, the circuit needs filtering to reduce the unwanted output frequencies. The circuit, **Fig. 3**, shows a suitable low-pass filter designed for the 1.8MHz band. The design is from the range of standard value capacitor (s.v.c.) filters developed by **Ed Wetherhold W3NQN**.

Naturally, the low-pass filter reduced the output – but I met another problem. I couldn't detect any output at 1.85MHz. Even coupling the output directly to the input of a receiver at that frequency, via a low value capacitor, gave no discernible signal on or near 1.85MHz. My next approach was to build an amplifier tunable at the desired frequency.

The simple amplifier that I built is shown in **Fig. 4**. The output is tuned in the collector of the transistor using a Spectrum Communications 45u0L 10mm screened coil and a 150pF capacitor. The core of the coil allows the tuned circuit to be peaked at 1.85MHz. But once again there was no discernible signal at that frequency.

Knowing that Walter was fond of this circuit and certainly wouldn't submit ideas for publication that didn't work – I decided to persevere. In fact, I wondered if one of the crystals might be more active than the other and if this could be a possible problem. As it happened, one of the easiest ways to check this was to use another little circuit from Walter – the crystal checker.

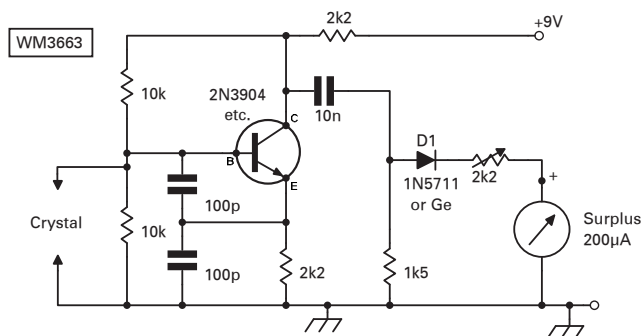
Crystal Checker

The G3ESP crystal checker was another popular *Sprat* article and the circuit is shown in **Fig. 5**. It not only shows if a crystal is active but also gives an indication of the output from an oscillator using the crystal being tested.

Like the circuits in Fig. 1 and 2, the crystal checker uses a Colpitts oscillator. The capacitive feedback loop is provided by two 100pF capacitors. These values of capacitance should be suitable for oscillation over a wide range of the high frequency spectrum.

The oscillating transistor can be a 2N3904, 2N2222A or similar devices. The output from the oscillator is coupled via a capacitor to a 1.5kΩ load. This radio frequency (r.f.) signal developed across the resistor is converted to a

Fig. 5: Another small project by Walter, this one not only shows if a crystal is oscillating but also gives an indication of the activity of crystal being tested.



direct current (d.c.) voltage by D1, which ideally should have a low forward voltage drop and fast switching action. A Schottky diode is ideal but failing that a germanium diode can be used. I used the common 1N5711 Schottky diode, although the BAT41 to BAT43 series of diodes are also suitable.

Suitable germanium diodes the OA81, OA91 and 1N34A are perhaps the more common types. The circuit would still work with a silicon diode but with reduced output. General purpose signal diodes like the 1N4148 and 1N914 could be used if Schottky or germanium diodes are not available.

The rectified oscillator signal is fed, via a variable series resistance, to a meter. The variable resistance (the wiper and one side of a potentiometer) acts as a sensitivity control. The suggested meter is a moving coil meter with a full scale deflection of around 200μA (microamps). Meters can be expensive and no one would suggest, least of all G3ESP, that an expensive meter movement is bought for such a simple circuit.

Walter wrote the article when many small edge-ways reading meters were cheaply available as surplus items. They were often designed as signal meters for cheap tape recorders or S-meters on CB radios. The good news is that they are still around – although they're now usually found on stalls at Amateur Radio rallies. I have several such meters in my junk box and most of them appear to have a full scale deflection (f.s.d.) of around 200μA.

I built up the G3ESP crystal checker using perf-board with a pair of small crocodile clip leads for attaching the crystal being tested. On testing the crystals used in the G3ESP wide range VXO both crystals (12 and 10.15MHz) appeared to have a very similar output. When I had tested them individually in the circuit in Fig. 1 the 10.15MHz seemed to give the greater output. On reflection this was probably because the 12MHz crystal was in the VXO part of



'Autumn' a water colour sketch, illustrating the versatility of Tadashi Okubo JH1FCZ.

the circuit. Although I was no further on in solving the problem of the lack of a 1.8MHz output signal!

Something Unique!

This *CoTPW* article is unique in that I've never before included a circuit in this column that failed to do what I intended it to do! Also, it's important to bear in mind that Walter Farrar G3ESP certainly wasn't the sort of Radio Amateur who would offer a circuit for publication that had failed to work for him.

I suspect that connecting two crystals in one oscillator circuit may produce a far more complex outcome than the simplicity of the circuit suggests. Unfortunately, since I moved to my much smaller retirement home with a very small workbench I no longer have my old, but trusty, HP141T spectrum analyser available for use to identify the problem.

A Challenge For Readers!

So, here's a challenge for *PW* readers! I offer you Walter's circuit – a circuit that he was proud to offer to others. It didn't do what I had hoped it would – but I suggest that you build it and see what you can do with it.

I think that there are better technical minds that read this column than the retired Vicar who enjoys himself with a soldering iron and a few components and writes *CoTPW*! As ever, your feedback is welcome and I wish you all well, keeping busy with your soldering irons!

PW

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Tony Nailer G4CFY's Doing it by Design

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Wide-Band Amplifier Update

In this session of Doing it By Design, Tony Naylor G4CFY describes the updates and assembly of the 5W wide-band h.f. amplifier he began in the last session.

In the *Doing It By Design (DiBD)* column, in the January 2011 issue of *PW* I detailed the development of a 5W broadband h.f. amplifier. The original requirement was for a single push-pull stage to give 5W output from 250mW input, working anywhere in the range 1.8 – 29.7MHz.

The resulting amplifier with feedback achieved 5W output with just 100mW drive at the top and bottom of that range and requiring just 36mW drive at 10MHz for full output. Furthermore I found, that with 180mW drive at 14MHz it achieves 10W output without much degradation of harmonic performance.

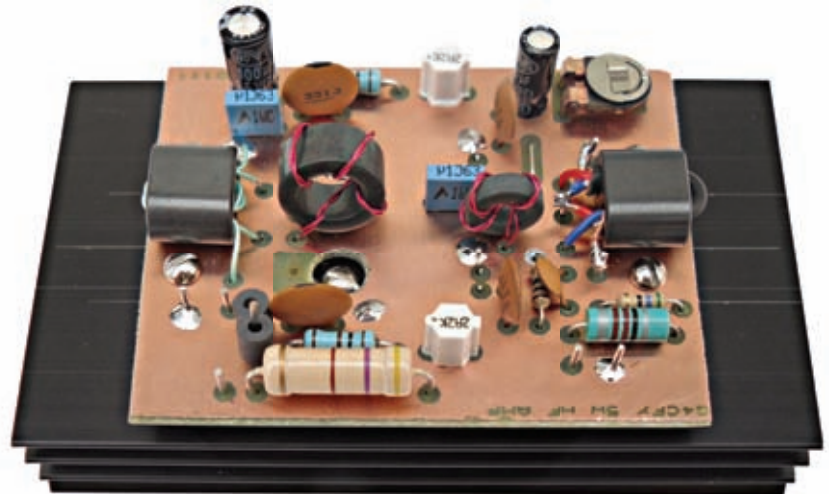
There have already been enquiries regarding the availability of a kit of parts, so in this issue I'll finish off the project giving full constructional details.

Finishing Touches

When the printed circuit board (p.c.b.) was originally laid out I left my options open for connecting the transistor

Update

This is an up-date about the graph of gain against frequency that appeared as Fig. 7, on page 27 of the January 2011 issue. There should have been the x-axis scaled in Megahertz but somehow that had disappeared! The left-hand end of the scale should be 1MHz and the end of that log decade near the MHz title is 10MHz, then 15, 20, 25 and 30MHz. (*Our apologies for the omission. Editor*).



The finished prototype amplifier.

collectors. To this end I placed a pad on the underside to enable soldering of the end of a tag. I also drilled the centre of these holes so a pin could be put in if required and I also made a clear area on the top-side ground plane above this.

Everything worked well as originally planned and I was able to fit a 4BA solder tag under the plastic ferrule insulator and soldered it to the track. Consequently, I have removed the dot from the underside and replaced it with a larger square land of copper, whilst on the top face I've filled the clearance area with copper.

The two electrolytic capacitors were originally laid out using a component model with 5mm lead spacing. However, I've now used a better lay-out, reducing their pin-out spacing to

Table 1 Measurement of the gain and spurious outputs of the prototype amplifier measured over a range of 1.8 – 29.7MHz.

Frequency (MHz)	Vin (r.m.s.)	Second (dB)	Third (dB)	Fourth (dB)	Fifth (dB)	Pin (mW)	Gain *	Gain (dB)
1.8	2.05	-37	-26	-48	-31	84	59.5	17.75
3.55	14	-36	-31	-46	-29	39	128.2	21.1
7.1	1.68	-43	-18	-46	-29	56	89.3	19.5
10.0	1.46	-42	-19	-46	-31	43	116.3	20.6
14.2	1.65	-35	-12	-47	-21	54	92.6	19.7
18.1	1.36	-40	-16	-55	-28	37	135.1	21.3
21.225	1.4	-52	-18	-56	-28	39	128.2	21.1
24.9	1.7	-49	-22	-55	-30	58	86.2	19.4
28.4	2.05	-46	-23	-50	-33	84	59.5	17.75
29.7	2.2	-45	-24	-48	-34	97	51.5	17.1

* this column is shown as numerical gain.

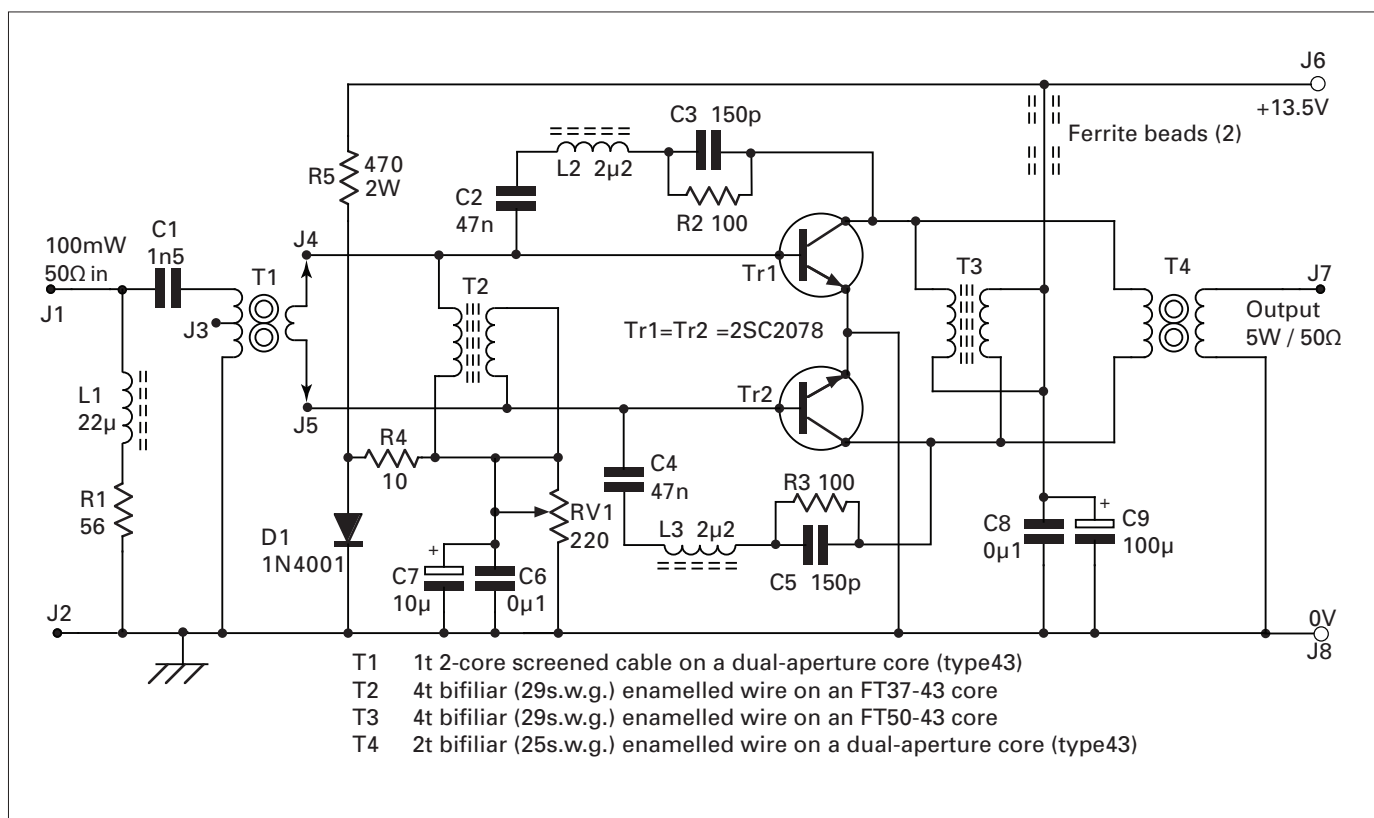


Fig. 1: The circuit diagrams of the updated 5W broad-band h.f. amplifier.

3.3mm, so the capacitors now fit directly down on the board.

In the picture of the finished amplifier, the r.f. input, dual aperture toroid at the right hand board end, with the blue and red wires, uses three terminal pins to attach the primary winding. These pins have now been included in the circuit diagram and will be included in the kit.

Final Tests

As promised in the previous article, I've undertaken further tests using different component values in the feedback networks and with the input compensation network. I was unable to achieve any improvement by varying the components in the input network – but a number of tests varying the values of C3 and C5, **Fig. 1**, reduced the gain/frequency variation. After these tests, the original value of 330pF was reduced to 150pF.

The results of the tests, including harmonics up to the fifth, are shown in **Table 1**. A graph of these results in **Fig. 2** shows that between 2.4 and 24.6MHz the gain is level within 1.8dB.

From Table 1 you'll see that the average harmonic attenuation is; 42.5dB for the 2nd, 18.5dB for the third, 49.7dB for the fourth, and 29.4dB for the fifth harmonics. These figures clearly shows that, in a push-pull amplifier the even-order harmonics are suppressed considerably better than odd-order ones.

Supply current to the amplifier was measured at 14MHz and found to be 1.86A, which at 13.5V is a d.c. input power of 25.1W and with 5W r.f. output represents 20% efficiency. The same test at 3.55MHz measured 930mA, giving 39.8% efficiency, whilst at 29.7MHz it was 990mA giving 37.5% efficiency.

Harmonic Attenuation

In broadcast work, the *R&TTE Directive* states that transmitters, with an output of up to 25W, must have harmonics no greater than 40dB below the carrier and not exceeding 250μW. If we apply this to this amplifier we need to ensure the harmonics do not exceed a ratio of 250uW/5W =

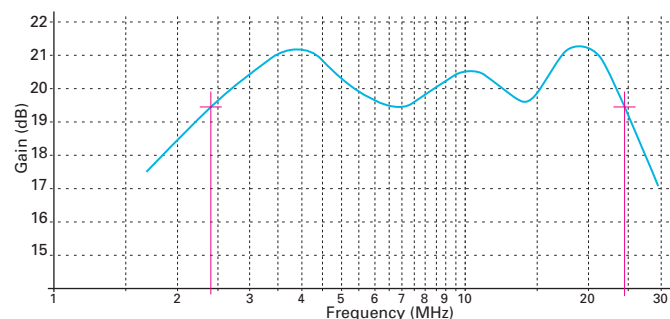


Fig. 2: Using the gain/frequency results from Table 1 to show the relatively flat gain over most of the h.f. band.

0.00005. This represents an attenuation of: $10 \log (0.00005)$ or -43dB.

The tests have revealed that the second harmonic is already quite good, but the third needs to be attenuated by up to 30dB or more. This eases the requirements of the low-pass filter and it's likely that a double Pi section, **Fig. 3**, will suffice. In referring to the *ARRL Handbook* for 1996, I found a family of 5-element Chebychev filters, which looked adequate for my needs.

In the family, filter number 17 had a cut-off frequency of 1.27MHz, a -3dB frequency of 1.77MHz. It showed -20dB at 2.54MHz, -40dB at 3.81MHz, with input and output capacitances of 1600pF, a middle capacitor of 3600pF, and inductances of 7.64μH. Now scaling this design to a 2MHz cut-off using a factor of 1.57 gave capacitances of 1016pF and 2286pF, and inductors of 4.85μH.

I tested the values on a linear circuit analysis program, which revealed the cut-off frequency was a little high, giving attenuation that wasn't quite good enough. Scaling the values by a further 1.2 gave capacitor values of 1200pF and 2700pF, and inductors values of 5.82μH.

The pass-band was flat to 2MHz and then rolled off steeply to attenuate the second harmonic by 22.5dB, the third by 41.5dB, the fourth by 54dB and the fifth by 65.5dB. By the addition of a series of filters scaled to each specific frequency

the unit should achieve a second harmonic –62dB with reference to the carrier, a third harmonic –58dB referred to the carrier and other harmonics that were immeasurably low.

Filter Components

The capacitor values derived for 1.8-2.0MHz band were standard values – but those scaled for the other frequencies proved not to be. Provision will also need to be made to use two capacitors in each position. The inductors need to be high Q, stable, able to dissipate the harmonic energy and to have very low emitted field. This means using toroids again.

The Amidon powdered iron toroidal core material type 2, is recommended for 250KHz to 10MHz use, and type 6 material for 3MHz to 40MHz. A calculation based on the T37-2 core for 5.82uH gave 38 turns, which would require the wire size to be 30s.w.g., which is too thin. One solution is to use two T37-2 cores glued together and a reduced number of turns and the other solution is to use a larger core with a higher AL value.

Calculations using the T50-2 core with an AL value of 49uH/100t gives the number of turns as:

$$N = 100 * (\sqrt{5.82/49}) = 34.5t.$$

As you can't have half turns with toroids, then 34t of 26s.w.g. will be used. I conducted similar calculations for all the Amateur h.f. bands and values of capacitance, inductance, and turns for the cores were determined.

In order to reduce unwanted losses in the inductors the gauge of wire was kept as large as practical. The component values provided in **Table 2** are for information for constructors when used with the circuit of Fig. 3. No p.c.b. was laid out for these filters as I think that each constructor can select just the ones required for specific projects.

Amplifier Toroids

Toroidal transformer, T1, is made by forming a 'U'–shape from twin wire with overall screen and then sliding it into the dual aperture core and trimming the ends about 10mm beyond the core.

Next, make a small nick in the outer sheath on each leg, right against the core. Remove the wire from the core and carefully cut around each sheath and remove the ends, leaving the mid-section.

Put the cable back into the core and then separate the screen wires and twist them together at each end (fashioned to run away from the central axis). Then strip two or three millimetres of each of the inner wire tails and twist a 'blue end' with a 'red end' to form the centre tap. The transformer will then be prepared for fitting.

Toroidal transformer T2 is made by first twisting two 80mm lengths of 29s.w.g. enamelled wire tightly together and then winding this four times through the core. The four tails are cropped to about 15mm long, scraped and tinned and then the start of one winding twisted to the end of the other to form the centre tap.

Transformer T3 is made in a similar manner to T2 – but using two 150mm lengths of 29s.w.g. enamelled wire. Toroid T4 is made by first twisting together two 110mm lengths of 25s.w.g. enamelled wire and winding this twice through the core. The wire ends are cropped to about 15mm long, scraped and tinned.

Circuit Board Assembly

I'll now describe the construction of the project using the p.c.b. (Fig. 4). Start by fitting all the terminals pins and push them home using long-nosed pliers. Then fit and solder all the other components but excluding the two-bead choke, the diode and the transistors. Then you should position the transistors, with the fixing hole of the collector tab centrally above the fixing

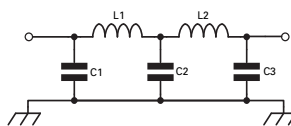


Fig. 3: The circuit of the double Pi filter that is adequate to minimise the odd-harmonic distortion of the amplifier's output.

