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Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine

D-Star Explained!

Chris Lorek G4HCL Introduces D-STAR and Tests Icom's Latest Digital Hand-held

NEW Icom IC-E920

UK FIRST REVIEW!

D-Star Compatible and Submersible Hand-held Transceiver

Reviewed

Timewave DSP599zx Digital Signal Processor

Build the PW Knole

G3PCJ's High Quality Receiver

Radio Personality

Robert van der Zaal PA9RZ

In the Shop

With Harry Leeming G3LLL

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

Waters & Stanton Eighteenth Annual

HOCKLEY OPEN DAY

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

SUNDAY 25th MAY 2008
From 10am

FT-450 NEW YAESU

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

Also get voice recorder and announcer!

W&S £529 D

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

FT-450AT with Built-In ATU **£609 C**

FT-950 NEW YAESU

100W
160 - 6m

W&S £999 D

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

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

These Yaesu offers expire 31/3/08

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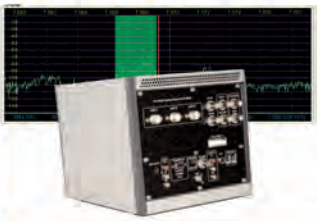
On most items over £200 in value it is now possible to buy with a finance agreement and pay nothing for 12 months without incurring ANY interest charges. If paid in full within 12 months then a £29 settlement fee is payable. **Typical example** of Buy Now Pay Later: Cash price - £600. Pay no deposit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

FLEX-5000A NEW HF Transceiver 100W 160m-6m FlexRadio Systems
Software Defined Radios



Performance Packed Radio!

This new software transceiver brings you performace and features no other radio in the world can offer!

SSB CW AM FM from milliwatts to 100W. 105dB dynamic range at 2kHz! 33dB intercept point. Single Firewire cable to PC. No sound card needed. 24 bit sampling at 192kHz, TCXO 0.5ppm ref. xtal, True plug and play with PC or laptop, Self-test and calibrate, Many contest & DXing features - www.flex-radio.com

Optional Internal Auto ATU **£225**

W&S £1695 D

Avair Power Meters

AV-201

Ideal for HF and VHF operation. It features high power handling up to 1kW.
** 1.8-160MHz * 5W, 20W, 200W, 1kW * Av or PEP* **£49.95 C**

AV-400 **£49.95 C**
140 - 525MHz, 5W, 20W, 200W, 400W

AV-601 **£69.95 C**
1.8 - 160MHz(S1), 140-525MHz(S2)

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

ICOM IC-E2820

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

IC-E2820 Mobile FM **£379 C**
IC-E2820 with D-Star **£519 C**

PW customers can claim an extra DC lead when ordering!

IC-E91

Fitted with D-Star
£349.95 C

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

FT-2000 YAESU

1.8-30MHz +6m 100W
£1695 D

FT-2000D 200W
£2399 D

FT-897D YAESU

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

W&S £579 D

Deal: FREE DELIVERY

FT-857D YAESU

New Low Price!

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

W&S £449 D

FT-DX9000D YAESU

FT-DX9000D **£7,299 D**
FT-DX9000CONTEST **£3,799 D**
FT-DX9000MP **£8,299 D**

FT-817ND YAESU

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

Deal: bhi DSP fitted **£449**

W&S £349 D

TM-V71E NEW KENWOOD

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

W&S £269 D

FTM-10R/E NEW YAESU

Bluetooth

W&S £249 D

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

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

IC-7700 NEW ICOM

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

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

W&S £3999

Deal: NC-4 Headphones **FREE**

IC-7800 ICOM

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

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

W&S £6400 D

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

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www.wsplc.com

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Zero Interest

!!!STOP THE PRESS!!!

DEAL! IC-E2820 + UT123 D-STAR MODULE FITTED ONLY £499.95!

NC-2 & NC-4 NOISE CANCELLING HEADPHONES!

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

£24.95 C

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

£24.95 C

TS-2000

KENWOOD

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

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

Deal: FREE Extra DC Lead (Quote advert when ordering)

W&S £1295 D

TS-2000X with 23cms £1599 C

TS-480SAT 100W HF+6m £679 D

IC-756PROIII

ICOM

HF + 6m 100W All-Mode

W&S £1749 D

IC-756PROIII Special Deal

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

Only £1829 D

IC-7000

ICOM

HF/VHF/UHF All-Mode Transceiver

W&S £899 D

Deal2: With TFT PAL TV Screen £989
Deal3: With TFT + Power-Mite PSU £1009

IC-7400

ICOM

HF - 70cms 100W transceiver plus SP-21 spkr and SM-20 mic £1295

IC-718 HF 100W transceiver £439

IC-706IIGDSP

ICOM

HF/VHF/UHF 100W Transceiver

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

W&S £649

IC-703DSP

ICOM

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

W&S £449.95 D

Visit our eBay shop for more bargains!

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

Exclusive to Waters & Stanton!

Radiomate NEW

For YAESU

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

Rig not included!

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

£99.95 C

bhi DSP Noise Cancelling

NES10-2 MkII

Speaker and programmable DSP unit. Offers dramatic noise reduction.

£99.95 C

ANEM

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

£124.95 C

NEIM-1031

Noise Eliminating In-Line Module.

£139.95 C

NEDSP-1061-KBD

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

£99.95 C

NEDSP-1062-KBD

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

£104.95 C

Icom VHF/UHF Mobile/Base

IC-E208

Dual Band FM Mobile *144-146MHz, 430-440MHz Tx *55/50W (3 pwr steps each band) *Wideband Rx 118-173, 230-549 & 810-999MHz £219.95 D

IC-910H £1089 D
2m/70cm 100W Base station all-modes Option for 23cm module (UX-910 £359)

IC-910HX £1239 D
As Above but with 23cm Module ready fitted and a big saving as well.

IC-2200H £179.95 D
2m 55W FM mobile with rugged construction and with digital option.

IC-2725E £279.95 D
2m/70cm radio. Easy to operate and install and a lovely detachable head.

Kenwood VHF/UHF Mobiles/Base

TM-271E

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

£149 D

TM-D710E *Low Price* £399 C
Dual band APRS 50W FM

Yaesu VHF/UHF Mobiles/Base

FT-7800E

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

£169 D

FT-1802E *Low Price!* £99 D
*2m FM Mobile transceiver *5,10,25,50W

FT-8800E *Low Price!* £219 D
*2m/70cm Dualband FM Mobile transceiver

FT-8900R *Low Price!* £249 D
*2m/70cm/6m/10m Quadband FM Mobile

Yaesu ADMS Software

Programming Software For Your Radio

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

ADMS-1 F for VX-110/150 / ADMS-1G for VX-7
ADMS-1H for VX-2E / ADMS-1J for FT-60E
ADMS-2H for FT-8900 / ADMS-2I for FT-8800
ADMS-2J for FT-2800 / ADMS-2K for FT-7800
ADMS-3 Programming Kit for VR-500
ALL £39.95 with FREE PC Radio Data Lead.
ADMS-4A for FT-817 & **ADMS-4B** for FT-857/8 ***BOTH*** £29.95 both these items require a separate CT-62 lead at £29.95

IC-E92 NEW

ICOM

2m/70cm Handheld with Built-in DSTAR

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

Includes antenna, and charger.

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

W&S £319.95 C

Icom VHF/UHF Handhelds

IC-E91 D-Star Ready

Latest dual-band handheld transceiver. receiver that covers 0.495 to 999MHz. £239.95 C

IC-E91 with D-Star	£349.95 C
IC-V82 7W 2m Digital	£159.95 C
IC-U82 70cms Digital	£159.95 C
IC-E90 6m/2m/70cm	£199.95 C
IC-T3H 2m 5W	£129.95 C
IC-E7 2m/70cm Wide Rx	£169.95 C

Kenwood VHF/UHF Handhelds

TH-F7E

- 144-146MHz Tx/Rx: FM
- 430-440MHz Tx/Rx: FM

Up to 6W out with Li-ion battery and **"scanner" style coverage from 100kHz to 1300MHz** including SSB on receive!

£199.95 C

TH-K2E 2m 5W	£99 C
TH-K2ET 2m 5W FM	£145 C
TH-K4E 79cm 5W FM	£139 C

Yaesu VHF/UHF Handhelds

VX-7R (Black)

Limited Special Offer

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

£209 C

VX-6E 2m/70cm wide rx 5W	£169 C
FT-60E 2m/70cm wide rx 5W	£129 C
VX-120 2m 5W w/8-key pad	£99 C
VX-170 2m 5W w/16-key pad	£109 C

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

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DM-15W 15W DUMMY LOAD

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

W&S £15.95 A

Power-Mite-NF NEW

NOISE OFFSET POWER SUPPLY

Banish Switch Mode Noise!

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

W&S £59.95 C

Power-Max-25-NF NEW

NOISE OFFSET POWER SUPPLY

Banish Switch Mode Noise!

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

W&S £89.95 C

W-25AM WATSON POWER SUPPLIES

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

W&S £89.95 D

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

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

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

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

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

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

Watson Power Meters

W-220

*1.6 - 200MHz *0-5W / 0-20W / 0-200W (max power 200W) *SO-239 *50 Ohms *Size 190x85x135mm *Weight 790g *Accessories: DC lead for 12V illumination

W&S £49.95 C

W-420 £49.95 C
118-530MHz, 0-5, 0-20, 0-200W, SO-239

W-620 £89.95 C
1.6-530MHz, 0-5, 0-20, 0-200W, SO-239

WHF Single Band HF Antennas

WHF-160B	160m Mobile Whip	£49.95 C
WHF-80B	80m Mobile Whip	£19.95 C
WHF-40B	40m Mobile Whip	£18.95 C
WHF-30B	30m Mobile Whip	£18.95 C
WHF-20B	20m Mobile Whip	£18.95 C
WHF-17B	17m Mobile Whip	£18.95 C
WHF-15B	15m Mobile Whip	£18.95 C
WHF-12B	12m Mobile Whip	£18.95 C
WHF-11B	11m Mobile Whip	£18.95 C
WHF-10B	10m Mobile Whip	£18.95 C
WHF-6B	6m Mobile Whip	£18.95 C
WHF-4B	4m Mobile Whip	£18.95 C
WHF-2B	2m Mobile Whip	£18.95 C

W-300T/S TRIPLE MAG MOUNT

W-300T accepts 3/8in stud mount antennas. W-300S accepts PL-259 mount antennas.

W&S £39.95 C

WM-14B MAGNETIC MOUNT

The base is fitted with an SO-239 socket, and 17ft of cable terminated in a PL-259 plug.

W&S £12.95 A

G5RV HF ANTENNAS

G5RV-FULL *80-40-20-15-10m *31m Top Section *300 Ohm: 9.2m *Resonant Band 20m *SO-239 Connector *50 Ohm Imped.

G5RV-FULL	Full Size	£24.95 C
G5RV-HALF	Half Size	£21.95 C
G5RV-XF	Extra Full Size	£49.95 C
GR5V-XH	Extra Half Size	£44.95 C
GR5V-DS	Double Size	£39.95 C

WSM-270 VHF/UHF MINI-MAG ANTENNA

*Ideal for use with dualband 2m & 70cm Transceivers *Tx: 144-146 & 430-440MHz *2.15dBi & 6.15dBi *50W Max *Micro Magnetic 29mm Base *Element Length 0.46m *2.75m Mini Coax with BNC

W&S £19.95 A

Bargain Price Antennas

Pre-tuned & Weather Sealed Fibre-glass encapsulation

W-30 2m/70cms 3/6dB length 1.15m 150W SO-239 £29.95 C

W-50 2m/70cms 4.5/7.2dB length 1.8m 150W SO-239 £39.95 C

W-300 2m/70cms 6.5/9dB length 3/1m 150W SO-239 £49.95 D

W-2000 6m/2m/70cms 2.15/6.2/8.4dB length 2.5m 150W £59.95 C

Mobile Whips Bargain Prices

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

Watson - the name you know!

W-2LE	2m 0dBv length 0.48m	£9.95 C
W-285	2m 3.4dBv length 1.33m	£12.95 C
W-77LS	2m/70cm 0/2.4dBv length 0.43m	£10.95 C
W-770HB	2m/70cm 3/5.5dBv length 1.1m	£16.95 C
W-7900	2m/70cm 5/7.5dBv length 1.58m	£24.95 C
W-627	6/2/70cm 2/4.5/7.2dBv length 1.6m	£27.95 C

QS-112 HANDHELD SPEAKER MIC

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

W&S £16.95 A

WEP-601 HEADSET WITH BOOM MIC

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

W&S £19.95 A

SP-160 COMPACT MOBILE SPEAKER

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

W&S £9.95 A

SP-170 COMPACT MOBILE SPEAKER

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

W&S £12.95 A

WM-S MOBILE MIC SYSTEM WITH PTT

*Hands-Free Operation with latching PTT *Mic mounts ontoSun Visor *PTT Box mounts on Gear Stick *DC Power taken from Radio Mic Socket

WM-S-FT comes with RJ-11 lead, WM-S-IC & WM-S-RW require additional lead, please ask when ordering.

W&S £39.95 C

HP-100 LIGHTWEIGHT COMMS HEADPHONES

*Dual 8 Ohm drivers *200 - 9,000Hz *Covered Ear Pieces *3.5mm Stereo *1/4" Stereo Adaptor

W&S £19.95 C

HP-200 COMMUNICATIONS HEADPHONES

*Dual 8 Ohm drivers *200 - 10,000Hz *Padded Ear Pieces *3.5mm Stereo *1/4" Stereo Adaptor

W&S £22.95 C

FBI-9 SECURITY TYPE EARPIECE

*8 Ohm Earpiece *Soft Clear Ear Clip *Clips Over Ear *3.5mm Mono **W&S £9.95 A**

WEP-300 SECURITY EARPIECE

*8 Ohm Earpiece *Secure in Use *Clips Over Ear *Fitted 3.5mm Plug **W&S £3.95 A**

WD-24 / WD-25 DUPLEXERS

WD-24

WD-24 SO-239 Socket & 2x PL-259 Plugs. Port1: HF + 6m + 2m Port2: 70cm

WD-25 SO-239 Sockets Port1: HF + 6m + 2m Port2: 70cm

WD-24 £22.95 A
WD-25 £24.95 A

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

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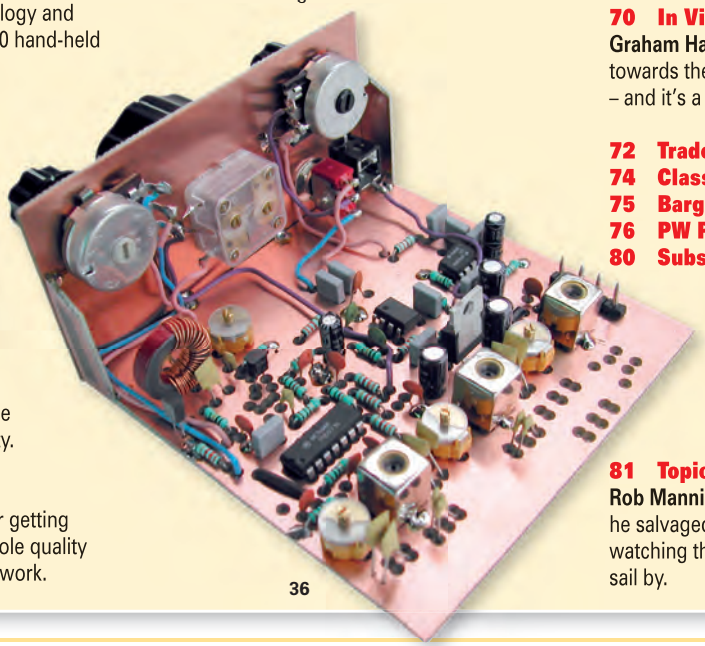

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Rob Mannion's

keylines

Rob thanks everyone involved with GB75PW and pays tribute to Pat Hawker G3VA.

January 28th 2008 was rather special for me, as it marked the 40th anniversary of the G3XFD licence. Unfortunately, as keen as I was in 1968 to get on to the air with my KW Vanguard amplitude modulated (a.m.) transmitter and Eddystone 750 receiver – as I had severe tonsillitis – it was well into February before I gave my first (very croaky) "CQ" call.

Getting on the air was a real adventure, and looking back, I realise just how many mistakes I made – and what a steep learning curve I found myself on. I also realise now just how little I then knew about EMC problems and making sure that the precious r.f. energy from my (50W d.c. input) Vanguard was being radiated effectively.

There were no voltage standing wave ratio (v.s.w.r.) measuring instruments in my shack then – just a little neon indicator bulb to indicate 'maximum smoke' and that was it! In fact, I'm sure that during my first six months on the air most of the r.f. from my long wire antenna was being wasted and radiated inefficiently – much of it in the shack!

How things have changed – and they've changed for the better! The old style Radio Amateurs Examination (RAE) syllabus could allow Amateurs onto the air with no practical training whatsoever! Of course, in practice, the vast majority of RAE students had much practical experience, as we'd often been taught by our peers at local clubs. Despite this, I've met and known many G3 callsigns who openly admit that they had never held a soldering iron, made, nor set-up and adjusted equipment for themselves until the home-brewing bug bit them many years later!

When the Novice system – complete with an extremely well structured training course – came into being I was most impressed with the practical skills the Novices demonstrated. And although I fully supported the Novice scheme, I also voiced my concerns at any classifications planned for any future licence system in the UK. However, despite my concerns, the different classes of licence have been introduced successfully and I've been proved wrong in spectacular fashion! My concerns on the effect of the new licence classification system in a nation seemingly (according to the media!) obsessed with the 'class system' were obviously unfounded!

Young Recruits

Visiting the **Poole Amateur Radio Society** with **Freddy Robinson –** my eldest grandson – I've been extremely impressed with the welcome received and the young recruits to our hobby who are being trained there. Nine year-old Freddy soon made friends and has thoroughly enjoyed himself.

However, I have to 'hold back' with Freddy, as it would be too easy to overload him with facts and information as we work in the shack. Despite this he made it obvious that he was interested in anything involving electronics and has an insatiable curiosity of how (literally) anything works.

To encourage Freddy I gave him an electronics kit for Christmas. Available in Maplin stores the exceptionally well designed kit (less than £20) enabled him, using snap-together components, to build (by himself mostly) many different projects, ranging from water level censors to audible alarms and flying saucers! In fact the highly amusing 'flying saucer' uses a speed controlled electric motor driving a rotor disc, and developing enough lift, it takes off and climbs high into the air. At one stroke Freddy learned about electric motors, speed control, simple aerodynamics and had great fun!

Freddy's enjoyment with the kit reminded me that Amateurs like myself – when we find someone who has a fledgling interest in what we're doing – can sometimes go 'overboard' somewhat. It's all too easy to demonstrate transceivers, Morse operations, test equipment, etc., and most likely overload our 'audience', when something simple could spark a lasting interest.

As I've said in the past, it's surprising just what – involving electronics – can attract the attention of a young person. Years ago I found – much to my surprise – that simple dynamic earpieces used a 'sound powered telephones' fascinated 13/14 year old school radio club members. They then went on to link school dormitories using their telephones – even developing a simple exchange – and that's when I realised that the simplest ideas can spark a life-long interest!

Rob Mannion G3XFD/EI5IW

Practical Wireless

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Practical Wireless

readers' letters

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

Star Letter

Science & Maths Studies

Dear Rob

First, I'd like to thank you and everyone else who contributed, for the special 75th anniversary issues published throughout last year. It was fascinating to see how *PW* reflected the changing nature of our radio hobby over the last 75 years.

Following last year's period of looking back, perhaps it's now appropriate to look forward, and to what the future may hold for us in Amateur Radio – and electronics – enthusiasts. While the number of Radio Amateurs is high compared to when I was first licensed in 1973, we're told that a decline is inevitable unless a steady stream of new enthusiasts can be recruited into the hobby. However, not being an advocate of 'numbers at any price', I'm also concerned about the loss of the collective skills and knowledge of UK Radio Amateurs, and hence our standing in relation to other users of the radio spectrum, to Ofcom, and to the UK Government.

It's been widely reported that the proportion of UK students taking maths and science courses has fallen over recent years. This is causing some concern, as it's resulting in fewer 'home-grown' science and mathematics graduates. Clearly there is an urgent need to – somehow – encourage more secondary school pupils to study science and maths. So, given this current lack of interest in science and the need to recruit new Radio Amateurs, perhaps now is the time to make a renewed effort to introduce Amateur Radio and electronics into every secondary school.

I was fortunate to have been introduced to Amateur Radio when I was 15, when I had sufficient mathematical and scientific knowledge to appreciate a technical hobby. My rapidly growing interest in radio also helped with my academic studies, as I became more interested in physics so maths became less of a chore. I also gained more than a little knowledge of UK and world geography! Sadly, these academic benefits may no longer be fully appreciated by teachers and other members of the academic establishment.

Undoubtedly there could be benefits to both the UK Radio Amateur movement and to the popularisation of science in schools, if Amateur Radio and electronics became appropriately supported extra-curricular activities. Where there is sufficient interest, after-school radio and electronics clubs could be formed, while at the very least, existing radio clubs could ensure that older schoolchildren were always welcome. It's worth a try!

Dr Philip Cadman G4JCP
Scotts Green
Dudley
Worcestershire

Thanks Phil! As readers may realise – Phil G4JCP is one of our established authors and has diverse interests in the hobby. To help take this debate further I'm sure there are other readers who could put their point of view – especially those in teaching! ***Rob G3XFD.***

No 599 Here!

Dear Rob,

I would like to mention that there are really QRP events which do not focus on RST599 only. Think of the original QRP contest which even offers a bonus when you follow the three 'H approach': hand logged, hand keyed, ham's head decoded! Another one is the annual Winter Sports of the G QRP Club – where you will find the non 599 operating style. I wonder whether the next issue of *PW* will be in time to announce the Yeovil Fun Run at the end of March? Some friends of the DL QRP group initiated the First European Fox Hunt. Every Monday from January to the end of March 1900 UTC to 2000 UTC on 40 and 80 metres there will be some 'foxes' on the QRG. And - to speak in hunter's terms – you have to chase them. There will be a lot of time for other QSOs then providing band conditions are good. **Dom M1KTA** and **Gary 2E0BFJ** will be foxes. So give them a call. It's an interesting exercise to check the bands for only one hour thoroughly. Perhaps *PW* would be kind enough to announce this brief info on its own website?

You'll find further info here and the calls of the Monday foxes in advance **http://foxhunt.qrpforum.de/**

I agree, the name Fox Hunt is a bit misleading, it's more an activity of activators, fox beacons, enthusiasts, and Amateur activists who wave the QRP banner this way. 73 to everyone.

Dieter Klaschka DL2BQD GQRP 7739
Kuelzviertel 20
D-16303 Schwedt
Germany

Thank you Dieter! I'd like to suggest that you post all your activities on the ***Southgate Amateur Radio Club's*** *website. This superb site (****www.southgatearc.org****/) is the ideal place to read the news ands to spread the news.* ***Richard Brunton G4TUT*** *who runs the site will be pleased to hear from you and to promote your activities.* ***Rob G3XFD.***

Increasing Level Of Stupidity

Dear Editor,

Once again it seems that the Amateur Radio service is not immune to the increasing level of stupidity within society in general. This evening I listened with increasing incredulity at

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the moronic jamming taking place on my local v.h.f. repeater, an activity which sadly, is a regular occurrence, leading to increasing numbers of local licensed Radio Amateurs openly admitting to me that they avoid using it purely because of such abuse, and asking why 'no-one is doing anything about it'.

However, this sort of abuse and stupidity is not confined to my local area. For the past few evenings, the DX window of 3.7MHz has been literally obliterated by (what appear and claim to be) high-powered Italian stations with signals of +20dB here in Wales, playing tape recordings of laughter, repeated idiotic comments, and making a myriad of other abusive noises, resulting in the top 10kHz of the band being completely unusable for any normal operation, let alone DX communication.

The abuse on 3.7MHz is something that affects a far wider area than my local v.h.f. repeater of course, but the effect is exactly the same. What impression does repeater jamming give to our new Foundation licensees, many of whom have joined the Amateur Radio service in order to escape such idiocy on 27MHz CB? What impression does the abuse on 3.7MHz give of us European Amateurs to the north American stations trying to work DX into Europe and hearing such chaos? Again, on 3.7MHz tonight, as on v.h.f., I heard Amateurs asking "why no-one is doing anything about it"?

The answer is in our hands. If you hear repeater abuse, switch to your input, and if the offending signal is full scale or end-stopping, then it's reasonable to assume that the jammer or abuser is fairly close to you. Report the abuse to Ofcom with recordings if possible, and any other details of the jammer's transmission, then announce it over the repeater.

Similarly, in the case of abuse on h.f., someone must be within range of the offenders and have a good idea, using local knowledge, of where the offending signals are coming from. Rather than remain silent, report it. That's the only way that radio abuse will be dealt with, not by leaving it to others and asking 'why no-one is doing anything about it'.

I have done this in the past, resulting in at least one repeater abuser going QRT. He now only uses computers for his QSOs via repeaters elsewhere, and yes, sadly he was licensed, and had been for nearly 20 years.

I am reminded of a saying that went: "All that is required for evil to triumph is for good men to do nothing". That says it all doesn't it?

Leighton Smart GW0LBI
Trelewis
Mid Glamorgan
Wales

Radio Enthusiasts & Recycling

Dear Rob,

As I was a keen reader of your Radio Basics series of articles – where you often suggested recycling old radio components – I remember E-mailing you to say how successful I had been at my local recycling centre here in Bournemouth. The Longham recycling centre was a real mecca for anyone in junky bits that could be used again, perhaps in a new role. Up until about two years ago the Longhams site was a teeming mass of people either dumping, swapping or buying from the authorised recyclers. And, if you were able to convince them that you knew what you were doing – mains powered equipment was not disabled by having mains leads cut off (for safety reasons!) when they were sold by the recyclers.

Unfortunately, the Longham recycling centre became far too popular and the site couldn't cope as people came from far and wide. Anyone could go there, dump their stuff and leave – often with some new 'goodies' because one person's junk is the other person's treasure! Nowadays though, the Longham centre is for residents of Bournemouth only and we have to show a Council Tax receipt or driving licence, etc., to the chap on guard at the entrance – even though he's too sleepy to bother to properly check your identity!

All the electronic and computer equipment is now sent away for disposal and probably ends up abroad for recycling. Recently, I heard that some unfortunate people had their personal details removed from recycled computer hard drives that had been sent to Nigeria! I think it's a shame the equipment is sent abroad – just imagine the fuel required by ships to get it to Nigeria, India or Bangladesh.

In the past I've managed to get a lot of reusable stuff – legitimately – from Longhams. It was dumped as junk and was resold to me to be taken away again to be reused and I even got a spare transformer for my old oscilloscope from Longhams. What an opportunity has been lost by sending recyclable electronic equipment abroad. It doesn't make sense for the environment as far as I'm concerned. Best wishes to you and **Tex G1TEX**.

Keith Hamilton
Bournemouth

I totally agree with you Keith and it's a great shame that because of the 'Politically Correct' approach adopted at most recycling areas – local authority owned but often operated by contractors – the chance of someone legitimately obtaining a scrap PC for spare parts has gone. In fact, I remember meeting you when I was dumping garden waste for recycling at Longham in 2006 and we were debating what would happen to some of the (probably repairable or suitable for spares) computers and consumer electronics at the site. I hope the madness of sending such stuff abroad will cease soon when those involved realise we are just exporting pollution to poorer countries. I'm sure that much of the material could be re-used here –with minimum pollution – by industry and the hobbyist (please join me on the Topical Talk *pages).* ***Rob G3XFD****.*

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

Elaine Richard's

news & products

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

South West SSTV

A small group of Amateurs in Wiltshire are maintaining regular SSTV activity during Monday and Thursday evenings primarily on 144.5MHz (f.m.) from around 2000UTC. The current group include **M3ZWP, G8TTI, G7KVO, 2E0MPN, 2E0OTL, 2E0DBD, G0GRI** and, occasionally, **M3WBS**. Additionally, **GW0GHF** (Penarth) has also exchanged pictures with several of the Wiltshire group in recent weeks. The group appreciate that others may be active on or around the same time and would welcome contacts to establish schedules or alternative working frequencies. Please contact the group via the Chippenham & DARC website **www.g3vre.org.uk**, which also includes an SSTV gallery.

A small on-line digi-mode club can be found at **http://groups.google.co.uk/group/digimode-group**, this website includes SSTV information, interface details and so on.

Any reception reports will be appreciated, either via the C&DARC website, QSL card or make yourself known by calling in on the net.

An SSTV Picture receiver by G0GRI from a transmission by 2E0MPN to G8TTI.

Slow Morse Net

For the last seven years, every evening that he can manage, **Ian G3ROO** transmits on 3.564MHz plus or minus QRM at 1830 local time and calls CQ QRS net at 12w.p.m. The idea is to give newcomers to c.w. the chance of a real live QRO with someone they don't know. It's proved very productive and very rewarding seeing people progress in this magic mode where real personal skill is exercised!

If other slow Morse operators would like to contact Ian, then he can update his website (**www.g3roo.org.uk**) with the information.

Summits on the Air Awards Programme

The popular Summits on the Air (SOTA) award programme has been successful in encouraging many new people into the hobby of Amateur Radio, particularly younger people. Each year, SOTAbeams, who manufacture portable radio antennas, awards prizes to youngsters who have excelled in carrying out SOTA activations throughout the year.

The 2007 winner is fourteen-year old **Thomas M3OOL**, shown in the photograph. Thomas, along with his dad **Rick M0RCP**, started activating in February 2007. Dogged determination has kept them activating throughout the year with Thomas achieving 46 hilltop activations. They have become regulars on 2m f.m. and s.s.b. in the Northwest of England and Thomas' win is well deserved. Thomas wins a 3-element SOTAbeam complete with feeder support pole and guying kit.

Runner up was **Timothy 2E0KEA** (12). Timothy did amazingly well with 29 activations logged - he's based in Suffolk, just about as far from any hills as possible! Timothy wins a Waterlog, waterproof logging system.

Kindly, SOTAbeams have agreed to sponsor the challenge again in 2008. Details at: **http://www.sotabeams.co.uk**

Lightweight Beam

SOTA Beams organisation have introduced the SB270. This is a super lightweight beam for 144 and 430MHz portable use. Building on the experience gained with hundreds of users of the original 144MHz SOTA beams, they have completely rethought the design to make the SB270 the easiest-to-use portable antenna ever. In addition to adding 430MHz, a new element mounting technique has been developed, making it faster than ever to put this antenna together in extreme conditions.

The three element 144MHz Yagi has been redesigned, giving even better performance than the original. The six element 430MHz Yagi has been designed to have a very clean radiation pattern as well as a broad bandwidth, allowing its use for satellite and ATV working. The whole beam, including the 144 and 430MHz elements, packs into a single slim tube 1m long. This allows easy use in the hills or for storage in a car boot.

The SB270 is sold as a complete kit including feeder, a mast and guying kit and is available at an introductory price of £79.95 + £8.50 P&P. Users of the original SOTAbeam can benefit from a trade-in deal.

SOTA Beams, 89 Victoria Road, Macclesfield, Cheshire SK10 3JA.

A GPS Microphone for the IC-E92D

Icom's new GPS speaker microphone, the HM-175GPS for the IC-E92D is designed for the active Radio Amateur. Whether you take your radio with you hiking, mountain biking, contesting or out on an expedition, the IPX7 waterproof (IPX7 1m depth for 30 minutes) new speaker mic will withstand it all.

The HM-175GPS allows the IC-E92D to display position information on the screen and lets you report your position in Digital Voice mode. Using the speaker microphone, the IC-E92D can show the direction to a received D-STAR station or to a memory position with a compass like display needle.

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

Compact Keypad

bhi have reduced the price of their Radio Mate compact Keypad for the Yaesu FT-817, FT-857 and FT-897 to £89.95 plus p&p. The Radio Mate enables the user to get the best out of their radio by making many of the common functions quick and easy to use. It is suitable for people who find some of the controls on their radio difficult to use. It requires no external power and connects to the 8-pin CAT interface of the radio. An LED indicates the current mode, red for the memory mode (up to 20 memories can be stored), green for the direct frequency entry mode and yellow for the modulation mode. There is an on on/off switch on the side of the unit.

More information can be obtained from bhi on **0845 217 9926**, or go to their website **www.bhinstrumentation.co.uk/html/radio_mate__keypad.html**

Advanced Antenna Design

Artech House has just published the book *Adaptive Antennas and Phased Arrays for Radar and Communications* by **Alan J. Fenn** of MIT Lincoln Laboratory, USA. Based on the author's extensive research at MIT Lincoln Laboratory, this book offers an in-depth description of adaptive array design, emphasising the r.f. characteristics, mutual coupling among elements and field-testing methods. It provides proven techniques for challenging projects involving radar, communication systems and antenna design.

The book presents example prototype phased array antennas, including discussions on monopole phased arrays, finite and infinite array analyses, measurements for planar arrays of monopole elements.

Adaptive Antennas and Phased Arrays for Radar and Communications (ISBN: 978-1-59693-273-9) is available from Artech House, priced £77.

Shefford & District's 60th!

To open their 60th year of celebrations, the **Shefford and District Amateur Radio Society** entertained the celebrated scientist **Prof. Colin Pillinger** of *Beagle 2* fame on January 31st.

Before a large audience of members and many visitors drawn from the local clubs, including Cambridge, Stevenage and Milton Keynes, the Professor (pictured here) presented a light hearted overview of the history and development of space travel and of his extraordinary *Beagle 2* Mars project.

David Lloyd G8UOD, the Shefford club secretary, invites all of their past members to contact him with their personal recollections and photos from earlier days, in order to contribute to the preparation of a special history of their past 60 years.

davide.lloyd@ntlworld.com or **01234 742757**.

High Speed Morse

Attention all those who can send and receive good Morse at high speed! The 6th IARU Region 1 High Speed Telegraphy championships are being held at Pordenone in Italy between April 23rd an 27th. Anyone interested in representing the UK is invited to contact **RSGB General Manager, Peter Kirby G0TWW, by post to RSGB Headquarters, Lambda House, Cranborne Road, Potters Bar, Hertfordshire, EN6 3JE** or by E-mail: **gmdept@rsgb.org.uk**. More information on this event is available at: www.hst2008.org

Celebrating 30 Years

A significant milestone has been reached in 2008 with the celebration by the **Wirral and District Amateur Radio Club** of their 30th Anniversary.

Founded in 1978, the Club meets twice monthly on a Wednesday at their HQ at the Irby Cricket Club on Wirral, for talks, presentations and practical evenings. The alternate Wednesdays are allocated to an informal gathering at various other local locations where lots of radio and technical topics are discussed.

Whilst a couple of senior members have gone 'Silent Key' over the last year, their overall membership is increasing, which is most pleasing to see.

The Club aims to provide a variety of talks and visits each year to encompass our members varied interests in amateur radio and electronics. A favourite activity is Direction Finding with a series of DF evenings during the summer which account for three of the seven trophies awarded annually. Recently these have been augmented with two 'all day' Sunday events (Spring & Autumn), held in N. Wales. These latter events now attract regulars from over 100 miles away.

The Club welcomes everyone with an interest in radio and associated technologies and promises a varied and interesting programme including 'on the air' nights designed to encourage the membership to try operating on bands they don't normally use.

For further information please see their website at **www.wadarc.com** or contact the secretary, Tom G4BKF, at **secretary@wadarc.com** (**07050 291850**).

International Marconi Day

International Marconi Day, which was originally the brainchild of two members of the **Cornish Radio Amateur Club** (CRAC), will be held for the 21st time on Saturday April, 26th, 2008. The event, which is not a contest as such, runs from 0000UTC for 24 hours on all h.f. bands. Awards for both licensed Amateurs and s.w.l.s can be obtained for contacting the requisite number of Award Stations. Full details can be found on the IMD website **www.gb4imd.org.uk**

Once again it is hoped that more than 40 registered Award Stations will take part. Award Stations are operated from sites that have a historical connection with Gugliemo Marconi during his lifetime.

Cornish Radio Amateur Club, PO Box 100, Truro, Cornwall TR1 1XP.

New President

Mike Isherwood G4VSS has been voted in as President of the **Warrington Amateur Radio Club** following the decision to create the new position at the club's 2008 Annual General Meeting.


Mike G4VSS.

Mike has been a keen Radio Amateur since his schooldays and obtained his first call sign, G8PVF, in 1978 and passed the Morse test in 1983 for his G4VSS call. Initially, he immersed himself in digital and satellite communications working with another club member, **Mike Mansfield G6AWD** (author of *A Practical Guide to Packet Operation in the UK*). Mike was a committee member of the Northwest Packet User Group for a number of years.

Moving on to h.f., Mike took part in the first St George's Island DXpedition mounted by the Warrington Club in 2000 and on a subsequent one in 2005 during his three year spell as Club Chairman.

Mike is on the committee of the **Northern Amateur Radio Societies Association** and is a member of **UKFM Western**, **AMSAT**, **British Amateur Television Club** and the **Chiltern DX Club**. His regular attendance at RSGB HF Conventions and AGMs means that he knows and is known to amateur radio officials and celebrities and is therefore well qualified to carry out the tasks club members have assigned to him.

Warrington Amateur Radio Club meets every Tuesday at 8pm at the Grappenhall Youth and Community Centre, Bellhouse Lane, Grappenhall, Warrington WA4 2SG.

Programme details and other information are available from the club's website **www.warc.org.uk** or the club secretary Paul Carter E-mail **g7odj@warc.org.uk**

Regular Courses

Regular RSGB Exam Courses are held at the **Whitton Amateur Radio Club**, Whitton Community Centre Percy Road, Whitton Middx TW6 2JL. The Course Tutor is **Colin M0DMJ**.

The Intermediate Course will be starting on Wednesday April 6th at 7.30pm with the exam on May 14th (seven Wednesday evenings). The costs for the course with exam is £57.

No course if offered for the Full Licence but the exam only can be offered and revision evenings before each exam are available. Whitton Amateur Radio Group in West London is a registered examination centre for all levels of licence. To apply for either course please E-mail Chris at **chris@the-grooms.com** or Tel: **0870 760 5082**.

Double Celebration

The RAF celebrates its 90th year on April 1st, 2008. Coincidentally, this falls in the same year as the RAF Amateur Radio Society celebrates its 70th anniversary and 70 years as a member of the RSGB.

To commemorate the two events, RAFARS members, supported by the Air Training Corps, will be activating special event stations (hopefully, GB90RAF), RAFARS related callsigns and callsigns related to ATC Squadrons and members during April 1st. Activation will be from a number of locations throughout the UK and possibly from abroad.

This is not a contest, anyone and everyone is invited to call in, whether RAFARS member or not. It is anticipated that a common QSL card, with the individual callsign of the station worked, will be made out for every contact.

Come and join RAFARS on air.

For more details, contact **Roy Walker g0tak@kencomp.net**

FDMDV Digital Voice

A new verion of the Amateur Radio digital voice software *FDMDV* is available as *FDMDV* version 6-Jan-2008 is now out of beta testing and proves to be stable. It includes various fixes related to incompatibility with different soundcards and PCs. On some PCs there were soundcard problems with the 48K sample rate; this release fixes those issues.

The *FDMDV* software is remarkable in that in fits a digital voice signal into just 1100 Hz, less than half the bandwidth required by s.s.b.

It is recommended that all users upgrade to this latest version.

Documentation and online finder at: **http://n1su.com/fdmdv/**

Download at: **http://n1su.com/fdmdv/download.html**

UK Amateur Radio Licences

Ofcom has supplied the figures for the total number of Amateur Radio Licences issued as at 31st December 2007.

Grade	Dec 31st, 07	Nov 30th, 07	Change
Foundation	9640	9514	+126
Intermediate	4095	4030	+65
Full/Advanced	50411	50260	+151
Club Stations	1289	1279	+10

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Macclesfield & District Radio Society

The **Macclesfield & District Radio Society** continues to hold successful licensing courses. In the recent Foundation examinations, there were three successful candidates - **Bob Murphy M3UVM**, **Damon Lake M3VEP** and **Peter Taylor** being able to get on the bands for the first time. Successful in the Intermediate course were **Greg Acton 2E0RXX**, **Chris Eyre 2E0CJD** and **Adrian Dodd 2E0DOD**.

A new Foundation Licence course is underway, with keen youngsters taking part and enjoying the practical assessments. Additionally, a group of the club's current Intermediate Licence holders are holding regular study clubs, in addition to their tuition, inpreparation for their forthcoming full licence examinations.

The society is set to become 'competitive' in 2008, with a developing interest in ARDF and plans for participation in the RSGB Tuesday night activity contests and club championships. **Ray King M1REK** has taken over as secretary for the club, with **Tom Read M1EYP** standing down. He joins **Keith Kelly G3VKF** who was re-elected as vice-chairman, and **Dave Lucas G0BIE** (chairman) and **Ron Rous G0WUZ** (treasurer) who are halfway through their terms of office.

Yeovil ARC build Knoles

Members of the **Yeovil Amateur Radio Club** have recently been building Knole direct conversion (DC) receivers, supplied by **Walford Electronics**. Constructors took their kits home and built them up in their own time. Later, they were given a check over and final alignment at a Club evening by their designer **Tim Walford G3PCJ**. Several of the Knoles were built for 20m, with others constructed for 40 or 80m. The photo (left) shows builders **Robert G6LLP** Chairman of YARC (left), **Brian M1FFP** and **Brian G7SFY** (right) discussing and installing the capacitors in their triple tuned r.f. bandpass input filters. They commented on the value of building and testing the RX in stages, and how this had added to their understanding of how the circuits worked.

Walford Electronics,
Upton Bridge Farm, Long Sutton,
Langport, Somerset TA10 9NJ.
Tel: (01458) 241224.
E-mail: walfor@globalnet.co.uk

club news

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

Send all your club info to

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Pete Milton. Tel: (01189) 695697
www.radarc.org
The Reading & District Amateur Radio Club meets on the second and fourth Thursday of the month at Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Berkshire RG5 4LY. March 27th is a talk on The In's and Out's of the Internet by Des Howlett G8FIF. The club is running a Foundation Licence Course on April 4th and 5th. April 10th is a talk on The Falklands Islands by Roger Eeles G0SWC and 24th is an Evening Shopping Trip to ML&S. April 16th to June 4th is The Intermediate Licence Course.

CHESHIRE

Chester & DRS
Graham. Tel: (07930) 655 121
E-mail: info@chesterdars.org.uk
www.chesterdars.org.uk
The Chester & District Radio Society meets on Tuesday evenings at the Burley Memorial Hall, Common Lane, Waverton, Chester CH3 7QT. March 18th is a talk by Dave Ollerhead, April 1st is a talk by John Goldberg, 15th is Experiences of working for Cable & Wireless by Les Green, 23rd is a Quiz Night as guest of Wirral Club and 29th is the Icom ICR1000 PC Controlled Radio by Brian Levitt.

Macclesfield & DRS
Ray King. Tel: (01260) 278431
www.gx4mws.com
The Macclesfield & District Radio Society meets every Monday at the Pack Horse Bowling Club, Westminster Road, Macclesfield SK10 3AT at 8pm. March 17th is an On the Air Night.

Stockport RS
David Simcock. Tel: 0161 456 7832
www.stockportradiosociety.co.uk
The Stockport Radio Society meets on the first and third Tuesdays at the Bramhall Air Scouts HQ, Leewood Hall, Benja Fold off Ack Lane East, Bramhall, Stockport SK7 2BX. March 18th is a talk on Stereo Sound by John Shufflebotham, April 1st is "Knot Amateur Radio 2" - the art of using rope and knots with Steve Holgate G8YTP and 15th is SDR (Software Defined Radio) and 5 9 at 70mph (HF & APRS mobile) with Chris Pomfrett M0EEG.

Halton RC
Sam. Tel: (01928) 714231
http://g7wfs.sytes.net/hrc/index.htm
The Halton Radio Club meets in The Play Centre, Norton Hill, Windmill Hill, Runcorn, Cheshire WA7 6LJ every Thursday from 7.30 to 9.30pm. There's plenty of parking and full disabled access. April 1st please note HRC Membership Expires! April 17th is a Video Night.

CORNWALL

Cornish RAC
Ian Williams. Tel: (01872) 561058
E-mail: ianporsche964@aol.com
www.cornishradioamateurclub.org.uk
The Cornish Radio Amateur Club meets at the Church Hall, Church Road, Perranarworthal, Truro TR3 7QE on the first Wednesday of every month at 7.30pm. There is also a Computer Section that meets at the same venue and time on the second Monday of every month, except December. April 14th is the AGM and 26th is International Marconi Day.

Poldhu ARC
Keith Matthew. Tel: (01326) 574441
E-mail: g0wys@yahoo.co.uk
www.gb2gm.org
The Poldhu Amateur Radio Club meets at The Marconi Centre, Poldhu Cove, Nr Mullion, Cornwall TR12 7JB. Tel: 01326 241656. April 8th is a Business Meeting (International Marconi Day).

COUNTY DOWN

Bangor and District ARS
Mike. Tel: 028 4277 2383
http://www.bdars.com
The Bangor and District Amateur Radio Society meets on the first Thursday of every month in 'The Boathouse', Harbour Car Park, Groomsport BT19 6JP at 8pm. Visitors and new members are most welcome. April 3rd is the Annual Constructors' Contest – there are prizes for the best entrants. They will also be showing a video (on the big screen) of a recent DXpedition.

COUNTY DURHAM

Bishop Auckland RAC
Mark Hill. Tel: (01388) 745353
http://barac.m0php.net/
The Bishop Auckland Radio Amateur Club meets every Thursday at 8pm in the Village Community Centre, Stanley Crook, Co. Durham DL15 9SN. Tuition for Foundation, Intermediate and Advanced licences is available. The club is registered as an RSGB exam centre.

Great Lumley AR&ES
David Barclay. Tel: 0191 3888113
E-mail: m0bpm@btinternet.com
The Great Lumley Amateur Radio & Electronics Society meets in the Community Centre, Front Street, Great Lumley, Chester-le-Street, Co. Durham DH3 4JD on Wednesday nights from 7 to 9pm.

DERBYSHIRE

South Normanton Alfreton and District ARC
A J Higton. Tel: (01773) 783658
E-mail: snadarc@linuxmail.org
www.snadarc.me.uk/
The South Normanton Alfreton and District Amateur Radio Club meets in the Village Hall, Community Centre, Market Street, South Normanton, Derbyshire DE55 2EJ. March 17th is a Junk Sale, April 7th is the AGM, 16th is a Committee Meeting, 21st is a Junk Sale and 28th is a Bingo Night.

DEVON

Torbay ARS
Dave Helliwell. E-mail: g6fsp@tars.org.uk
www.tars.org.uk
The Torbay Amateur Radio Society meets Fridays at 7.30pm in the Teignbridge District Scout Headquarters, Wolborough Street, Newton Abbot, Devon TQ12 1JR. March 21st and 28th is a Presentation Night, tickets £5, April 4th & 18th are Operating Nights, 11th is a Natter Night and 25th is a 90/10 Sale.

DORSET

Bournemouth RS
John. Tel: 07719 700 771
www.brswebsite.org.uk
The Bournemouth Radio Society meets on the first and third Friday of each month at the Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH. Meetings take place in Room 5 at 8pm and members assemble in the bar from 7.30pm. Visitors are always welcome.

EAST SUSSEX

Brighton RC
Reg Moores. Tel: (01273) 503869
The Brighton Radio Club meets on the second and fourth Tuesdays of each month at the Vallance Community Centre, Conway Court, Sackville Road, Hove BN2 3WR at 7.30pm. Anyone wishing to know more are welcome to come along to a meeting, entrance is free.

Hastings E&RC
Gordon Sweet. Tel: (01424) 431909
E-mail: gordon@gsweet.fsnet.co.uk
www.herc.uk.net
The Hastings Electronics & Radio Club meets on the third Wednesday at the Taplin Centre, Upper Maze Hill, St Leonards on Sea TN38 0LQ at 7pm. March 21st is a talk on the new military communications system, Bowman and April 18th is a Spring Auction at William Parker School, Parkston Road, Hastings at 7pm, entrance is £1.

ESSEX

Braintree & DARC
Keith. Tel: (01376) 329279
www.badars.org.uk
The Braintree & District Amateur Radio Society meets on the first and third Monday of the month in The Clubhouse, Braintree Hockey Club, Church Street, Bocking CM7 5LJ. March 17th is a Project Construction Night, 24th is a Club Net Night, April 7th is a Construction Contest, 14th & 28th are Club nets and 21st is How to operate HF rigs.