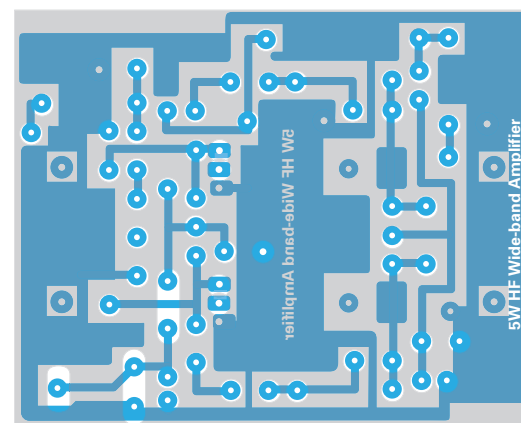
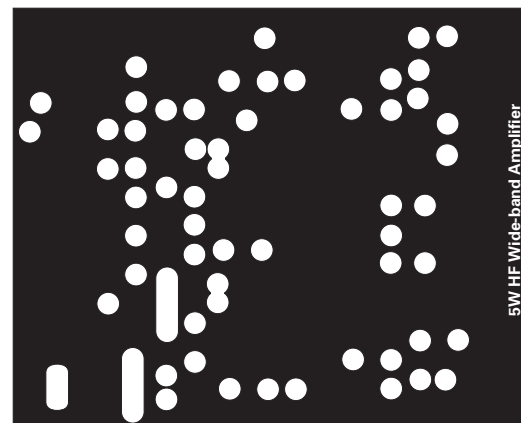
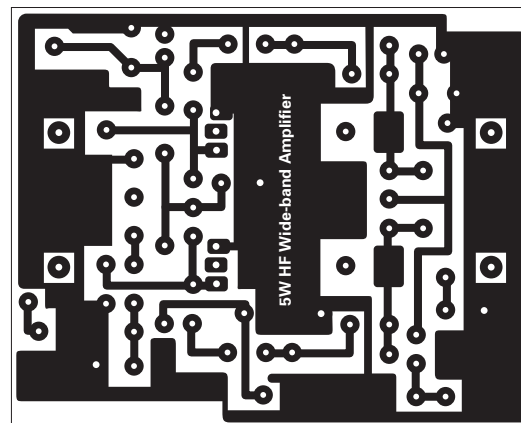
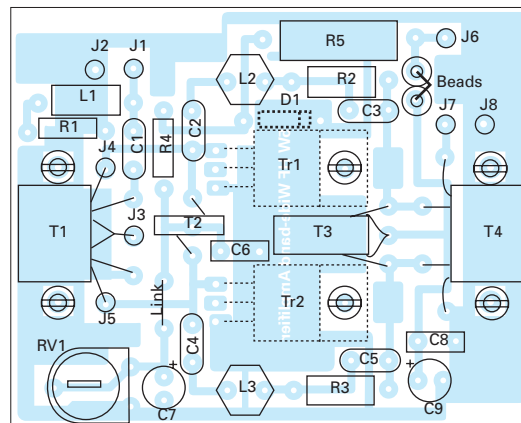


Fig. 4: The overlay and p.c.b. patterns. The top-most is the overlay as if looking through the p.c.b. but ignoring the 'earth-plane' side. Below that is the track-side view and below that earth-plane side view. The lower illustration is as if you're looking through from the earth-plane side to the track pattern underneath.

Table 2 Component low-pass filter values suitable when using the circuit of Fig. 3.

Frequency (MHz)	C1, C3 (pF)	C2 (pF)	L1, L2 (µH)	Turns/Gauge (s.w.g.)	Core
2.0	1200	2700	5.83	34t 26	T50-2
3.8	300+330	1200+220	3.06	25t 24	T50-2
7.2	330	680+68	1.62	18t 22	T50-2
10.1	120+120	270+270	1.16	17t 22	T50-6
14.35	100+68	330+47	0.82	14t 20	T50-6
18.1	100+33	150+150	0.64	13t 20	T50-6
21.45	100+12	220+33	0.54	12t 20	T50-6
24.9	68+27	150+68	0.47	11t 20	T50-6
29.7	82	180	0.39	10t 20	T50-6

hole in the board, and mark the legs with a pencil where they need to be bent to fit into the board.

Next, using pliers bend the legs of each device at 90°. Offer them to the board again and ensure that when the legs are in the holes the fixing hole of the device is central to the clearance hole in the board.

Then you should fit the 4BA solder tag onto the plastic insulating ferrule and add this to each transistor – securing them with a nut and bolt. Fit the transistors to the board – with the front face in firm contact with the underside of the board. Bend the tabs of the solder tags down to contact the printed circuit track.

Note: It will be necessary to just trim part of the curved end of the tags so they contact the board in the middle of the pad. Solder the tags to the pads. Remove the fixing screws and nuts.

Solder diode D1 to the underside of the board and ensure it is pushed tight against the side of transistor Tr1. Finally – using two of the snipped off component leads – solder the leads in the position of the beads. Slip one bead on each wire and bend them over so they cross. Snip off the surplus – but spread them out so they're not touching.

Final Assembly

When you've finished the soldering, etc., examine the board (top and bottom) with the aid of an eye-glass. Ensure there are no poor joints nor solder splashes.

If everything is in order – add the four 16mm (5/8in) screws to the board and secure with a washer, a half nut and a full nut. Present the assembly to the heat-sink and secure it with another nut on each.

Next, add a smear of heat-sink compound or silicon grease to the mica washers and put them on the heat-sink where the

transistors will fit. Then add a smear of heat-sink compound or silicon grease to the backs of the transistors. You can then present the assembly to the heat-sink and secure with a full nut in each of the four positions.

You can then fit the plastic insulating ferrules onto the two remaining 12.5mm (1/2in) screws and fit from the top-side through the transistor tabs. Finally, secure with a full nut on each whilst holding the screws from rotating using a screwdriver. The assembly will then be ready for commissioning.

Commissioning The Project

To commission the project, attach a short length of coaxial cable to the output terminals of the amplifier. Connect

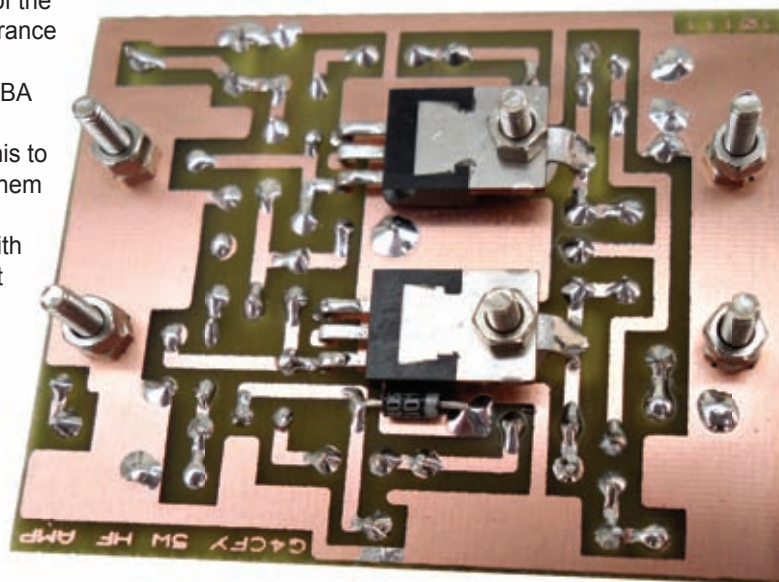
this to a high frequency (h.f.)

dummy load and suitable r.f. power meter. Then connect a twin lead from the supply terminal and earth of the amplifier to a bench power supply unit 13.5V with a minimum supply capability of 2A.

Next, connect a multi-meter on the 100mA range to the two leads of the bead choke. Switch on the supply and adjust the trimmer potentiometer on the board to give a bias of 50mA. Then you can switch off the supply, remove the multi-meter, and solder the bead wires together.

You'll then be able to undertake operational and gain tests in the band 1.8-29.7MHz using a signal source between 35 and 100mW! I hope that this unit will be a really useful addition for the home constructor of QRP transmitters, anywhere in the h.f. band. If you wish to correspond regarding this or other articles in this series please contact me on tony@pwpublishing.ltd.uk Cheerio for now.

PW



This is how the two 'power' transistors are mounted on the p.c.b.

Kits & Bits

A full kit of parts including heatsink, nuts and screws, solder tags, and insulators, and the p.c.b. kit without wound toroids £29. The full kit as above with wound toroids costs £39. Ready-built and tested (without harmonic filters) £49.

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



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

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

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

TRANSMIT AMPLIFIERS, for 2 or 4 or 6 metres, single stage RF switched, class AB linear. Diecast box with heatsink and SO239 connectors. **TA6SA 2W in 25W out, TA4SA 2.5W in 25W out, TA2SA 5W in 25W out. Complete kit £63.00, ready built £82.00. TA6SB 5W in 50W out, TA4SB 7W in 50W out, Complete kit £70.00, ready built £89.00.**

TRANSMIT AMPLIFIER & RECEIVE PREAMP, for 2 or 4 or 6 metres. Receive gain adjustable 0-20dB. Switching for either part or straight through. RF switched on transmit. Diecast box with suitable heatsink and SO239 connectors. RF input and output as detailed in paragraph above. **TARP6SA, TRRP4SA, or TARP2SA complete kit £89.00, ready built £123.00. TARP6SB, and TARP4SB complete kit £92.00, ready built £126.00.**

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

COMPONENTS

(see web-site for details)

CAPACITORS, ceramic, poly block, electrolytic, mica, trimcaps.

RESISTORS, ¼ W carbon film, 10Ω to 1MΩ, and trimpots.

DIODES, small signal, zener, rectifier, Schottky, & varicap.

TRANSISTORS, small signal AF and RF bipolar and FET, medium and high power VHF.

QUARTZ CRYSTALS, HC18U, HC25U, & HC49U, new & used.

INTEGRATED CIRCUITS, linear & logic.

VALVES, tested good, B7G, B8A, Octal, and older.

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TYPE	Package	F MHz	Gfs mmhos	Idss mA	NF dB	Price £
3SK45	TO72	200	14	17	2.2	2.00
3N201	TO72	300	12.8	15	2.0	2.25
40673	TO72	400	12	15	3.5	2.50
BF964S	SOT103	1000	18.5	10	1.0	1.50

P&P £1.00 any quantity

SPECTRUM 10mm COILS, pin compatible with TOKO types. Coil values 1.2, 2.6, 5.3, 11, 23, 45, and 90uH. Some types have the primary tapped at ¼ turns and a low impedance secondary winding. Others have centre tapped primary and relatively high impedance secondary winding. Full details of turns ratios, etc. can be found on the components page of the website.

1-24 qty 75p each plus £1 P&P. 25-99 qty 55p each plus £2.50 P&P.

NEW PRODUCT High power ceramic wafer switch 4 pole 5 way with silver plated contacts. Rated at 2kV and 10A for use in ATU's and Power amplifiers. **£8.50 each plus £1.50 P&P.**



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



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STANDARD, crystal calibrator unit phase locked to Radio 4 using a two-loop system. Includes a monitor receiver to ensure Radio 4 is being heard loud and clear. Fixed outputs 10MHz at 2V p-p, and 1KHz at 1V p-p as oscilloscope CAL signal. Switched outputs 1MHz, 100KHz,

10KHz, and 1KHz at 6V p-p, into 500 Ohms. Single board design as featured in July & Sept 2008 PW. Background heterodyne whistle at 2KHz confirms lock condition. 12/13.5V DC operation at 65mA. **PCB kit with ferrite rod £50.00, PCB kit + drilled box and hardware complete £86.00. Ready built £131.50.**

SPECTRUM COMMUNICATIONS

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3rd -18dB, 4th -49dB, and 5th -29dB. Should be used in conjunction with a double Pi type low pass filter, either harmonic halfwave or 5 element Chebychev. Normal supply 13.5V DC with current between 900mA and 1.86A. **Full kit of parts with heatsink but without wound toroids £29. Full kit with wound toroids £39. Ready built £49.** Price includes postage but not low pass filters.



PORTLAND VFO

A rock stable FET VFO. Meets the requirement for the Intermediate Licence VFO project. Modified to allow alignment to top and bottom of required band. Several versions available: 5.0 - 5.5Mhz for 20 & 80 metres; 7.0-7.2MHz for a direct conversion for the extended 40metre band; or 7.900 - 8.400MHz for use as part of a mixer-

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DUAL PEAK/NOTCH FILTER & AUDIO AMPLIFIER



It connects directly to the loudspeaker or headphone socket of the receiver and produces up to ½W of audio to a front facing loudspeaker. The unit can be used to notch out two unwanted heterodynes, or

just one while enhancing the wanted audio frequency. Similarly it can be used sharpen otherwise dull speech or to dampen shrill audio. **PCB kit and all the potentiometers £35.75. PCB kit and all the hardware with drilled and labelled box £73.00. Ready Built £112.00.**

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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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1:1 BALUN 160-10m, 1kW rated. Loss under 1dB from 1.8 to 40MHz. Ideal for use with the G4CFY trapped dipole, or any other aerial fed with low impedance twin feeder. £43.00 inc P&P. Version with Marconi-T switching. £53.00 including P&P.		TRAPPED INVERTED L AERIAL 80/40/20/15 & 10m, for a small garden. Coax driven from far end of garden and tuned against ground. A good all round aerial with 6dB more gain than a 24 foot trapped HF vertical. That's 4 times power on TX and one S point extra on RX. £74.00 inc. carriage.		

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Abigail Jones (now M6ABZ) receiving her Foundation Pass Sheet from Tutor Dave Rycroft G4OKO.



At GB0TAC – Mrs Judy Allen exchanging greetings. Operator Steve Cole G3YOL with Tony Griggs G4KMB, Bob McVey G3GMC and Bob England G4REH.



At the International Helicopter Museum. Martin Jones G7UWI, Dave Rycroft G4OKO, Gerry Newton G4UOS, Ray Burgess G3RXG with (standing) Howard Grinter G0LCC.



Group of members of WSMRS in 1920s

Amatuer Radio

In Focus

The Weston-super-Mare Radio Society

Stephen Cole G3YOL turns the spotlight on and provides the fascinating background of the Weston-super-Mare Radio Club. And just like their famous newly-restored pier this club seems to be on the ‘up and up’!

Welcome to *In Focus*, where I'm aiming to share a little bit of our history – and hopefully, you'll join us at the club to learn more and receive a friendly welcome! The Weston-super-Mare Radio Society (WSMRS) was founded at the inaugural meeting on Wednesday, January 3rd 1923. The invited speaker at the meeting was Mr. O. J. Carpenter AMIRE who spoke about the “Little understood Heaviside Layer” and its importance in long distance transmission.

Mr Carpenter also expressed surprise “at the amount of interference due to the improper use of local regenerative receiving apparatus” when listening in at Weston.

Cable Communications

Weston-super-Mare has a history of association with long distance communication. In 1885 the **Commercial Cable Company** was granted permission to bring ashore the first of their four telegraph cables “for the purpose of transmitting messages exchanged with America.” This was the year when sixpenny telegrams were introduced, which resulted in good business in the Weston cable office (originally in two cottages near the sea front).

Although **Cable & Wireless** closed their transatlantic operations at Weston in 1962, this was not the end of Weston's

association with cable communications. On Wednesday, June 22nd 1988, the Radio Society operated a special station **GB0TAC** at the nearby village of Brean when the last section of a transatlantic fibre optic cable was brought ashore for **Mercury Communications**. This cable was about to allow 1000s of simultaneous telephone calls. The 24-hour radio operation made 100s of contacts world wide as well as arranging for greetings messages to be passed between **Mrs. Judy Allen**, Chairman of Brean Parish Council, **Mayor MacInnes** of Sea Girt (New Jersey) and **Mayor Winterstella** of Manasquan also in New Jersey, as well as **Mayor Dismont** of Hamilton, the capital of Bermuda. At the american ‘end’ In New Jersey the cable comes ashore at Sea Girt and terminates at Manasquan with a spur to Bermuda.

Wartime Wheezers & Dodgers

Incidentally, nearby **Brean Down** and **Brean Down Fort** were famous for the Second World War experiments and developments carried out by the **The Directorate of Miscellaneous Weapons Development** (DMWD), known colloquially as the **Wheezers & Dodgers** to everyone in the Royal Navy. Much of their experimental work was carried out at HMS *Birnbeck* – the requisitioned pier at Birnbeck, literally next door to Weston.

The RN ended up with the complete pier because, when it was due to be partly demolished as an anti-invasion precaution, the demolition team were warned by the Pier Master that as it was a chained-linked-construction pier, anchored at one end to Birnbeck Island – which would collapse altogether if any sections were removed. So, it was promptly requisitioned and remained in HM Service for the rest of the war. The Admiralty have always denied that the fully licenced bar on the pier had any bearing on the matter to take it over! (see Wikipedia http://en.wikipedia.org/wiki/Directorate_of_Miscellaneous_Weapons_Development and http://en.wikipedia.org/wiki/Birnbeck_Pier

Marconi At Weston

In 1897 **Guglielmo Marconi** demonstrated wireless communication between **Lavernock Point** in South Wales and **Flatholm Island** in the Bristol Channel and then **Brean Down** near Weston. This was the longest distance ever covered until then – 13km (8 miles). Marconi became known in Weston during his visits, being referred to by some locals as “that foreign looking gentleman” and it was recorded that he stayed in the Coastguard Cottages when in Weston. He and his team obtained ironmongery from Leaver’s hardware store that’s still in the town, although now at different and larger premises. They also used the services of an electrical engineer in the town for charging batteries.

Marconi’s achievement was celebrated by the Weston-super-Mare Radio Society a hundred years later when members operated a special event station **GB100BD** on **Brean Down** in 1997 and contacts were made with some 2000 other stations in 60 countries around the world. Permission from the National Trust was necessary to operate on Brean Down, as well as from local landowners to permit access for vehicles. For the same centenary a station was also operated at ‘**The Time Machine**’, Weston’s museum, using the club’s call sign **G4WSM**.

Special Celebrations

Our Special Event (SE) stations have supported other notable events. In 1985 an SE station was operated at Weston’s railway station during the celebration of the 150th anniversary of the founding of the **GWR** (‘God’s Wonderful Railway’). This coincided with the first visit of **Heinrich Hennies DL9OAQ**, one of the Radio Amateurs from Hildesheim in Germany, Weston’s Twinned Town. Heinrich enjoyed assisting with the operation of the radio station and was also particularly impressed with some of the steam locomotives that visited the town during that time.

There have been regular skeds between Hildesheim and Weston Amateurs for 25 years. In 1999 a special activity was arranged between Amateurs in the Hildesheim and Weston areas with a Diploma being awarded to all those taking part. A further railway associated activity took place in 1986, when the centenary of the opening of the Severn railway tunnel was celebrated by special radio operation at Pilning, near the English mouth of the tunnel.

Local Events

Members of the Society have always been pleased to have a presence and support local activities and groups.

Special stations have been set up with Scout groups in the area for **Jamboree on the Air**. Usually this has included other activities for the Scouts, such as soldering practice, building simple radio receivers and helping Scouts to obtain their communication badges. A similar arrangement has also been organised with the Girl Guides for **Thinking Day on the Air**. Stations have been operated at the sea front for Weston’s **Air Days** and, later, **Helidays** (see details on the helicopter museum) as well as for the annual **Beach Race**.



Chairman Dave Dyer G4CXQ operating GB2WZ at Westonzoyland Pumping Station.

Over recent years various On the Air activities have been supported. One of these locations was the historic lighthouse on the beach at Burnham-on-Sea.

Many Amateurs will have visited Burnham to take their Morse test at the former receiving station for Portishead Radio. Other locations were the **International Helicopter Museum** on the outskirts of Weston, and Westonzoyland Pumping Station, a station first installed in 1831 to drain the Somerset Levels, now also the home of the **Museum of Steam Power and Land Drainage** operated by volunteers (for more information about this museum see www.wzlet.org). More recently **Railways on the Air** has been supported by operation at the **East Somerset Railway** near Shepton Mallet. (www.eastsomersetrailway.com)

Top Band Direction Finding

Members of the Society take part in and support Top Band (160m) direction finding and have staged events. They hosted the 2009 National Final that started on the Mendip Hills, with the ‘A’ and ‘B’ stations on, or close to, the hills and one down on the Somerset Wetlands. Each station was in a very different type of location.

Perhaps the newest experience for visitors was the wetlands area that’s criss-crossed by wide drainage ditches known locally as ‘rhynes’. These cause confusing access. Congratulations must go to **Peter Lisle’s** winning team, and that of **Brian Bristow**, which came in second overall.

Licensing Courses

For many years Society members have been helping newcomers to gain their licence, first by running courses to prepare them for the Radio Amateurs Examination, and later by **Nick Sparks G4ZUX** for the newly introduced Novice Licence; then Morse Assessment for former Class B licensees by **Steve Cole G3YOL**.

Instruction for the later Foundation Licence was first given by **Graham Jones G4DPH**, since then instruction for all levels has been in the equally capable hands of **Dave Dyer G4CXQ** and **Dave Rycroft G4OKO**, and appreciable success has been achieved.

The numbers taking the foundation courses are too numerous to name individually, but some were 14 years old or younger. Many have exceeded a mark in excess of 90%, and some attained 100% and there have been few failures. It’s pleasing to note that four existing Society members passed their intermediate level in 2008; **Steve Walrond 2E0JQF**, **Ricky Wilmot 2E0UWI**, **Neil Lambert 2E0HOQ** and **Gary Lewis 2E0RGL**.

Anybody wishing to join a course should contact the Hon. Secretary of the Society, **Paul Kelly G3SDH**; telephone (01761) 221206; E-mail: g3sdh@btinternet.com

Royal Air Force

Many former members of the Royal Air Force know Weston if they have spent time at the **RAF No 1 Radio School** at nearby Locking. The callsign **G8FC** was operated there for many years at the Headquarters of the **RAF Amateur Radio Society (RAFARS)**. Locking RAF has been closed for quite a few years now, but for a long time there had been links between Weston Radio Society and G8FC. Many members of the permanent Station staff were members of the Weston Society and at times WSMRS held their meetings at the RAFARS headquarters shack.

Many Different Venues

Like many other clubs WSMRS has had many different venues for their meetings over the years. For the last few years it has become settled at **Weston-super-Mare Social Club** where members have been made very welcome and also given the use of a room for a shack. Members meet there most Mondays for 8 p.m., but the main meeting is in the function room, usually on the third Monday in the month. Further information about the Society can be found on www.radioclubs.net/wsmrs and visitors and new members are very welcome – we look forward to meeting you!

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case)



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Old Antenna For Sale!

In his Buying Second-hand column this month, Chris Lorek G4HCL offers advice on second-hand antennas – items which he considers to be a great bargain rather than useless bits of metal!