Colchester RA
David Chambers. Tel: 07766 543784
www.g3co.ccom.co.uk
The Colchester Radio Amateurs meets at 7.30pm on alternate Thursdays at St Helena School and The Colchester Institute, Sheepen Road, Colchester, Essex CO3 3LE. Members and non-members welcome. March 20th is the Three Club Quiz Night at St Helena School and April 17th is the ZL Special with Alan Cross G0HKG at the St Helena School, Sheepen Road, Colchester.

Chelmsford ARS
Martyn Medcalf. Tel: (01245) 469008
E-mail: info2007@g0mwt.org.uk
www.g0mwt.org.uk
The Chelmsford Amateur Radio Society meets on the first Tuesday of each month in the Marconi Sports & Social Centre, Beehive Lane, Great Baddow, Chelmsford CM2 9RX at 7.30pm. April 1st is a talk on the GHz Bands by RadCom microwave columnist Sam Jewell.

Loughton & Epping Forest ARS
Marc Litchman. Tel: 020 8502 1645
E-mail: info@lefars.org.uk
www.lefars.org.uk
The Loughton & Epping Forest ARS meet Friday fortnightly at All Saints House, Romford Road, Chigwell Row, Essex IG7 4QD between 7.45 and 10pm. All visitors will be made most welcome. March 28th is the AGM, April 11th is a VHF Night-on-the-Air and 25th is Distributed Computing & the Search for Extraterrestrial Intelligence by Marc Litchman G0TOC.

HAMPSHIRE

Fareham & District ARC
Ken Sapsed. Tel: 023 9279 7240
E-mail: secretary@fareham-darc.co.uk
www.fareham-darc.co.uk/
The Fareham & District Amateur Radio Club meets on Wednesdays evenings from 7.30pm in the Portchester Community Centre, Westlands Grove, Portchester, Fareham PO16 9AD. March 19th is an evening with Chris M0EAY, 26th is the Easter Quiz, April 2nd is a Natter Night & Club Station Operating with G3VEF/G8KGI, 9th is an evening with Dave G7CFR, 16th is an evening with Steve G7HEP and 30th is an evening with Andrew G0AMS.

Horndean & District ARC
Stuart Swain. Tel: (02392) 472846
E-mail: g0fyx@msn.com
www.hdarc.co.uk
The Horndean & District Amateur Radio Club meets on the first and fourth Tuesdays each month in the Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants PO8 9SF at 7.30pm. Visitors are always very welcome. March 25th is a talk on Egypt - The island of Philae by Dave Bartlett, April 1st is a Natter night/social evening and April 22nd is a talk by David Clark (ex-Radio Officer) on "The last voyage of the RMS Queen Mary".

HUMBERSIDE

Hull & District ARS
Raymond Penny. Tel: (01482) 504618
E-mail: sirraymond@sirraymond.karoo.co.uk
The Hull & District Amateur Radio Society meets every Friday at the Walton Leisure Centre, Walton Street, off Anlaby Road, Hull HU3 6JB.

KENT

Bredhurst RATS
www.the-brats.co.uk
The Bredhurst Radio Amateur & Transmitting Society meets on Thursdays at the Parkwood Community Centre, Rainham, Gillingham, Kent ME8 9PN at 8.30pm. If you are interested in joining the club, write to: Membership, The BRATS c/o The Club Room, The Parkwood Community Centre, Long Catlis Road, Rainham, Gillingham, Kent, ME8 9PN. March 27th is a talk by John Mallichan on Making large inductors without iron or coils. Annual subscriptions are due April 1st.

Bromley &DARS
Graham
E-mail: bdars@grahamc.net
www.bdars.org
The Bromley & District Amateur Radio Society meets in The Victory Social Club, Kechill Gardens, Hayes, Kent BR2 7NH (off B265, Hayes Lane, Bromley) on the third Tuesday of the month at 7.30pm. March 18th is a talk on oscillators by Graham G4NPD and April 15th is An Erk's Existence (5 years in the RAF) with Peter G7UFQ.

LANCASHIRE

Oldham RC
Christopher Cunliffe. Tel: 07749347142
E-mail: secretaryoarc@btinternet.com
www.oarc.org.uk
The Oldham Radio Club meets on Thursdays at Royton Air Training Corps, Hillside Avenue, Royton, Oldham OL2 6RF at 7:30pm. March 27th is the Fred Lees award with quiz, April 3rd is the start of the Spring Foundation course (there are 10 places available, contact Christopher by E-mail: secretaryoarc@btinternet.com or on 07749 347142. The course will run for 6 weeks) and May 8th is the Foundation exam.

Ellenroad RC
David. Tel: (01706) 358650
E-mail: info@ellenroadradioclub.org.uk
http://www.ellenroadradioclub.org.uk/info.htm
The Ellenroad Radio Club (ERC) meets every Monday evening from 7 to 9pm at the Ellenroad Steam Museum, Elizabethan Way, Newhey, Rochdale OL16 4LG. The museum houses the UK's only fully-working cotton mill engine, complete with its original steam raising plant and 220ft high chimney. Formerly known as the Shawclough ARC, the club shack is well stocked with HF, VHF and UHF equipment - most importantly, hot refreshments are also available! Newcomers are always welcome and made to feel at home.

LINCOLNSHIRE

Eagle RG
Steve Burke. Tel: (01507) 600202
E-mail: m5zzz@btinternet.com
www.eagleradiogroup.com
The Eagle Radio Group meets at The Eagle Hotel, Victoria Road, Mablethorpe LN12 2AJ on the second Tuesday of each month, meetings start at 8pm. The group operates an open policy so, if you are in the area, pop in. April 8th is a talk by Mark 2E0NCG on HF & DXing.

Spalding & DARS
Graham Boor. Tel: 07947764481
E-mail: secretary@sdars.org.uk
www.sdars.org.uk
The Spalding & District Amateur Radio Society meets at the Castle Sports Swimming Complex, Spalding PE11 1QF on Fridays at 7.30pm.

LONDON

Cray Valley Radio Society
Bob Treacher. Tel: 020 8265 7735
www.cvrs.org
The Cray Valley Radio Society meets on the first and third Thursdays of the month at the Progress Hall, Admiral Seymour Road, Eltham, London SE9 1SL at 7.30pm for 8pm. April 17th is the AGM.

Southgate ARC
Donald F Berry. Tel: 020 8360 3614,
E-mail: dfberry@eggconnect.net
www.southgatearc.org
The Southgate Amateur Radio Club meets on the second Thursday of the month at Winchmore Hill Cricket Club, The Paulin Ground, Firs Lane, Winchmore Hill, London N21 3ER at 7.30pm.

Wimbledon and District ARS
Jim Bell. Tel: 020 8874 7456
E-Mail: james@jbell5.wanadoo.co.uk
www.gx3wim.org.uk
The Wimbledon & District Amateur Radio Society meets on the second and lat Friday of the month at Martin Way Methodist Church, Buckleigh Avenue, Merton Park, London SW19 9JZ. Visitors are welcome whether they are licensed or not. March 28th is a talk on VHF DFing Antennas by Jim G4WYJ, April 11th is a Surplus Equipment Sale and 25th is the Construction of Antennas for VHF DFing.

THE LOTHIANS

Cockenzie & Port Seton ARC
Bob Glasgow. Tel: (01875) 811723
E-mail: gm4uyz@cpsarc.com
www.cpsarc.com/news.php
The Cockenzie & Port Seton Amateur Radio Club meets in the Thorntree Inn (Lounge Bar), High Street, Cockenzie, East Lothian EH32 0HP from 7pm till late. Organised talks are held in the Port Seton Community Centre, South Seton Park, Port Seton, East Lothian EH32 0EE. April 19th is a 10 Pin Bowling Night at Megabowl Kinnaird Park at 8pm.

Lothians Radio Society
Tony Sigouin. Tel: 07739742367
E-mail: enquiries@lothiansradioscoiety.com
www.lothiansradiosociety.com
The Lothians Radio Society meets on the second and fourth Mondays of the month in the Royal Ettrick Hotel, 13 Ettrick Road, Edinburgh EH10 5BJ from 7pm. Membership costs £12 per year and includes a free BBQ every June! April 9th is Product Safety by Norrie Stewart.

MERSEYSIDE

Wirral & District ARC
Tom. Tel: 07050 291850
E-mail: secretary@wadrac.com
www.wadarc.com
The Wirral & District Amateur Radio Club meets at the Irby Cricket Club, Mill Lane, Irby CH61 4XQ on the second and fourth Wednesdays of each month. Other Wednesdays are informal (D&W) meetings at a local hostelry. April 2nd is a D&W at The Saughall Hotel, Saughall Massie, 9th is Women in Radio by Lisa M0LSA, 16th is a D&W at The Ring O' Bells, W.Kirby, 23rd is a Quiz with Chester and District RS, 27th is the N.Wales DF Challenge (Sunday) and 30th is a D&W at The Egremont Ferry, Wallasey.

NORFOLK

King's Lynn ARC
Ray Dowsett, MBE. Tel: (01553) 671307
E-mail: ray-g3rsv@supanet.com
http://www.klarc.org.uk
King's Lynn Amateur Radio Club meets every Thursday at the Scout HQ, Chequers Lane, West Winch, King's Lynn, PE33 0NY off the A10 at West Winch at 7.30pm.

North Norfolk ARG
Tony Smith. Tel: (01263) 821936.
E-mail: g4fai@btinternet.com
www.radioclubs.net/nnarg/
The North Norfolk Amateur Radio Group meets in the Radio Hut at the Muckleburgh Collection Military Museum, Weybourne, North Norfolk NR25 7EG on Wednesdays and Thursdays from 10am to 4pm and some Sundays from 1 to 4pm. New members always welcome.

SHROPSHIRE

Telford & District ARS
Mike Street. Tel: (01952) 299677
E-mail: mjstreetg3jkx@blueyonder.co.uk
www.tdars.org
The Telford & District Amateur Radio Society meets on Wednesdays at the Little Wenlock Village Hall, Malthouse Bank. Little Wenlock. Telford TF6 5BG at 8pm.March 26th is the Annual General Meeting, April 2nd is Open House/ Committee, 9th is 2008, Out & About, 16th is Whaddon Mk3 OE Paraset by M0TAW, 23rd is Getting the Club Projects going with G0VXG and 30th is a talk on Radio Astronomy (provisional).

SOMERSET

South Bristol ARC
Len Baker. Tel: (01275) 834282
E-mail: g4rzy@msn.com
www.sbarc.co.uk
The South Bristol Amateur Radio Club meets at the Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol BS14 0LN. March 19th is a Club Quiz Night and 26th is the PC & Electronics Workshop, April 2nd is the Spring Table Top Sale, 9th is a Wine & Cheese Evening with Muriel, 16th is a Horticultural Evening with Mrs Susan Grace, 23rd is an introduction to RAYNET with Sean and 30th an On the Air Evening.

Yeovil ARC
Gary.
E-mail: g.swain@tesco.net
www.yeovil-arc.com/
The Yeovil Amateur Radio Club meets at the Red Cross Centre, Grove Avenue, Yeovil BA20 2BE (on the corner where Grove Avenue meets Preston Road). March 27th is a Committee meeting and station on air night, April 3rd is the Fun Run, 10th is the QRP Convention briefing, 17th is the AGM, 24th is a Committee meeting and station on air and 27th (Sunday) is the QRP Convention.

SOUTH GLOUCESTERSHIRE

Thornbury and South Gloucestershire ARC
Tony. Tel: (01454) 417048
E-mail: tonytsgarc@beeb.net
http://jma-databases.co.uk/tsgarc/index.php/Thornbury_%26_South_Gloucestershire_Amateur_Radio_Club
The Thornbury and South Gloucestershire Amateur Radio Club meets in the United Reformed Church Hall, on the corner of Chapel Street and Rock Street, Thornbury BS35 2BA at 7.30 - 9.30pm. April 2nd is Radio Controlled Aircraft by John G6RAZ & Garry G7NVZ, 9th is the AGM, 16th is a Video Night, 23rd is Radio Restoration by Mike M1DPB and 30th is an On the Air Night.

SOUTH WALES

Barry ARS
Glyn Jones. Tel: (01446) 774522
E-mail: glyndxis@talktalk.net
www.bars.btik.com
The Barry Amateur Radio Society meets on Tuesdays from 7.30 to 10.30pm in the Sully Sports & Social Club, South Road, Sully CF64 9TG. April 29th is How to Work Satellites by Ken Eaton GW1FKY.

SOUTH YORKSHIRE

Axholme Radio Club
John Fennell. Tel: (01427) 872522
E-mail: g4hoy@tiscali.co.uk
The Axholme Radio Club meets at Hollytree Farm, Westend Road, Sandtoft, Epworth DN9 1LB on Wednesdays at 10amm to 4pm, Thursdays at 7 - 9pm and Saturdays from 10am - 4pm (other times by arrangement).

SURREY

Sutton & Cheam RS
John Puttock. Tel: 020 8644 9945
E-mail: info@scrs.org.uk
www.scrs.org.uk
The Sutton & Cheam Radio Society meets on the third Thursday of the month at 7.30pm in Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey SM1 2EY. In addition to monthly meetings, licence training courses are held at regular intervals in Banstead Surrey. April 3rd is a Natter Night, 17th is Loops and Other Small Antennas by Professor Mike Underhill G3LHZ.

TYNE & WEAR

Angel of the North RARC
Nancy Bone. Tel: 0191 477 0036
E-mail: nancybe2001@yahoo.co.uk
www.anarc.net
The Angel of the North Radio Amateur Radio Club meets every Monday 7 to 9pm at Whitehall Road Methodist Church Hall at the corner of Whitehall Road and Coatsworth Road, Bensham, Gateshead NE8 4LH. The entrance to radio club room is through door at the side of building next to the car park. The car park entrance is on Whitehall Road.

Tynemouth ARC
Tony Regnart. Tel: 0191 280 1981
E-mail: tony.regnart@gmail.com
www.gx0nwm.co.uk
The Tynemouth Amateur Radio Club meets each Friday from 7 to 9pm at St. Hilda's Church, Stanton Rd, North Shields, Tyne & Wear NE29 9QB. It's known locally as 'the church near the fire station'. March 21st is an Informal meeting at Preston Grange, 28th is Transmitting the Venetian Way, April 4th is a Junk Sale, 11th is PC Virtualisation with Glen G0SBN, 18th is the Annual General Meeting, 25th is the International Marconi Day Briefing and 26th is International Marconi Day.

WEST MIDLANDS

Aldridge & Barr Beacon ARC
Roy Horton. Tel: (01922) 691646
E-mail: leslie137@btinternet.com
www.g0neq.co.uk
The Aldridge & Barr Beacon Amateur Radio Club is a daytime club and meets at the Aldridge Community Centre, Middlemore Lane, Aldridge, Walsall WS9 8AN on the first and third Monday of every month at 2pm to 4pm. They have a long wire and a 2 metre antenna for radio operation using the club callsign G0NEQ. April 7th is Preparation for the PW 144MHz QRP contest and 21st is a Photoshop Master Video Show by Horace.

Sutton Coldfield RS
Andy Sherman. Tel: (01827) 875155
E-mail: peugeotnut@hotmai.com
www.hamradio.piczo.com
The Sutton Coldfield Radio Society Meets on the second and fourth Monday of the month at 7.30pm (no meeting on bank holiday Mondays) in the Sutton Coldfield Rugby Club, 160 Walmley Road, Sutton Coldfield, West Midlands B762QA.

Wythall Radio Club
Chris Pettitt. Tel: (07710) 412 819
E-mail: g0eyo@wythallradioclub.co.uk
www.wythallradioclub.co.uk
The Wythall Radio Club is based at Wythall House, Silver Street, Wythall, near Birmingham B47 6LZ. They meet every Tuesday at 8pm and meetings are informal and friendly. March 18th is a talk on Antennas and Feeders by Peter G4LWF and 25th is a Natter Night, April 1st is the 2m Club Championship from Shack, 8th is a Committee Meeting (open to all), 15th is Antenna Modelling by Chris G0EYO, 22nd is a Natter Night and 29th is a Quiz Night on General Knowledge and Radio.

WEST SUSSEX

Horsham ARC
Andrew Vine. Tel: (01483) 272456
http://www.harc.org.uk/
The Horsham Amateur Radio Club meets on the first Thursday of the month at The Guide Hall, Denne Road, Horsham, West Sussex. March 20th is the 80m SSB Club Championship and 27th is a Social at The Blue Ship, The Haven, April 3rd is The History of Recorded Sound by G0GNA, G7EYL & G4JHI, 7th is the 80m CW Club Championship, 10th is a Committee Meeting, 16th is the 80m SSB Club Championship, 17th is a Social at The Frog and Nightgown, Faygate, 24th is the 80m Data Club Championship and 26th is the HARC Grand Day Out (via Calais).

Worthing & DARC
Roy or Joyce. Tel: (01903) 753893
www.wadarc.org.uk
The Worthing & District Amateur Radio Club meets every Wednesday at 8pm in the Lancing Parish Hall, South Street, Lancing, BN15 8AJ. There's a free car park at the rear and full disabled access. Visitors are always welcome. April 2nd is a talk by Peter Dodd G3LDO, 16th is a Round Table Suggestions Evening and 30th is GX3WOR on the Air.

WEST YORKSHIRE

Pontefract & District Radio Club
Colin. Tel: (01977) 677006
E-mail: info@pontefractradioclub.org
www.pdars.com
The Pontefract & District Radio Club meets every Tuesday from 7pm and Thursday from 8pm at the Carleton Centre, Carleton Grange, Carleton Road, Pontefract, West Yorkshire WF8 3RJ. March 25th Continuing the CW Decoder Project and April 1st is Completing the CW Decoder Project.

WILTSHIRE

Trowbridge & District ARC
Ian Carter. Tel: (01225) 864698
E-mail: ian.l.carter@btinternet.com
http://uk.geocities.com/tdarc@btinternet.com
The Trowbridge & District Amateur Radio Club meets at Southwick Village Hall, Southwick (nearest postcode is BA14 9QN). The 2007 Committee wish to remind members and prospective members that the club celebrates its 25th Birthday in December 2008 and all members joining in 2008 will have free membership in 2009. April 2nd is a talk by Mike Adams M0ALW and 16th is a Natter Night.

WORCESTERSHIRE

Worcester RAA
Martin Carter. Tel: 07976 917987
E-mail: secretary@m0zoo.co.uk
www.wraa.co.uk
The Worcester Radio Amateurs Association meets on the second and fourth Tuesday at the Hallow Scout HQ, off Main Road, Hallow, Worcester WR2 6PP. Visitors, as always, will find a warm welcome at the new clubhouse, as will potential new members.

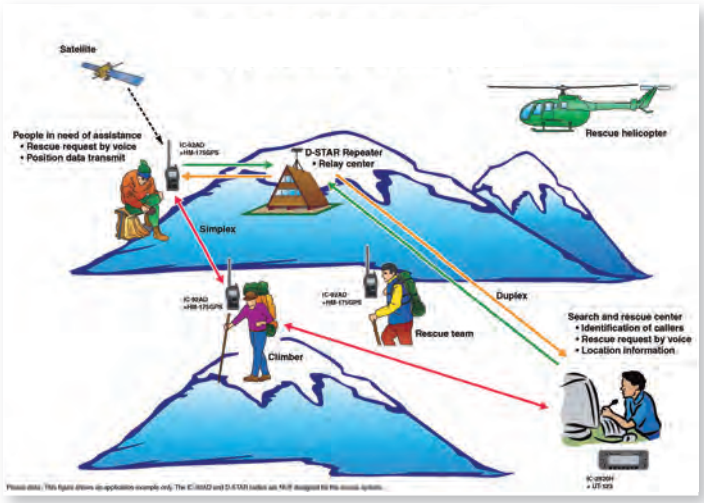
Club Secretaries

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

Feature

D-STAR

Taking Amateur Radio Into The Digital Age



The D-STAR designers envisaged many uses for the new digital technique.

We could rightly say that radio started off its very first days using a digital mode, that of simple on-off keying of a radio carrier using Morse code to introduce information to the '1' and '0' states. We then added amplitude modulation (a.m.) and its various later derivatives such as single sideband (s.s.b.) and TV, and analogue frequency modulation (f.m.) eventually became the most-used mode on v.h.f. and u.h.f. amateur Radio bands for speech, TV, and data including packet radio. A natural progression was digital coding of analogue transmissions, predominantly speech and there are very few of us don't already own or use a digital cellphone!

In 1998, a research study to investigate digital technologies for Amateur Radio was started in Japan and was administered by the **Japanese Amateur Radio League** (JARL). The Japanese government funded the study – they like our own government obviously were aware of how Amateur Radio was beneficial in creating 'radio aware' people and promoting careers in the field of radio communication. The research naturally involved equipment manufacturers as well as other observers and three years later in 2001 the D-STAR standard was published by the JARL as an open protocol, i.e. available to be implemented by anyone.

At the moment, the only Amateur Radio equipment manufacturer to have produced and have available radio equipment for D-STAR has been Icom, although I'm sure it's only a matter of time until others follow suit, as it's certainly taking off!

Any future equipment or software that supports the D-STAR protocol will of course work with the D-STAR system, so you're not 'locked in' to one manufacturer or other. Right now, Icom (UK) are offering 'ready-to-run' D-STAR 144 and 430MHz repeater equipment to interested groups at what appears to be a very reasonable price, which must surely help to make the system even more popular. There's also a 'DV Dongle' available from Ham Radio Outlet (HRO) in the USA to allow you to join in D-STAR communication from a PC.

Digital Modulated FM

The D-STAR equipment use digital modulation of an f.m. transmission and the system supports two types of digital data streams, DV (Digital Voice) and DD (Digital Data). The Digital Voice mode (DV mode) is used on both 144 and 430MHz and manages to fit in both digitised audio at 3600 bits per second – including error correction – and simultaneous digital data at 1200 bits per second.

In DV mode, the voice signal is converted to and from a digital data stream using an AMBE – Advanced Multi-Band Excitation – codec (a codec is simply a term meaning a code/decode circuit or program). This allows a D-STAR DV mode transmission to fit into a 6.25kHz spaced narrow band f.m. (n.b.f.m.) channel, rather than 12.5 or 25kHz.

The Digital Data mode (DD Mode) is used on 1.3GHz (23cm) and is purely data but at a much faster over-air rate of 128kbits per second. However, this also offers exciting facilities, including information for users in new areas such as local radio club meeting dates and so on.

Digital Repeaters

Just as we'd use a normal f.m. repeater, Radio Amateurs can also use a D-STAR repeater in the same way, the only difference being that digital modulation is used each way. Unlike systems such as Echolink – which use the internet for linking – D-STAR treats all repeaters in the same way and a local repeater seems no different to one that's hundreds or even thousands of kilometres away, linked either by microwave or the Internet.

In fact, D-STAR repeaters act just like normal repeaters, everyone listening to it will hear the call and can answer the individual station – and the callsign is also digitally added into each of the transmissions. Besides local contacts, if the repeater is in a network

Chris Lorek G4HCL provides an introduction to D-STAR and tests Icom's latest IC-E92E digital hand-held.

then the D-Star equipped operator can also 'cross connect' to others (as I did) either within the same region such as in Kent with a link between GB7FK and GB7IC. Or it can be to another D-STAR repeater like **HB9BO on Mount Schilthorn** in Switzerland at 3km above sea level, or **IR0UAC** in **Rome**, and have a contact each time – in fact it was just as though I was chatting with a local user.

With repeaters that are networked, the local D-STAR repeater shares the callsigns around the D-STAR system, so it 'knows' where the active stations are at any time. Then, if someone wants to call a particular callsign, from anywhere in the world, they just enter that callsign and the system finds out where the operator was last and automatically routes the call to the local repeater repeater where that callsign should be operating from. If a particular callsign moves between areas, a quick transmission on the new repeater they're in the area of, will then update the contact details. Other applications such as Dchat (messaging) and DStarlet (E-mail) can be also used by linking a radio to a PC.

There are currently hundreds of D-STAR repeaters on the air around the world and the number is increasing day by day. Many operate in 'stand alone' mode for local use, whereas others are interlinked via a gateway network as the D-STAR protocols and software have been written to support repeater linking systems either just within a given area – or indeed around the world, using either microwave links (e.g. for local operation) or Internet links (for wider area linking).

The DV dongle allows decoding of digital audio on many 'flavours' of computer. See www.dvdongle.com

I've listed in the accompanying table, the D-STAR repeaters throughout the world which are linked via the **K5TIT** gateway network, which I'm told achieves a critical mass and becomes the only network to belong to outside of Japan! A point to note here is that, if I wish to use the gateway facility on D-STAR, I first need to be registered with the gateway system. This can easily be done locally and my thanks go to **Jerry G4JMP** for his invaluable help on this as well as for plenty of hints and tips in advance on using the network! Jerry duly registered me several days before my first D-STAR contact – yet alone any gateway connection attempt.