Many Radio Amateurs will have taken advantage of better summer and autumn weather to put up their shiny new antennas – often leaving their old antenna system lying around in the garage or the garden shed, just waiting for either a good home or to be taken to the dump. This is where we come in!

It's often said that "your antenna system is the most important part of your station", and it's certainly true that, what you plug into the antenna connector of your transceiver or receiver has a very great effect on the on-air performance of your station. Many people however, think little of the antenna and just erect something that's often a compromise.

Of course, if you've got space limitations or you don't want to go along the route of trying to obtain planning permission for a mast or tower – then you'll naturally be restrained in what you can use. Or perhaps maybe you simply don't want anything that looks rather obtrusive? Either way, there's a large choice out there waiting to be purchased!

Why Buy Second-Hand?

The most compelling reason to buy a second-hand antenna, is probably because of price considerations. It's possible get a good second-hand antenna at a fraction of the price of a new one, as unlike electronic equipment, antennas just don't seem to hold a good re-sale price.

In fact, owners have been known to throw, or give away their old antenna, when getting a new one. The new antenna may have been purchased to help improve their station, be it fixed or mobile, or perhaps to add new bands, such as the 'newish' World Amateur Radio Conference (WARC) high frequency (h.f.) bands, to their older trapped h.f. vertical or beam antenna system. Remember that many older

design 'trapped' type antennas only operate on the 14, 21 and 28MHz (20, 15 and 10m) bands.

So, to help, I'm providing some –hopefully useful – pointers for you on what to look for either after you've bought the antenna (or even better) before you do so. If it's the latter – you may get an even better bargain!

Physical Damage

If the reason for the (seller's) newer antenna is that their old antenna has become physically damaged – you'll probably need some mechanical skills. Prime examples for this sort of damage are h.f. trapped vertical antennas, which seem invariably prone to this for some reason. Many of them come away from their lower mountings and the tubular elements are damaged by whatever they fall onto.

Mind you, a friend of mine who lives by the coast often has had the tubular antenna elements on his 144MHz beam damaged by heavy seagulls using them as perches. This then leads to the elements bending. Then after being repeatedly re-bent back by him, they finally snap as the seagulls take off*.

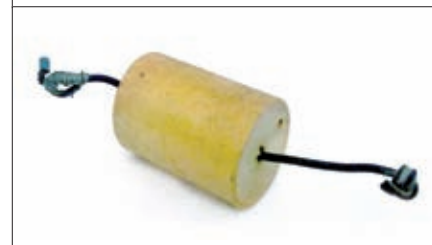
Unfortunately damaged antennas like these are commonly resigned to a place in the non-ferrous recycling bin at a local dump. In my experience, the owner typically just wants to replace it – maybe with their household insurance settling the invoice.

If you place an ad, let's say in the 'Wanted' ads section of *PW*, for an unwanted but damaged antenna and offer to collect it, you'll often get it for a low price. Fortunately, replacement aluminium tubing is readily available from suppliers, either a local supplier if you're lucky, or by mail order otherwise.

As an example a typical price of a 2m length of 12.7mm (half inch) outside diameter 16s.w.g. wall aluminium tube is around £9, and around £10 for a similar length of 15.875mm (5/8th in)



The steel-wire brush is a little 'savage' to use on aluminium elements, a brass-wire one is preferable.



Two types of encapsulated traps for wire antennas that normally have few problems.

outside diameter tube, with plenty of other sizes and wall thicknesses being readily available. All you need is a small hacksaw and maybe a small drill and you've an almost 'good as new' new h.f. vertical or v.h.f./u.h.f. beam antenna made from the damaged one.

***Editorial note:** The guano produced by the birds is also extremely corrosive Chris! G3XFD.

Centre Junction Boxes

Apart from obvious physical damage to the antenna elements, the other thing to watch out for is the centre junction box of a beam or dipole antenna. This is small plastic enclosure into which your coaxial cable enters and the driven antenna elements emerge from. Open this up and take a look inside. If you see plenty of corrosion then you'll know that water will have probably got in.

Water damage is no great problem, a good clean with a metal brush will usually do the trick for the interior connections, use a finer brass-wire brush rather than the steel-wire ones. Then after doing the clean-up there should be a good (zero-resistance) connection between the internal connections and the relevant antenna elements. Once you've connected your own coaxial cable to the cleaned up points, make sure you seal the box well externally.

When sealing a mid-point box, self-

amalgamating rubber tape (**not** ordinary pvc electrical insulating tape) works very well. You can get this from do-it-yourself and plumbing and electrical suppliers. To use it you remove the backing tape and stretch it to around twice its length while you wrap it over the junction box. The rubber tape then literally 'melts' or amalgamates into itself forming a waterproof seal. You'll need a knife to cut it off when you want to remove it.

Tip: Any surface about to receive a layer of self-amalgamating tape must be absolutely dry. Any hint of dampness will make the tape ineffective.

Traps & Loading Coils

There are typically two types of traps and loading coils; encapsulated types as you'll find on h.f. wire antennas such as trapped dipoles and metal-encased types as you'll find on tubing-based multi-band antenna elements. Encapsulated types shouldn't give you any problems, the end connections may invariably be tarnished or corroded but, again, these connections can easily be cleaned up with a wire brush.

Metal encased traps are hollow and have air inside them and they'll often be satisfactory electrically. This type usually has drain holes to let out any water that may have got in. When re-assembling traps onto horizontal elements, they should of course be oriented with the drain holes pointing downwards. That's, of course, so that water that does get in, drains away rather than pooling inside.

However, putting the holes in traps at the lowest point, doesn't stop insects, like flies, spiders, or even ants getting



Enclosed traps, for tubular elements should be mounted with their drain holes at the lowest point.

in. They can often make the hollow trap their home, sometimes in a large colony! So if you find that one or more of the traps or loading coils on your second-hand antenna isn't working as it should be, and the electrical conductivity between physically connected elements is okay (check with a multi-meter on a low ohms setting), then carefully open up the traps in turn to see whether an insect infestation could be the cause of the problem.

Buying VHF/UHF Mobile Whips

Apart from physical damage and maybe a bit of road grime, second-hand v.h.f. and u.h.f. whips should normally give you no problems at all. That is unless the previous user has put excessive power into the antenna causing arc-over or burn-outs. But this is very unlikely, as most mobile rigs have limited transmit power. So, one of these should normally be a good buy if you find one.

A VHF/UHF Base Collinear?

The golden rule with multi-band or collinear v.h.f./u.h.f. antennas, is to check the antenna's s.w.r. readings on all bands before you put it up in the air! If you'd like to check one before you buy

it, then take a dual-band handheld and a suitable s.w.r. meter and patch lead along with you.

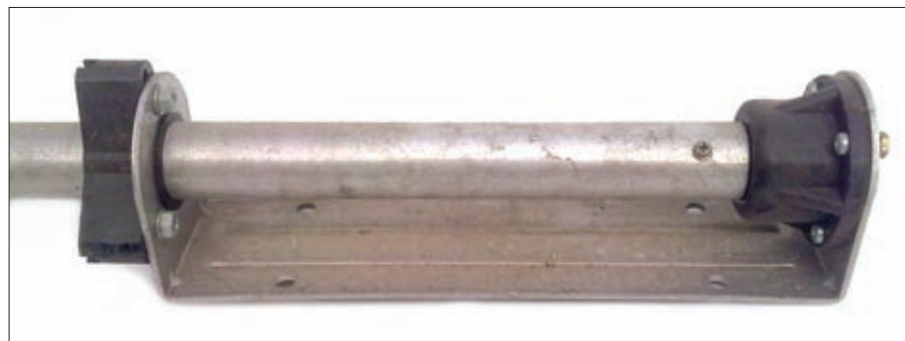
These antennas are invariably designed to be operated in free space. So, unlike mobile whips which usually need a ground-plane, they won't need any radials apart from any which are part of the antenna itself and attach to the base section.

A quick check of the s.w.r. should show if the antenna is operating correctly. These antennas are usually encased in either a fibreglass tube or a hard plastic or polycarbonate tube, and the inner element assembly is often secured using some sponge foam spacers at intervals. Intermittent problems could arise if the antenna has been repeatedly flexed by the wind in the past, so while holding it at the base, give it a shake while you're monitoring the s.w.r.

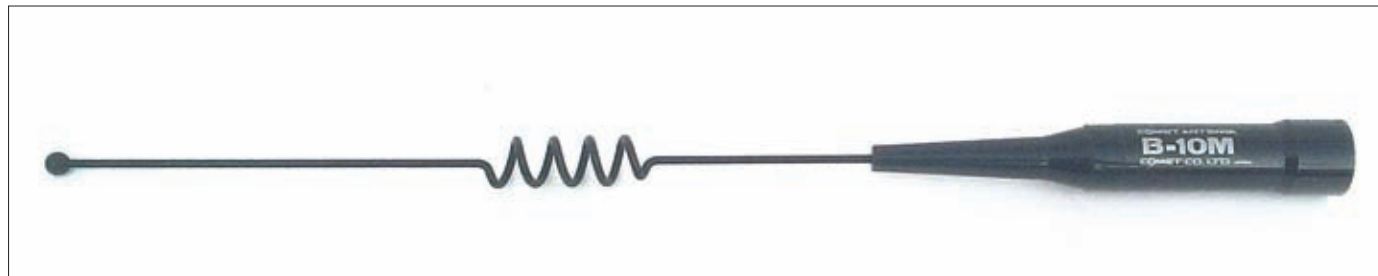
If there are sudden 'jumps' in the reverse power, it could indicate a loose inner connection. Some antennas element assemblies can be pulled out by unscrewing the lower fixings between the coaxial cable connector and the metal section attached to the outer fibreglass sleeve. All you have to do is simply re-solder the internal connections and re-assembling the antenna, which should result in perfect performance again.

Sadly that's all I have space for this time but if any readers would like me to cover a specific type of equipment I'd be most pleased to hear from them. I can be contacted by email to g4hcl@rsgb.org.uk or post to PO Box 400, Eastleigh SO53 4ZF.

PW



Vertical antennas often have small crack in the base of the bottom tube and corrosion at the lowest connections due to water damage.



Mobile whip antennas usually are problem-free.

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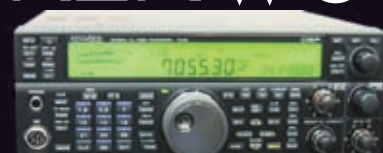
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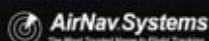
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Weak Signal Operating

In his regular Data Modes column, Mike Richards G4WNC shows you how to get going with JT-65A.

Welcome to *Data Modes (DM)* where, following-on from my description of MFSK last month, I'm going to take a close look at the JT65A, mode, which is another frequency shift keyed (f.s.k.) mode that has become very popular for weak signal working.

The JT65A data mode is part of the specialised WSJT suite of weak signal modes that were initially developed by **Joe Taylor K1JT** to assist with Earth-Moon-Earth (EME) and meteor communications.

Achieving successful EME and meteor contacts is a highly skilled operation as the signals are usually extremely weak. The WSJT suite was developed so that the best of modern information theory could be utilised to help achieve more contacts.

The WSJT modes have proved extremely effective and are now in regular use for this type of communication. The technology can also be applied to other communication links and is particularly good for dealing

with very weak signals on the h.f. bands. Whilst some of the WSJT modes use high-speed short duration signals, JT65A is a low speed mode that is particularly well suited to use on h.f. and is in regular use throughout the those bands.

The Inside Story

Let's take a look at the inside story. Due to its specialised nature, JT65A is very different to many of the more popular modes that we have covered so far in this series. It's definitely not intended for 'chatty' QSOs – but is instead used to convey the minimum information necessary to confirm a successful two-way contact.

To support this, each message is restricted to just 72 data bits using standard message formats that I'll cover a bit later. All messages are time synchronised to start at one second past the UTC minute and finish at 47.8 seconds past. This calls for an accurate PC clock but that is relatively

easy to achieve if you have an Internet connection available.

As with many of the more advanced data modes, JT65A uses forward error correction (FEC) techniques to ensure the message has the best chance of being received without error. By way of a reminder FEC systems add specially formatted information to the message that can be used by the decoder to both recognise and correct errors. In the case of JT65A, the 72 bits of the message data are split into twelve 6-bit information symbols or words and sent via a Reed-Solomon encoding system.

The Reed-Solomon encoder is a mathematical algorithm that processes the message and adds 6-bit parity symbols to the message that can be used for error correction. In the case of JT65A a total of 51 parity symbols are added which when combined with the 12 message symbols, makes a total of 63 x 6-bit symbols.

The Reed-Solomon encoding technique is an excellent system

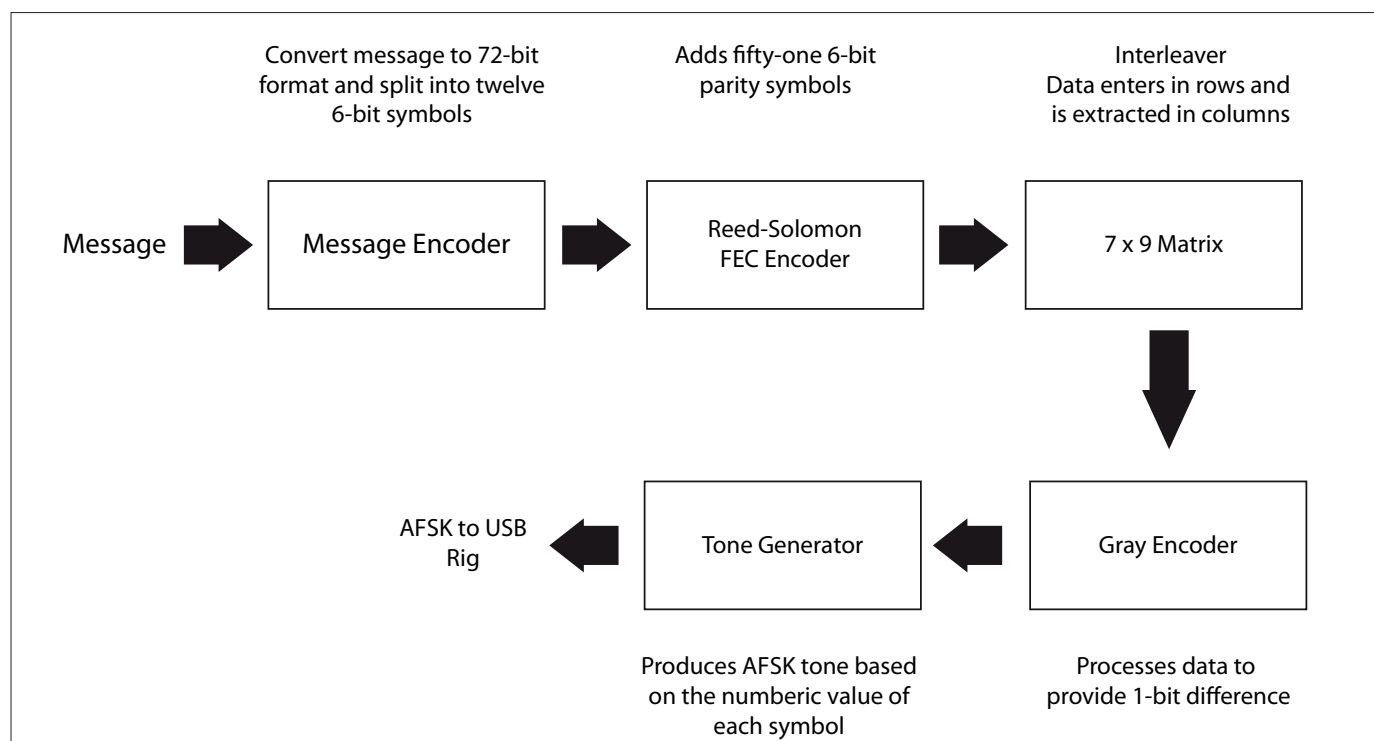


Fig. 1: Block diagram of the encoding process for JT65A.

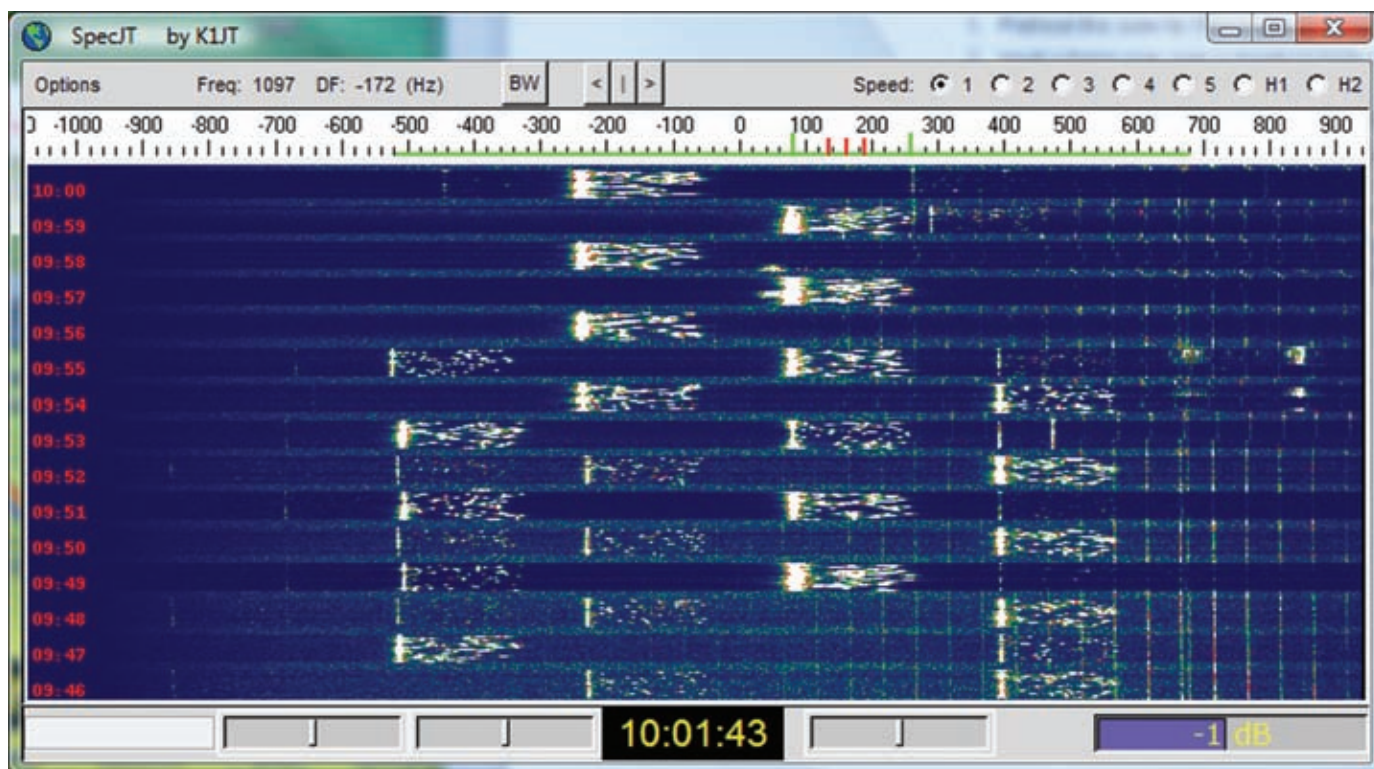


Fig. 2: The waterfall display of JT65A signals on h.f. using SpecJT, note the timings down the left hand side of the display.

that is used extensively by NASA for processing communications from all its deep space probes. You'll also find Reed-Solomon encoding used in many other fields including disk drives and mobile phones.

Once the FEC encoding is complete, the 63 symbols are interleaved (muddled-up!) by feeding them into a 7 x 9 matrix and then extracting them column by column. This was initially done to minimise the effect of radio drop-outs but in practice it makes no difference. However, the interleaving has been left in place to ensure compatibility with earlier software systems. The next stage in the encoding process is to apply a Gray code to the 63 symbols.

The Gray code examines the symbols and ensures that successive symbols differ by just one bit and is used to provide improved tolerance to frequency instability. Finally, the symbols are converted to audio tones using the following formula:

Tone = (1270.5 + 2.6917*(symbol value+2)Hz).

However, to be correct, this technique is actually Audio Frequency Shift Keying (AFSK) as the audio tones generated are then transmitted via a single side-band (s.s.b.) transmitter. I've shown a diagram of the encoding process in Fig. 1.

Message Format

Working with very weak signals is one

of the specialised areas of our hobby and, over the years, a number of abbreviated message protocols have been developed to make the exchange of information more efficient. These protocols are used in JT65A to construct simple messages that will fit within the 72 bits that are available for each communications exchange.

After analysing the callsign formats it was determined that every combination could be handled with just 28 bits of data. The 4-digit Maidenhead locators were also examined in the same way and found that 15 bits would be sufficient for any locator. The standard message therefore comprises a callsign for each of the calling and called stations, that's 28-bits each, plus 15 for the locator and one for a signal report making 72 in total (28+28+15+1).

You can also send plain text messages but these are limited to a maximum of 13 characters per message with the following characters allowed 0-9, A-Z plus a full-stop, hyphen, forward-slash and question mark. To help with particularly weak signals, JT65A has three special short-hand messages; RO, RRR and 73. These messages are used as follows: RO = 'Roger' – confirmed report, RRR = 'final Roger' and 73 = '73 Goodbye' and is optional.

Each of these messages is specially encoded and comprises an alternating pair of tones that can usually be copied, even under extremely difficult conditions.

Getting The Software

Using JT65A is relatively straightforward but this is definitely a mode that you need to monitor first before you hit that transmit button. As I mentioned earlier, all JT65A communications are scheduled in UTC so, the first requirement is an accurate clock on your PC. Although you may have your PC set to automatically update from the Internet, a daily update is not really good enough as PC clocks are notoriously unstable.