The Icom IC-E92D

Chris Lorek G4HCL reviews Icom's latest IC-E92E digital hand-held.

The IC-E92D is a dual band 144/430MHz transceiver with built-in D-STAR capabilities and there's no additional 'plug-in' board required for this. It also has a wideband receiver as well as simultaneous dual-frequency receive with two variable frequency oscillators (v.f.o.s) 'A' and 'B'. So, for example, I could listen to both 144 and 430MHz at the same time, or indeed listen to a broadcast station or whatever – anywhere between 0.495–999.990MHz on a.m., n.b.f.m. and wide band f.m. (w.b.f.m.) WFM, while keeping a watchful eye out on the Amateur channels on either 'normal' n.b.f.m.' or D-STAR or indeed anywhere between 118-174MHz and 350-470MHz in f.m., n.b.f.m. (for 12.5kHz step use), a.m., and DV modes.

The set has 1304 memory channels arranged into 26 memory banks. Each v.f.o. has 600 regular channels, 50 scan edges and two quick-access 'call' channels.

Each of the memory channels, memory banks and scan edge channels can be given a short alphanumeric identity of up to eight characters. It's possible to scan the v.f.o.s and memory channels in various modes such as 'all scan', selected band scan, programmed, memory, memory mode, all bank, selected bank, bank link, program link, skip, and priority scans; phew! There's a built-in CTCSS and DTCS encoder and decoder for repeater access or quiet monitoring, and a 'tone scan' allows the user see which sub-tone is being used on the channel being received.

Tough & Waterproof

The transceiver is fully water-sealed, and can stand being fully submersed in water at a depth of 1m of water for half an hour. As well as this, the tough construction of the set's case means it can be taken out and about without worrying about whether it'll survive the odd knock, rainstorm, or even being dropped in the snow in winter!

A unique 12-pin multi-way accessory connector is fitted on the top panel of the set. The transmitter has four selectable output power levels, from 5W to 100mW, and a switchable time-out timer of 1, 3, 5 or 10 minutes to help prevent accidental long transmissions.

On receive there's an auto power save, as well as an auto power-off and even an auto power on to save the batteries. The set comes supplied with a 1620mAh Li-Ion battery pack and a side-mounted d.c. power socket protected by a rubber waterproof cover lets an external supply of between 10-16V d.c. to be used.

The front panel backlit liquid crystal dispay (l.c.d.) can show two

frequency displays for bands A and B, an alpha-numeric channel name, and there's also a small bandscope built in, which shows activity around the tuned frequency while still letting the operator monitor the centre frequency itself. The display also shows received short data messages and the like in the DV mode. Below the display are backlit buttons and a backlit keypad, with five of the keypad buttons acting as 'navigation' buttons when entering parameters are entered using the transceiver's menu mode.

The IC-E92D has an optional PC remote control capability in both analogue and DV modes. When it's connected to a PC – via an RS-232 cable – most of the functions of the transceiver can be controlled from a PC, including sending and receiving short data messages in DV mode.

The D-STAR Functions

The transceiver has built-in D-STAR DV mode facilities on band A. If the selected DV is selected mode and a normal f.m. signal is received – or indeed another mode – the set can usefully automatically change the operating mode on transmit and receive to the detected mode!

As well as being able to manually enter information such as my own call, repeater and gateway callsigns and other information such as short data messages, I found that a handy 'one touch reply' button allowed me to automatically call back the received station – including the repeater callsign. The set's memory also stores the last 20 received callsigns.

During the tests I found that if I'd called in DV mode, a built-in voice recorder can record an incoming message of up to 30 seconds for me (or three messages of up to 10 seconds each). Additionally there's also a 10-second transmit audio memory to let the user record their own callsign together with an automatic answer feature!

The GPS Capabilities

The 'E92E can automatically display received GPS location information from other stations on its front-panel display. By plugging in an Icom HM-175GPS external microphone, I discovered it can also automatically send the GPS location each time it transmitted, as well as at pre-set intervals between 5 and 30 minutes if needed.

The transceiver will even show the direction and distance on a compass-based display to a similarly-equipped received station from a present location, as well as displaying the operator's own location on the screen! And, if I had linked the rig set to my PC – with appropriate mapping display software that takes standard incoming NMEA 0183 format information – it's possible to also see where other stations are on a map on the PC screen!

Reading The Manual!

After receiving the set from Icom I busied myself reading the 147-page user instruction manual while giving the transceiver its first charge. Then came a marathon memory-programming affair, with so many channels available the set was not just a dual band hand-held but a 'do-everything' wideband scanner as well!

My initial feelings were that the set was a sturdy, 'built for the purpose' hand-held. It fitted comfortably in my hand and using it on my daily walks to and from work was an easy one-handed affair due to the sensible control layout.

My transmitted audio was always described as crisp and clear and I appreciated the ability to select n.b.f.m. (2.5kHz deviation for 12.5kHz channel spacing) for 144MHz and normal f.m. (5kHz deviation for 25kHz channel spacing) on 430MHz.

The receive audio output level from the small internal speaker was easily loud enough for hand-held use while either indoors or walking out and about. However, when I used it in nosier locations – and when mobile – it would have helped if I could have plugged an external speaker in. But this would have meant me obtaining and wiring up the unique 12-way multi-way plug used by the IC-E92D, or using an optional Icom speaker microphone (or earphone specific to the set)as there's no 3.5mm external speaker socket fitted.

From home, with the IC-E92E connected to my rooftop 144/430MHz collinear antenna via a set-top BNC-to-SMA antenna adapter, I found no problems whatsoever with off-frequency or

The tough little IC-E92D is almost dwarfed by its microphone!

out-of band signals affecting the receiver. This really surprised me, as many hand-helds I've tested in the past are often overwhelmed with intermodulation breakthrough (where several off-frequency signals mix together inside the receiver circuitry to form unwanted on-channel interference), particularly on v.h.f. Well done Icom!

Using the set-top antenna showed that this was also reasonably efficient and I could access my semi-local 144MHz repeater from indoors at home using the set in hand-held mode, this being my usual 'tough test' for hand-helds! The receiver was nicely sensitive and I found I could receive all the usual distant repeaters and other stations as I could with my normal desktop h.f./v.h.f./u.h.f. multimode base station transceiver.

In contact – via GB3SH – with A**lan G8IPG** who was portable in Hedge End (east of Southampton), around 13km (eight miles) from me, I found I could nicely hear him direct, again with no interference problems, and also with **Andy G4MYS** and **Peter M1PVF** both in Southampton who were each non-line of sight with me.

Note: Although simultaneous two-frequency receive is possible, I found that the receiver(s) muted when I went on transmit, thus no 'full duplex' contacts or listening out on the other band were possible while in contact.

Weekend D-Star Experience!

During the review period I took the IC-E92D along with me on a weekend break in Kent, where I was saying at a small hotel in Littlestone-on-Sea. It was a lovely sunny weekend and on the first afternoon just after arriving I quickly found a pub's sunny beer garden with a lovely sea view, which – surprise, surprise – (or maybe not due to forward planning!) was also within a stone's throw of the GB7FK D-STAR repeater and gateway in Capel.

Within seconds of me putting a call out, back came **Matt M1CMN/M** on his way to Folkestone and we had a chat until he started getting out of range, due to the ridge between the repeater site and Folkestone itself. By this time, **Brian G3OJZ** from Capel Cliffs had joined us using his Icom 2820, and we had a lengthy chat for almost an hour, about past and present trends in radio, Brian incidentally being a retired Merchant Navy Service Radio Officer with a wealth of experience.

Although I was a long way from home, Brian knew that he recognised my callsign and near to the end of the contact he remembered why, as he'd seen yours truly featured as the *Radio Personality* in that very month's issue of *PW*! Matt then re-joined us but I had to offer my apologies as I had to finish for the evening meal.

Next morning after breakfast I was most surprised to find that I could access GB7FK from the upstairs hotel bedroom! The RSGB's repeater coverage map for GB7FK showed not even mobile coverage – yet alone hand-held – anywhere within several miles of that location. Later, I had a long chat with **Declan M0TMX** in Ashford through GB7FK, who also had an IC-E92D complete with GPS microphone as well as a pair or IC-2820s – that's real D-STAR keenness!

I found I could hear Declan fine on the repeater input as well, which was good going from Ashford to an indoor hand-held rig right on the coast. Matt M1CMN/M again popped in – he was in Dover helping on RAYNET duties for the half-marathon that day. Being well outside the predicted coverage range for GB7FK I kept the transmitter on high power. Here I found, in common with virtually every other hand-held in high power mode, that the case became quite warm (even a little

Data or Voice Repeaters?

The D-STAR repeaters – I'm told – are currently recognised as data repeaters, and many have thus been allocated 'data' repeater channels on 430MHz rather than speech repeater channels. Unfortunately the input frequency of some of these fall very near to those used by license-free low power devices in the UK and Europe, such as car key-fobs, wireless remote control systems, wireless-linked weather stations, wireless alarms, and so on. This was evident when I was in contact, as some repeater input signals suffered from occasional 'data garbling' due to the intermittent operation of low-power devices near to the repeater. Switching between the repeater input frequency, when I could hear the station directly, and the repeater output, showed that the input signal was quite clear and very readable in DV mode yet the well-sited repeater was also picking up interfering signals which garbled the re-transmitted signal. I do hope that the 'powers that be' realise this and re-allocate more appropriate frequencies for D-Star DV repeater use on 430MHz.

Technical Specifications IC-E92D

Transmit Range; 144–146 MHz, 430–440 MHz
Receive (Operational range);
A band: 0.495–999.990 MHz FM/WFM/AM
B band: 118–174 MHz, 350–470 MHz FM/FM-N/AM/DV
Memory channels: 1304 channels (including 100 program scan edges and 4 call channels)
Useable temp. range: –20°C to +60°C
Frequency stability: ±2.5ppm (–20°C to +60°C)
Digital TX speed: 4.8kbps
Voice coding speed: 2.4kbps
Power supply: 7.4V DC (with BP-256)
External DC power: 10–16V DC

Current drain (at 7.4V DC):
TX High (VHF/UHF) 1.8/2.1A typical.
RX Power Save(Duty= 1:4)/Rated output/Stand-by
FM (Single) 38mA/150mA/65mA typical.
FM/FM (Dual) 43mA/180mA/90mA typical.
FM/DV (Dual) 50mA/220mA/130mA typical.
DV (Single) 47mA/200mA/110mA typical.

Tuning steps (kHz): 5*, 6.25*, 8.33*, 9*, 10, 12.5, 15, 20, 25, 30, 50, 100, 125, 200
* Not available on all bands or modes.

Antenna impedance: 50 ohm (SMA connector)

Dimensions (W x H x D): 59 x 112 x 34.2 mm (projections not included)

Weight (approx.): 325g (with antenna and BP-256 battery pack)

Transmitter;
Output Power: High 5W typical, Mid 2.5W typical, Low 0.5W typical, S-low 0.1W typical.

Spurious Emissions: Less than –60dBc (High, Mid)

Max. Freq. deviation: ±5.0kHz (FM) / 2.5kHz (FM narrow)

Ext. MIC impedance: 2kΩ

Receiver;
Sensitivity (typical, except spurious points):
FM (at 12dB SINAD, 3.5kHz dev)
1.625– 29.995MHz 0.4uV 30.000– 75.995MHz 0.25uV
76.000–117.995MHz 0.25uV 118.000–173.995MHz 0.18uV
174.000–259.995MHz 0.32uV 260.000–349.995MHz 0.32uV
350.000–469.995MHz 0.22uV 470.000–599.995MHz 0.32uV
600.000–999.995MHz 0.56uV
WFM (at 12dB SINAD, 52.5kHz Dev)
76.000–108.000MHz 1uV 175.000–221.995MHz 1.8uV
470.000–770.000MHz 2.5uV
AM (at 10dB S/N, 30% Mod.) 0.495– 4.995MHz 1.3uV
5.000– 29.995MHz 0.56uV 118.000–137.000MHz 0.5uV
222.000–246.995MHz 0.79uV 247.000–329.995MHz 1uV
DV (at BER 1%, 4.8kbps)
VHF (Ham band) 0.22uV UHF (Ham band) 0.22uV

Selectivity: AM/FM Wide More than 50dB
FM-Narrow, DV More than 45dB
WFM More than 300kHz/–3dB
Less than 700kHz/–20dB

Intermediate frequency: A band (1st/2nd) 61.65MHz/450kHz (Except WFM)
WFM (1st/2nd/3rd) 59.25MHz/13.35MHz/1.95MHz
B band (1st/2nd) 46.35MHz/450kHz

Spurious and image rejection: VHF (Ham band) More than 60dB
UHF (Ham band) More than 50dB (IF more than 60dB)

Spurious radiation: Less than –57dBm

Audio output power: More than 200mW at 10% distortion (7.4V DC) with an 8Ω load

External speaker: 8Ω impedance

Supplied accessories; Battery pack (BP-256)
Wall charger (BC-167D)
Antenna (FA-S270C)
Belt clip (MB-111)
Hand strap

UK D-Star Repeaters On Air

(as of Feb 2008)

Callsign	Output	Input	Location	QTH
GB7FK	439.9125	433.9125	Folkestone	JO01OC
GB7IC	430.9625	438.5625	Herne Bay	JO01NI
GB7IC	1290.650	1270.650	Herne Bay	JO01NI
GB7PI	439.9125	433.9125	Barkway	IO92XA
GB7ML	439.9125	433.9125	Chertsey	IO91RJ
GB7SS	439.8875	433.8875	Hockley	JO01HO

D-Star repeaters also licensed;

Callsign	Output	Input	Location	QTH
GB7SF	145.7375	145.1375	Sheffield	IO93GK
GB7YD	145.7125	145.1125	Barnsley	IO93HO
GB7YD	439.9125	433.9125	Barnsley	IO93HO
GB7DG	145.7750	145.1750	Glasgow	IO75TS
GB7DE	145.6375	145.0375	Largo Fife	IO86NF

D-Star Worldwide Repeater Gateways

Worldwide (non-USA)

VK8RAD	Darwin Northern Territory, Australia
VK2RAG	Sydney NSW / Australia
VK3RWN	Melbourne Victoria, Australia
LU3AOC	Buenos Aires Argentina
OE6XAD	Graz - Dobl Austria
PY2KEP	São Paulo Brazil
VE6WRN	Calgary AB, Canada
VA7ICM	Vancouver BC, Canada
VE7VIC	Victoria BC, Canada
VA3ODG	Ottawa ON, Canada
VE3YYZ	Toronto ON, Canada
F1ZPL	Courbevoie - Paris France
DB0ADB	Bamberg Germany
DB0DF	Berlin Germany
DB0BS	Bochum Germany
DB0DDS	Dortmund Germany
DB0FEU	Feuchtwangen Germany
DB0HRF	Gr.Feldberg/Frankfurt Germany
DB0DUR	Marl Germany
DF0MHR	Mülheim Germany
DB0SLH	Norderstedt / Hamburg Germany
DB0VOX	Nuernberg Germany
DB0WZB	Veitshöchheim Germany
DB0WZ	Würzburg Germany
IR3UCZ	Chioggia Italy
IR2UX	Milano Italy
IR3UEF	Monselice/Padua Italy
IR0UAC	Rome Italy
IR3UQ	Verona Italy
CQ0DLR	Leiria (Candeeiros) Portugal
HB9F	Bern Switzerland
HB9BO	Mt. Schilthorn (3000 m) Switzerland

and of course;

GB7IC	Herne Bay UK
GB7FK	Folkestone UK

USA;

KL7FF	Ketchikan AK
K4DSO	Birmingham AL
KI4PPF	Huntsville AL
KI4SAZ	Magnolia Springs AL
W4KCQ	Tuscaloosa AL
W7KDS	Kingman AZ
KE7JFH	Mesa AZ
K6SOA	Laguna Beach CA
KI6JKA	Los Angeles CA
WA6IRC	Los Angeles CA -
KF6BQK	Malibu CA
W6HHD	Mt. Bullion CA
K6MDD	Mt. Diablo CA
KI6KQU	Mt. Woodson, San Diego CA
W6YYY	Oakland CA
K6IFR	Palm Springs CA
W6UUU	Pleasanton CA
KI6JUL	San Jose CA
W6DHS	Volcano CA
W1IXU	Bristol CT
KJ4ACN	Lakeland FL
KI4VKC	Panama FL
W4DOC	Atlanta GA
KI4SBA	Cumming GA -
WD4STR	Lawrenceville/NE Atl GA
K4USD	Morrow/Stockbridge GA -
WH6DHT	Aiea HI
W9CEQ	Batavia IL
NS9RC	Chicago IL
W9ICE	Indianapolis IN
W5SHV	Shreveport LA
WD8MKG	Holton MI
K6ZC	Fairmont MN
K0MDG	St Louis MO
W0OMD	Ozark MO
K5RKN	Brandon MS
KI4TMJ	McHenry MS
KI4WXS	Charlotte NC
W0MAO	Lincoln NE
K1HRO	Salem NH
NM5WR	Los Alamos NM
K2DIG	New York NY
KD8DRG	Akron OH
KE7MVI	Medford OR
W3EXW	Pittsburgh PA
W3EOC	Pocopson PA
W5HAT	Bruceville TX
K5TIT	Dallas TX
W5NGU	Denton TX
KE5KAF	Laredo TX
NE5R	Mesquite TX
K5CTX	Temple TX
WW4EMC	Spotsylvania VA
WS4VA	Stafford VA
WD4HRO	Woodbridge VA
N7IH	Bellevue WA

hot) after a long period of operation indoors with it held in my hand. But used outdoors with a cooling sea breeze it wasn't a problem, even after an hour's worth of chatting.

Displayed Information

Later that day I took a ride to the north coast of Kent, I again enjoyed the sunny weather by chatting through GB7IC on 430MHz in Herne Bay from the centre's car park, as well as using the gateway system to link through to GB7FK again. I chatted with **David G8GJQ** using his IC-2820 via GB7IC, also with **Mat M3PPU** using his IC-91 hand-held from his garden, Mat also had an IC-2820 but like me was also enjoying the sunny weather outdoors!

As I was quite near to GB7IC and – as an experiment – I decided to drive to literally 'right outside the door' of the repeater location at Icom-UK's offices and carried on chatting with Mat using the 'EL' (extra low) transmit power output setting of the IC-E92.

Unlike digital TV or GSM, where a weak signal causes the reception to initially go 'bitty' and rapidly disappear, as a D-STAR signal becomes weak, or more correctly as the data error rate increases, the demodulated audio starts to go from perfect copy to becoming increasingly garbled until the signal finally drops out.

Whether it's an effect of the error correction of D-STAR or whatever, I did seem to find that I achieved communication ranges rather further than I'd have expected with normal analogue f.m. speech. I've been designing and testing mobile and portable f.m. transceivers for almost 30 years, so I believe I know what to expect! But D-STAR really did surprise me, especially with its capabilities so far away from GB7FK and well outside the coverage area, as well as from M0TMX in Ashford, each time using the IC-E92D indoors with it's small set-top antenna.

I think that D-STAR is a very interesting and exciting progression in amateur radio for v.h.f./u.h.f. communication. It's an open amateur radio standard available to all and I do hope other manufacturers will offer products as well as homebrew projects (there's already one started) becoming available.

With current on-air activity and an increasing numbers of repeaters this shows D-STAR is well and truly happening. The IC-E92D is an extremely versatile hand-held transceiver and wideband receiver, with excellent technical performance as well as having D-STAR capabilities built in as standard.

Finally, my thanks – and those of the Editorial team – go to **Martin Lynch and Sons** for the loan of the IC-E92D for review.

rallies

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

Send all your rally info to

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

April 6th
Spring Militaria & Electronics & Radio Amateur Hangar Sale
Rod Siebert. Tel: (01270) 623353
www.hackgreen.co.uk
The Spring Militaria & Electronics & Radio Amateur Hangar Sale will be held at Hack Green Secret Nuclear Bunker, Nantwich Cheshire. (CW58AP Sat-Nav). There will be a sale of militaria & electronics in the large hanger with a variety of traders. Also on the same day is the Ex-Military Landrover Association 'Bunker Crank Up' with a large display of military vehicles.

West London Radio & Electronics Show
Paul. Tel: (01737) 279108
E-mail: info@radiofairs.co.uk
www.radiofairs.co.uk
The West London Radio & Electronics Show will be held at Kempton Park Racecourse, Sunbury-on-Thames, Middlesex TW16 5AQ. Doors open at 10am. There will be trade stands, a Bring & Buy, special interest groups and plenty of car parking. The event will also feature the RSGB Top Ham Competition.

Cambridgeshire Repeater Group Rally
Paul or Jane. Tel: (01462) 683574
E-mail: G2PA@btinternet.com
http://www.cambridgerepeaters.net/?page_id=78
The Cambridgeshire Repeater Group Rally will be held at Bottisham Village College, Lode Road, Bottisham, Cambridgeshire CB25 9DL (6miles east of Cambridge, via A14 & A1303). Doors open at 10am and entry is free of charge to paid up members of the CRG, all others will be asked to pay £2.00. There will be trade stands as well as a Bring & Buy.

April 13th
Enniskillen Amateur Radio Show
Alan. Tel: 0286 634 1108
http://www.lougherneradioclub.co.uk/
The Lough Erne Amateur Radio Club is hosting the 27th Enniskillen Amateur Radio Show at The Share Centre, Lisnaskea, County Fermanagh BT92 0EQ. There will be a Bring & Buy and all the usual facilities including food and parking on-site.

Andover Radio Club Boot Sale
Martin. Tel: (01980) 612070
E-mail: martinsmith@kukltd.co.uk
http://www.arac.co.uk
The Andover Boot sale will be held at the Wildhern Village Hall and Playing field just north of Andover off the A343 northbound out of Andover (postcode SP11 0JE). Entry is £1 per person and pitches/boots are £5 with some tables inside the hall at £7 each. The site is equipped for disabled access. Light refreshments will be available in the hall.

April 25th - 27th
National Exhibition of Amateur Radio, Electronics, IT, Hi-Fi Car Systems and Tuning
www.radioamatorepordenone.it
The National Exhibition of Amateur Radio, Electronics, IT , Hi-Fi Car Systems and Tuning will be held at Pordenone Fair, VialeTreviso no. 1 - 33170, Pordenone, Italy. There will be equipment for radio amateur, including transmitters and transceivers, antennas and accessories, electronic components, computers and car hi-fi. The event also includes the IARU R1 High Speed Telegraphy championships. Doors open from 9am to 6.30pm on the first two days and 9am to 6pm on the final day.

April 27th
Yeovil Amateur Radio Club 24th QRP Convention
George Davis. Tel: (01935) 425669
www.yeovil-arc.com
The Yeovil QRP Convention will be held in Sherbourne Arts Centre Association, Digby Hall, Hound Street, Sherborne DT9 3AA. Follow the white road signs to the town centre as Digby Hall adjoins the central shopping car park. Doors open at 10am. There will be trade stands, a Bring & Buy, catering and talk-in on S22.

May 4th
3rd Dambusters Hamfest
Tony Nightingale. Tel: (01507) 527835
E-mail: G3ZPU@hotmail.com
The third Dambusters Hamfest will be held at Thorpe Camp Museum, Nr Coningsby, Lincolnshire LN4 4PE (the 617 Dambusters Squadron base). Free pitches are available for traders and entry is £2 per person, which includes entry into the museum. There are no inside pitches but traders can bring their own tents, gazebos or marquees at no extra cost. Please book these in advance. The Naffi will be open for hot drinks and home made cakes. Doors open for visitors at 10.30am.

May 5th
Dartmoor Radio Rally
Peter. Tel: 01822 860277
The 24th Dartmoor Radio Rally will be held at Tavistock College, Crowndale Road, Tavistock, Devon, PL19 8DD. There will be trade stands, special interest groups, Bring & Buy, catering and free parking. Doors open at 10.30am (10.15am for disabled). Talk in on 145.550MHz.

May 16th – 18th
Dayton Hamvention
www.hamvention.org
The Dayton Hamvention will be held in the Hara Arena, Dayton, Ohio, USA. A 3-day pass will cost $20 in advance or $25 on the door. Outside exhibits open at 8am each day and inside exhibits open at 9am. There will be a large RSGB bookstall.

May 18th
Magnum Radio Rally
Helen. Tel: 0777 6385247
E-mail: Helen@magnumrally.org
www.magnumrally.org
The Magnum Radio Rally will be held in the Magnum Leisure Centre, Harbourside, Irvine, Ayrshire KA12 8PP. There is plenty of free car parking and doors open at 10.30am. Entry fee is £3.50 and there will be trade stands, a Bring & Buy and special interest groups.

June 1st
Spalding Rally
Alan. Tel: 0776777296
E-mail: rally-secretary@sdars.org.uk
www.sdars.org.uk
The Spalding Rally 2008 will be held at The Sir John Gleed Technology School, Halmer Gardens, Spalding, Lincs PE11 2EF. Doors open 10am. There will be a Fleamarket, free parking and plenty of catering.

June 8th
Elvaston Castle National Radio Rally
Ken Frankcom. Tel: (01332) 720976
www.elvastonrally.co.uk
The Elvaston Castle National Radio Rally will be held at Elvaston Castle, Derbyshire DE72 3EP. There is plenty of car parking and the gates open at 9am. Entry fee is £4 with accompanied under 16s free. There will be catering, a Bring & Buy, trade stands, the RSGB and special interest groups.

June 15th
Newbury & Districts ARS Rally and Boot Sale
Richard Jolliffe. Tel: (01635) 46241
E-mail: carboot@nadars.org.uk
The Newbury & Districts ARS Rally and Boot Sale will be held at the Newbury Showground - nearest postcode RG18 9JU. Pitches are £10 each or you can erect your own marquee for £50. The entry fee for visitors is £2.

June 27th - 29th
Hamtronic Show
www.hamradio-friedrichshafen.de/html/en
The Hamtronic Show will be held at Messe Friedrichshafen, Neue Messe 1, 88046 Friedrichshafen, Germany. There will be trade stands, special interest groups and a large RSGB Bookstall.

June 29th
West of England Radio Rally
Shaun. Tel: (01225) 873 098
Email: rallymanager@westrally.org.uk
www.westrally.org.uk
The West of England Radio Rally will be held at the "Cheese & Grain" venue, Frome, Somerset.

July 5th
Reddish Rally
Nigel. Tel: 0161 428 8413 evenings and weekends
www.reddishrally.co.uk
The Reddish Radio Rally will be held in St.Mary's Parish Church Hall, St Mary's Drive, Off Reddish Road, Stockport, Cheshire SK5 7AX. Doors open at 10.30am and entry is £1. There will be car parking available. Tables available at £10 each. Please note this is a Saturday rally as the venue is in use on Sundays!

July 6th
Barford Radio Rally
David. Tel: (01953) 458844
www.norfolkamateurradio.org
The Norfolk ARC Barford Radio Rally will be held in Barford Village Hall, Barford, Norfolk TG113077. There will be car parking available and the doors open at 9am. There will be trade stands, a Bring & Buy, special interest groups and the RSGB bookstall.

New! Flex SDR-5000

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

Available usually from stock: £1695
Internal ATU: add £229

Mini VNA PC Controlled Antenna Analyser

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

ML&S Price
£209.95

Technical Specifications:

- Frequency coverage 0.1MHz to 180MHz
- DDS Generator with 0 dBm output
- 2 BNC Ports allow Transmission Measurements e.g. filters, traps
- USB 1.1 and USB 2 compatibility
- RS232 optional socket for Pocket PC's or Remote Displays
- Fast Scan (typical 0.6 sec for 500 points)
- Use of an internal Industrial Directional Coupler
- High Reflection Dynamic Range 40dB to 35dB (VSWR 1.06:1 or better)
- Wide Transmission Dynamic Range > 50-55dB
- Measures VSWR, RL, Rs, Z +/-jx, Phase, Cable length, R/L/C
- Finds Minimum VSWR automatically
- New transparent box with LED indicators for the operation status
- In-Circuit-Programming for future firmware onboard CPU upgrades
- Operation from 3.6V Phone Batteries possible (current drawn <150mA)
- Software compatible with Windows and Linux operating systems.
- Save and Load of previous measurements
- Software for Pocket PC available

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MFJ-971 £74.95
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MFJ-16010 £44.95

MFJ-949E 300 Watt Antenna Tuner
If you want a good reliable All-in-One ATU this is the one for you. Worldwide reputation for being able to match just about anything. £115.95

MFJ-971
Portable ATU, 1.8-30 MHz 200W cross needle SWR/PWR. An ideal QRP ATU. Easy to use and very compact. QRP Portable ATU **Only £74.95!**

MFJ-993B
This very popular Autotuner from MFJ lets you tune any antenna automatically balanced or unbalanced - ultra fast. It's a comprehensive automatic antenna tuning center complete with SWR/Watt-meter, antenna switch for two antennas and 4:1 current balun for balanced lines. What will it tune? Just about anything! End feds, open wire feeders, beams, dipoles, G5RV's you name it. **Only £189.95**

MFJ-834 RF Current Meter 160-10M 3 Amps. **£59.95 Only £49.95 this month only!**

MFJ-16010 Mini Random Wire 100W ATU. Just plug your HF transceiver on one end, throw out some wire out of the window and tune. Nice and compact (only 2 x 3 x 2 inches) **Only £44.95**

MFJ-974HB 160 Thru 6 Meters Balanced Line Antenna Tuner.

The MFJ-974HB is a fully balanced true balanced line antenna tuner. It gives you superb current balance throughout its very wide matching and frequency range. **£159.95**

MFJ-259B/L
Range: 1.8-170MHz. HF frequency coverage. Keeps your antennas in check. Complete pictures of your antenna's performance. You can read antenna SWR and Complex Impedance 1.8 to 170MHz. **£199.95**
MFJ-269 1.8-450MHz version of the above. **£239.95 Add an MFJ-29C Carry Case for only £22.95!**

Don't forget ML&S stock one of the largest displays of MFJ in the country!

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The finest range of keys available today.
For the full range of these beautiful Italian crafted keys, see web.

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The best British range of keys money can buy.

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Optibeam Antennas

Serious HF Antenna arrays for serious DX'ing.

Featured Antenna
The OptiBeam OBW10-5 is a 10 element 20m, 17m, 15m, 12m & 10m (14MHz, 18MHz, 21MHz, 24MHz, 28MHz) wire beam.
- Gain: 11.5 dBi/12.0 dBi/11.8 dBi/12.3 dBi/12.6 dBi; Length: 7.70m, Weight: 14 kg. **Price: £949 with balun & UK mainland delivery.**

Please see our website for the full range Optibeam products

5 STAR British products from WonderWand

New! WonderWand Combo
A one-stop solution to your portable antenna requirements. The new WW Combo is a single unit housing the famous WonderWand and TCP Tuneable Counterpoise. Full operation 7MHz-440MHz, max 40PEP. **In stock now! £159.95**

New! WonderWand WonderPole
As featured in CQ magazine in Japan! Yet another new antenna system from WonderWand products. 20-10M Portable dipole for any rig with an SO-239 Socket. 40 Watts PEP. **Only £129.95**

The original and best selling WonderWand

40m-6m portable antenna for all rigs. Ideal for IC-703, FT-817, FT-897 etc. Superbly made and excellent value for money. **Only £89.95**

WonderWand TCP
A tuneable counterpoise ideally suited to the WonderWand for increased performance. **Only £59.95**

Real-time Virtual Radar

AirNav RadarBox

The AirNav RadarBox is the closest you can be to real world aviation without leaving your chair thanks to next generation Radar decoding.

By decoding ADS-B (Automatic Dependent Surveillance Broadcast) radar signals, you will be able to see on your computer what real Air Traffic Controllers see on their screens in Real-Time. Flight number, aircraft type, altitude, heading, speed are all updated each second. Included is the award winning software interface developed by the world's leader in flight tracking and monitoring solutions, AirNav Systems.

MLS Price: £469.95 incl. VAT

For further information see www.VirtualRadar.co.uk

Kinetic SBS-1 MkII

Aircraft enthusiasts worldwide are now able to directly monitor the skies in an unprecedented fashion. Additionally, the SBS-1 provides small and medium sized airfields with many of the safety and operational benefits previously only available to large international airports - at a fraction of current radar costs. Coupled with a Mode-S/ADS-B transponder the SBS-1 becomes an invaluable tool in flight training operations.

NEW LOW PRICE!

- *Connects to laptop/desktop PC via USB*
- *Track Mode-S/ADS-B equipped aircraft in real time**
- *An invaluable tool for aircraft enthusiasts*
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- *Easy to install, portable and lightweight*
- *Real-Time aircraft position and identity data*
- *Powerful SBS-1 Basestation software included*
- *Package includes all necessary components to connect to your Windows XP PC*

**UK airspace from March 2005 and for all categories of flights in all other airspace from March 2008.*

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Icom

The NEW Icom IC-7700
HF/6m All Mode Base Transceiver

Remember our information on the Icom X3? We may have got the number wrong but here is a fantastic looking new HF & 6M radio from those very clever guys at Icom Japan. The new Icom IC-7700 is a self-contained, top-performance HF/6m transceiver closely related to its "bigger brother", the IC-7800.

RRP: £3999.95
Call ML&S for more details

Icom IC-E2820
Dual Band Mobile

ONLY: £379.95
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D-Star Capable

PC Controlled Receivers from ICOM

Four models to choose from:

IC-PCR1500 10kHz-3300MHz All Mode **£369.95**
IC-R1500 As above but with remote head **£419.95**
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See web for full details, PDF's etc.

Icom IC-7000

Full range of accessories available, please see web for more details.

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Icom IC-706MkIIG

HF+6M+2M + 70cms Mobile/Base.

£599.95
Whilst stocks last!

Icom IC-7400

Fantastic HF+6M+2M 100W All Mode Base Transceiver.

SPECIAL PACKAGE DEAL
SM-20 Desk Mic, SP-21 Speaker, MP-250A PSU
All for £1359.00 Rig only CALL

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The best 2/70 & 23cm dedicated all mode base. 23cm included.

RRP £1675 ML&S £1239

Basic Version (without 23cm) also available: **£1089**

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£319.95

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VHF/UHF DUAL-BAND FM TRANSCEIVER

Latest Dual Band Handie with D-Star fitted as standard. Full range of accessories including HM-175 Remote GPS microphone. See web!

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Triple Band Handie
Only £199.95!
Or available with 4m and extra antenna for **Only £239.95**

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Basic ready to go 100W HF Transceiver supplied with Microphone & DC Lead.

CALL FOR BEST PRICE

Icom IC-703
IDEAL FOR M3 USERS
10W Portable/Base HF Transceiver with built-in ATU.
RRP £703 ML&S: CALL!

Stop Press
GB7ML D-Star repeater now active from Chertsey

Icom IC-E208
2/70 mobile 50/55W Transceiver with host of additional features. Remote head leads included.
RRP £365 ML&S: £219

kenwood

NEW Kenwood TM-D710E

The Kenwood TM-D710E is the replacement for the previous TM-D700E, which was hugely successful in introducing mobile APRS to Amateur Radio operators around the world. As well as a built-in 1200/9600 baud TNC with improved APRS functions, the TM-D710E also incorporates as standard firmware to enable it to operate as an Echolink Node Terminal when connected to a PC (running Echolink software).

IN STOCK!!!
Price - CALL!

NEW Mobile Transceiver
TM-V71E
v.h.f/u.h.f. mobile transceiver

- High r.f. power output (50W)
- Dual receive on same band
- Green and amber colour display
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- Programmable memory
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- Wide Band Reception : 118-524MHz & 800-1300MHz (excluding cellular blocked frequencies)

NOW AVAILABLE, ONLY £269.95

Kenwood TS-2000E
Just superb on all bands 160m-70cm with optional 23cm (X-Version)
RRP: £1699 ML&S: £1299

Kenwood TS-2000X
As above but with 23cm fitted. **RRP: £1999 ML&S: £1699**

TS-2000 Bundles

Bundle 1 TS-2000E Supplied with hand Mic, DC Lead ... **£1299**
Bundle 2 As above with MyDEL MP-250A PSU **£1379**
Bundle 3 As above with MC-60A Desk Mic **£1499**

The TS-2000X (fitted with 10W 23cm module) version of any of the above is available for an additional £400 on the above prices.

Kenwood TS-480SAT
The best selling Kenwood H.F. Can be used mobile or base. Includes ATU.
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As TS-480SAT but 200 Watts, no ATU. **ML&S £799.95**

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2/70 Handie with Gen Cov RX. If you must have SSB RX on your dual-bander then buy one!
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Only £89.99
25 Amps maximum, 22Amps constant, ideal for most modern HF Transceivers

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Linear 25-30A 13.8VDC PSU, using a large transformer, twin meters to monitor Volts & Amps. Been on the market for over 20 years in various different brand names and model numbers.

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Icom

Icom IC-756Pro mkIII

Buy now, pay later*
Package Deal
IC-756ProIII, SM20 Microphone, SP-23 New Base Speaker with filters.
RRP £2768
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Rig Only **New Low Price £1749**

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ALWAYS IN STOCK RRP £6400.00
Defer payment for 6 months - Interest FREE!*
The Icom Flagship Base Transceiver just keeps getting better & better. Now fitted with 3 Roofing Filters for even more receiver performance.
On permanent display next to the FTdx9000.

CALL FOR ML&S Package Deal

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NEW

Perseus VLF-LF-HF Receiver

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

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

ML&S are Sole Distributors for Perseus in the UK and Ireland

RRP: £599.96

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FT-857D + ATAS-120 Auto Antenna Bundle
Only £679.95 for both
(Rig only: CALL)
The Ultimate HF Mobile Installation!
VERY LIMITED OFFER!

ML&S £679.95

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High Power version of the FT-817. Use as a transportable, (20W) or as a base/mobile (100W)

Bundle 1.
FT-897D 'Vanilla' Basic FT-897 HF-70cm Transportable.
£Call!

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FT-897D + LDG AT-897 & MP-8230 22Amp PSU.
Only £849

Bundle 3.
FT-897D, FP-30 7 FC-30 The most compact HF base with built-in mains PSU & Bolt-On Auto ATU.
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Bundle 4.
FT-897D, 2 x FNB-72, CD-24 & PA-26. The ultimate HF/V/U system with both batteries, charger & adapter.
Only £849

Bundle 5. Ultimate FT-897D System!
As above but with MP-4128 23 Amp PSU & LDG AT-897 Auto-Tuner.
Only £1079

Yaesu FT-817ND Bundles
CALL - LOW PRICES ON THESE BUNDLES

Bundle 1 FT-817ND 'Vanilla' - Basic FT-817
Bundle 2 FT-817ND + YF-122C 500Hz CW Filter
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All ML&S FT-817ND's include;
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Why not add a CSC-83 Carry Case for only £19.95?

Yaesu FTdx9000D 200 Watts or 400 Watts, TFT Screen or not. You choose. Call for more info or see www.FTdx9000.com 'D' spec now shipping at **£7299**

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NEW LOW PRICE! NOW ONLY £169.95
Bar make the tea it'll give you 2m/70cm @ 50W/40W

Yaesu FT-8800 Similar to the FT-7800 but can receive on 2 & 70 simultaneously ..... **ML&S: £219.95**

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yaesu

YAESU'S "MIDSHIP RADIO"

FT-950

Many of you grabbed the new Yaesu FT-950 HF&6M from us at the end of November. Once again Yaesu identified a position in the market and hit it spot on. When Peter Hart said it was "An eye catching radio with some very nice features" and "it represents extremely good value" he wasn't kidding. If you don't need dual receive or internal PSU like its Dad, (the FT-2000) then check out the FT-950. **You can even own an FT-950 for just £100 deposit and 36 payments of £32.67 (STS).**

For more information see: www.FT-950.com

The FT-950 available NOW from ML&S at only £999.95 including FREE UK Mainland delivery.

yaesu

FT-2000

Available from stock and on permanent demo in our showroom

- Two Versions, 100W and 200W
- FT-2000 100 Watts, 160-6m, Internal PSU
- FT-2000D 200 Watts, 160-6m, External PSU
- Variable RF Tuning & Roofing Filters as standard

ML&S Call for latest prices

Accessories

DMU-2000 Data Management Unit
● Spectrum Scope with Limited Bandwidth Sweep feature ● Audio Scope/Oscilloscope Display Page ● Swept-Frequency SWR Page ● Memory Channel List ● World Clock withGreyLine Page ● Rotator Control Page ● Log Book Feature £699.95

SP-2000 External Speaker with 2 inputs & filters..... £139.95

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CW Filters for Sub-Receiver YF-122C (500Hz) CW Filter £94.95
YF-122CN (300Hz) CWN Filter £109.95

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The ultimate accessory Quadra System 1kW HF Linear Amplifier, PSU & Auto ATU. ..... Always available from stock, £Call

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NEW FT-450AT

Full 100 Watts, DSP, Optional internal ATU & measuring only 9"x3.3"x8.5"

Just like a good radio station... the Yaesu hits keep on coming!

HF & 6m full DSP

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Linear Amp UK

Final Production Run!

LINEAR AMP UK

Ranger 572

The Ranger 572 uses two rugged 572Bs valves to produce 800W on the Amateur HF bands. As with all our models, the Ranger has a toroidal transformer providing the power into a voltage doubler board. The voltage doubler is used in preference to a bridge rectifier as it keeps the AC volts down.

ML&S £999.99

Challenger IV Minimum 1.5kW output

Using a single 3CX1500A7 ceramic triode valve due to its rugged construction and high gain. There is a massive 2.2kVA toroidal transformer producing 3200V after the voltage doubler board. The Challenger will cover all the HF bands, 10m - 160m with separate band switch positions for the WARC bands.

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Discovery Two. 2m Linear Amp 400-1.5kW output

Limited availability. Also available with G531 triode, maximum output 1.2kW.

ML&S £1395

palstar

AT-AUTO

Full range of Palstar now in stock

Palstar AT-Auto	Automatic 1500 Watt ATU	£899.95
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Palstar AT-1500DT	1500W Differential Antenna Tuner	£339.95
Palstar AT-2K	2000W Antenna Tuner	£349.95
Palstar AT-4K (2.5kW) & **AT-5K** (3.5kW)	Antenna Tuners **AT-4K**.....£649.95 **AT-5K**.....£849.95	
Palstar BT-1500A	Balanced Antenna Tuner	£449.95
Palstar ZM-30	Antenna Analyser	£289.95
Palstar Power/SWR Meters	**PM-2000A**....£139.95 **PM-2000AM**....£139.95 **PM-5K Digital**....£299.95	
Palstar Dummy Loads	**DL-1500** (1.5KW).....£69.95 **DL-2K** (2kW).....£139.95 **DL-5K** (5kW).....£279.95	
Palstar R30CC Receiver	Palstar R30CC, fitted Collins filters for SSB & AM	£499.95
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Palstar MW550P	Active preselector & ATU for AM & 160M reception	£199.95
Palstar SP30	Matching Desk Speaker	£39.95
Palstar AA30	New Low Noise Active Antenna 300kHz-30MHz	£69.95

For the full range of Palstar products see: www.HamRadio.co.uk

Full range of Hustler Mobile & Base HF antennas available from stock

Base Station Range, free standing, max 7.3m tall, 1kW
4-BTV 40/20/15/10m..... £149.95
5-BTV 80/40/20/15/10m..... £179.95
6-BTV 80/40/30/20/15/10m £194.95
17-BTV-S 17m add on for 5-BTV or 6-BTV.... £49.95

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RM10 to RM-80 10M to 80m single-band whips,
£19.95 to £31.95

HUSTLER

Full range of Hustler accessories in stock.

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DIAMOND ANTENNA · COMET · Maldol

ML&S are now UK Agents for Optibeam Antennas
Made in Germany, these are the best engineered HF Beams in the world.

Super Antennas, Diamond, Comet, Optibeam and Maldol always in stock! Please call for details.

mydel

ML&S Only £229.95

NEW MyDEL CG-3000.

200W and 200 memory channels.

- Tunable frequency: 1.8 - 30 Mhz with long wire antenna from 8 meters
- Input impendence: 50 ohms
- Input power: 10 - 200W PEP
- SWR: <2:1
- Power supply voltage: 12V +/- 10%
- Current consumption: <0.8A
- Auto tuning time: Approx. 2 seconds (first time tuning) Less than 1 second (return to memory frequency)
- Memory channels: 200
- Weight: 1.8 KG
- Size: 310 x 240 x 72mm (L - W - H)

As reviewed by Steve White in Radcom
"A real bargain when compared to its obvious USA competitor" "Well built & performs impressively"
Steve White, Radcom November.

CG-3000 shown with optional remote switch

NEW! Remote control for the CG-3000. £29.95

NEW MyDEL CG-5000

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

Specifications:

- Tuneable frequency: 1.8 - 30Mhz with long wire antenna from 8 meters
- Input impendence: 45-55 ohms
- Input power: 10 - 600W PEP
- SWR: <2:1
- Power supply voltage: DC 13.8V
- Current consumption: <1.5A
- Memory channels: 800
- Auto tuning time: 0.5-6 seconds (first time tuning), less than 0.2 second (return to memory frequency)
- Weight: 1.8 KG
- Size: 365mm x 240mm x 75mm (L - W - H)

ML&S Only £439.95

Nifty Equipment Manuals and Quick Reference Cards for Yaesu, Icom, Kenwood, Elecraft & Ten-Tec radios. See Web for details.

LDG

LDG Tuners & Accessories

NEW! AT-1000Pro

Building on the success of the AT-1000, LDG Electronics has refined and expanded its flagship 1KW tuner. Continuous coverage 1.8 to 54 MHz, Power rating HF (1.8 to 30 MHz), 1000 Watts Single Side Band 750 Watts CW, 500 Watts Digital (RTTY, Packet, etc.) 6 meters: 250 Watts (any mode) Capacitor / Inductor fine tune controls. Tuning time: 0.2 recall, 10 seconds average, 30 seconds max. Antenna impedance: 6 to 1000 Ohms (approximately 10:1 SWR, 3:1 on 6M) Intro price £399.95

LDG AT-7000 Specifically designed for the IC-7000! The AT-7000 is the ideal tuner for your shiny new IC-7000. First, it matches up to 10:1 SWR (3:1 on 6 meters), so just about anything you can feed with coax is good to go. And, it has 2,000 (not a typo; that's 2,000!) memories. £139.94

LDG Z-100 100W Auto ATU 160M-6M ..... Only £119.95

LDG AT-100Pro & AT-200Pro 100W or 200W Auto Tuner,160M-6M with 2 Antenna outputs AT-100Pro £169.95 AT-200Pro £179.95

AT-897 Bolt-on Alternative Auto Tuner for the FT-897.Wider tuning range and cheaper too! Only £179.95

LDG Z-11Pro Portable compact & tunes 100mW to 125W £139.95

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The Timewave DSP599zx Digital Signal Processor

In our crowded bands these days, it's always useful to have very tight filters, to ward off QRM along with the ability to reduce noise on the band that also seems to be in abundance! I suffer with power-line noise at my QTH and on 1.8MHz 'Top Band' it's S8 most of the time and on 14MHz – when I turn the beam toward the lines – it comes up to S7.

If only the power lines were underground! Working DX and weak signals becomes difficult without help so I thought it would be interesting to see what the Timewave DSP599zx can do to improve things!

Small Equipment & Big Book!

It's quite amazing how a small piece of equipment can be accompanied by such a large handbook! However, the Timewave DSP599zx really is a tiny heavy-weight. Most people think of it as a noise reduction filter, but that would be an awful misnomer. At 193 mm wide x 216 mm deep x 48 mm high (7.6in. wide x 8.5in. deep x 1.9in. high) and weighing 1.15kg. (2.53lb) it has a lot of technology inside.

In fact, the '599zx is a noise filter but it's also a variable voice and c.w. (Morse) filter, and a data filter – covering most of the used data modes, especially RTTY. It can also be used as a piece of test equipment and your favourite configurations can be saved into memories. I was impressed enough to read on further!

Although the manual says that the '599zx comes only with a 12V d.c. connector with the lead, mine had a lead already made up. However, you will have to supply the audio leads and these require an RCA ('phono' type) connector on the DSP599 end and a plug to suit my radio on the other.

Also in the package there's is a CDROM with the set-up instructions, demonstration programs and useful links. It also includes manuals for most of the Timewave products.

Modern transceivers now employ DSP at the intermediate frequency (i.f.) and this is the preferred system. However, audio frequency (a.f.) DSP has improved and can be seen now as a very useful accessory to have in addition. When signals are weak and we have a noise floor that's not always ideal I think that the Tesco motto *Every little helps!* – applies.