The simplest solution is to install an application that will force an update every 15 minutes or so. There are several around but I use *Dimension 4* as it can be downloaded for free from: www.thinkman.com

Once installed you can choose the appropriate time service and set the update period, 15 minutes is a good starting point. The software is set to run at start-up and will automatically update your PC in the background every 15 minutes.

There are two main decoding packages available and they're both free! The first is the full WSJT software suite produce by Joe Taylor. This is an excellent package that contains all you need to send and receive a number of WSJT modes including JT65A. This software can be downloaded from the WSJT home site at: www.physics.princeton.edu/pulsar/K1JT/

For h.f. only use, it may be easier to start with the software program *JT65-HF*. This is an alternative decoder that has

been customised for h.f. work so there are less options to consider and set-up before you can get on-air. The *JT65-HF* program can be downloaded from: <http://jt65-hf.sourceforge.net/>

Incidentally, *JT65-HF* also has a useful support group available that can help you get going if you have problems. They can be found at: <http://groups.google.com/group/jt65-hf>

Setting-Up

As I mentioned above, your first task is to start listening and see what the mode looks and sounds like. By far the best place to start listening is 14.076MHz (u.s.b. dial frequency) as there is nearly continuous activity around this frequency. Other dial frequencies to try are: 1.805-1.808MHz, 3.576MHz (USA), 3.796MHz (Europe), 7.039MHz (Europe), 7.076MHz (USA) and 10.139MHz.

Having dialled up one of the above frequencies, you should hear the sound of *JT65A* in action, it's rather like someone playing random, though not very musical notes on a flute. Signals are often quite weak as most operators run with very low powers, I usually run with one watt or less.

Once you're tuned-in, startup *JT65-HF* and choose the 'Station Setup' menu at the bottom of the main screen. The

first task here is to enter your callsign, Maidenhead locator, then select the correct sound input and output devices from the drop-down menu.

If your system is set-up to switch your rig's p.t.t. via a serial port you can enter the details on this screen, otherwise leave the p.t.t. port set to 'NONE'. If you're using rig control software such as *OmniRig* or *Ham Radio Deluxe (HRD)* you should select the 'RB/PSK Reporter/Rig' Control tab and select the appropriate option. Don't worry if you don't have rig control as it's not essential with *JT65A*. With the basic settings complete press the 'Save Settings and Close' window at the bottom of the screen.

Your next task is to get the sound levels right. At the top of the screen you should see the waterfall display, with signal traces scrolling slowly down the screen. If all is set correctly the screen should be blue with yellow traces to indicate signals, I've shown a screen shot in **Fig. 2**. If there are no traces to be seen, or the screen is mainly yellow you may need to adjust the sound levels.

At the top left of the program window, you'll find a small panel titled 'Audio Input Levels', where you can select between left and right inputs and set the gain. Ideally with just band noise and no signals the display should show 'L

0' or 'R 0'. If the figures are significantly different you can use the 'Digital Audio Gain' sliders in the panel to make adjustments.

Towards the bottom of the main control section you will find a tick-box labelled 'Enable Multi', make sure this is ticked as this will allow the decoding of multiple stations in the decoder's passband. If there are signals around you just need to sit back for a while and you will see reports building-up in the main display area, see **Fig. 3**.

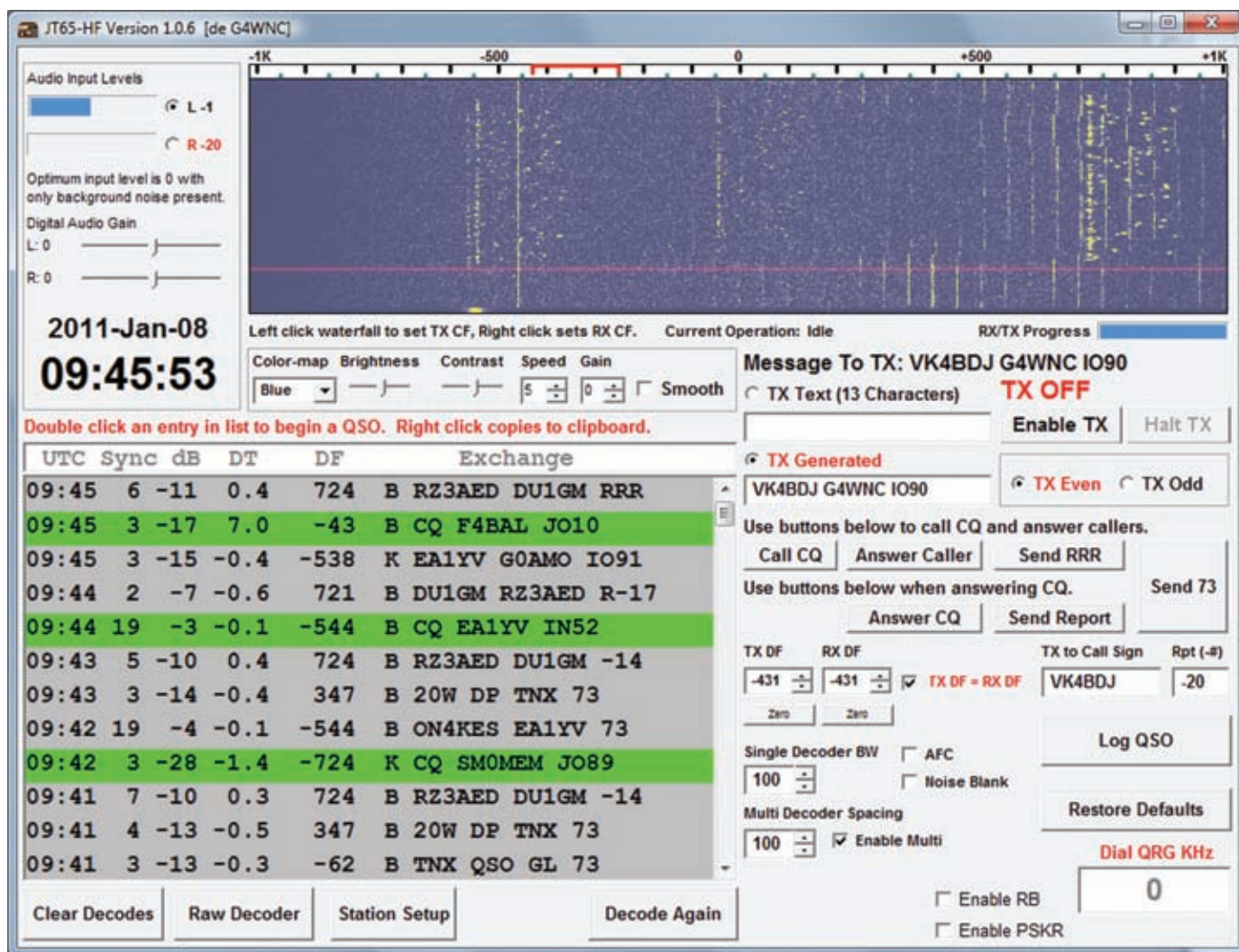
These reports may seem rather confusing at first so I'll pick-out the important columns for you. The extreme left-hand column is fairly obviously the time in UTC and is used to show the transmit minute for that station. The next important column is marked 'dB' and shows the average signal-to-noise ratio of the signal. Negative figures are normal with this mode and performance is often reliable down to -20dB or more.

Next we have 'DF' or 'Delta Frequency' this tells us the frequency off-set from the centre point of the waterfall display. The Exchange is the actual message and you will see they are all abbreviated. To help you understand the format here is an example of a hypothetical QSO between my station at IO90 and G1ABC at JO02.

Double click an entry in list to begin a QSO. Right click copies to clipboard.

UTC	Sync	dB	DT	DF	Exchange
09:15	5	-19	0.7	-94	B SP3JGS JA1KGW RRR
09:15	5	-15	-0.3	-328	B RU6BU RA4NCX RRR
09:15	4	-18	-1.0	-756	B CQ JH4BTI PM54
09:14	11	-6	0.1	659	B CQ SP3GVX JO72
09:14	3	-8	-0.3	474	B CQ IZ2BKT JN55
09:14	6	-5	-0.0	-94	B JA1KGW SP3JGS -10
09:14	16	-5	-0.3	-538	B CQ EA1YV IN52
09:13	8	-10	-0.3	-328	B RU6BU RA4NCX -08
09:13	3	-8	-0.1	-541	B 20W 73 HNY TU
09:13	2	-19	-0.6	-756	K SAYONARA 73
09:12	5	-10	0.2	662	B CQ SP3GVX JO72
09:12	7	-8	-0.2	474	B CQ IZ2BKT JN55

Fig. 3: the decoding screen of *JT65-HF* with CQ calls highlighted in green.



Specialist JT65-HF software in action.

CQ G4WNC IO90

(This is a CQ call, no need for repeats as the FEC code will ensure good copy.)

G4WNC G1ABC JO02

(This is the response to my CQ call and tells me the operators call and location.)

G1ABC G4WNC R -11

(The R is abbreviation for Roger and -11 is the S:N ratio and serves as the report.)

G4WNC G1ABC R -10

(This is my report back from G1ABC.)

1W VERT 73

(Here's is my plain txt insert giving details of power/antenna and signing off.)

You may come across some variations on the basic format, i.e. 'RRR' used to indicate the final Roger and a report of just '-05' with no R. Alternatively you may see 'OOO' as a signal report, this just means the transmission has been copied. One of the helpful features of JT65-HF is the colour coding of messages. You will probably have already noticed that CQ calls are highlighted in green. When you start a QSO you will find that the station you're working is highlighted in red.

Once you've spent some time monitoring you can start preparing to transmit and JT65-HF has been designed to make this as simple as possible. The first step is to check your transmit audio levels and power. To do this, connect a dummy load to your rig and set the output power to around 5W. Now click the 'Call CQ' button and on the next minute the

software should key your transmitter and you can adjust the audio drive level for minimum ALC whilst delivering the required output.

Next, you can connect up the antenna and look around for someone calling 'CQ'. When you spot one, double-click on the display line and the software will automatically adjust the transmit and receive offset frequencies, create the appropriate response and start the transmission at the beginning of the next minute. You can then run through the messages as I described earlier. If you don't get the expected response from the distant station you just have to repeat your last message until it gets through.

Unfortunately, I've run out of space for this month so next time, I'll continue with a few more details on how to get the best from this mode. Cheerio for now! **PW**

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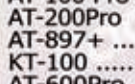
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Farnell G-12	£59.00
B.N.O.S 12amp power supply	£59.00
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ABM-1-KIT Ramsey Passive Airband Monitor	£60.00



Very Long Distance Tropospheric Pathways

Tim Kirby G4VXE, as keen as ever – discusses exceptional tropo propagation. It all started when a UK Band II station disappeared – to be replaced by a Spanish station!

Welcome to the *World of VHF (WoVHF)* – where we explore the exciting events above 30MHz. Recently, I had the opportunity to discuss very long distance tropo paths with Richard Gosnell G4MUF. Richard had been in Devon and had been interested when the local Band II station he'd been listening to had been replaced by a station from Northern Spain.

I mentioned to Richard that the path from the south coast to Spain and in particular the Canaries is a well established DX path on 144 and 432MHz (and other v.h.f./u.h.f. bands besides) and many contacts have been made over that path.

In fact, **Reg Woolley**, at that time **GW8VHI** worked EA8XS on 432MHz back in 1984 over a path of 2786km. Indeed, it wasn't bettered until 2003

when G0FYD worked EA8BPX at 3019km. It shows what's possible when conditions are just right!

Reunion Island – To VK?

I was interested to hear from Reg, who now **G8VHI** that attempts are being made to bridge the 6000km between Reunion Island in the Indian Ocean and VK6 – Western Australia. **Phil Mondon FR5DN** is actively seeking 'sked' partners in VK6 to try tropo tests with on 144MHz and potentially above. And there's interesting history here, which Phil was kind enough to explain to me.

Back in 1996, on May 30th and June 4th, **Yvon Yvon Kong Kaye FR1GZ** on Reunion Island (take a look at his excellent QTH site photograph on QRZ.com website) believes he heard the VK6RBU beacon which was at that time active on 144.560MHz.

Unfortunately, there's a slight amount of doubt because FR1GZ was not able to understand Morse code at that time, but subsequent discussions with VK6HK led Yvon to confirm, "that was what he heard".

Neither FR1GZ or FR5DN has such a good take off across the ocean to VK6 now, but Phil FR5DN says that he is concentrating on operating portable from the side of the mountain and looking towards Australia. So, if you are in VK6, or know someone that has interest in v.h.f. – this sounds like an amazing project to be involved in. Bear in mind that Phil has already worked from Reunion Island to South Africa on both 144 and 432MHz!

Although the distance is almost twice the G to EA8 path, my guess is that the opportunities for ducting are probably somewhat better owing to the warmer and generally more stable weather patterns in the area. It may be interesting to refer to the William Hepburn tropospheric ducting page, **Fig. 1**, for the area: www.dxinfocentre.com/tropo_ino.html on a regular basis – I'm just looking at the current conditions and though they are not perfect for the path – they're not bad at all! I'm hoping that perhaps we might have some more developments to report before long!

Meteor Scatter

From long distance tropo now we're going on to meteor scatter. I was prompted to do so after I read a very interesting article from **Dr David Knight G3YNH** who is the Charman of the **Norman Lockyer Observatory** in Sidmouth, Devon.

David had been studying meteor reflections close to 144MHz during the recent Geminids meteor shower in December. You can read the article at:

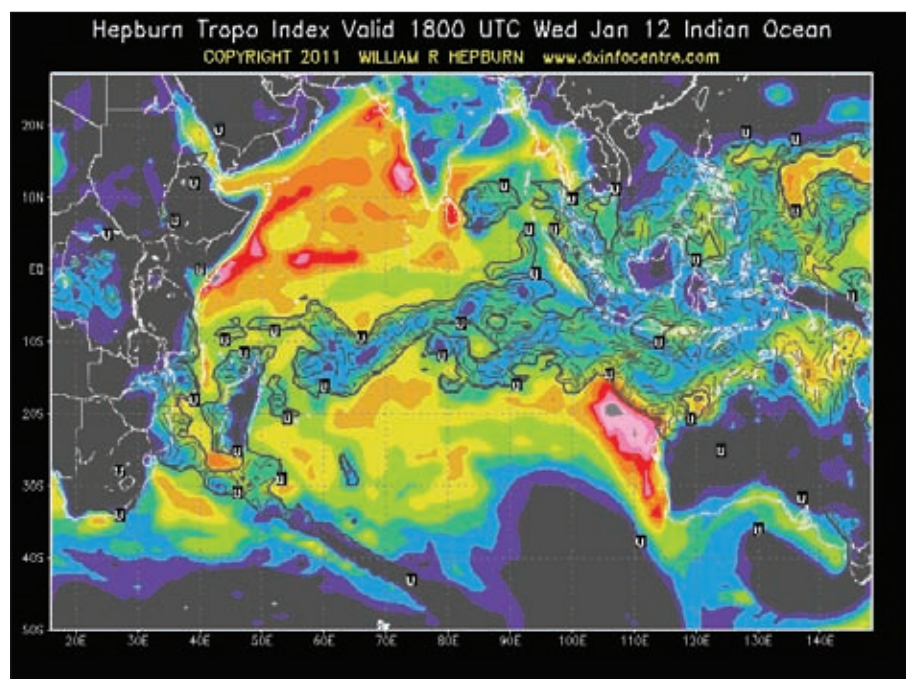


Fig. 1: Screenshot of a Tropo forecast map, courtesy of William Hepburn, and it can be found at: www.dxinfocentre.com

www.gb2nlo.org/index.php/articles/geminid2010 and I highly recommend it. Hopefully David's article will inspire you to try some similar tests of your own.

What was particularly interesting to me was to read that David had, for the purposes of his tests, monitored a very high power transmitter located near Dijon in France which transmits on 143.049MHz. I was curious whether I would be able to hear it myself, as it sounded as if it could be a good propagation indicator for me for a variety of propagation modes. So, I tuned the FT-847 to the frequency and turned my 5-element 144MHz beam to the south east.

Within a couple of seconds I had heard a 'ping' (a short reflection caused by a meteor) at good signal strength. Even more interesting were the very weak but almost continuous reflections that occur quite frequently. This could be meteor reflection or possibly even aircraft scatter – there being many aircraft in the air between me and Dijon! In David's article, he also wonders whether a satellite in low earth orbit could cause a reflection?

I'd never considered that before but given the very high power of the transmitter concerned (it is reputedly in the megawatt region) then this could well be possible. I plan to keep a close eye on the 143.049MHz frequency as I suspect it will be a very good indicator of tropospheric ducting to the south-east as well as meteor scatter. If your 144MHz c.w./s.s.b. rig tunes down another MHz, why not give it a listen and let me know how you get on?

You may also find it interesting to connect up a computer with a soundcard and run a program like DL4YHF's *SpectrumLab* so that you can see the traces of the signal visually. If you do – you'll very quickly become adept at spotting the Doppler shift and various other effects on the signals.

The 70MHz Band

Here at **G4VXE**, I decided that since the possibility of Sporadic-E was probably fairly remote for a month or two, I would get my converted Philips FM1000 PMR set back on 70MHz and see what contacts I could make, **Fig. 2**. The first impression was that activity has really picked up since I last listened – I think the availability of more commercial equipment seems to have had a positive effect on the number of stations on the air.

My first contact getting the rig back on the air was with **Dave Davis G4AQK**



Fig. 2: A Philips FM1000 converted ex-PMR f.m. rig - a simple way of getting on 70MHz FM as mentioned in the text.

in Swindon. Dave reported that my signal was strong, but I had a strong hum on my audio! With Dave's help and that of a monitor receiver, it soon became apparent that if I touched the case of the rig, the hum went! **Rob Loss G4XUT** recommended a ferrite ring on the power lead into the rig as he suspected radio frequency (r.f.) feedback.

To my surprise, Rob's suggestion cleared the problem completely. Until, a few weeks later, the hum reappeared! This time, no amount of ferrite rings could get rid of the hum. Then, the penny dropped! This second 'attack' was all around the time of the extremely cold weather – here in Longworth, Oxfordshire my weather station recorded -12°C.

There was some ice build up on (and I suspect, in!) the antenna which obviously caused a higher standing wave ratio (s.w.r.) than normal and hence the r.f. feedback! Rob G4XUT mentioned that he had seen some other converted PMR rigs susceptible to r.f. feedback in this way, so if you get reports of a hum on your transmission, you'll know what to do!

During enhanced tropo conditions on December 31st I heard 2E0EKF (who the callbook shows as being in Chigwell, Essex) and **G0AUI** (shown as being in Haywards Heath). Unfortunately, I didn't have a chance

to call either of them as we were due out of the house but both would have been good distances from here. Another 'gotaway' on 70MHz was our old friend, **David Butler G4ASR** who I heard on 70.450MHz during the **RSGB Christmas VHF/UHF Cumulative Contests!**

On January 3rd, I was very pleased to be called though, by **G3NRT/P** who was operating portable from the top of Dunstable Downs running about 5W to a mag-mount antenna.

Chris Hoare G4AJA has been trying out one of the AnyTone AT-5189 70MHz f.m. rigs, lent to him by **Nobby Ashman G4JVJ**. Impressions were good and Chris found that he had better audio reports using the rig than on his converted PMR sets. Chris measured the high power setting on the rig as 25W – which seems to be at odds with the 60W claimed output in some advertisements, but should be a useful output nevertheless.

Chris says that the rig lacks any sort of signal strength indication and also that the handbook lacks clarity in places. However, in Chris' opinion, the receiver appears to perform adequately compared to ex-PMR equipment.

The 144MHz band

Mark Haynes M0DXR reports that he's not been active this month owing to a house move. However, the good

news is that the new house is in a much better location than the previous one. Mark's already had some positive discussions with the neighbours about the possibility of putting up antennas, so we hope to be getting some DX reports from Mark again, very soon.

It was great to have a report for the first time from **Tim Hague M0AFJ**. Tim keeps a close eye on the Hepburn tropo website (mentioned above) and saw the possibility of an opening on December 11th. He worked EA1MX (IN73) and F6FHP (IN94). Tim says he has a very poor location in Milton Keynes, so he was pleased with the contacts. He runs an Icom IC-7600 to a solid state 350W amplifier and a 6-element DL6WU Yagi.

Reg Woolley G8VHI from Nuneaton had a great time during the Quadrantids meteor shower. On January 3rd he worked: OH9HEU (KP25) at 2077 km, DF2NU (JN58), YU7KB (JN94), OH6UW (KP22), S58P (JN76), S58M (JN76), SA7BAO (JO65) who was running 25W to a 6-ele Yagi, I8KPV (JN70), CT7ABA (IN60), I2SVA on SSB and F6FDR (JN24). Reg reckons that four new squares in a day is good going. It is, when like Reg, you've worked 384 squares without using moon-bounce! Reg runs 300W from a solid state amplifier to 2 x 9-el DK7ZB at 15.4m (50 feet).

Here in the shack at **G4VXE** most of my s.s.b. activity was during the RSGB Christmas VHF/UHF Cumulative Contests. I was pleased to work ON4WY (JO11) on both December 28th and 29th. Not quite so far off, but over a difficult path for me was GW8IZR (IO73) on Anglesey worked on December 29th. Finally, F8DGY (JN18) was a nice contact on January 3rd.

If you've got a v.h.f./u.h.f. rig in the car, it helps you to keep an eye on conditions even if you can't get to the c.w./s.s.b. portion of the band – so I was interested to hear GB3PO (Ipswich 145MHz repeater) and GB3BX (Wolverhampton 145MHz repeater) as I was driving out of the village on an errand on December 31st, both repeaters are not heard under flat conditions from Oxfordshire.

It was great to hear once again from **Panos Dadis SV1GRN** on behalf of the Athens QRP Net that the group (SW1QEG, SV1EIW, SW1JGW and SW1EIX) had once more been active from their portable QTH at Mount Parnitha near Athens (KM18UD) on November 21st. They made QRP contacts with their friends across the Aegean Sea in Turkey. These, including TB3JJ, TB3CNC, TA3TTT and TB3AP, operated from Izmir (KM38GN) **Fig. 3**.



Fig 3: Members of the Athens QRP Net have again been active portable from Mount Parnitha, working the Izmir group on 2m QRP, contacts included TB3JJ, TB3CNC, TA3TTT and TB3AP in Turkey across the Aegean Sea.

Some nice QSOs were made, using only 2W.

It is also good to hear that the Athens group managed to demonstrate Amateur Radio to a group of Boy Scouts who visited the summit of Mount Parnitha. Under the supervision of SW1JGW, some of the Scouts were able to work **Tahsin Demirarslant TA3BS** who is very well-known in Greece. Panos was operating from near his home (KM18XA) and was pleased to be able to work into Turkey. It's exciting to hear about the portable activity that the groups in Athens and Izmir are making and let's hope that during the 2011 Sporadic-E season, we may have the opportunity to work them from the UK.

Graham Boor G8NWC had not found much of interest on the bands, but said "2010 proved to be a good year in the RSGB VHF UK Activity Contests for the **Spalding & DARS**, more entries and bands than previous years resulted in very respectable positions in the final results. Many members have joined in the fun and competitive element of these contests, and have found that it encourages them to improve their stations and operating procedure, which can only be good for the hobby."

Excellent news! – and I agree with Graham that the UK Activity Contests on the v.h.f./u.h.f. bands each Tuesday night are having a very positive effect on activity. Even if you don't like contests, the sessions ensure there is plenty of activity to test out a new antenna or rig, or just make a few contacts.

The 432MHz band

I had some enjoyable QSOs during the RSGB's Christmas VHF/UHF

Cumulative Contests on the band working as G4VXE, but nothing very distant! However, it was good to work David Butler G4ASR on the band.

The 1296MHz Band

Des Kiely G0RBD reports that the 1297MHz f.m. activity in the Chippenham/Melksham area of Wiltshire continues to be good, with some surprising QSOs being made. The group have made QSOs over paths that initially do not seem to work, with antennas pointing at each other, suggesting that there is an obstruction on the direct path. But by beaming at a common point, which presumably provides a reflection of signals, a contact can be made!

This mechanism works on many bands (including h.f. at times!) but becomes very much more viable as you go up in frequency as it's 'easier' for surfaces to reflect the higher frequencies. When I lived in Cheltenham, **Graham Jones G3VKV** who also lived in the town was able to work **Tim Leighfield G3KEU**, now a Silent Key, near Swindon on 10GHz.

The direct path between them was pretty much impossible, but by beaming their dishes at the masts on top of Cleeve Hill, they found that they could make regular contacts. The moral of this story seems to be that if you can't work someone on a direct path on the microwave bands, it may well be worth trying some reflected paths.

That's it for this time – keep the E-mails coming in as I'll be delighted to share the news of your activity on the v.h.f and u.h.f. bands. Cheerio for now. Tim G4VXE.

PW



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Counting Nixies

Phil Cadman G4JCP, clad in his traditional brown dustcoat is busy 'in the shop' where a pioneering PW digital frequency meter has caught his eye.

Hello vintage radio fans, and a very warm welcome to the Valve & Vintage 'shop' (V&V)! I do hope you all had an excellent Christmas and have had a good start to the New Year. Oh, and I must say thank you to Chris Rees GU3TUX from the Channel Island of Alderney, for sending me an E-mail regarding the KW Electronics KW76 receiver. It was much appreciated.

Subjects for this column are sometimes explicitly suggested by V&V readers themselves. But occasionally, it only takes one seemingly innocuous point in a letter or E-mail to give me enough ideas for an entire column (or two!). Such is the case with this column, and all because of an E-mail I received from John Lawrence GW3JGA!

If you remember, last time I asked if anybody still had any old PW construction projects tucked away. John E-mailed to say that yes

he has –17 of them in fact! And what's more, they were all constructional projects he produced for PW from 1970 onwards.

Digital Frequency Meter

One of John's projects really caught my eye: spread over the last four issues of 1971 was a design for a digital frequency meter (d.f.m.) using transistor-transistor logic (t.t.l.) integrated circuits. Although still relatively new, these logic chips were available to the home constructor at affordable prices.

John's article (Figs 1 & 2) had won the PW Designer's Trophy for 1971, having been judged the best entry in the PW 'Project Autumn' competition. While digital readouts are very much the norm today, before the 1970s they were extremely rare on anything other than professional equipment. Hence an accurate d.f.m. was a significant article for PW.

The t.t.l. technology was invented in 1961, with the devices used in John's d.f.m. appearing in the late 1960s. So, t.t.l. can hardly be called vintage,

although by today's semiconductor standards it most certainly is! However, the design does use valves (of a sort). Plus, it only took a short time for t.t.l. chips to completely change the way Radio Amateurs accurately measured frequency.

Consequently, I thought it may be interesting to cover both the numerical indicator tubes used in the digital display, and to relate how radio amateurs measured frequency from about the time of the Second World War up until the 1970s.

A good friend of mine, David Reynolds G3ZPF, built a d.f.m. similar to the one designed by GW3JGA, and he too still has it in his possession. At my request, he kindly took some photographs with it working. The photo, Fig. 3, shows the small size of the meter (note the Belling-Lee connector) compared to the size of ex-military frequency meters then in common use. Note also that G3ZPF's d.f.m. incorporated a mains power supply.

Standard t.t.l. devices could only manage to operate as high as 20 to 30MHz, so to extend their range into the v.h.f. spectrum, fast – and, unfortunately at that time, very expensive – dividers called pre-scalers were manufactured. These devices could divide an incoming frequency by some fixed number; ten was often chosen to make things easy. The output of the pre-scaler would then be fed into the normal input of the meter. That's the purpose of the switch marked HF and VHF above the input connector in Fig. 3.

Cold Cathode Indicators

Before seven segment l.e.d. indicators became available, instruments requiring a digital readout often used cold cathode numerical indicator tubes. The Burroughs Corporation of America introduced these devices in the mid 1950s and called them Nixie tubes.

Fig. 1: The front cover of the September 1971 issue of PW in which John GW3JGA's article began.

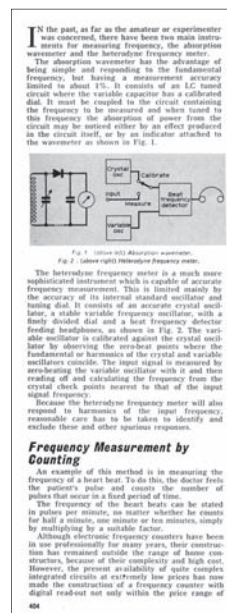


Fig. 2: The start pages of John's article.

As so often happens with successful devices, all later similar indicator tubes, regardless of their manufacturer, were often referred to as Nixie tubes. This was despite 'Nixie' being a registered trademark of the Burroughs Corporation!

Nixie tubes – or simply, Nixies – are cold-cathode gas-discharge tubes just like ordinary neon lamps, but there's a big difference in their construction. A neon lamp would normally have two identical small cylindrical electrodes and can be fed with alternating or direct current.

In contrast, a Nixie may contain as many as ten (or more) metal cathodes, each shaped to form a different number or symbol. The cathodes are insulated from one another and are stacked, in a line, one behind the other. The anode is a coarse mesh of fine wire.

The entire assembly is housed in a glass bulb which contains a small amount of mercury, together with neon gas at low pressure. The photo, **Fig. 4**, shows a rear view of the Nixies (and their associated t.t.l. drivers) in G3ZPF's d.f.m. You should be able to see the mesh anodes in the photograph, **Fig. 5**, a front view of a Nixie tube.

When an electric potential of about 180V is applied between the anode and any cathode, the gas breaks down and emits light. With proper choice of gas pressure and cathode dimensions, almost all the light comes from the immediate vicinity of the energised cathode, and the result is a luminous orange-red number. The photograph shown in **Fig. 6** was taken in subdued light to emphasise the colour of the digits.

A few t.t.l. devices were produced with high voltage open collector outputs specifically designed to drive the cathodes of Nixie tubes. The ones shown in **Fig. 4** – the integrated circuits (i.c.s) or 'chips' positioned closest to the Nixies –



Fig. 3: This photograph David G3ZPF's d.f.m. which incorporated a mains power supply, even though it is very small for the time it was built.



Fig. 4: This shows the rear view of the Nixies and their associated t.t.l. drivers in G3ZPF's d.f.m.

are type 74141. This device takes a four-bit, binary coded decimal (b.c.d.) input and decodes the number to activate one of ten open collector outputs.

The use of Nixie tubes in amateur-built equipment was relatively short lived, because by 1972, seven segment l.e.d. displays were available at prices similar to those of Nixies. With no need for a high 'striking' voltage, seven segment l.e.d.s could be run from the same 5V supply rail as the logic chips, thus greatly simplifying power supply requirements. Manufacturers of t.t.l. devices responded to the increasing use of l.e.d. displays by producing a wide range of logic chips incorporating seven segment decoder/drivers.

Smooth Curves Preferred

Despite the advantages of l.e.d. – and, of course, vacuum fluorescent and liquid crystal – displays, most people probably

prefer numbers with smooth curves, as opposed to angular 'seven segment' numbers. Perhaps it's this, and an increasing interest in older technology, which has recently motivated electronics enthusiasts to once again build projects using Nixie tubes.

Indeed, there are some speciality manufacturers making Nixie time clocks for sale to the general public. You can even buy a Nixie wristwatch!

Counting Cycles

Digital frequency meters measure frequency by counting the number of cycles of an input signal over an accurately known period of time. Although this sounds simple, it wasn't that simple to achieve before the availability of semiconductor logic devices.

In the 1940s, a cold-cathode tube called the Dekatron had been produced. Its display capabilities were rudimentary; just a dot of light which could be moved in a circular path (so appearing to rotate). However, with some relatively simple circuitry, it had the ability to move the dot of light back and forth, and so 'count'.

By cascading a number of the Dekatrons and gating their input, you could produce a frequency counter. Dekatrons were also used as computational elements in early computers. However, they weren't within the price range of the average Radio Amateur.

Heterodyne Frequency Meters

During the Second World War, there was a need to ensure radio receivers and transmitters were on the correct frequency. The heterodyne frequency meter was one answer to the problem, and I'd guess that tens of thousands of these instruments were produced. After hostilities ceased, large numbers appeared on the surplus market and were eagerly snapped up by Radio Amateurs.

Their advantages were low cost, accuracy and simplicity. Oh, and the Amateur Radio Licence in those days stipulated that an Amateur station **had to have** a satisfactory means of measuring frequency.

New Amateur stations were inspected shortly after a Licence had been granted, and any Amateur station was liable to be inspected at any time by the relevant authorities. So it was prudent, to say the least, to have some means of measuring frequency.

Actually, if you didn't mind being crystal controlled, a simple absorption wave-meter would suffice, but if the transmitter had a variable frequency

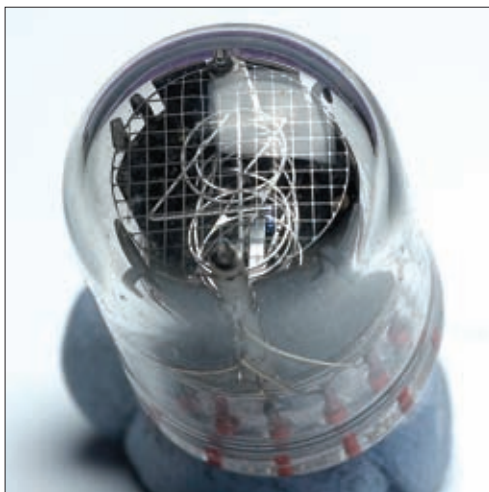


Fig. 5: The ten individual cathodes are shaped as numbers, the anode is the mesh in front of them all.

oscillator (v.f.o.), then a heterodyne frequency meter was essential. Otherwise, the man from the Post Office (our Regulator in those days) might have closed you down!

Amateurs with either luck or money managed to get hold of an American BC221 Frequency Meter, **Fig. 7**, (or similar), which was the main component of the SCR211 Frequency Meter Set. But it was the cheaper British Class D Wave-Meter which was most often found in UK Amateur shacks. Both meters performed the same function but they operated slightly differently. To help, I'll very briefly cover the operation of both, starting with the BC221, which is somewhat easier to understand.

Understanding The BC221

The BC221 frequency meter consists of a very accurately calibrated v.f.o., a 1MHz crystal oscillator, a detector (mixer) and an audio amplifier. The meter uses three valves, the detector and 1MHz crystal oscillator being combined. The audio amplifier drives a pair of headphones and is used to amplify the audio beat note produced by the detector.

To tune a receiver to a precise frequency, the v.f.o. would first be calibrated against the internal 1MHz crystal. Throughout the v.f.o. range there would be dial settings specifically marked as crystal check points. Next, using the charts that always accompanied the meter, the v.f.o. would be set to the wanted frequency. The absolute accuracy of the meter was wholly dependent on these calibration charts.

In fact, the charts are worthy of special mention, because every BC221 was individually calibrated. This process took a human operator many hours of careful work to accomplish. As you may have guessed, the tuning dial on the BC221 wasn't directly calibrated in frequency, only in an arbitrary – but very fine – numerical scale. Given the large numbers of BC221s being produced, the manual calibration process was taking far too long – so something had to be done.

To get over the problems, machines were built to automatically calibrate the BC221s once they had been tested. An early robot of sorts, it first noted the dial reading for an internal heterodyne beat. Next, it calculated the number of hertz per dial division from the previous calibration point. I believe it did this at 327 points and interpolated between them, finally printing all 3,252 different frequency value numbers listed in the calibration chart.

The BC221 covered a continuous



Fig. 6: a photograph, with a random reading, taken in low lighting to emphasise the display.



Fig. 7: A BC221 Frequency Meter for sale at a radio rally stall.

frequency range of 125kHz to 20MHz, using both fundamental and harmonics of its v.f.o. Higher harmonics could be used to extend the frequency range beyond 20MHz, but they were not listed in the calibration chart.

The Class D Wave-Meter

The British Class D wave-meter also had a v.f.o., crystal oscillator (100kHz and 1MHz) and detector, but combined all three functions in a single ARTH2/ECH35 triode-hexode valve. The v.f.o. dial was directly calibrated 0 to 100kHz, negating the need for any calibration charts. However, while greatly easing its manufacture, the simplicity of the Class D did result in a few limitations.

I think that only two limitations were of any significance: a rather restricted frequency range of 1.9 to 8MHz, and an accuracy of ± 2 kHz. That said, ± 2 kHz accuracy was sufficient to satisfy the man from the Post Office! Also, the upper frequency limit could be extended by using higher harmonics of the v.f.o., as long as reasonable care was taken to identify the actual harmonic.

In use, the crystal oscillator could be used to provide 1MHz markers using the 1MHz crystal. Next, the v.f.o. would be switched on and the dial set to '0', and the calibration control tuned for zero beat against the 100kHz crystal (while listening on headphones). In this state the meter provided 100kHz markers, and it was up to the operator to tune the

receiver to roughly the right frequency using the 100kHz markers as a guide.

Finally, the dial would be tuned to the correct offset – zero to 99kHz – and the receiver tuned exactly onto the signal from the Class D.

Checking Transmitter Frequency

Using either the BC221 or the Class D wavemeters, checking the frequency of a transmitter followed a similar procedure. However, instead of the frequency meter providing a signal, a tiny portion of the transmitter output was fed into the meter where it was mixed with the v.f.o. to provide a beat note.

As you can imagine, checking the frequency of a transmitter with a digital frequency meter was much simpler than using a heterodyne frequency meter. And with a pre-scaler, a d.f.m. could operate well into the v.h.f. spectrum.

Built-In Digital Displays

Towards the end of the 1970s, the cost of displays and digital logic had reduced to the point where manufacturers of Amateur Radio gear could offer equipment with digital read-outs. Some transceivers – like my own Trio (now Kenwood) TS-520S – were designed to use an external add-on unit.

Other transceivers were available with internal digital readouts as an extra cost option. Within a very few years, digital readouts had become almost universal, with only the lower cost equipment still using analogue dials.

Incidentally, you may think that modern receivers and transmitters which have digital readouts incorporate a digital frequency meter. Not so! In almost every case, the digital display is driven directly from a microprocessor. This microprocessor also controls (directly or via another processor) a frequency synthesiser.

But bear this in mind – there's no guarantee that the synthesiser is doing what it's been told to do! Hence the digital display could be wrong. That's not likely, and you'd soon realise something was wrong, but just remember, having a digital display is not necessarily the same as having a digital frequency meter.

My Thanks

My thanks to John GW3JGA for his E-mail and for giving me ideas for the V&V column. Please remember you can help too! If you have any comments or ideas, please send them to me, either via E-mail to: phil@g4jcp.freemove.co.uk, or by mail to: **21, Scott's Green Close, Scott's Green, Dudley, West Midlands DY1 2DX.** 73, Phil G4JCP

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The Canadian Arctic Calling!

Carl Mason GW0VSW has another letter from Gerry VE8GER in Canada and wonders – is Gerry our most remote reader?

All reports to Carl by the 15th of the month please!

If you read the November 2010 HF Highlights (HFH) you may remember me mentioning the station of Gerry St. Amund VE8GER above the Arctic Circle in Inuvik, Canada. The picture we printed was actually of his grandson Joe aged 12 who spent five weeks with him during the school 'break-up' season last spring.

Joe wanted to try his hand at operating the station – but was a little shy in making his first contact! Maybe one day he'll get bitten by the Amateur Radio bug! Gerry dropped me a line to say, "Just got some photographs done with me holding *PW* magazine taken in front of the 'Inuvik' sign as you enter the town.

"This is the end of the famous 'Dempster highway which stretches for 670km (417 miles) from Dawson City in the Yukon to Inuvik in the North Western Territory. If you're interested in learning

more about the highway you can go to the following link at www.yukoninfo.com/dempster/

"The sign signifies the life style of the local natives as they lived here many years ago and the three cultures here, the Inuvialuit, the Gwich'in and the non-native population. I woke this morning to a temperature of -29°C with a wind chill of -34°C. I'll be packing up my ski-doo and heading out to the cabin to get it warmed up for this weekend. Naturally, I'll be taking my radio equipment with me so will try and get on the h.f. bands when I can."

Thanks for the news Gerry! I wonder if this makes Gerry our most distant reader? If you know any different then please let us know.

The DX News

On to some brief DX news now and to East Africa where **Maurizio Buffoli IK2GZU** will be active from Ilembula, Tanzania as **5H3/IK2GZU** until March 8th while doing volunteer work for the local mission. He will operate using c.w., s.s.b. and RTTY using the mission's 3-element tri-band for 14, 21 and 28MHz fixed to Europe. There are also verticals or dipoles for other bands though operating on the 1.8 and 3.5 bands is unlikely. The QSL route is preferred via the bureau and Log book of the World (LoTW). An on-line log search and QSL request form will be available at www.buffoli-pm.it/

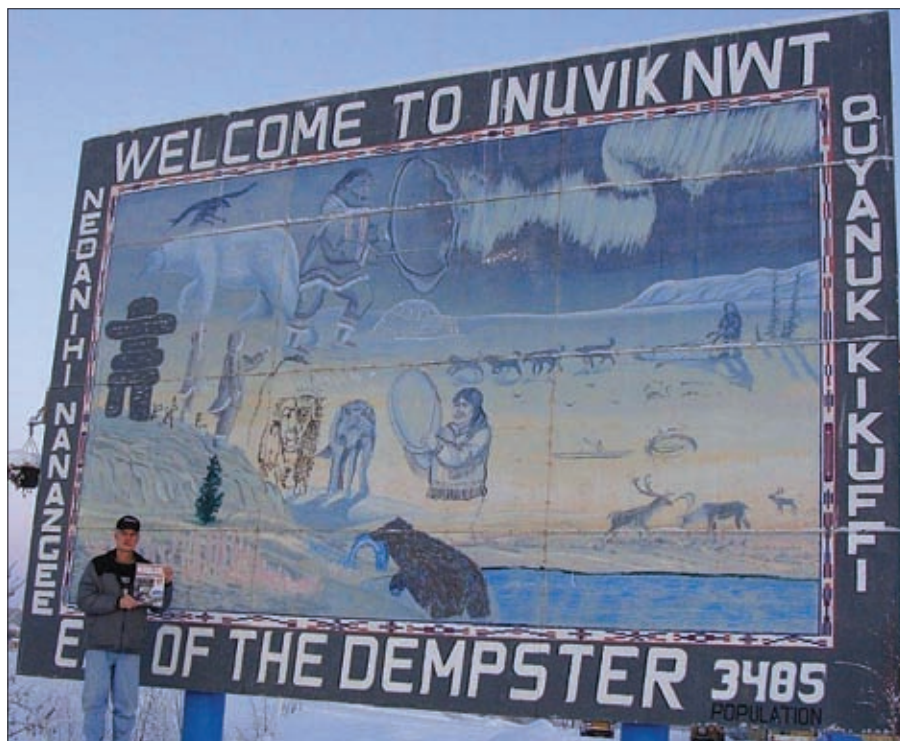
In South Central Africa **Laci Toth OM5AM** will be active as **D2AM** from Luanda, Angola until March 17th and so far he has been QRV on 14MHz using s.s.b. and RTTY. The QSL route is via the home call either direct or through the bureau.