How It Works

Let's now take a look at how the DSP unit works. First, the '599zx takes the audio analog output from the transceiver, converts it to a digital signal, processes it and then converts it back to analog audio before passing it to the loudspeaker or headphones.

The device carrying out all the processing is a 16 bit, 27ns Analog Devices ADSP-2181 with 80kb of memory, in other words – the brains of the '599zx and is shown in close-up in **Figs. 1** to **4**. This gives the user a wide variety of possibilities of configurations for various modes including, c.w. and data. (I'll cover these in more detail later).

The noise reduction and both notch and bandpass filtering enables the user to set the parameters of the filters suitable for each mode and the settings – when made – are then instantly visible on the unit's liquid crystal display (l.c.d.) screen. The filters are tuned by two variable optical encoders and although they feel a little wobbly to the touch they're perfectly fine in operation.

Roger Cooke G3LDI – always busy on the h.f. bands – tries out a rather special digital signal processing unit from Timewave.

I found the control buttons to be rather small and with age (mine!) they all seem to be getting smaller on equipment nowadays – as I've mentioned before! Despite this I had no problem using them and I always have my reading glasses on when at the desk anyway! The l.c.d. is perfectly legible and I think it's much better to have the ability to vary the bandwidth selectively and have the settings displayed, rather than merely select fixed settings with a switch.

The front panel, Fig 1, is populated with nine push buttons, 13 light emitting diodes (l.e.d.s), two variable optical encoder controls, also with push switches and a level control.

Fig. 1: The input and output connections are through RCA phono plugs and sockets and you will need to make up your own leads for these.

The rear panel has a 12V d.c. power connector, RS232 DB-9F connector for computer interface, two 8-pin DIN connectors for alternate radio connections, and eight RCA (phono) connectors, the top row for one radio and the bottom row for the second radio. They are push-to-talk (p.t.t.), audio input, line output, and speaker output.

There's also a quarter inch stereo jack connector for headphones. The photograph, Fig 1.3, Shows the top of the printed circuit board (p.c.b.). The front panel can be disconnected from the main board and the main p.c.b. is held in with two screws underneath the board.

The manual is very comprehensive, running into eight sections divided into sub-sections in the American fashion. It has a fault-finding guide in the unlikely event that you can't get it to work and several mini sections at the back under the title *Appendix*. There are also a few pages devoted to circuitry, configuration data and a useful *Operation Reference Card*. There's the previously mentioned CDROM with more information, URLs, and demo programs.

On The Air

After I had read the manual, it was time for me to install, set-up and learn how to use it! I started by plugging it into a 12V d.c. supply, then I connected it to the a.f. output of my transceiver into the audio input Channel A, with the audio output of Channel A connected to the loudspeaker.

Once the DSP599zx is connected, I found that using the unit was fairly intuitive. The front panel has a back-lit yellow l.c.d. display, showing parameters for the various modes. The mode switch selects **Voice**, **CW** or **Data**. The level control also doubles as the **On**/**Off** switch.

Following the instructions, I adjusted the audio output of the transceiver until the yellow l.e.d. was flashing – but ensuring that it was doing so just below the level where the red l.e.d. started flashing. Next, I adjusted the level control for required audio from the speaker. (It's possible that these two controls will have be juggled for best setting).

I was then ready to have a play with the '599zx. I selected s.s.b. on the transceiver and pressed **Mode** on the '599zx until the **Voice** l.e.d. illuminated and the parameters were shown on the display.

Note: There are several of the 599zx's features that are common to all modes. These include the **Random** button, which is the noise reduction function. The noise filter works by looking at the signals and noise combined and dynamically filters out the undesired content. This is called correlation, or co-relation. This is a term used in probability theory, and looks at the strength and direction of two independent variables. (I remember vaguely

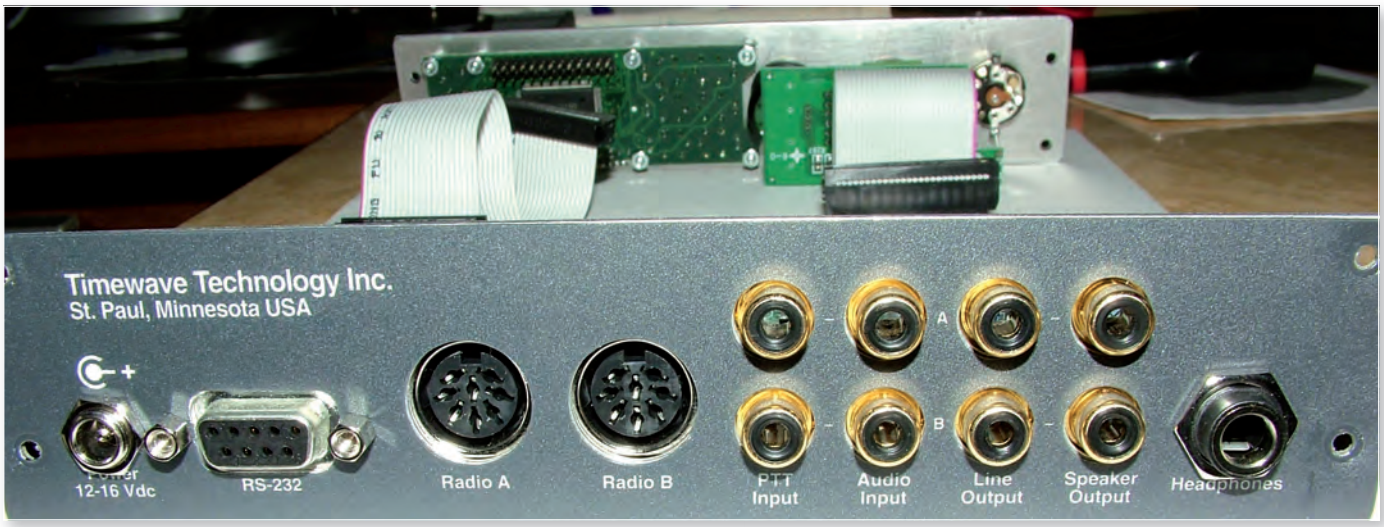

Fig. 2: A closer look at the input and output connections and the two radio connections.

covering this in our maths at school, but that was many life-times ago!). Suffice it to say that the noise reduction varies for random noise between 5 and 20dB and up to 50dB for heterodynes (Beat notes or 'carriers').

There's also an automatic notch and a manual notch filter. The automatic filter is a multi-tone filter that removes heterodynes. The manual filter is controlled by the front panel encoder marked **Center Freq**. This has a dual notch and a single notch capability.

Two Audio Channels

The DSP599 can be set up for two different audio channels, meaning that two separate radios can be used if required. The two channels can be configured independently, from the **Setup** mode. However, using this function means that speakers or 'phones monitor both channels simultaneously. This could prove useful to those c.w. contest operators who work 'single operator two radios' (SO2R), but is something I won't be trying!

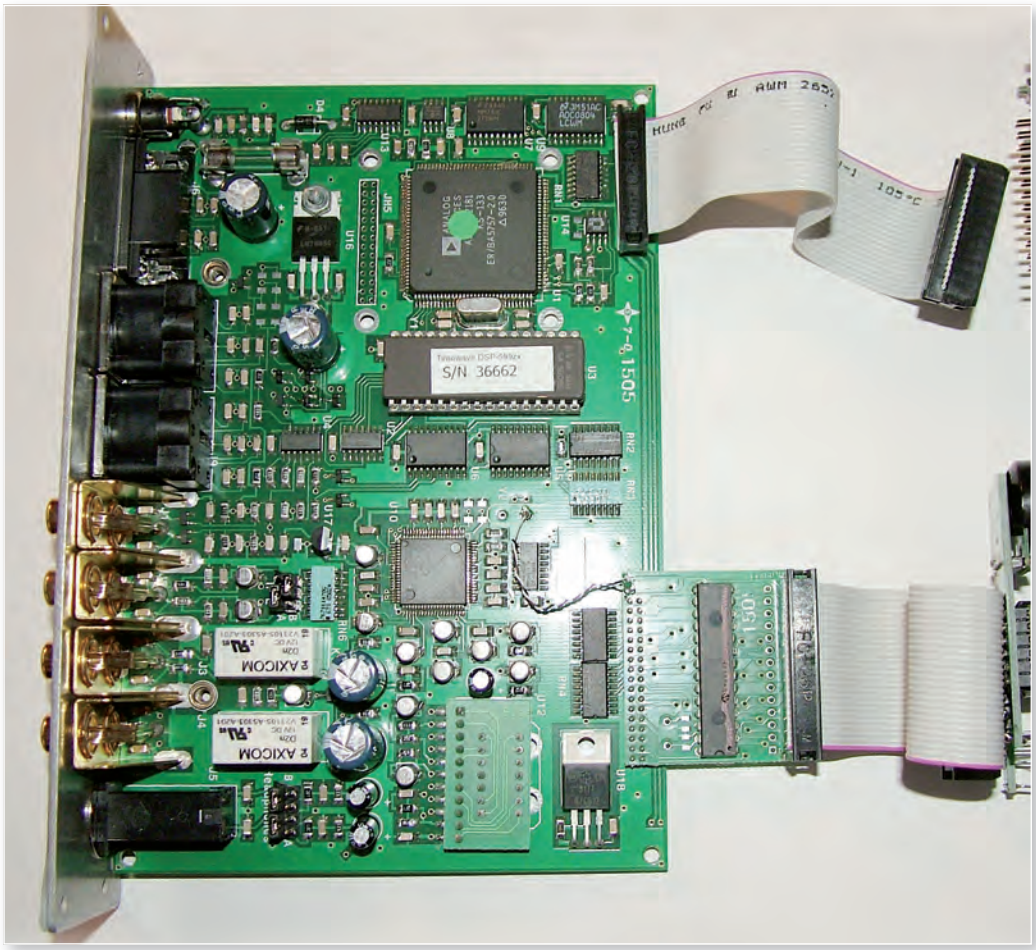

Fig. 3: The The functions are cariied out without a great deal of physical hardware.

Memory Settings

Six memories are available to store complete settings, and the DSP599zx has an AGC control to optimise the signals. Each mode can be bypassed in different ways, and return to the mode will provide all the parameters that were set originally.

The Three Main Modes

The DSP599zx can be used on all voice modes, but I used it on s.s.b. only, as that will be the main mode of interest to most operators. When the **Voice** mode is selected the l.c.d. display provides the readings for low pass (LP) and high pass (HP) filters. These can be altered according to the QRM encountered.

I found that if there's interference from an adjacent s.s.b. signal, the steep skirt response of each filter allowed me to just about eliminate the QRM by careful tuning of the encoders, without affecting the desired signal.

Additionally, I found that if I was suffering from noise – of any variety I encountered – pressing the **Random** button reduced it. I think that experimenting with this control will soon enable the user to reach an acceptable level. However, while it works well, I'm not too enamoured with the end result – but if it means reading the signal or not, then the choice is academic! I found it made the audio sound quite hollow, but it did improve the readability and with some experimentation with the various functions, it is quite acceptable.

The ability to move the filters is the most important function. Although there is a limit – the range of the high pass filter is 100 to 1000Hz and the low pass is 1000 to 5000Hz.

The Morse Mode

The Morse mode really excelled when I using the filter! Again, the fully tunable bandpass filters utilising a linear phase response enables the user to 'close in' on the signal with little – if any – sign of 'ringing'. Ringing – it really does sound like the reverberations of a small bell right on the frequency you want to listen on – is the bug-bear of narrow filtering but '599zx exhibited no ringing – even when I reduced the filter bandwidth down to 20Hz!

Dragging weak signals out of the noise is a real pleasure and it would certainly help the avid DXer. Coupled with the notch filter, set on manual, I found I could eliminate an adjacent annoying station causing QRM.

Another really neat feature is the **Marker** tone. Pressing the **Tone** control inserts an audio marker on the centre frequency of the bandpass filter. This enables the user to match the received signal when tuning because switching in the narrow filter does not lose the wanted signal. **Note:** The level of this feature can be adjusted as well, so it's not overpowering.

The other neat feature is the ability to shift the c.w. tone pitch to whatever frequency I preferred – I like a low

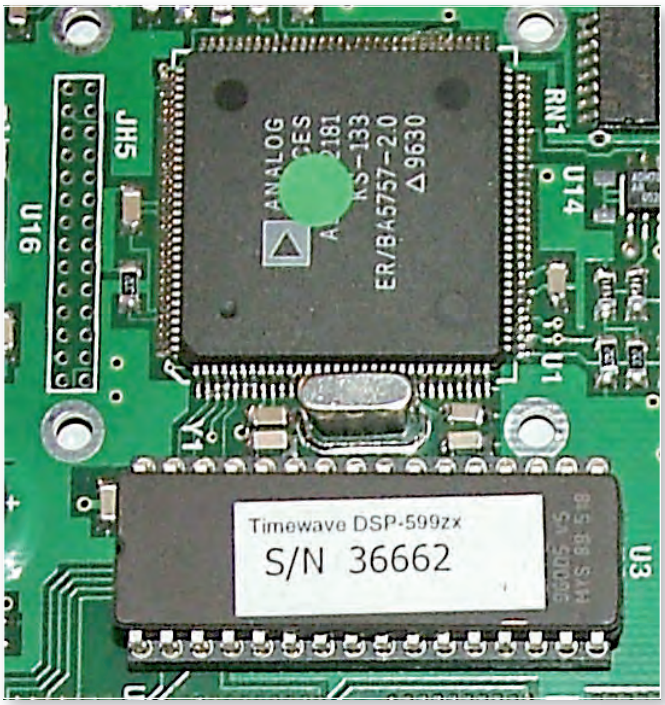

Fig. 4: These two i.c.s carry out all the whole d.s.p. functions. (I assume that the vacant 'U16' pads area is for possible future expansion?).

tone, around 450Hz, for best c.w. reception. The range of the filters in this mode is: Bandwidth 10 to 600Hz and the centre frequencies are 200 to 2100Hz.

Using The Binaural Mode

Many years ago, somebody produced a circuit for stereo reception of c.w. and this is the **Binaural CW** feature that can be used with the DXP599. It enables the c.w. operator to produce a panoramic display of signals 'across the head' so to speak, with low frequencies to the left and high to the right. In visual terms it's much like looking at a crowd of people!

In mono, the crowd of people would all be in single file and all shouting on different frequencies! Spread them out in a line in front of you and the sounds then become spatially separated and easier to hear. In this separated mode the DXP599 also has a c.w. **Spotlight** feature which allows a weak signal to be focussed on, whilst the operator can still be able to hear the other signals.

Using the Spotlight feature in conjunction with the **Random** (noise rejection) and the automatic gain control (a.g.c.) can produce great results although the feature has to be set up properly and stored in memory for recall. Of course, the only pre-requisite for this mode is a pair of stereo headphones, as mono headphones won't work and the effect is not as effective when used with loudspeakers.

Data Modes

The 599zx's Data modes includes RTTY, of which there are several choices, Amtor, and derivatives, including Clover, h.f. Packet, SSTV and Wefax. However, I only used it on RTTY, and then only with MMTTY, using the DSP599zx as a bandpass filter with notch. This is perhaps a slight overkill, as MMTTY already has those functions inbuilt but having said that, I still noticed an improvement using the two in tandem!

The DB9F connector on the '599zx's rear panel allows the user to connect to a PC and then the DXP599 becomes an RTTY modem, so a suitable terminal program would have to be used. Using it in this way, setting the mode up will then give a tuning display on the l.c.d.

There is also a Re-modulator function in this mode. This enables the DSP599 to take a noisy RTTY signal and clean it up, producing two new AFSK tones, which are then sent to a multi-mode controller. However, I don't think many Amateurs will use this mode as the MMTTY/N1MM combination is much better for contesting, etc. There are quite a number of filter selections for different modes, far too many to cover here.

With the version 5.0 firmware, PSK31, SSTV and RTTY can be used just with the '599zx, a transceiver and a computer with the appropriate software. No other multimode controllers are required and full details are provided in the manual, along with wiring details, etc.

It's also possible to use the DSP599zx as a test instrument. It can help analyse signal and can be used as an audio millivoltmeter and audio sine wave generator. Full details of these functions are provided in the comprehensive manual.

I'm sorry (pleased really!) to say that this unit has become glued to the shelf so it will be staying in the G3LDI shack! If you need some extra help with winkling out the weak ones, this is for you too! Now, where did I see a note of the different flavours of coffee that the Timewave '599zx makes? ●

Product
The Timewave DSP599zx

Company
Nevada Radio (UK Agents)

Pros & Cons

Pros
The Morse mode really excelled when I using the filter! Again, the fully tunable bandpass filters utilising a linear phase response enables the user to 'close in' on the signal....I'm sorry to say that this unit has become glued to the shelf so it will be staying in the G3LDI shack! If you need some extra help with winkling out the weak ones, this is for you too!

Cons
Control buttons rather small.

Price £349 (P&P free for *PW* readers)

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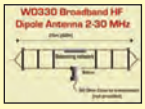

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Amateur

radio personality

Robert van der Zaal PA9RZ

Editorial comment: I've known Robert PA9RZ for many years and I'm proud to say that he's a great asset for Amateur Radio with tireless enthusiasm. Robert is a very frequent visitor to the UK (where he manages to find time off from his work as Chairman of the Benelux QRP Club – I don't know) and everyone who meets the 'Jolly Cloggie' – as he calls himself – knows it's more than British Real Ale that brings him here! **Rob G3XFD**.

***Rob G3XFD**: Welcome to the PW Radio Personality feature Robert! Even though I know you were a bit taken-aback at being invited I'm so pleased you've agreed.*

Robert PA9RZ: Yes, thank you for the invitation Rob, although as you know I don't regard myself as a 'personality' – instead I think of myself just as a keen QRP operator and builder – and a lover of British Real Ale! However, I'm pleased to agree to chat to you over in Dorset!

***Rob G3XFD**: What part of The Netherlands do you come from Robert?*

Robert PA9RZ: From Sassenhiem where I was born on 20 July 1958. Sassenheim is a town and former municipality in the western Netherlands, in the province of South Holland.

Robert's house on the canal.

***Rob G3XFD**: What brought you into Amateur Radio?*

Robert PA9RZ: It's quite a long story Rob! I must have been around about eight years of age. My Dad's brother – Uncle Bert – still lived in the old house, together with Granny and were running the shop – they literally sold everything you needed – left by Grandfather. I enjoyed being with Granny and my uncle, especially when in the hobby room and workshop. The valved radio, once built by Dad from a Dutch design – around in 1951 – was usually playing. It covered not only long wave, medium waves and short wave but also the Marine Band and we sometimes eavesdropped on the local fishermen. Uncle Bert then told me that on 80 metre band you could hear 'radio amateurs'. I asked, "What's a radio amateur', Uncle Bert?
"Well, Robert", he replied, " these are people that are allowed to use a transmitter from their home!" And that's how young Robert's interest was first triggered!

***Rob G3XFD**: How did it go from there Robert – after you first 'got the bug'?*

Robert PA9RZ: Granny died and Uncle Bert finally found his 'Miss Right', the old house was sold and Dad's old radio ended up my room! But despite the umpteen pieces of wire strung and twisted together with the bare ends attached to a tree across the back garden, all I heard were fishermen! Besides, one gust of wind and the wire always fell to pieces again. So the radio got stuck on Radio Veronica, the famous Dutch pirate station that could also be heard in England.

***Rob G3XFD**: When did you first come into contact with Radio Amateurs directly Robert?*

Robert PA9RZ: It happened when I was at secondary school where, encouraged by my Dad, I found my way to our school station **PI1ROS**. **Cor Slegtenhorst PA0CSL**, unfortunately no longer with us, was a biology teacher and thought his radio hobby could be of a great support to the lessons in foreign languages. At that time, the minimum age for an Amateur Radio licence in the Netherlands was – 18 but the authorities approved of Cor's idea and issued the special 'educational' license with a PI1 prefix and the ROS was derived from the name of our school.

***Rob G3XFD**: When did you actually get on to the air first Robert?*

Robert PA9RZ: I managed it – supervised by Cor – in September 1972 at the age of just 14. I then became one of the operators of the station – operating our Heathkit HW12 and a half wave dipole on 80m. After the normal lessons I learnt about s.s.b., its 'Donald Duck' like sound on a normal radio and re-discovered Dad's old radio. It's amazing how much you can understand of s.s.b. on an a.m. radio! In a QSO with another school boy running the station of his school **PI1MTH** – if I remember it correctly – he told me about a special circuit and sent me the circuit diagram. Dad fired up his soldering iron and built that magic circuit. With the help of fellow pupil **Hans**, later **PA0HMU**, who was one class higher, I found the spot in the circuit to connect the magic circuit

The Editor chats to Robert van der Zaal PA9RZ. A Dutch QRP enthusiast and keen Ambassador for Amateur Radio.

A younger Robert at university.

and a new world opened up to me! The magic circuit was called a beat frequency oscillator of course and I no longer listened to Donald Duck, enjoyed listening to Amateurs and as a result I joined the **VERON** the Dutch counterpart of the RSGB.

***Rob G3XFD**: How did you progress on from there Robert – did you get much help?*

Robert PA9RZ: Yes, I got a lot of help and became short wave listener NL4338 and – assisted by my 'Elmer' **Henk Schrier PA0GF**, a retired Royal Netherlands Navy 'sparks' – my station grew. I first met Henk in one of my earlier QSOs from school and, as he lived near my other Granny, I told him I had already seen his wires! Soon I was invited in and Henk and his XYL **'Netty'** became long term friends. Henk built me a converter for down-converting from 20m to the Marine Band and later lent me his HRO5. I decided that, when grown up, I would join him on the air as PA0RZ. Alas, that callsign was no longer available. Henk became a Silent Key ten years ago but I still see 'Netty' on a regular basis.

***Rob G3XFD**: How did things go from there Robert – were you busy on the bands and building equipment?*

Robert PA9RZ: Well, in between studying, I managed a bit of radio Rob! After secondary school I left home and at the age of just 18, I went to the Technical University of Twente in Enschede, near the German border. To stop the other members of the radio club from moaning about the need for operators of the club station PA0THT, I passed the technical part of the RAE in April 1977 and in June that year, still 18, became **PE1AZR**. Henk PA0GF lent me his Standard 2m f.m. rig. My home station was with my parents and from university I operated either as PE1AZR/A or from PA0THT.

In 1979 I started building my own 2m transmitter, a project that I'm still working on! The receiver I used in those years was an old Geloso, again lent by Henk, with converters for 2m and 70cm.

***Rob G3XFD**: I know you had a really unpleasant accident while riding your bike Robert – how did you recover after receiving such severe head injuries?*

Robert PA9RZ: The accident happened when in March 1980, after being pushed of my bike I woke up in hospital a few days later with a fractured skull and a cerebral contusion. During my long recovery, building the transmitter became a therapy for my injured brain. In November 1980 I passed my Morse test and in the following Christmas holiday the full licence was delivered with my new callsign **PA3BHK**. Due to the accident my studies took me ages – but thanks to Amateur Radio, operating from the campus as PA3BHK/A, I met the 'locals' from the Eastern part of the Netherlands. Many became close friends, I picked up quite a bit of the local dialect and they helped me survive as a 'Campus Granddad'. My 'fox hunts', the DFing games on 2m I organised in the area around University, made me quite popular and helped my recovery!

***Rob G3XFD**: At this time Robert – it seems you really got started in home-brewing. What was the first rig you made?*

Robert PA9RZ: Being short of cash, a Japanese 'black box' was well above my financial limits so I built a small double sideband and c.w. rig for 80m. Fortunately, we had access to the measuring tools and the workshops of the University and the experimental 2m transmitter I built worked fine and with 2W c.w. – plus my 'new' receiver – an FRDX-500 – I even managed to work **GM0GMD** via the magnificent visible Aurora of 13 March 1989!

***Rob G3XFD**: After much hard work you finally graduated – overcoming the head injuries that could have really slowed anyone own – so what did you do then?*

Robert PA9RZ: Yes, I finally graduated in December 1989 as a Master of Electrical Engineering and found a wonderful job as a Patent Examiner with the European Patent Office near The Hague here in Holland. After work I had only little energy left for building – but I could finally treat myself to nice rigs! For the time being I re-joined my parents at home, patiently waiting for a specific house and my patience was rewarded in 2005! Another dream came true when 'vanity' calls were introduced and with PA9RZ I came very close to the callsign of my boyhood dreams!