Your Reports

On to your reports now and to **Eric Masters G0KRT** in Worcester Park, Surrey who used his Kenwood TS-570DG with c.w. at 5W. His antenna was a modified home brew W3EDP, 26m (84ft) long with counterpoises, tuned with an SGC-230 on 3.5MHz



Gerry St. Amund VE8GER in his shack.



Gerry St Amund VE8GER with a copy of *PW* on hand!

logging I1GIS (Italy) 1941 and SM0W (Sweden) at 2313UTC.

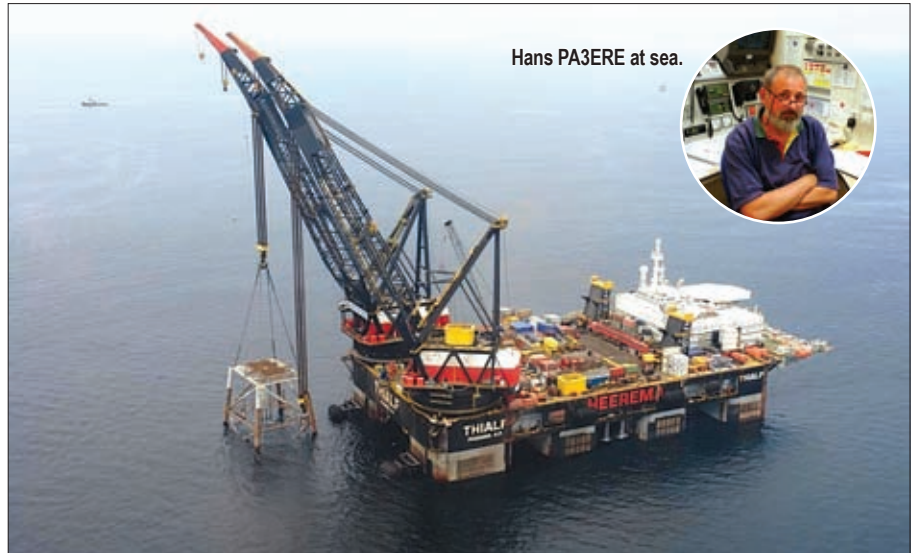
Operating my own callsign GW0VSW, I had an interesting two-way QRP QSO with **PA3ERE** (Netherlands) at 2016 using an FT-857 at 5W, Z11 Pro auto tuner and modified SRC X80 vertical. The operator **Hans van den Toorn** was running, in his words, “a modest station” which consisting of a 30 year-old Icom IC-720A on low power a little under 5W. The rig is very basic but has an excellent receiver and has never let me down since day one. Hans said “I use it with a horizontal delta loop with a circumference of about 60m (200ft) and this is fed with open line via a remote SGC-230 auto coupler, just hit the key and you are tuned at 1:1 on all h.f. bands”.

Incidentally, Hans was previously a Radio Officer in the merchant navy for 23 years followed by 17 years working on oil rigs, production platforms and crane vessels. He retired four years ago and now enjoys Amateur Radio every day.

The 7MHz band was in good shape and **Paul O’Kane EI5DI** was one station I heard operating in the CQ WW CW Contest in November. Although I was unable to break his huge pile up that evening with my QRP, I listened in for a while as he was working a fair amount of DX. This was either weak or inaudible on my recently installed half size inverted G5RV which runs East to West – but I hoped to get an idea of how the antenna was working. Many of you will recognise Paul’s call as author of the well known SD contest logging programme www.ei5di.com/

For those of you who are new to Paul’s logging software it’s intended for single-op unassisted entries using both c.w. and s.s.b. and runs on all versions of Windows from Windows95 to Windows7. It covers all the major international contests and dozens of others worldwide and also supports DXpedition and special event logging from 1.8 to 50MHz. Although SD isn’t free you are able to download v15.27 and test it in any supported contest.

However, if you want to try an older ‘free’ version of the EI5DI logger, you can get that at www.rsgbcc.org/hf/sd.shtml where you will also find free logging program for the popular RSGB Commonwealth Contest and IOTA contests. Paul said “I had a great time working a ‘single operator high power’ (SOHP) station on 7MHz and ended up with about 2250 QSOs, 106 countries and 33 zones in about 32 hours! There were some interesting openings,



The SSCV *Thialf* semi-submersible crane vessel which Hans PA3ERE worked on.



The CG3MUG QSL card received after he worked by George G3ICO on 21MHz c.w.

particularly Saturday morning around 0400 and several JAs copied with reasonable signals around 1600ish.

“The pile-ups were huge! Another surprise (I’m not used to working 7MHz from home) was that it was possible to work North America all day and night! It was also the first time I had used my Elecraft K3 (see www.elecraft.com/) in CQWW and it was just great! On Sunday night 7MHz was a real ‘jungle’ of signals, but I was able to get and hold a spot near 7.020MHz and worked 400 stations in the last three hours of the contest. One highlight was being called by ZL8X from Kermadec (New Zealand) and two or three KH6 stations (Hawaii)!

“I was based at the EI9E contest station in County Wexford and the new 4-square antenna there was fabulous. The only problem was severe static which closed me down any time it snowed which was not expected in November. With the 4-square, you have instant gain in any of four directions, the main ones being the USA, North Europe and JA/VK, South Europe and South America. As such, it’s more effective than a beam and even outside the favoured directions (which are fairly broad) it still worked remarkably well.

“One interesting thing, and it



Paul EI5DI’s station showing *WinKey*, the Elecraft P3 and K3 and a single paddle key made by Scheunemann. The display on the P3 shows two c.w. signals spaced 300Hz apart. On a full screen scale of 2kHz it really makes a precision instrument Paul said!

happened on both Saturday and Sunday around dawn, was that JA, VK and ZL came in better from the USA direction (300) - must have been some sort of auroral skew? I’ve said it already but the K3 with a full set of c.w. filters and the P3 ‘panoramic adapter’ are great and allowed me to slot in between big stations about 6–700Hz apart and work away.

“Incidentally, the P3 unit shows you exactly what c.w. waveforms are like and some stations had key clicks (yes you can see them) extending to more than 1 kHz on either side. I did get chased at one stage by K3LR who was not bothering me but I was obviously bothering him.”

Thanks for that Paul! It was also interesting to note that over the weekend all h.f. bands had activity on them and there were many strong signals including the higher bands. The days that followed the contest most of the higher bands appeared almost dead!!! It goes to show that a few ‘CQ’ calls could get you some surprise QSOs.

On to **Bill Ward 2E0BWX** in Edwinstowe, Nottinghamshire who used his Icom IC-7400 and SRC X65 wire antenna to work 7MHz PSK stations

IW6CNM (Italy) at 2224 and OK2PKT (Czech Republic) at 2233 with 25W, while s.s.b. found at 50W found IZ0OSI in Rome at 2315.

THE 14MHz Band

On to the 14MHz band now and here Bill 2E0BWX worked PSK31 again logging EB3JT (Spain) 1100, RX6BH (European Russia) 1125 and HA3GO (Hungary) at 1421UTC. He adds, "After reading the article in *PW* (Jan issue) by *David Dix G8LZE* on WSPR, I decided to give it a go and found some surprising results. My signal was copied on 14MHz in the USA by KZ3X in Pennsylvania at 1524, in Israel by 4Z4TJ in Beer-Sheva in the Northern Negev Desert and (by far the best for me) VK6PG in Noranda, Western Australia at 1458! Now, I'm aware of course, that these aren't actual QSOs, but it proves my signal got out there! I'm really pleased about hitting VK as I was only running 5W into my X65 wire at the time!"

In New Zealand **Peter Leng ZL4TE** worked s.s.b. stations CE1KR (Chile) 0640, ZA3HA (Albania) 0754, DL3NCR (Germany) 0921, F1PKH (France) 0947, LA2IT (Norway) 0950, and RA1CY (European Russia) 0953. Then came UT4WT (Ukraine) 0954, LY1TR (Lithuania) 0956, 9M6TMT (East Malaysia) 1009 QSL via NI5DX and HS0ZIN (Thailand) 1020UTC, all were achieved using a Yaesu FT-1000MP MkV and 100W to a Cushcraft AV-3 vertical.

Martyn Medcalf M3VAM in Chelmsford, Essex used his Yaesu FT-897 at 10 watts into a Comet CHA-250BX antenna to work s.s.b. stations OM5M (Slovakia) 0941, PA1AW (Netherlands) 1009, HA1YI (Hungary) 1040, 8S0C (Sweden) 1048, S51A (Slovenia) 1053, KR1X (USA) in Dover, Delaware at 1057, SV1DPI (Greece) 1105, UD3D (European Russia) 1108, CQ3L (Madeira Islands) AF-014 at 1115 and T70A (San Marino) 1213UTC.

The 18 & 21MHz Bands

The 18MHz band had some 'short' openings recently and **Peter Lowrie MI5JYK** in Newtownabbey, Northern Ireland used his Yaesu FT-817 with wire vertical again and 5W s.s.b. He worked 9A2X (Croatia) 1321, EB220FI (Spain) 1331, 9H4JX (Malta) on Gozo Island EU-023 at 1420 and IS0RXF (Sardinia) EU-024 at 1427UTC.

Meanwhile, **George Davis G3ICO** in Yeovil, Somerset used c.w. to work 12 USA stations including K8CW in Ohio 1257, K8CCG Missouri 1359, WA3YUR Pennsylvania 1414, K8BLA Georgia



the QSL from C91WW (C91DJ), worked by Jeremy Smith on 28MHz s.s.b.

1437, W4SO Florida 1442 and AA9DI Indiana 1550 and finally, K3EL in New York at 1929.

Moving to 21MHz, George managed ZA3HA (Albania) 1435, CG3MUG (Canada) a special call for 'VBA' Thunder Bay Canadian Coast Guard Radio, which was celebrating 100 years of radio service at 1524. Then came V26K (Antigua & Barbuda) NA-100 at 1508 (QSL via AA3B), HC2/SM0COP (Ecuador) 1625 and VP5/W5CW (Turks & Caicos Islands) NA-002 at 1636UTC. All were achieved using his Elecraft K2 at 10W to a 40m long doublet antenna.

Also on the 21MHz band was Eric G0KRT who used QRP working VY2ZM



The QSL from PC25MRC, worked by Geoffrey Powell M1EDF on 7MHz c.w.

(Canada) 1558, YU7JDE (Serbia) 1602, EZ3W (Turkmenistan) at 1609. Then came several stations in the U.S. including K3LR in West Middlesex, Pennsylvania at 1623 and CR3R (Madeira Islands) at 1714UTC (QSL via CT1BOL). This was a DXpedition to the Desertas Islands (Group AF-046), which are three small islands Ilhéu Chão, Deserta Grande and Bugio. They're all of volcanic origin and are located to the south-east of the Madeira island. They are uninhabited due to the inhospitable conditions and lack of fresh water and were declared a protected area in 1990 becoming a natural reserve five years later.

The 24 & 28MHz Bands

On the 24MHz band was **Jim Pedley GM7TUD** in Locharbriggs, Dumfries who used s.s.b. to work VK7XX (Australia) OC-001 in Turners Marsh,



The QSL card from S4FJ after Bill 2E0BWX worked him.

Tasmania at 0957, VR2XMT (Hong Kong) 1012, C56FR (Gambia) 1046 (QSL via ON4TA bureau only), and Z23MS (Zimbabwe) at 1237 (QSL via UA3DX). Then came VP8LP (Falkland Islands) SA-002 at 1251 and C50K (Gambia) at 1318, while Bill 2E0BWX had one s.s.b. contact with SV3AQR (Greece) at 0950UTC.

Moving to 28MHz Jim GM7TUD found Z21BB (Zimbabwe) 1036, AU2JCB (India) 1134, EA8CAZ (Canary Islands) AF-004 at 1134. Then came FR5EC/P (Reunion Island) AF-016 at 1144 and C91UA (Mozambique) at 1148. Then came C50C (Gambia) at 1308, ZS1WE (South Africa) at 1309 and LU2EM (Argentina) at 1327UTC, all were achieved using a Kenwood TS-450 with 100W and Cushcraft MA5B mini beam.

Jim comments, "I have just put up a Cushcraft D3W dipole for 10, 18 and 24MHz and have to say I have been pretty pleased with it so far. I had not heard a whisper from ZL8 on 10MHz previously but put the dipole up and with my first call on that band put them in the log. The 24MHz results speak for themselves!" Jim is now trying to get his head around the menus of the Kenwood TS-590S, which he has bought to replace his well used FT-450.

Finally, **Jeremy Smith M0XVF** in County Durham operated on 28MHz with s.s.b. logging TA2/DL7BC (Turkey) 1000, YM2W (Turkey) 1009, C4N (Cyprus) AS-004 at 1023, CR3A (Madeira Islands) at 1105 and was pleased to have an unexpected QSO with C91DJ (Mozambique) at 1220 QSL via GI4FUM running a Yaesu FT-857 at 50W to an 80m dipole.

Signing Off

Well it's been another very good month with plenty of activity on all h.f. bands and some interesting DX to work especially on the higher bands. My thanks to **Maurio Pregliasco I1JQJ/KB2TJM** editor of the **425 DX Newsletter** for all the DX information and to all our reporters for their logs. Until next month I wish you all good DX.

PW

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Front-End Filters & Headphones

In this What Next? column, Colin Redwood G6MXL aims to answer all your questions and responds to a reader's please for help to overcome pager interference.

Welcome to *What Next?* (WN?) where this month I'm going to cover a couple of topics. Firstly, prompted by an E-mail from Arthur Lawrence G3RZV, I am going to look at front-end filters for the v.h.f. and u.h.f. bands. Secondly, I'm going to look at headphones.

The E-mail from Arthur G3RZV was interesting. He writes that "I'm currently feeling depressed by having my v.h.f./u.h.f. activity ruined by pagers. They're not far enough up the hill from me. I have two dual-band main transceivers and a dual-band handy. My simple set-up is a 3.1m dual co-linear antenna mounted at about 7.5m (25ft), with H100 feed to the shack."

Arthur continued, "Both the main rigs, an Icom and a new Kenwood are wiped out by the 150MHz services, on both their bands. I've tried stubs, and notch

filters, etc. While monitoring on the pagers band shows them significantly reduced, the 2m and 70cm bands s.w.r. is completely ruined. I might as well not have an antenna connected."

Arthur goes on to say, "As I see it, I need something that will stop the pager band but will not affect the 2m and 70cm bands. Nothing I've tried meets the criteria. I have a very old Kenwood 2m rig that's all that I can use at the moment. It's connected to the antenna via a two tuned circuit filter that is working perfectly. I don't have 70cm on it so it doesn't matter."

"I've been using the handy, a TH-F7E with satellite tracking and an arrow antenna, but while the new TM-V71E is capable, I can't use both bands at once. Local QSOs are out too. I'm looking for a method of eliminating reception on the 150MHz band without any effect on the

Amateur bands. Do you know of any sources of suitable designs? Thanks. Arthur G3RZV."

Thanks for your E-mail Arthur! Well, fortunately, I know of two solutions that may meet Arthur's needs.

The first of these is made by **Cross Country Wireless**. They produce a range of filters (**Fig. 1**), amongst which is a double notch filter. This has two separate notches to filter out the radio paging frequencies at 138 and 153 MHz. According to their web site at www.crosscountrywireless.net, the filters are made to order, and are available with a variety of r.f. connectors. The specification claims an insertion loss of less than 1dB within the 2m amateur band and losses of greater than 25dB at 138 and 153 MHz.

The second filter solution is to be had from *PW* advertiser **Waters & Stanton**, who can supply the DCI range of bandpass filters (**Fig. 2**). The DCI website at www.dci.ca/ is a good place to start. For the UK and Europe the 2MHz wide versions are probably a better choice than the 4MHz wide versions. Incidentally, DCI also do a range covering the 70cm band and a range of dual-band 2m and 70cm models.

Using Headphones

I'm surprised how few Radio Amateurs seem to use headphones when operating, as I believe they are a really useful item in the shack. However, you may ask – why use headphones?

In reply I can think of a number of reasons for using headphones. Firstly, they can isolate the listener from surrounding background noise, such as the family chattering or the TV in the background. Headphones can also



Fig. 1: One of the filters in the range available from Cross Country Wireless.

help with the task of concentrating on weak DX signals. Equally important, members of the family can find the constant 'noise' of s.s.b. and Morse signals being tuned in, quite distracting and disturbing.

Safety Considerations

Before I continue, I must emphasise the importance of not turning the volume up too high when you're using headphones. The human ear is an incredibly sensitive transducer. High sound levels can cause irreparable damage to hearing. For Radio Amateurs this is a particularly important consideration as our hearing is so important!

We can suddenly go from trying to pick out a very weak signal where we may turn the volume up high, to an extremely loud signal if a strong signal appears on the same frequency. Some headphones intended for the professional broadcasting and DJ markets include sound limiters. There are several types of headphone available, so let's look at the various types available.

In The Ear Transducers

I'll start with the 'In the ear' type of 'headphone'. These are the type which is commonly supplied with portable music playing devices such as MP3 players (Fig. 3). Almost without exception they have 3.5mm stereo jack plugs. The sound and comfort of these vary considerably.

In my limited experience, those in-ear headphones from well-known brands such as Apple, Phillips, Sony and Sennheiser generally sound better and are more comfortable to use than the ultra-cheap ones found in bargain basement shops, market. Additionally, on some models the lead length can be quite short.

Small 'Over Ear' Headphones

The sound quality of the small 'over ear' type of headphone varies enormously in my experience. At best these can be very good, although I have never found the sound isolation (Isolation from external noise) to be particularly good. These tend to weigh much less (typically around 100g) than larger headphones.

Large Over Ear Types

The large over ear type of headphone is my personal preference. However, the sound quality of these types of headphones can vary a lot – but for Amateur Radio purposes the

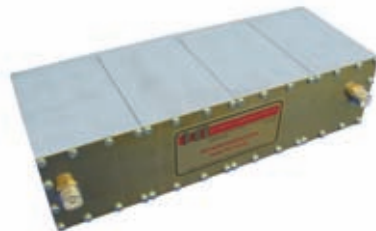


Fig. 2: One of the DCI range of filters available in the UK from *PW* advertiser Waters & Stanton.



Fig. 3: In-ear headphones supplied with MP3 players often have short leads.



Fig. 4: Over the ear type of headphones generally have the best sound isolation.

performance doesn't need to be hi-fi quality (Fig. 4).

Headphones aimed specifically at amateur radio may have a limited audio frequency response. This is ideal for Amateur Radio purposes, as it may reduce high-audio frequency hiss and low audio frequency hum, but may make them less suitable for other uses.

It may be an idea to avoid the really expensive hi-fi models for Amateur Radio purposes because they are not designed to handle exceptionally loud and distorted sound, which can damage their cones. These types of headphones can be quite heavy (typically around 350g). Prices can vary a lot from around £20 upwards.

Maximum Isolation

Some types of over ear headphones are designed to provide a higher level of isolation than normal over the ear

types. I have found these types exert a higher pressure on the side of the head than other types. Typically these are the types supplied to broadcast and DJ users, where isolation is the most important consideration.

Try Before You Buy!

If you are thinking of investing in headphones, then I would suggest first getting a really cheap pair (any sort) just to see how useful you find them. By cheap I mean spending no more than a few pounds on them. If you find headphones helpful, then I would try out a number of different models. Check them firstly for comfort, and secondly for isolation according to your needs. Don't underestimate the importance of comfort.

I recently used a pair of headphones from a well-known Amateur Radio manufacturer. Whilst these particular

'phones provided a good level sound isolation, I found that after wearing them for a couple of hours I got a headache due to the pressure they were exerting on my head. However, I am aware that my head is at the larger end of normal (I sometimes have difficulty in finding hats that fit), so this may not be a problem for everyone!

Lead length

In the shack, I much prefer to have a long lead on my headphones, enabling me to stand up to reach for something from a shelf above the operating position without pulling on the lead. In my view, many headphones designed for portable MP3 player use tend to have leads that are too short for use in a traditional shack.

Four Connectors

There are four connectors commonly used for headphones. These are the mono and stereo versions of the quarter-inch (6.3mm) jack plug and the mono and stereo versions of the 3.5mm jack plug. Whilst there are exceptions most base-station transceivers and receivers use quarter-inch jacks, and most portable transceivers use 3.5mm jacks.

The same principle applies to main-powered hi-fi and portable entertainment equipment. Adaptors are available to convert quarter-inch connectors to 3.5mm connectors and vice versa. The quality of the adaptors seems to vary a lot. Some of the very cheapest can give intermittent connections. Those adaptors supplied with headphones from the better manufacturers in my experience are generally the most reliable.

Boom Microphones

Some headphones are also supplied with a boom microphone (**Fig. 5**). This can be a useful feature as it keeps hands free to tune, writing up the log, etc. I found boom microphones and headphones a particularly useful combination when participating in a net and wanting to do other activities in the shack at the same time.

Note: I would caution against wearing headphones when soldering or other construction activities. On one occasion I let the headphone lead touch the soldering iron and managed to burn a hole in the headphone lead insulation!

Impedance

Most headphones have an impedance of between 8 and 600Ω. For most purposes the electrical impedance of the headphones will not be a major



Fig. 5: Headphone with boom microphone, giving hands-free operation.



Fig. 6: A High impedance ear piece – ideal for use with simple crystal sets when good strength signals are available from the receiver .

consideration. However if you want to use multiple headphones in parallel (for example at a radio club activity), then putting two 8Ω impedance headphones in parallel may put too much strain on the output stage of the audio amplifier of a receiver or transceiver. Adding a low value resistor (say 3.9Ω) on series will often provide the necessary protection.

Some very simple radios (e.g. crystal sets) require high-impedance headphones. Unfortunately, it's not easy to find really high-impedance headphones new. Simple high impedance crystal ear pieces (**Fig. 6**) are however available from **Bowood**

Electronics Ltd and **Sycom**, both of whom advertise in *PW*.

If you want 'proper' high-impedance headphones, then I can only suggest looking around junk boxes at radio rallies where you might be able to track down some from 'the good old days'. If you take this route, be prepared to replace the wiring, which in many cases will have become perished over the years*.

**Colin's warning should be noted. I purchased a pair of (in otherwise excellent condition) 2000Ω late 1920s manufactured high impedance headphone at a rally in the summer – only to find that both sets of coil windings had corroded away and were completely open circuit. This was because at some time the connections had been made using a corrosive solder flux. Editor.*

Using Headphones in Practice

With most transceivers, when you plug headphones into the front-panel headphone socket, you'll mute the internal loudspeaker. This is generally what I think most amateurs would want in these circumstances.

Unfortunately in addition to muting the internal loudspeaker, the external speaker is often also muted too, which means that you may not be able to use headphones to find and assist with tuning slow scan TV (SSTV) signals. In these circumstances, I suggest constructing a small external box with separate headphone and data output sockets, with separately adjustable volume controls for the headphone and the data output.

Sharing & Listening

If you want to share your headphone listening (perhaps during a club activity such as a contest, or when running a special event station) you may want to have additional headphone outputs and perhaps even a speaker. This is so that the public can hear the stations you are working whilst you are concentrating on working the station.

If you adopt this approach, make sure you have people to explain what is going on, and that you don't have too many low impedance devices connected in parallel which might put too great a load on the receiver's audio output stages. See you next time! **PW**

Web Links

Cross Country Wireless www.crosscountrywireless.net/filter.htm

DCI www.dci.ca/?Section=Products&SubSection=Amateur

There's a very interesting working model that can be found at: www.ece.drexel.edu/commweb/cov/cov_encoding.html



Harry Leeming G3LLL's In the Shop

The Cedars, 3a Wilson Grove, Heysham, Morecambe LA3 2PQ
Tel: (07901) 932763 E-mail: G3LLL@talktalk.net

"Honesty Is The Best Policy"

This month Harry G3LLL has some feedback from readers and wonders about the risk of buying equipment from car boot sales.

Welcome to In The Shop (ITS) and this time I'm starting off by thinking about the risks of second-hand equipment. While car boot sales can produce some surprises, as there's always the chance of paying for stolen property, I prefer to rummage in second hand, or charity shops, where at least a receipt will be available. It's amazing what bargains turn up, and Nathan Markley G7HUG wrote to me to share his experience.

Whilst poking around a local cycle and second-hand curio dealer Nathan spotted a Yaesu FRG7 general coverage communication receiver. He asked the owner for a few details and was told that it had been taken in 'good faith', but that all the signals were distorted and un-resolvable. It looked quite clean, so Nathan decided to take a risk and parted with £40.

When Nathan arrived home he dismantled it to find an extra frequency modulation (f.m.) discriminator panel was neatly fitted underneath and was wired to what had been originally the pilot lamp switch. He knocked this

switch off, and lo and behold the set then functioned perfectly. Indeed, he found that not only had he got an excellent FRG7, he had one that had been neatly modified for f.m.

Feeling rather guilty because of the low price he had paid, Nathan returned to the shop, told the owner what he had found and offered to pay extra. The cash was refused, but he was thanked for his honesty and the shopkeeper promised to advise him of anything else that came in that looked interesting. A nice ending Nathan – thanks for your letter!

Dave's Problem

'Dave' E-mailed to tell me about a fault that he had on his FT-757 when it was new. The rig worked perfectly on all but the 1.8MHz band, where he got complaints that his transmission was distorted. He then returned it to the supplier a couple of times, but they could find nothing wrong.

As all his other rigs at home worked perfectly, Dave was pretty certain that the fault lay in the rig and so

he eventually persuaded the shop's engineer to take it home, and try it out on the air. Sure enough it was distorted on 1.8MHz, and eventually the fault was traced to some screws!

The circuit board was held down with several retaining screws and these were loose. When these were properly tightened, the fault disappeared and never returned. It was strange that the problem should only occur on one band – and whilst in the north of England we say, "There's now't funnier than folk", I think on occasions radio equipment also comes pretty high up the list!

High Voltage Rectifiers & Capacitors

Keith Lacy G3ZON, wrote to remind me to mention those innocent looking resistors that are often wired in parallel with rectifiers and smoothing capacitors. So, thanks for the reminder Keith and let's now think about a typical case.

'Ted' owned an FT-101Z that blew a fuse and a replacement followed it quickly into the waste bin. He consulted a few friends and acting on their advice checked the rectifier diodes in the high voltage supply and finding that two were short circuit he replaced them. The rig was then as good as new – that is until a week later when it blew another fuse!

The replacement rectifiers were then found to have failed and more replacements soon went the same way. Enquiries on the internet resulted in Ted being advised to check the resistors that were in parallel with the diodes – and sure enough one was open circuit.

To help understand the problem, take a look at the circuit at Fig. 1. This circuit is about as simple as you can get, but it can supply around 850V to the anodes of a pair of 6146 p.a. valves. Whilst smoothing and regulation would be rather poor, this wouldn't matter too much as pentode and tetrode valves are more sensitive to their screen voltage than to their anode volts.

The circuit uses a single rectifier diode in a half wave circuit – so

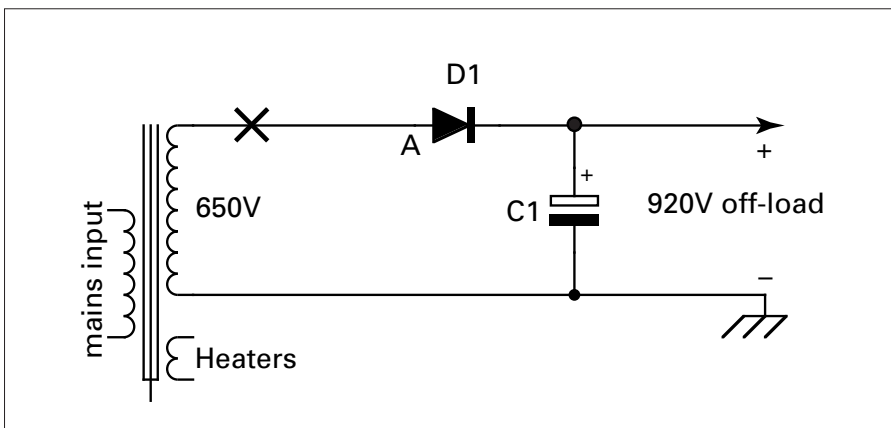


Fig. 1: A simple half-wave rectifier may be used to provide the high voltage supply for some rigs with valved transmitters. Simplicity itself, perhaps, but not without problems says Harry.

let's now have a look at the required specification for D1. The 650V alternating 50Hz root mean square (r.m.s.) input will have a peak value of 1.414×650 , i.e. 920V. When the power supply unit (p.s.u.) is first switched on C1 will have no charge in it, and so it will take a tremendous rush of current which will only be limited by the direct current (d.c.) resistance of the mains transformer and the internal resistance of C1.

If the resistance totals to say 45Ω , with 920V peak applied, a peak current of around 20A will flow through D1. As soon as the capacitor starts to charge this current will reduce, but when selecting a diode to use in this position, the current surge will have to be allowed for. If a 'better' transformer is fitted, with a lower resistance secondary, then the surge current will increase and it may be necessary to limit this by fitting a resistor of say 25Ω at point 'X'.

The voltage and current ratings of the diode must allow for all eventualities. At point 'A' on the peak of a negative input cycle there will be -920V. If the p.s.u. has no load on it C1 will have charged up to +920V, and so across the diode it will be 1,840V.

The mains voltage may go a little high at times, there may also be the odd spike on it. Additionally, if someone switches something else off and on again quickly at the same time, or as let's say a 'fridge thermostat closes, the voltage and switch on surge current may exceed these values. The p.s.u. is only required to deliver around 850V on load, but to be on the safe side the rectifier should be rated at well over 2000V (2kV).

A pair of 6146 valves require a maximum of 500 milliamperes (mA), but once again a margin should be built in, and so a diode rated at 750mA and 30A surge, with a peak inverse voltage rating of 2.5kV should be okay. Whilst such diodes are no doubt available, they are likely to cost pounds, whereas diodes such as the BY127, which is rated at 1250V 1A with a 30A surge capability, can be bought in bulk and will cost the equipment manufacturer a few pence each. The temptation to use two of these in series as per **Fig. 2**, instead of one 2.5kV diode is commercially irresistible.

However, the method of using two diodes in this way can have problems. For example, suppose that D1 has a reverse resistance of $100M\Omega$ but D2 has a reverse resistance of $500M\Omega$, what's going to happen? With the oldest type of silicon diodes the reverse voltage would divide itself according to the resistance of the diodes, so that D2 would be subjected to many times the

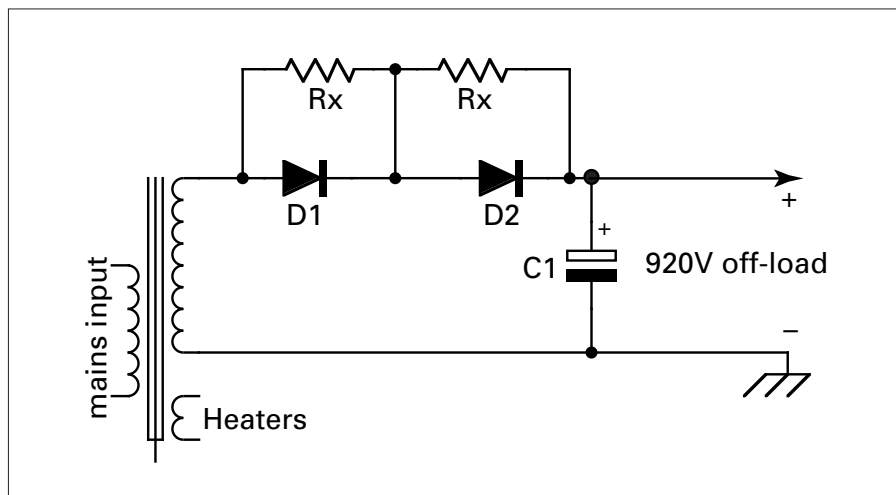


Fig. 2: Replacing the single diode of Fig. 1, with two identical types in series can help. But to minimise the voltage 'stress' across any one diode, the equal-value resistors fitted (RX) should also be able to deal with the voltage stress too!

voltage across D1 and would probably go short circuit.

Once this diode was shorted out D1 would then be overloaded and would go the same way blowing the power supply's fuse. The standard answer to this problem is to fit resistors of about $560k\Omega$ to equalise the voltages, as per the ones marked RX in Fig. 2.

Unfortunately, many modern resistors, which are often physically small, are not too happy having a high voltage across them, even if operated well within their wattage rating. If one of the resistors RX decides to go open circuit this throws things out of balance, and as in Ted's case, results in short circuit rectifiers and a blown fuse.

When servicing a high voltage p.s.u. you have a choice; either fit two 1W $270k\Omega$ resistors in series in place of each of the single resistors, or, as advised in the *ARRL Handbook*, rely on the 'avalanche' properties of modern silicon diodes and fit two identical diodes from the same production batch without the resistors.

As far as I'm concerned the jury is still out on this subject, but as it's always desirable to have some resistors to discharge the voltage when the rig is switched off, so I fit the resistors. Any comments from you readers?

High Voltage Capacitors

It's difficult enough trying to get replacements for the 550V electrolytic smoothing capacitors used in Amateur Radio rigs, (No don't ask me, I **haven't got any spare**) but just about impossible to obtain ones rated at over 1,000V. Because of this, manufacturers such as Yaesu and Kenwood, resorted to fitting two 550V capacitors in series.

Here again the internal resistance of these is likely to vary, and so resistors are connected in parallel

with the capacitors to equalise the voltages. So, if a capacitor blows, after you have obtained a replacement please remember to check the values of the resistors and replace them if necessary.

Linear Amplifiers

If you think you have problems with the 850V supply in a high frequency (h.f.) rig, how about about the high tension (h.t.) supply of over 2000V (2kV) in a typical h.f. linear such as the FL-2100Z To enable this amount of power to be handled, two sets of five series connected diodes are used **Fig. 3**. This is smoothed by six 550V smoothing capacitors, also connected in series. Parallel connected resistors are used to equalise the voltages and also as a safety measure in a high voltage linear.

Safety warning: Capacitors can hold their charge for weeks if there's no discharge path and (**particularly with high voltage units**) the rule is to leave the equipment to discharge for a few minutes after pulling out the mains plug and then to short the h.t. to chassis (just to be sure) before touching anything. (Note that the mains transformer only provides 850V, but I'll explain more about this next time.)

Headphones Again

Last time I discussed the various problems that can occur when using modern headphones with older equipment. However, just to really make things really difficult Yaesu managed to produce quite a large batch of FT-101E units on which the headphone socket was wrongly wired. These will not switch the internal speaker off – no matter what plug is fitted. The answer is to rewire the socket as shown in **Fig 4**, and then make sure that a mono plug is fitted to the 'phones.

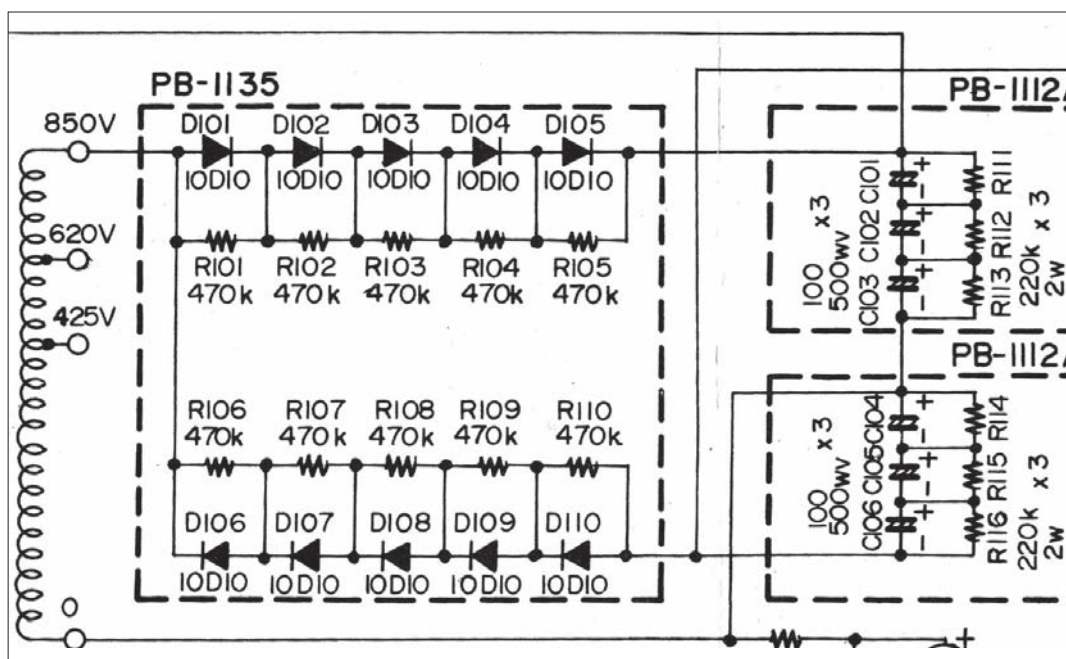


Fig. 3: An instance where multiple diodes and resistors are used is shown here in the circuit of the FL2100Z power supply

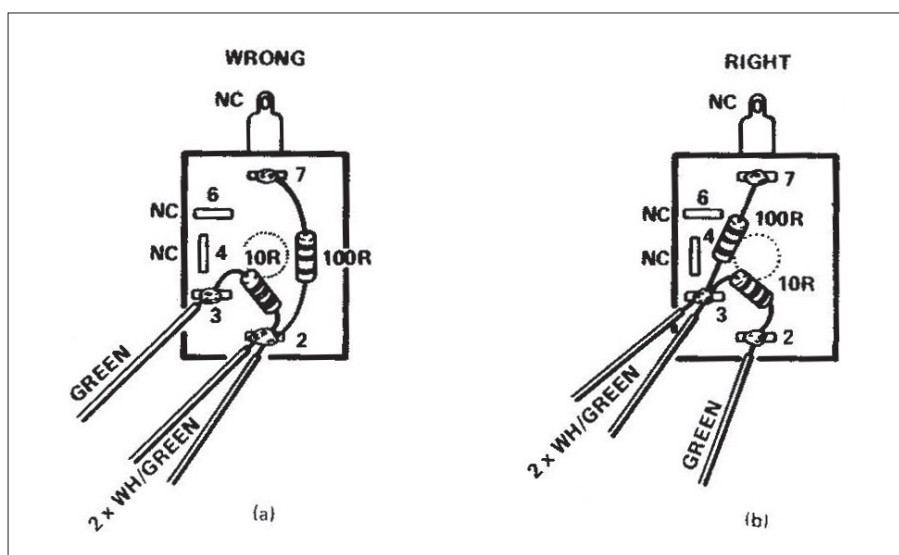


Fig. 4: A modification to cure a wrongly wired headphone socket, which didn't cut out the internal speaker when using headphones. This was a problem that occurred on quite a large batch of FT-101E units.

You Can't Oblige Everyone

Originally, our business was part of a family photographic and audio business, but in 1983 my wife **Brenda** and I opened our own Amateur Radio shop. The area we moved to was rather run down but it was cheap and there were no parking problems.

Soon we had a steady stream of locals with radios and cassette players that they wanted repairing and I soon learnt that to even attempt to oblige would be commercial suicide. I didn't want to be rude to people by saying,

"This heap of junk is not worth repair", and so I invented a minimum repair and handling charge of £15. As soon as I mentioned this they were out of the door in a flash!

Fuse Problems

As I'm sure readers of *PW* know, fitting the wrong fuse, or replacing one that has been blown by a fault, can be dangerous. However, to many people who came through the door, thinking that we some kind of electricians, there was no problem, they just asked

for a fuse. At first I tried to explain what a fuse was for, but I soon decided that spending several minutes selling a ten pence item was just not on.

Things came to ahead when a customer rather gruffly asked for a fuse for his TV, like the one he had in his

hand. I obliged, but a few minutes later he was back demanding a free replacement as the one I had supplied was faulty, it had blown straight away! That was it – from then on it was, "Sorry we don't sell fuses!"

Although I had a local Radio Amateur to help me on Saturdays, for most of the time I had to do the practical work myself. At times I was torn between completing an important repair and attending to people in the shop. However, there was always a very narrow line between recognising and getting rid of 'time wasters', and giving polite and helpful attention to those who had the potential to become valuable customers.

Sometimes I got it right! I had always been sympathetic to enthusiastic teenagers, who whilst they might have had not much money to spend, showed real interest. It certainly paid off, one became a magazine Editor and another writes for *PW*, and just about every other radio orientated publication. Both friends gave my shop favourable mentions over the years, and when you are in business you just can't beat free publicity!

See you next month when I will tell you about our visit to see the largest rechargeable wet cell battery in the UK!

PW

Problems

I like to hear about problems with older equipment, particularly pre-1990 Yaesu rigs. Please email me, (add some radio related term in the subject heading, to differentiate against spam), or write and enclose a stamped addressed envelope. Remember that electricity is dangerous, if you are not familiar with safety precautions you must never work on your equipment whilst it is plugged into the mains. (Switching off at the wall socket does not necessarily make equipment safe).



Rallies

Send your rally info to:

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

E-mail: newsdesk@pwpublishing.ltd.uk

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

FEBRUARY

February 13th

The Harwell Rally

The Harwell Radio and Electronics Rally will take place at the Didcot Leisure Centre, Mereland Road, Didcot OX11 8AY – this is three miles from the A34 between Oxford and Newbury. The doors will open at 10.30am (10.15am for the disabled) and admission will be £2.50 (children under 12 free). There will be talk-in (GX3PIA) on 145.550MHz, free car parking, trade stands, special interest groups, a flea market, catering with a licensed bar and facilities for the disabled.

Ann G8NVI

Tel: 01235 816379

E-mail: rally@g3pia.org.uk

www.g3pia.org.uk

February 13th

The Northern Cross Rally

The Wakefield and District Radio Society's Northern Cross Rally will be held at its old home of Thornes Park Athletic Stadium. There will be free car parking but the organisers have advised that the roads outside the stadium now have double yellow lines and you risk getting a ticket if you park there. Overflow parking will be available nearby.

Talk-in will be provided on their local, wide-coverage repeater GB3YW (145.7857MHz, 82.5Hz, narrow deviation) courtesy of the Five Towns Repeater Group.

The doors will open at 10.30am (10.15am for the disabled) and admission will be £3.00. There will be trade stands, special interest groups and catering.

Ken Quinn 2E0SSQ

Tel: 07900 563117 (before 20.00 please)

E-mail: kquinn27@o2.co.uk

February 27th

The Rainham Radio Rally

The Harwell Radio and Electronics Rally will take place at the Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent ME8 0BX. The doors will open at 10.00am (9.30am for the disabled).