***Rob G3XFD**: What about your QRP activities Robert – you are very well known as Chairman of the **Benelux QRP Club**. How did that start?*

Robert PA9RZ: One of the Amateurs I regularly spoke with 'after school' was **Frans Priem PA0GG**. He operated 80m mobile when driving home from work. In those years he was thinking of a QRP club for the Dutch speaking part of Europe, resulting in the Benelux QRP Club that was founded in April 1975. During activities of the VERON, I had the pleasure to meet Frans and his XYL **Veronica** a number of times and we became friends and although I was still a listener – Frans had told me all about QRP!

When I was first licensed my efforts to create more than a few watt of output power usually resulted in 'Indian Modulation' – smoke signals! As I never found the right blanket for proper signalling, radio wise I got stuck with QRP. I finally joined the Benelux QRP

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Club in 1984 and in 1985, encouraged by **Peter Halpin PD0MAM** – an English friend living in Holland – I also joined the G-QRP Club. Unfortunately both Frans and Pete are no longer with us, Frans passed away only a few months before my graduation in 1989 and Pete died just a few years ago. My activities on 80m made me part of the active Benelux and also the G QRP gangs.

***Rob G3XFD**: You're a very frequent visitor to the UK Robert and I think there are family connections – and I believe it isn't just our Real Ale that brings you over?*

Robert PA9RZ: No, it's not just the Real Ale Rob! Close friends of my family who live in Norfolk have been giving me a home away from home for many years. However, after I graduated and found that wonderful job I could finally afford to travel to and through England and, to a lesser extent, France, on a regular basis and operating h.f. QRP as either G/ or F/ PA3BHK/P is great fun!

My sister's late father-in-law **Peter Stiles** – was licensed as **G2BHR**. He and his XYL **Andrena** lived on The Lizard peninsula, only a few hundred yards from Lizard Point. When he was still alive I popped in to see them every now and then and although Peter was no longer active, I was! Within an hour of my arrival we had set up either a G5RV, a v.h.f. or u.h.f. antenna – or both – and G/PA3BHK/P was on the air.

The trips to Cornwall – I prefer the Celtic name Kernow – were usually combined with a visit to the Yeovil QRP convention, now held in Sherborne – or a business trip, followed by the long journey to Norfolk. My days in The Lizard are long gone but I still try to attend the Yeovil QRP convention and I love to 'do' the Leicester Show and bring you and **Tex Swann G1TEX** some Dutch cheese or – fresh Herring just for you Rob!

***Rob G3XFD**: You still visit us regularly Robert – and I know you often head for East Anglia – what's the attraction?*

Robert PA9RZ: Nowadays when I am active as M/PA9RZ/P, it's usually from the Norfolk Broads. The Rochdale convention was one of my favourite events too – but usually in October the number of days of my leave left is limited and I no longer fancy an 8 to 10 hour journey only for a weekend. But it's always a pleasure to see my G-QRP friends at rallies or at their homes!

Being in England allows me to enjoy the Real Ales the way I should – on draught – and also to find British N or TT gauge model railway items and to brush up my English. In 1994 the officers of the Benelux QRP Club asked me whether I wanted to chair the club. One of the reasons was a suggestion from my G QRP friends and it looks as if I'll be in that post for many more years!

***Rob G3XFD**: Are you very active from home nowadays Robert?*

Robert PA9RZ: When in 1999 I got my new callsign, my h.f. dipoles were replaced by a vertical for the DX bands and a W3DZZ. Both the new antenna system and the wonderful propagation helped me to become 'QRP Master', get my 1000 miles per Watt, WAC-QRP and DXCC-QRP, all in less than three years' operating! Living with your parents means that there's quite some time left for playing with radio. However, now that I have my own home I'm not as active as I used to be.

Popping into see Mum and Dad after work (we live 200ft apart) for a chat, having a cuppa and browsing through the newspaper shortens the afternoon. But getting up well before 6am to beat the morning rush doesn't allow late evenings. I must admit, my h.f. antennas are not perfect either and propagation has been disappointing recently.

My shack is well equipped with a decent workbench, nice measuring tools and some fine (mainly QRP) rigs, both classic and modern. My latest purchase was an FT-221R, which with the IC–202 is one of the finest 2m rigs ever built! My equipment allows me to operate from 160m 'Top Band' up to 13cm. Unfortunately, a Dutch standard garden usually doesn't leave enough space for a proper Top Band antenna – but next time I feel naughty I'll try to string a wire across the canal along my back yard!

***Rob G3XFD**: We share an interest in railways Robert – but aren't your favourite trains smaller than mine?*

Robert PA9RZ: When I was 'on my way', Dad was convinced that I would be a boy and he finally saw an excuse to start with model railways! German

Young Robert on the air, active as the 'fox'.

model trains were very expensive then but hardly represented their prototypes. So Dad was pleased to see proper, affordable models by Hornby although he found 00 gauge a wee bit too large. When in England for work, in March 1958, he discovered Triang TT-3. And when I was born in July 1958, he had started a TT-3 layout. Which means that both model railways and Amateur Radio – although he never had a licence – were much inspired by the interests of my father. My sister **Caroline** and I inherited his photography skills.

***Rob G3XFD**: Looking back Robert, what do you think Amateur radio has done for you over the years?*

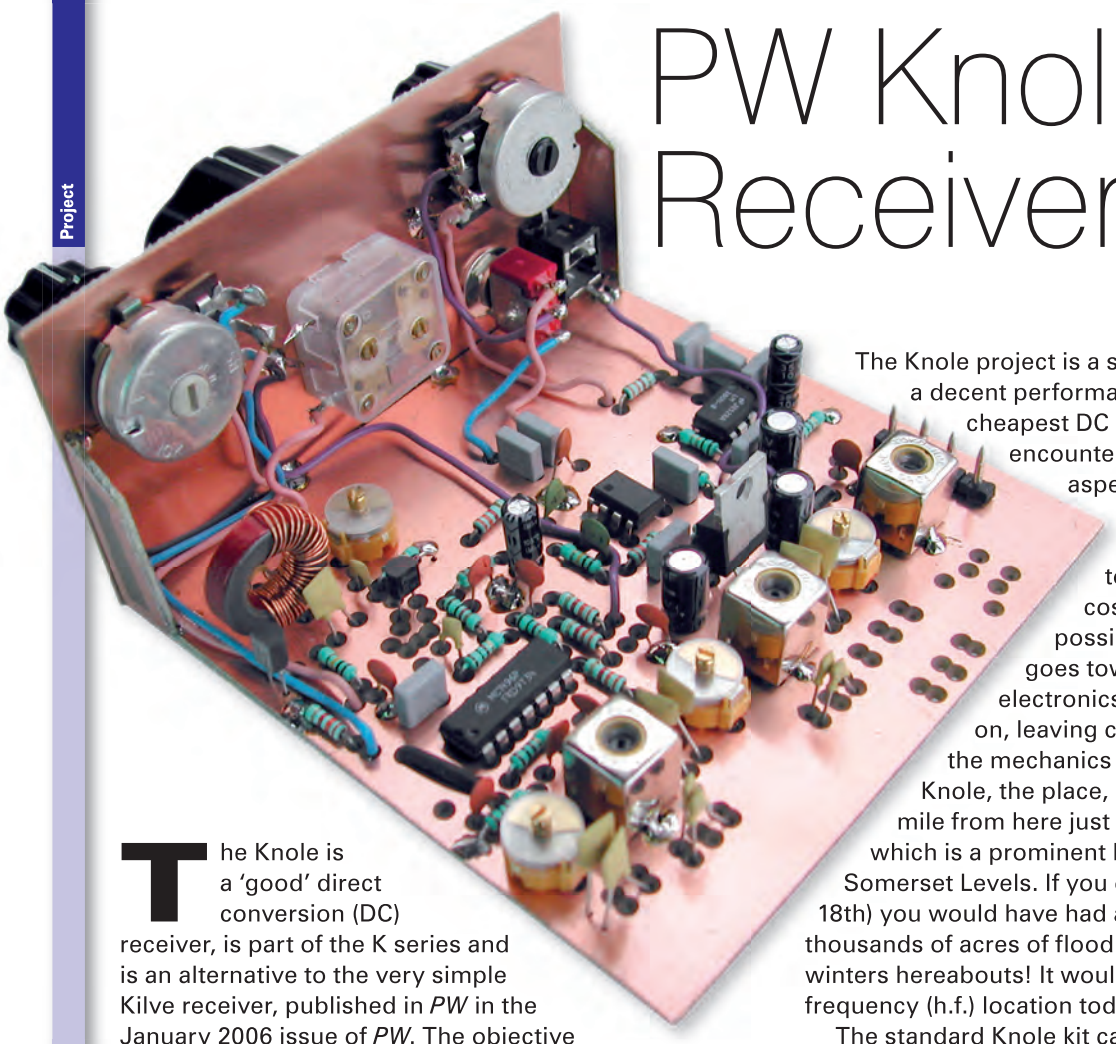
Robert PA9RZ: In the nearly 36 years that I've been 'radio active', Amateur Radio has become a part of my life rather than just a hobby – it helped me to recover from brain injury. It helped me to become a real 'local' in the area where I studied and it helped me to 'integrate' and become close to a local in many parts of England. Maybe my way of becoming a Radio Amateur is old fashioned. After all, I passed the RAE thanks to a keen interest, *Electron* (the Dutch counterpart of *RadCom* – some amateur radio handbooks and common sense, without the present compulsory three steps from Foundation, via Intermediate, to Full as in the UK. Perhaps I'm old fashioned myself?

***Rob G3XFD**: Thank you for sharing your life story so far Robert! We wish you well and that you have many years of enjoyment from our hobby!*

Robert PA9RZ: Old fashioned or not, it was a pleasure to share my history with you and I feel privileged to be the first 'Cloggy' Amateur Radio Personality to appear in *Practical Wireless*. Thank you very much, Rob, and thank you very much, Tex – I wish you good luck with your fine magazine! ●

Project

PW Knole Receiver

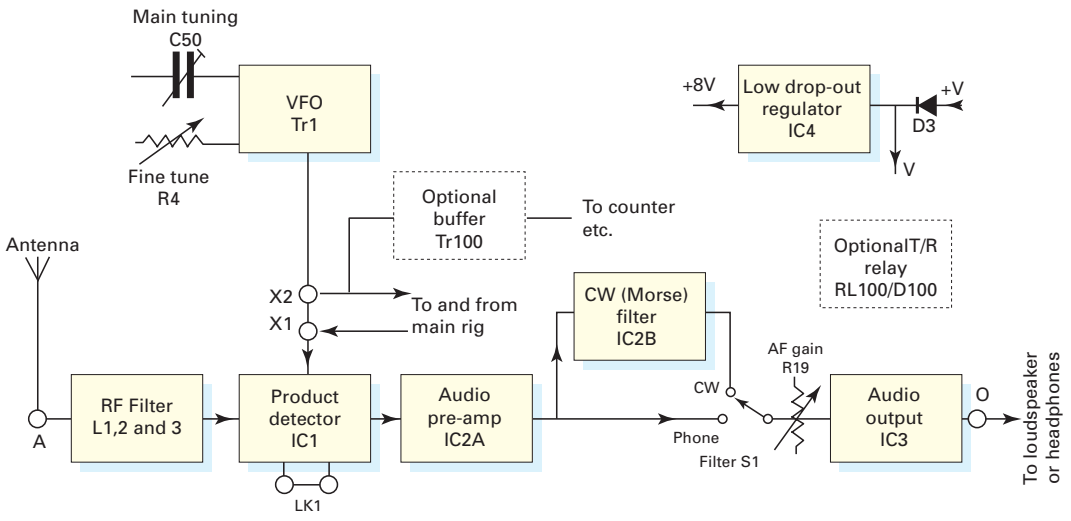


The Knole project is a single band receiver with a decent performance although it's not the cheapest DC receiver project you might encounter. However, as in most aspects of life – you get what you pay for!

For all my designs, I try to minimise the mechanical costs so that – as much as possible – of the sale price goes towards the all important electronics, which I concentrate on, leaving constructors to add to the mechanics if they wish. Incidentally, Knole, the place, is a little hamlet about a mile from here just underneath The Knole, which is a prominent hill on the edge of the Somerset Levels. If you climbed that today (January 18th) you would have had a magnificent view of the thousands of acres of flood water that we get most winters hereabouts! It would be a jolly good /P high frequency (h.f.) location today!

The standard Knole kit can be used on any single band 3.5 to 14MHz inclusive. The kit includes all of the parts to build the project 'open' style as in the accompanying photographs (See Kits & Bits panel).

The Knole is a 'good' direct conversion (DC) receiver, is part of the K series and is an alternative to the very simple Kilve receiver, published in *PW* in the January 2006 issue of *PW*. The objective here is a receiver that can be used for serious communications work – without going as far as the complications of a superhet design.



Fig, 1: Block Diagram of the Knole DC receiver.

Tim Walford G3PCJ has been using his designer's experience to get the best performance from the least number of components!

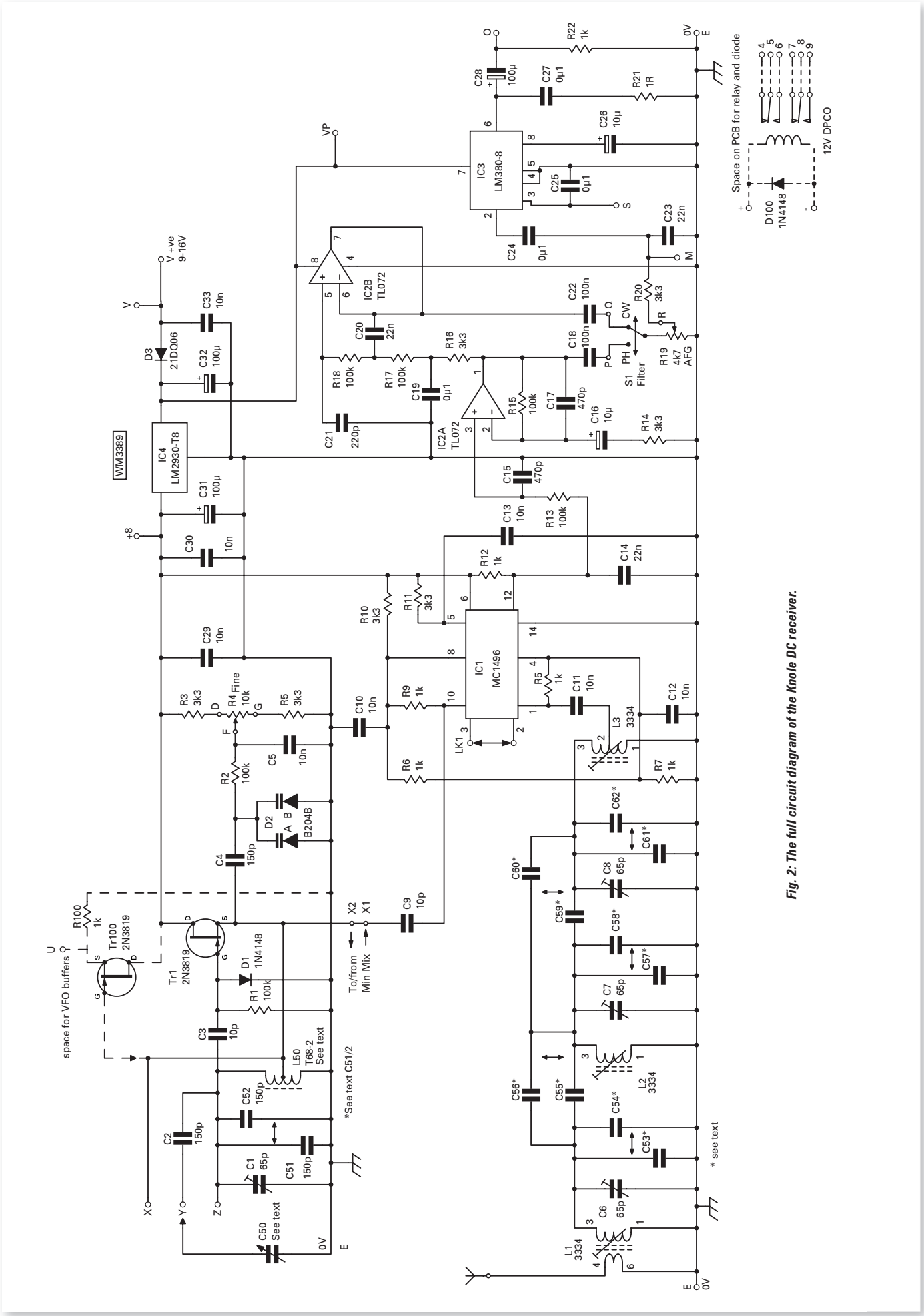


Fig. 2: The full circuit diagram of the Knole DC receiver.

The Main Improvement

The main improvement in the Knole circuitry has been to make it more resistant to broadcast station interference (BCI) which is of course particularly troublesome on the 7MHz band at night due to the nearby 41 metre broadcasting band. Extensive experiments have shown me that, of the common Gilbert cell type active mixers like the SA602 often used as a product detector, the MC1496 has the best overload margins while retaining reasonable gain.

The characteristics of the MC1496 is key to reducing the chances of BCI from 'in-band' signals as on 7MHz. However, the next approach for reducing BCI is to improve the front end radio frequency (r.f.) filters, hence it has triple tuned bandpass filters instead of the more common double (or even single) tuned versions to give better out of Amateur band rejection – such as often plagues 3.5 and 14MHz with simpler filters.

The selectivity of a DC receiver is usually directly related to the bandwidth of the audio stages. For example, if they are wide open to – let's say 10kHz – the receiver will respond or 'hear' signals 10kHz away from the intended tuning point. So, reducing the audio response and providing a steeper attenuation slope just outside the desired band will help considerably.

In the Knole design the main 'phone filter attenuates well above 3kHz. For Morse signals, the special c.w. filter follows the 'phone filter and has an even faster 'fall off' above 1kHz. The main audio output stage can drive a small loud speaker or the modern portable cassette type 32Ω headphones.

Because the Knole is intended to be a serious design, more conventional controls are appropriate it has a small printed circuit board (p.c.b.) front panel which you attach to the main board, the whole assembly sitting on rubber feet – see Photo 1. This is fine for base station use – but when you take the project up you can easily put it in your own case for better protection!

Bearing in mind /P considerations, the Knole also has a wide supply range – 9 to 16V – with full reverse protection. Incidentally, the active devices I've used can actually be used up to 22V if you were to use higher voltage electrolytic capacitors. This this might be useful because an associated 1.5W transmitter working at 13.8V is often able to produce about 5W on 22V for short periods, which might get you out of a QRM hole! These features lead to the block diagram shown in **Fig. 1**.

The Circuit

The diagram, **Fig 2**, shows the complete circuit, which uses four integrated circuits. The incoming supply is passed through a small power Schottky diode for reverse supply protection and then feeds the low drop out LM2930-T8 regulator. This combination allows the supply to be down to only 1V above the regulated 8V line that feeds the critical product detector and variable frequency oscillator (v.f.o.).

Signals from the antenna pass to the triple tuned r.f. bandpass filter and this uses TOKO 3334 inductors with a range of capacitors to suit the chosen operating band. Each inductor is resonated by a combination of a 65pF trimmer with a 'pair' of fixed capacitors. **Note:** using a trimmer allows for the regrettable time when the supply of TOKOs is exhausted and they have to be replaced by toroids.

The 'pair' of fixed 150pF capacitors is omitted for 14MHz (20m), or connected in series for 7MHz (40m) or in parallel for 3.5MHz (80m). Similarly, the two pairs of 10pF top coupling capacitors can be installed as either a single capacitor for 7MHz, or a pair in series for 14MHz or a pair in parallel for 3.5MHz.

The r.f. bandpass filter (b.p.f.) is followed by the MC1496 product detector, with its external chain of resistors to set the input bias levels. These extra parts can be tolerated, with their decoupling capacitors, since there's plenty of space on this p.c.b.

The output of the product detector is applied to the first audio stage which has a 'phone bandwidth and gain of 33 –it uses one half of a low noise TL072 op-amp. The other half is used for the unity gain third order low-pass c.w. filter.

A switch selects which of these audio signals feeds the audio frequency (a.f.) gain control and the output stage, which uses an 8-pin version of the LM380 (this has a further fixed voltage gain of 50). The output stage has facilities for muting and injecting a c.w. sidetone when used with a transmitter.

VFO Tuned circuit details

Band (MHz)	Inductor (turns)	Tap (turns)	Tuning – 65pF trimmer plus following:- C50	At:	C51/52	Combination
3.5	26	7	150pF	Y	Parallel	150+150 pF
7.0	18	5	150pF	X	Single	150 pF
10.065	15	3	65pF	X	Series	150+150 pF
14.0	11	2	150pF	X	Series	150+150 pF

The Inductor is created from the total number of turns on a T68-2 toroid, tapped 'up' from the 0V end of the winding.

Table. 1.

The remaining key element is the v.f.o., which directly feeds the local oscillator input of the product detector. This runs at the frequency of the chosen operating band so it has to cater for operating over the range of 3.5 to 14.35MHz! Stability would be inadequate if a 3334 TOKO were to be used for the whole range, so instead I've used a powdered iron red toroid (type T68-2) with the number of turns altered to suit each band.

Turning to the r.f. filters, here I've used a 65pF trimmer in conjunction with several fixed 150pF capacitor options. The main tuning is by a PolyVaricon – also with a choice of connection point – to reduce the effective tuning range on any particular band. Fine tuning is provided by a potentiometer and varactor diode, which doubles as receiver incremental tuning (RIT) when used with a c.w. transmitter.

Although running a v.f.o. at 14MHz is challenging for really good stability, I've found it to be quite adequate for receiving purposes where occasional re-tuning is normal anyway. **Note:** For transmitting purposes this v.f.o. cannot be used directly because of potential chirp/FMing problems, so other approaches have to be used, which will inevitably provide the necessary stability and (possibly) an alternative local oscillator drive for the Knole.

Fig. 3: A toroid wound for the 3.5MHz band.

Fig. 4: A toroid wound for the 14MHz band.

Building the Knole

Building the Knole is very straightforward – there's plenty of space! By all means put it in a box but I suggest building it 'open' style as in the photos first and you should study these to see where parts are located. Start assembly with the 'mechanical parts' like the four screw connector, TOKO cans, and trimmers. Afterwards, follow the usual approach of building in stages starting with the supply aspects, followed by the audio output stage.

When it's completed, the audio stage can be tested with the 'screwdriver hum' test! Because the product detector provides the bias voltages for the audio op-amp, you must install the product before proceeding with the op-amp audio stages. Again you can gingerly use the screwdriver and yourself as a source of audio signals! Having completed the product detector, it 's probably best to tackle the v.f.o.

Don't be put off by having to wind the toroid! The single winding uses 24s.w.g. enamelled wire on a T68-2 red toroid, **Table 1. W**hen completed the turns should be spaced around about three quarters of the toroid's circumference, **Fig.s 3** and **4.**

Setting the v.f.o. is best done with another general coverage receiver or a frequency counter. First set both Knole tuning controls to mid position and then drape the other receiver's antenna wire over the Knole. Then tune the general coverage receiver so it's around the chosen operating band until the Knole's v.f.o.'s signal is found as a strong heterodyne whistle.

Then adjust the v.f.o. trimmer to bring the frequency to the middle of your chosen band. Note: If you're using a frequency counter, it must be connected via a divide by 10 probe to the X tap point on the v.f.o. inductor.

Note that the frequency will go up, especially on 14MHz, when the probe is removed so set the trimmer for a lower frequency than you actually want. If the coverage on any band that uses the 150pF section of the PolyVaricon is too large, then try the 65pF section instead.

Capacitor Options

The only remaining components are the band pass filters. Take care over the various capacitor options for the different bands as described earlier! When you try to align the filter, ideally start with a signal in the middle of your chosen band – ideally it should be steady in amplitude and frequency. You might find that it's so far out of alignment that you can't hear anything using the normal antenna and earth terminals.

If you cannot hear signals, temporarily connect the signal source or antenna to pin 4, and a 0V connection to pin 6 of the 3334 TOKO that feeds the product detector, and adjust its associated trimmer to give the maximum heterodyne audio signal output.

The next job will be to transfer the signal source to pins 4 and 6 of the middle TOKO and peak up its trimmer and finally transfer the signal to the antenna/earth input and peak up all three trimmers again as there will be some interaction between them. It can be done using 'off air' signals but it will almost certainly be necessary to use the setting up procedure already described and should be alert to possible fading of the signal being listened to.

Note: If any one trimmer has to be set to either maximum or minimum capacity, it's possible to (gingerly) adjust the core of the associated TOKO so that the trimmer can be properly peaked – but this is not usually necessary.