Trev

Tel: 07717 678795 (leave a message)

E-mail: trev@wig1.co.uk

www.thebrats-qth.org

February 27th

The Swansea Rally

The Swansea Amateur Radio Society Rally will be held at the Court Herbert Sports Centre, Neath Abbey, Neath SA10 7BE. The doors will open at 10.30am and admission will be £2.50. There will be free parking, trade stands, special interest groups and catering with a licensed bar.

Roger GW4HSH

Tel: 01792 404422

www.radioclubs.net/swansears

MARCH

March 6th

The Bournemouth Annual Sale

The Bournemouth Radio Society's 23rd Annual Sale will be held at the Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH. The doors will be open from 9.30am to 2.30pm and admission will be £1.50. There will be parking, trade stands, special interest groups, catering and facilities for the disabled.

John G0HAT

Tel: 07719 700771

www.brswebsite.org.uk

March 6th

The Exeter Rally

The Exeter Radio and Electronics Rally will be held at the America Hall, De la Rue Way, Pinhoe, Exeter EX4 8PW. The doors will open at 10.30am (10.15am for the disabled) and admission will be £2.00. There will be talk-in, trade stands, a Bring & Buy and catering. All profits from the event will be shared between the local 2m and 70cm repeaters, GB3SW, GB3EW and GB3EX.

Pete G3ZVI

Tel: 07714 198374

E-mail: g3zvi@yahoo.co.uk

March 13th

The Wythall Rally

The Wythall Radio Club's 26th Annual Radio Rally will be held at the Woodrush Sports Centre, Shawhurst Lane, Hollywood, Near Wythall, Birmingham B47 5JW, which is two miles from J3 on the M42. The rally will be open from 10.00am to 3.00pm and admission will be £2.00. There will be talk-in on S22, on-site parking, trade stands, a Bring & Buy and refreshments.

Chris G0EYO

Tel: 07710 412 819

E-mail: g0eyo@blueyonder.co.uk

www.wrcrally.co.uk

March 19th

The Lagan Valley Rally

The Lagan Valley Amateur Radio Society Rally will be held at The Village Centre, 7 Ballynahinch Road, Hillsborough. The doors will open at 11.30am and there will be car parking, trade stands and catering.

Jim G10DVU

Tel: 02892 662270

E-mail: jim.henry@ntlworld.com

March 20th

The Callington Rally

The Callington Amateur Radio Society Rally will be held at Callington Community College, Launceston Rd, Callington, Cornwall PL17 7DR. The doors will open at 10.00am and admission will be £2.00. There will be parking, trade stands, a raffle, a Bring & Buy, catering and facilities for the disabled.

Chris G7UDX

Tel: 07973 418371

E-mail: g7udx@mac.com

March 20th

The Yeovil QRP Convention

The 27th Yeovil QRP Convention will be held at Digby Hall, Hound Street, Sherbourne, Dorset DT9 3AA (adjoining the central shopping car park). The doors will be open from 9.30am to 4.00pm and there will be talk-in on S22, car parking, trade stands, a Bring & Buy, catering and facilities for the disabled.

Derek M0WOB

Tel: 01935 414452

March 27th

The Spring Hangar Sale

The Spring Militaria, Electronics and Radio Amateur Hangar Sale will be held at Hack Green Secret Nuclear Bunker, Nantwich, Cheshire CW5 8AP. The doors will open at 10.00am and admission will be £2.50. There will be civil, military and vintage radio equipment plus vehicle spares and more.

Rod Siebert

Tel: 01270 623353

E-mail: coldwatr@hackgreen.co.uk

www.hackgreen.co.uk

APRIL

April 3rd

The South Gloucestershire Rally

The Avon Scouts Amateur Radio Club together with the Thornbury and South Gloucestershire Amateur Radio Club will be holding their third rally for the West Country at the Avon Scouts Activity Centre, Fernhill, Almondsbury BS32 4LX. This is conveniently located close to the crossover of the M4 and M5 motorways. The rally will start at 10.00am, admission will be £2.00 and there will be talk-in on S22, ample parking, refreshments and facilities for the disabled. There will also be space for 20 car boots on a hard standing nearby; tables and boots are available at £5 each and prior booking is essential.

Stan Goodwin G0RYM

Tel: 01454 413177

Mobile: 07833 517370

E-mail: gentryone@googlemail.com

www.avonscouts.org.uk/woodhousepark

April 10th

The Blackpool Rally*

The Northern Amateur Radio Societies Association (NARSA) Exhibition will be held at the Norbreck Castle Exhibition Centre, Blackpool. The doors will open at 11.00am (10.45 for the disabled) and there will be car parking, talk-in, special interest groups, a Bring & Buy, catering with a licensed bar, Morse tests and facilities for the disabled.

Dave M0OBW

Tel: 01270 761608

E-mail: dwilson@btinternet.com

www.narsa.org.uk

April 17th

The Andover Boot Sale

The Andover Radio Club's Spring Boot sale will be held in the Village Hall at Wildhern, which is north of Andover just off the A343 (postcode SP11 0JE). The doors will open at 10.00am for buyers (9.00am for sellers) and admission will be £1.50. Vendors will be charged £6.00 per boot or £8.00 per table. There will be talk-in on S22, catering and facilities for the disabled.

Martin

Tel: 01980 612070

E-mail: martinsmith@kukitd.co.uk

www.arac.org.uk

April 17th

The Lough Erne Rally

The Lough Erne Amateur Radio Club 30th Annual Rally will be held in the Share Holiday Village, Lisnaskea, Co. Fermanagh BT92 0EQ N. Ireland – access from 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 and facilities for the disabled.

Iain

Tel: 028 66326693

E-mail: gibbjgbb@aol.com

www.lougherneradioclub.co.uk

April 17th

The Kempton Rally*

The West London Radio and Electronics Show will be held in the Kempton Park Racecourse, Stains, Sunbury-on-Thames, Middlesex TW16 5AQ. The doors will open at 10.00am (9.50am for the disabled) and there will be free parking, talk-in, trade stands, a Bring & Buy, special interest groups, lectures, a raffle, catering and facilities for the disabled.

Paul M0CJX

Tel: 0845 165 0351

E-mail: info@radiofairs.co.uk

www.radiofairs.co.uk

Radio Spectrum under threat!

As users of the Spectrum, the issue is simple: PLA devices are causing interference and if we don't do something now we might not have a hobby take part in – it's that serious. Now is the time to start a Spectrum Defence Fund – not just to fight the PLT issue but other threats as and when they come up. The RSGB intends to challenge Ofcom's interpretation of the various Acts and Directives in respect of the PLA/PLT threat. We aren't looking to remove Comtrend and other such devices from the market place – that's an expectation too far, neither are we likely to see rapid results. What we are looking for, among other things, is to challenge Ofcom on their duty to ensure that in the future, non-compliant items such as Comtrend, are not put on the market.

A Judicial Review would likely cost in the region of £75,000 but could be a lot more as we'd be taking on organisation with almost unlimited funds to defend their corner who could, if they so desired, play a very long game that in turn we'd have to match. If every amateur in the UK pledged £10 to the Spectrum Defence Fund we'd probably have enough to fight the case and so we need your donations (no matter how small) to help us meet the threat.

Please help amateur radio and the radio spectrum by donating to the fund today!



Help us protect the future of Amateur Radio
Please donate online at

www.rsgb.org/defencefund

You can also donate by post by sending a cheque payable to 'The Spectrum Defence Fund' and sending it to: Spectrum Defence, RSGB, 3 Abbey Court, Fraser Road, Priory Business Park, Bedford, MK443WH. The 'Spectrum Defence Fund' is a secure and independently audited fund, the proceeds of which will only be used in defence of the radio spectrum.



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B.B. Mar '11

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NEVADA

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TRANSCEIVERS

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ICOM E91 DUALBAND HANDHELD	£169
KENWOOD TMV71E DUALBAND	£199
YAESU VX3E DUALBAND HANDHELD.....	£110

HANDHELD SCANNERS

ALINCO DJX2 AM/FM/WFM RADIO	£79
BEARCAT 72XLT H/HELD.....	£80
ICOM R5 HANDHELD SCANNER	£145

RECEIVERS

ETON MINI 300 PORTABLE	£13
LOWE HF 150 RECEIVER	£189
YAESU VR5000 WITH DSP.....	£435

ACCESSORIES

ALINCO EJ47U DIGITAL BOARD.....	£46
AOR VI8200 VOICE INVERTER.....	£40
DAIWA CN101L	£59
JIM M75 SCANNER PREAMPLIFIER.....	£54
KENWOOD MC85 MICROPHONE	£79
PALSTAR AA30	£69
TOYO SA450 ANTENNA SWITCH.....	£17
UNIROSS CHARGER & BATTERIES.....	£12
YAESU FC30 ATU	£165
YAESU MH35A2B SPEAKER MIC	£19
INTELLIGENT DIGITAL MULTIMETER.....	£25
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BEARCAT 800XLT BASE/MOBILE SCANNER.....	£259
ICOM R5 HANDHELD SCANNER	£179
ETON E5 PORTABLE SHORTWAVE RADIO	£69
ETON G3 PORTABLE SHORTWAVE RADIO	£69
ETON S350 RED PORTABLE RADIO	£59
ETON G8 PORTABLE SHORTWAVE RADIO	£39
ETON E100 PORTABLE SHORTWAVE RADIO	£35
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PALSTAR SPS9600 POWER SUPPLY.....	£150
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YAESU FT-900	£595
YAESU FT-60	£120
ALINCO DJ-V5	£200
ALINCO DJ-195	£100
ALINCO DJ-S11	£75
ALINCO DR-430 70CMS	£85
ICOM PMR 446X2WATER RESIST/W.CHARG	£200
MIDLAND CB 77-250K	£50
MIDLAND CB 77-805UK.....	£55
MAXON ALERT 7E CB	£65
STANDARD HX260E MARINE H/H NEW	£99

RECEIVERS

RCA AR-88 WITH MATCHING SPKR	£POA
YAESU FRG-7	£75
JRC NRD 345	£395
JRC NRD 525	£725
JRC NRD 535	£795
AOR 8200 MK3 DEMO MODEL	£349
LOWE HF-225 WITH KEYPAD	£325
YAESU FRG-9600	£225
YUPITER Y MVT-7100.....	£110
YUPITER Y MVT 7300	£99
UNIDEN UBC-800XLT EX DEMO/SOFTWARE.....	£265
UNIDEN UBC-860XLT DESKTOP	£65
REALISTIC PRO 2005	£80
REALISTIC PRO 50	£25
AMI DIGI SAT RX ASR WS201.....	£129
ALINCO DJX3.....	£70
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WORLD RECEIVER WR2100	£80
GOODMANS GCD200 DAB SPECIAL PRICE	£50
BPL WORLD SPACE	£25

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MILITARY STRAIGHT KEY CIRCA 1940.....	£35
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BHI NOISE AWAY ANEM	£55
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ICOM HS-51 SPECIAL BULK PRICE	£27
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YAESU XF-110CN FILTER	£55
YAESU XF-110S FILTER.....	£55
YAESU YSK-900 SEPARATION KIT	£65
AKD WA3 ABS WAVE METER	£25
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CG SB-2000 DATA CONTROLLER	£75
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ZETAGI HP1000 SWR METER	£65
MFJ 1278B DATA CONTROLLER.....	£65
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PM-2000 2KW PWR METER	£70
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Microset	PT-110	12V Stabilized 10A PSU with Over V / A protection.....	£69
Nevada	PSDL	50ohms Dummy load Dc-3000MHz max 15W.....	£30
Heil	AD-1-Y4	Cable for pro set and yaesu 4 pin round.....	£10
Kenwood	AT-50	1.8-30MHz 100W Matching Automatic ATU.....	£219
Midland	SWR-25	3.5-150MHz SWR / Power Meter 100W.....	£29
Roberts	R-862	HF/VHF receiver AM/WFM 0.15-0.281 / 0.522-1.62 / 4.6-21.95 / 87.5-108MHz 3 VDC (2*R6 / AA).....	£49
Alinco	DJ-X3E	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 700Ch + 8.33kHz step.....	£95
Optoelectronics	Model-2810	10Hz-3GHz Frequency Counter.....	£145
Academy	CB-34	3-way SWR Bridge and Field Strenght Meter 25W (3.5MHz) 15W (7MHz).....	£15
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Microset	PR-430A	70cms 100 Watt Version 15db Gain -1.2db NF.....	£130
Microset	RU-45	70cm 3-15W in,45W out Linear + GaAsFET Preamp 12V.....	£149
Microset	PT-107	12V Stabilized 7A PSU.....	£39
Kenwood	BC-10	Desk Charger for PB-5, 6, 7 & 8 Ni-Cd's with PB-6.....	£29
Roberts	R-861	Portable 150kHz-30MHz SSB, FM stereo RDS.....	£139
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	Moorse Prac	Home Made Morse practice oscillator.....	£10
Timewave	DSP-59	Multi-mode Audio Noise Filter with Gain Control 12V DC.....	£89
MFJ	MFJ-940A	28-30MHz 10m Mobile ATU + meter 150W.....	£39
Hi Mound	HK-706	Standard Straight Morse Key + Cover.....	£39
Win-Radio	WIN-108	108-136MHz Airband Hand Held Receiver 20Ch.....	£79
Yaesu	CD-24	12V DC Charge Adapter for FT-897D Ni-MH.....	£69
Midland	Alan-78Plus	Multi 40ch 4w CEPT CB Mobile Transceiver.....	£399
Garmin	eTrex H	Hand held 12Ch.High-sensitivity GPS + 500 Waypoints 2 x AA cell (not supplied).....	£59
Uniden	UBC-60XLT	66-512MHz (with gaps) FM Hand Held Receiver 80Ch. 4 x AA cells.....	£59
MFJ	MFJ-784B	Tunable DSP Audio Filter with Noise Reduction 12V.....	£189
Yaesu	FT-60E	2m/70cm FM Mil. Spec. 5W Hand Held Transceiver + Full CTCSS & DTMF keypad.....	£119
Shure	526T	Dynamic Desk Microphone + Mic-lock VOX & Amplifier 1x PP3.....	£59
Alinco	DJ-V17E	2m FM Palm Transceiver 5W, DTMF keypad & CTCSS.....	£99
Watson	WM-2000	Desk mic + Amp, Compressor & Graphic Equalizer.....	£79
Alinco	DJ-V17E	2m FM Palm Transceiver 5W, DTMF keypad & CTCSS.....	£99
Icom	IC-E90	6m,2m,70cm FM Hand Held Transceiver + DTMF keypad CTCSS & wide RX.....	£159
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SW	7-11	10W Mobile Speaker 8ohm.....	£19
AOR	AR-2002	25-550,800-1300MHz AM,FM,WFM Receiver 20Ch. 12V.....	£149
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RADIOWORLD

01922 414796

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ICOM	IC-2200H 144?146.....	£189.00
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NATO	Morse Key.....	£199.00
AOR	AR-2002 Receiver.....	£199.00
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MFJ-784B	DSP Filter.....	£219.00
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Yaesu	FT-480R 2m SSB, CW & FM Transceiver.....	£220.00
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MFJ-1278b	DSP Multimode Data Controller.....	£249.00
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MFJ-994B	600 Watt IntelliTuner Automatic Antenna Tun.....	£275.00
Yaesu	FT-690R II.....	£275.00
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Kenwood	R-2000 Receiver Inc Converter.....	£299.00
Yaesu	FRG-100 HF Receiver.....	£299.00
AirNav	Radarbox 2009 version.....	£299.00
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Alinco	DX-70TH HF & 6m transceiver.....	£399.00
Icom	IC-R72 Receiver.....	£399.00
Yaesu	FT-817ND HF 6m VHF UHF 5W Transceiver.....	£419.00
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Icom	IC-756Pro HF / 6m Transceiver.....	£899.00
IC-7400	HF, 6m & 2m transceiver.....	£899.00
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Icom	IC-910HX 2 / 70 / 23cms Base.....	£1,150.00
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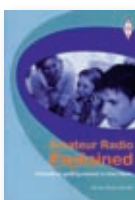
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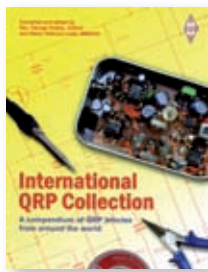
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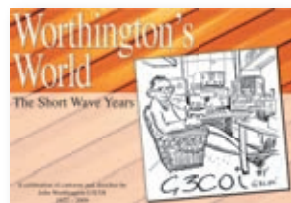
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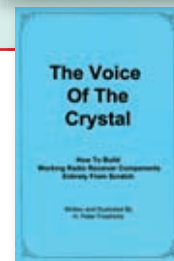
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Rob Mannion G3XFD/EI5IW's

Topical Talk

The Editor discusses points raised in readers' letter – including Internet based fraud and more comments on digital – DAB – radio.

In his letter (Letters this month) Ian Donnelly 2E0XOD has voiced the concerns he has regarding viruses, fraud and 'scams' operating via the Internet. In fact, I'm sure that Ian has struck a resonant chord for many of us, because hardly a day passes in the national media without a major internet-based fraud being mentioned.

Of course, here in the PW offices we receive many E-mails seemingly (I say seemingly because many are sent from much closer to home!) from Sierra Leone or the Ivory Coast offering us a small fortune (often bizarrely high amounts of money) in exchange for – basically speaking – our financial details, bank account, etc.

The scams – often called 419 after the (criminal-code paragraph) in Nigeria where they originated – are usually very amusing in their crudeness. But people do fall for the crazy offers before they find their bank accounts have been emptied. I wonder how many PW readers saw the BBC documentary where one lady – a willing potential 'victim' – and the documentary programme staff traced the base of the 'Nigerian' scam to Holland! Personally, I thought everyone involved in the documentary was very brave – as the alleged Nigerian fraudsters seemed extremely menacing! (Even to some of my Nigerian friends!).

Interestingly, the Nigerian 419 scam pre-dates the Internet and even the FAX system scams too. In fact the Nigerian authorities were dealing with the criminals behind the attempted frauds 40 years ago or so. However, in the days of fraud-attempt-by-letter they were in fact

much more sophisticated and targeted victims personally, using carefully obtained information. They weren't the crude 'undisclosed recipient' hoaxes we know today.

Unfortunately, despite the seemingly secure systems, the modern PC machine still seems extremely vulnerable to the many thousands of Internet viruses. I've heard from many readers who've inadvertently picked up a virus that then automatically uses their computer to broadcast adverts promoting electronics companies, mostly based in the People's Republic of China. I – and the readers involved – know this claim is true because I have replied to them to say I've received E-mails (purported to be from them) with links to the spam-advertisers. **This is fact and not speculation!**

The Apple Macintosh computers we use in the PW offices and users of the Linux system are broadly immune to many viruses – at the moment. The on-line criminals are concentrating on the vulnerable PCs – but this isn't to say we won't be targeted in the future.

We must not be complacent and everyone should be prepared to warn friends when scams, fraudsters and viruses are detected. So, if a friend starts sending you what appears to be odd messages advertising odd things (you know what I mean!) – give them a call and let them know. **Tex Swann G1TEX** who looks after our computers says that most people who have a computer infected by a virus don't realise it's been 'nobbled'.

Despite the 'doom and gloom' there's some good news! Recently, following

arrests in Russia and in the USA, spam traffic on the Internet dropped by an enormous percentage literally overnight – as the criminals were rounded up. So, there's hope for a safer Internet in the future. But until then – we have to help each other, flag up suspect websites and keep everyone warned of possible problems.

Success With DAB Antennas

I found **David Miller G4JHI's** letter (Letters this month) very interesting and I'm pleased David is generally happy with his DAB radio reception – using a fixed relatively high gain antenna system in his roof and what seems like a good quality (possible 'active') antenna in his car. He's also correct regarding 'local community' analogue (f.m.) transmitters being allowed to remain on Band II.

Most correspondents who have reported they're satisfied with the DAB radio reception seem to be using fixed, relatively high gain Band III antennas, feeding the signals to their receivers via coaxial cable. Personally, I think that their success adds weight to my argument that DAB radio – Band II or III – can only ever be reliable when a receiver is connected to a fixed, correctly adjusted roof or loft mounted antenna.

PW Publishing Office Opening Hours

Starting in February, we will all be working from home on Fridays and the office will be closed so please either E-mail or leave a message on our answer phone and we will reply to you the following week.

Rob Mannion G3XFD/EI5IW

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Building the Tintenna

Ray Howes G4OWY was much intrigued by the simple 144MHz antenna that **PW's Tex Swann G1TEX** constructed using the rim of a discarded coffee container. However, Ray's version uses another re-usable item – empty beer cans – proving that Radio Amateurs are pioneers in recycling!

Ben Nevis – An Amateur Radio Challenge!

Our hand-held radio specialist author – **Richard Newton G0RSN** – became **GM0RSN** when he drove to Lochaber in the Western Highlands of Scotland to climb the 1334m high Ben Nevis. Richard climbed the highest mountain in the British Isles – and was on the air thanks to Yaesu UK!

Valve & Vintage

Tim Walford G3PCJ has a treat for valve fans this month – as he describes a vintage but still practical valved v.f.o/mixer design.

Technical For The Terrified

Tony Nailer G4CFY explains more on r.f. feeders and looks at how we use the antenna as a transmission line and along the way and is determined to reduce the fear of feeders in readers!

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Optional, YAESU Exclusive, Fully-Automatic -Tuning Preselector System!

Fully automatic, Ultra-sharp, External μ -Tuning Preselector (optional) features a 1.1" (28 mm) Coil for High Q

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DMU-2000
Data Management Unit (option)