And that's it – that's all you have to do!

Using The Knole

As ever, a decent external antenna (preferably a balanced antenna) matched to the receiver (and any associated transmitter) with a resonant antenna matching unit (a.m.u.) will give the best results. For 'phone use, using the wider audio filter, just tune for the best intelligibility of incoming signals. Then tune to the section of the band that's of interest using the main tuning and finally, use the fine control to obtain good copy.

For c.w. use, the initial search around should be done with the wider 'phone filter and then increase the selectivity by selecting the c.w. filter if there's a need to reject nearby signals. Because the rig is direct conversion, beat signals will be heard on either side (in frequency sense) of an incoming signal – the signal that has least interference should be selected.

If the Knole's v.f.o. is to be used to drive an associated c.w. transmitter (with crystal mixing to avoid chirp), then the technique is to tune for zero beat on the incoming signal with the main tuning while the fine tuning control is centred or shorted out. Then tune off on either side with the fine control to obtain a suitable beat note on going to transmit, the transmitter can then automatically short out the fine control so that it's possible to transmit on the other stations frequency.

Unfortunately, broadcast interference (BCI) is always a potential problem, especially if the user happens to live close to the BBC's overseas h.f. transmitters at Rampisham in Dorset – like one builder of the Knole project! The first thing to try, is reducing the input r.f. signal and increasing the audio gain.

Often, even a small reduction in the interfering signal will eliminate BCI and leave the wanted signal much more intelligible. If this fails, the next approach is a 'trap' connected across the antenna input. I suggest starting with a 5 or 10μH inductor in series with a 500pF variable capacitor and then just tune it for least interference. My friend found these methods got rid of the unwanted noises for most of the time!

The Knole can be used on other bands with changes to the r.f. filters and the v.f.o. – but they are not standard kits. Top Band (1.8MHz) coverage is easy, but the bands above 14MHz are really best approached with a crystal mixing scheme for the v.f.o. to obtain adequate frequency stability (designs are available – please ask).

For associated transmitters, you can use the Kilton for c.w. or the Kilmot for double sideband (d.s.b.) phone – these are normally operated as 'separates'. In addition, the Knole's p.c.b. has provision to mount a transmit–receive antenna changeover relay for either transmitter.

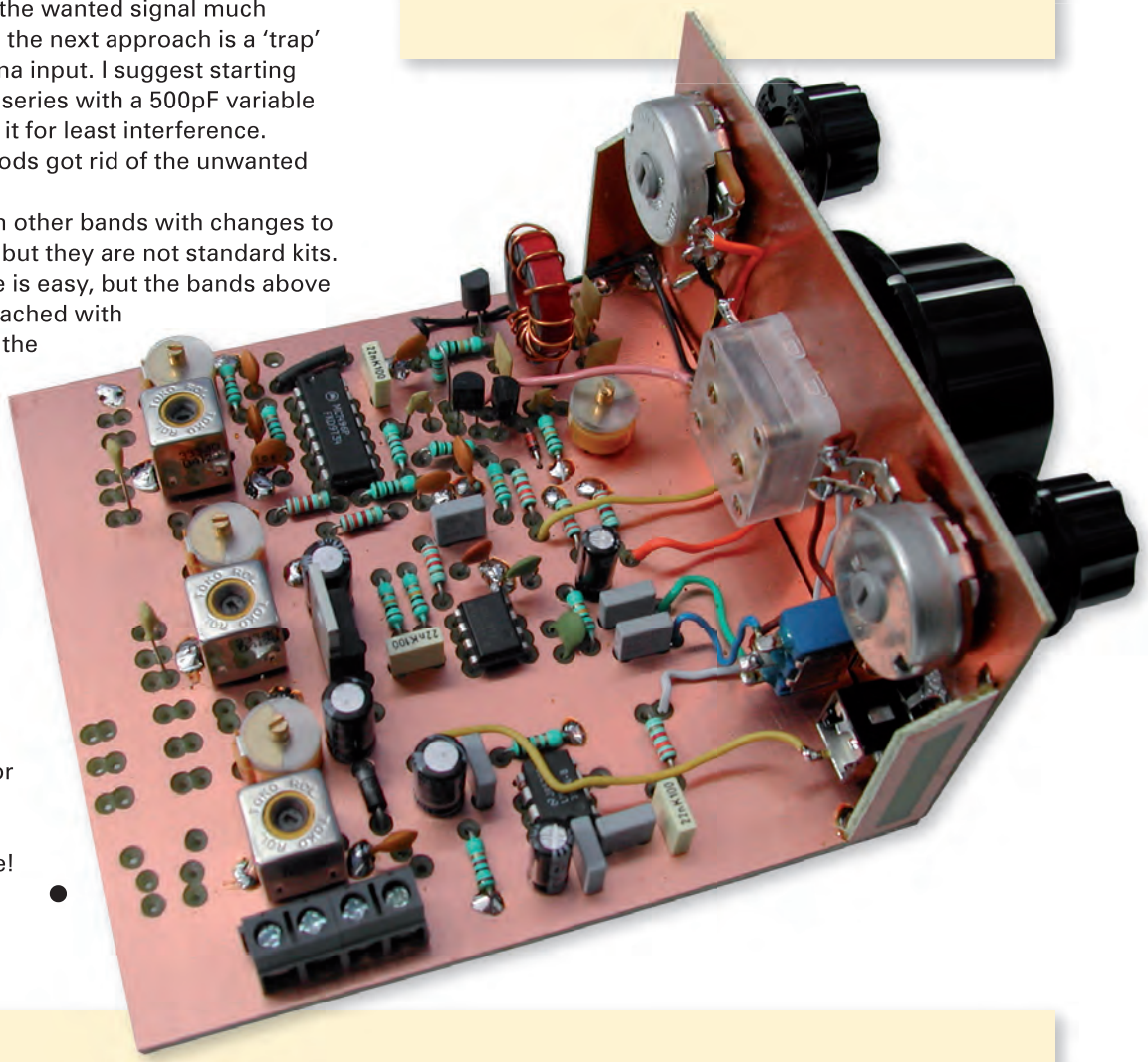
Finally I hope you enjoy building and using the Knole!

Kits & Bits

Kits for the Knole are available from Walford Electronics. They include all parts to build them 'open style as in the accompanying article photographs. Prices are:-

Knole DC receiver (any single band 3.5 to 14MHz) .. £44
Kilton c.w. transmitter TX (3.5MHz) £19
Kilmot d.s.b. 'phone transmitter (3.5MHz).....£24
Phone/c.w. crystals for either transmitter
for 207 or 14MHz..... £2 each
P&P is £3 per order.

Please send your orders with a cheque direct to **Walford Electronics, Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ**. Further information is available at **www.users.globalnet.co.uk/~walfor**



Knapp Updates

I've just been made aware of a small error of mine in the instructions, diagrams and photos that appeared in the March issue of *PW* featuring the Knapp project. Transistor Tr1 is shown incorrectly fitted and should be turned through 180°. Luckily, it's unlikely to matter much, as many junction f.e.t.s work happily with their source and drain interchanged!

I'd also like to suggest a small optional change in the Knapp Regenerative receiver. For those of you who have built this project, I suggest that by increasing C12 to 47nF, it's possible to 'lift' the bass response, making the audio sound louder and less 'toppy'! For convenience in future Knapp kits, the other polyester capacitors C1 and 13 are also changed to 47nF but this is purely for ease of part picking!

Tim G3PCJ

Feature

Forbidding on the outside but fascinating inside!

From Nuclear Bunker to Amateur Radio Centre!

Editorial comment: This article is a direct result of my own interest when I came across references to the mysterious 'Beacons' while I was preparing the **Warrington Amateur Radio Club's** *In Focus* feature. When I telephoned **Albert G3ZHE** to ask what the 'Beacons' were, Albert explained and I quickly realised there was an interesting story to be told – and Albert got the job! The lesson to be learned here is – don't mention anything interesting 'in passing' if you don't want to end up writing an article to share it with *PW* readers! My thanks go to Albert for his extra work producing an excellent article. **Rob G3XFD**.

The Editor, Rob G3XFD, issued me with a challenge regarding the Frodsham Beacons and here's my reply! And the story starts in the dim and distant past.

There are imposing Sandstone outcrops that stand at the Northern end of the Cheshire plain. They are the Frodsham and Helsby Hills and rise to 160m (525ft) above sea level (a.s.l.). A sandstone ridge runs south from them for about 30km (48 miles).

Along the ridge there are several Iron Age Forts and Barrows along the ridge – Eddisbury Fort being the most prominent. The hill above Frodsham – a town mentioned in the *Domesday Book* – has been a 'beacon' and lookout for many years.

Passing Cyclist

Without knowing, it I passed the Beacons many times when I was a teenage cyclist in the early 1950s! Although I was then aware of something sticking out of the trees at the top of Frodsham Hill in North Cheshire and was told that a Second World War bunker existed below ground on the site.

The present building was built on the top of the hill in early 1950s as a Cold War control centre. Its official name is **4 Group, 79 Brigade Mersey** (GDA) gun defended area AAOR, Grid Ref SJ520766.Today the hill and masts can be seen from the M56 motorway between junctions 12 and 14.

Enter Amateur Radio

I joined the Warrington ARC soon after I got my G3ZHE call in 1970 and again became aware of The Beacons. A group of club members also supported Raynet and did practice work with Cheshire County.

County Hall in Chester sits on the Welsh Border and the only radio 'pathways' meant that they could only contact areas on the Wirral and down the Mersey valley along the North Cheshire border. In fact, about 80% of Cheshire was a radio black hole to them!

The Beacons building is made of thick re-enforced concrete with an operations room just like you see in the films (complete with young ladies moving model ships or aircraft about on map tables). It has overhanging side rooms and a balcony for the senior commanders 'Brass Hats' and the Club Chairman! It also has many other rooms for meetings, equipment repair and radio communications.

The Radio Room includes Amateur Radio and CB radio. The masts carry many antennas for data links and county communications and include Amateur Radio links.

The Beacons & Raynet

The Beacons, at 160m a.s.l., is about 20km (approx 12 miles) from County Hall and when considering radio pathways – the whole of the county of Cheshire can been seen. As a result, County Hall has kept the building in good repair as their emergency operations room.

Local Raynet members set up a weatherproof box at the side of the building so that they could drive up in a car and put a 144MHz station on the air to set up a link from the vehicle 'in residence'.

A friend of mine, **Guy Woods G8NRF**, told me of a callout he got during floods in the 1970s when he set up the link with County Hall and the emergency services. He operated from his car until they opened the buildings for the duration of the Emergency.

Amateur Radio Course

After the Novice Licence was launched, further negotiations resulted in the Foundation and Intermediate courses being started in 2002. Readers may remember the RSGB asking clubs if they would set up as course and examination centres because local technical colleges had mostly closed down their City & Guild RAE courses and would not support Foundation or Intermediate courses.

The Warrington ARC members decided not to set up our own courses and instead, we joined **Dave Wilson M0OBW** and his

Everyone enjoyed The Beacons meetings. This shot is taken from the controller's platform.

Successful candidates.

Albert Heyes G3ZHE describes a remarkable Cold War era control centre that's found a new purpose with Radio Amateurs.

wife **Kath M1CNY** in what became a joint effort at a great location. Several other clubs in the area agreed to join together and run the new courses at The Beacons and we became known as the Three Counties Group.

A trial run took place at RSGB HQ in Potters Bar in Hertfordshire with Morse assessments for a group of Class B Amateurs so that they could get on the h.f bands. Dave M0OBW then brought the Foundation set-up to the group and we started our first course at The Beacons in January 2002 – with 45 students!

We started at 9am on a Saturday morning and worked on until around 5pm. After each section – of around 40 minutes – we have a breakout session when the class splits into small groups with an instructor to iron out any problems. Sometimes these breakout sessions take place doing a tea break in the mess room.

We do the same on Sunday but at 3pm we turn the lecture room into an examination centre. Kath M0CNY – our RSGB Area Representative – acts as a very strict invigilator. The papers were marked on site and results given.

At that time a student who has just missed a pass could do an immediate re-sit. These immediate re-sits were ended after the first year and re-sits are organised at a later date. Incidentally, the sense of achievement on our student's faces when they get their pass slips is always worth seeing!

Learning By Our Mistakes

On our first course we planned the Morse assessment to be done on Sunday morning. However, we quickly realised that many of our students were dreading the Morse and it spoiled their Saturday!

We then decided to move the Morse assessment to the first event after registration on Saturday morning. This made for a less tense and far happier group – in fact by lunch time on Saturday's it was more like a big radio club meeting and this sequence of events became the norm for all the following courses.

Feeding The Multitude!

The 'Chippy' in Frodsham does a roaring trade as our demand for fish, chips and peas, etc., is vast – it's like feeding a Biblical multitude! Our catering team set up a list on Saturday morning and then we 'phone in the order around 11.30am and pick it up about 12.30pm. Lunch with a break out session quickly follows as the smell of the fish and chips enters the enclosed building and I've no doubt you can imagine the effect!

Catering on Sunday was bring your own or get a Bacon Bap from the site kitchen. The Team lay on tea, coffee and soft drinks during the course. This has made for a happy and convivial series of courses.

The Team

We've had 19 team members since we started. Our leader is Dave Wilson M0OBW. Followed by **Dave Bibby G1PIX**, **Roland Jeffery G0GZI**, **Sam Bell G0SBI**, **Mark Harper MW1MDH**, **Steve Roberts M0SJR**, Kath Wilson M1CMY, **Julian Woolvin M0JPW**, **Frank Mallows G1GYJ**, **Ryan Simmons M3UTD**, **Zoe Bayliss M3LIV**, **Martin Tust G4LUQ**, **Graham Merrington G1IVV**, **Mike Jackson M0ACK**, **Mike Isherwood G4VSS**, **Steve Foulkes MW1STE**, **John Glover M5HFJ**, **Pat Glover M0PAT** and myself, **Albert Heyes G3ZHE**.

Other Foundation and Intermediate courses have been run by the group at other locations, e.g.at a Scout Camp, also at a school in Chester and in a Church Hall near Frodsham.

Table 1

Foundation classes in 2002 with 295 passed in 10 courses.

2003	145 passed in 5 courses.	Intermediate 49 in 5 courses
2004	139 passed in 6 courses	Intermediate 50 in 4 courses
2005	144 passed in 6 courses	Intermediate 50 in 4 courses
2006	70 passed in 4 courses	Intermediate 39 in 3 courses
2007	24 passed in 1 course	Intermediate 6 in 1 course

Foundation Total = 817 Intermediate Total = 194

Joint Total 1005

When the Morse test speed was reduced to 5w.p.m. we ran several weekend Morse Camps at The Beacons with a good pass rate.

Dave Bibby G1PIX (PIXIE to his friends) has been running the Advanced course at The Beacons during the **Runcorn & Widnes** ARC Friday night club meetings for several years with a good pass record (see **Table 1**).

Plenty Of Characters!

As you would expect quite a few of our students stick in our memories. For example – **Shirley Smith** a local teacher got her M3, then 2E0, and passed the Morse and became **MW0YLS** in a year and was a very early 'Mountain Goat with Summits on the Air (SOTA) – a truly remarkable lady!

We discovered another remarkable person during a c.w. assessment when **Ian Hulse** did his sending at 25w.p.m. and then told us he was an ex Royal Navy radio operator! Within weeks Ian – by then **M3VIH** – became the Cheshire County Chief Morse Examiner and was soon **2E0VIH**.

We've had registered blind students, some very deaf people and several dyslexic students on the courses. Examination paper readers are supplied for our dyslexic and blind students. The group are otherwise involved with disabled students – the tuition is given in their homes and via the RSGB Representatives an examination is organised so they can take it in their homes.

The Costs?

Well yes, there are costs! A *Foundation Licence Now* course book – which contains all you need to know – costs about £5+post from the *PW* bookstore. The RSGB exam and registration varies around £25 – depending on the cost of room rental, etc. But of course, we must remember that our Licence is now free for life and all the tutors at The Beacons give their services free!

I think it's the best thing the RSGB have done for years. What a great introduction Foundation an Intermediate courses are to those with an interest in radio communication. We have managed to bypass the school computer clubs which have siphoned off the young end of our hobby for a long time.

The RAF Air Cadet Communications badge includes the Foundation as one part of their six part award. Scouts have also formed part of the youth end of our courses. I've had a great time as a tutor and now have many QSOs with ex-students!

The End In Sight

After I started this article, the County Police took over the building in late 2007 and we are no longer able to it. So, it's unlikely that any more courses will be possible from The Beacons as it's – sadly – being closed at the end of the financial year in March 2008.

The group is now looking for a new location so that we can restart in 2008. So, if you know of any other likely site let me know!

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The Rev. George Dobb's

carrying on the practical way

The month the Rev. George Dobbs G3RJV takes a look at an old favourite – an L tuner in 'mini' form.

"Nothing is particularly hard if you divide it into small jobs."
Henry Ford

In the 1980s our annual family holidays were governed by the academic year; we had sons at school and my wife was teaching. But living in Lancashire, we also had the 'Wakes Weeks. These were local annual holidays originally given to workers in the local cotton mills. During Wakes Weeks all factories and mills in town closed down, the machinery would undergo maintenance, and the entire working population would take holidays; usually at the seaside.

Although almost all the cotton mills had ceased production and many had been demolished, we still had a Wakes Week in June until the end of the 1980s. For us the main advantage of the June wake was cheaper ferry fares across the English Channel because for several years we took our old Volkswagen camper van to France and Germany. These were simple holidays with our two young sons with an added bonus of some Amateur Radio portable operation.

The G3RJV Equipment

My holiday Amateur Radio equipment varied from year to year and I began with an ancient tenet PM3 transceiver. This was a 1970s QRP direct conversion (DC) transceiver with a dual-gate m.o.s.f.e.t. mixer and a distinct lack of input tuning. It usually received the Amateur band signals accompanied by local short-wave broadcast music!

My favourite radio was a home-built 14MHz superhet transceiver. This began life with a gift when **George Burt GM3OXX**, a doyen of Amateur Radio construction, sent me a 600Hz bandwidth, 9MHz crystal filter. It was a gift that had to be returned if I hadn't used it in a home-made transceiver within three months. The resultant transceiver gave me a lot of portable operating pleasure and I still have the rig!

One of our favoured camping sites was on the border of Luxembourg and Germany. It had excellent facilities for a family although I must confess that adding the LX to my callsign did draw me to finding it! As those experienced in operating Amateur Radio from campsites will know, the main problem is often being able to provide a viable antenna.

My basic antenna set-up was a set of Hustler h.f. whip antenna that I bought in the flea market at the Dayton Hamvention in the USA. They worked surprising well but were very fiddly to set up.

I once worked several Japanese stations – in one day – on 14MHz with a 5W c.w. signal. But loaded whips are always a compromise and I added a collection of simple wire antennas in my portable armoury. I had a 14MHz dipole made from twin bell wire and various other pieces of wire, including some cut to a half-wave (33 feet) and a quarter-wave (16½ feet) on 14MHz.

Assuming that I could find a campsite pitch with a suitably placed tree, I had reasonable success on 14MHz with an end-fed half-wave wire as shown in **Fig. 1**. Incidentally, this version was suggested by **G3WQW** in an issue of *Sprat* (the journal of the G QRP Club) several years ago. The 10 metres (33ft.) wire is an approximate half-wave on 14MHz and is strung up as high and as clear as possible.

Cheap multi-stranded p.v.c. wire is suitable and a blue or green p.v.c. covering is useful to provide a little camouflage. The capacitors C1 and 2 are both screwdriver adjustable trimmer capacitors although C1 ought to be an air-spaced trimmer as it handles some r.f. voltage and I used a postage stamp type compression trimmer for C2

Making up the antenna is simple and L1 and 2 are wound on a T68-6 core. The inductor, L1, (33 turns of 24 s.w.g. enamelled wire) should occupy about three-quarters of the circumference and L2 (five turns of p.v.c. covered solid wire) is wound over the centre of L1.

Simple Set Up

The antenna is very simple to set up and the half-wave wire is connected to the top of L1/C1 and a counterpoise wire is attached to the other end. I often used a 5m (16.5ft) quarter-wave wire, although a piece of wire about a

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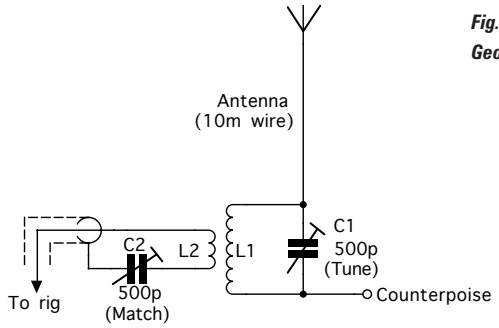


Fig. 1: The end-fed wire antenna system that George used portable for many years.

metre long works as well.

Using a v.s.w.r. bridge (usually called an s.w.r. meter) the **Tune** control (C1) is adjusted for the lowest reflected signal reading. Then the **Match** control, C2, is adjusted to obtain an even lower reading and it may take several adjustments of C1 and 2 to get the lowest reflected reading. I think that this is a useful and relatively compact antenna for portable operation.

With the prospect of retirement in a few months time, I have once again turned my thoughts to possible portable operation. My wife **Jo**' and I spend quite a bit of time in mid Wales at our family's wooden lodge. Although it belongs to the family, we're the chief users and so I have a small Amateur Radio station placed in one small corner!

The station runs a few watts of r.f. power to a W3EDP antenna strung though an adjacent wood. But since we are surrounded by hills and good walking country and I have a telescopic fibre-glass pole – the plan is to take a small transceiver into the hills.

I would also like to use more than one band, so a more flexible method of tuning a simple wire antenna is required. This calls for an antenna tuner that can cope with high and low impedance loads. For example, a half-wave end-fed wire presents a high impedance and a quarter-wave wire a low impedance and random lengths of wire will vary in impedance according to the band in use.

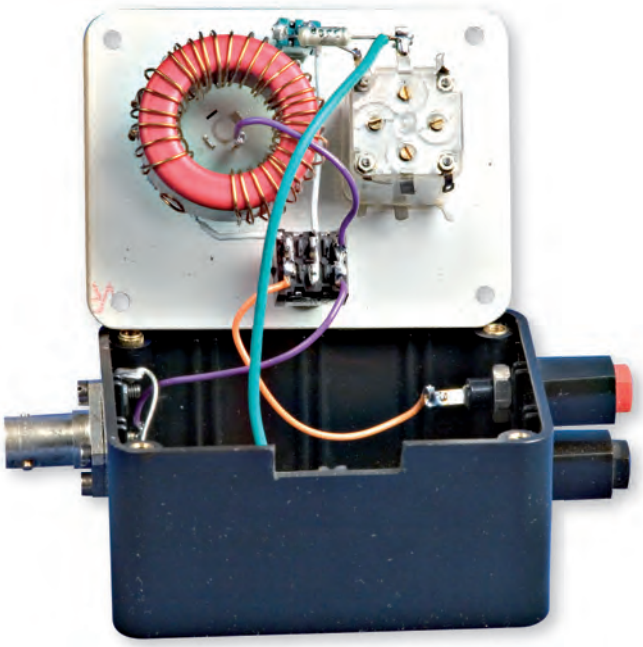
The L Match

One of the simplest antenna tuner configurations is the L-Match (or L-Network). It has only two parts; a capacitor and an inductor and it can be configured for high or low impedance matching. The diagram, **Fig. 2**, shows two configurations for the L-Match where the capacitor and the inductor are variable.

In **Fig. 2a**, the capacitor is connected at the transmitter side of the inductor. This will match a low impedance antenna to the 50Ω load of a transmitter or transceiver and **Fig. 2b** shows the capacitor on the antenna side of the inductor. This arrangement is suitable for matching a high impedance antenna to a 50Ω load.

The L-Network also has the advantage of being a low-pass filter; it attenuates frequencies higher than the tuned frequency. This will help suppress harmonics in the transmitted signal.

What I required was a compact antenna tuner that can offer both of the configurations I've described and the diagram, **Fig. 3**, shows the circuit of the Mini-L Match tuner. The inductor, L1, uses a 12-way, single pole, wafer switch to select a range of inductances.



Looking inside the miniature L-match and its interconnections.

The variable capacitor, C1, is a solid dielectric type with a value of 340pF. Similar capacitors are available from several suppliers or they can be culled from an older a.m. portable radio. **Note:** The choice of this capacitor does mean that the tuner is limited to lower power (QRP) use, say 10W output or less.

Additional capacitance can be provided by C2, added to C1 via the switch S3. The value of C2 (330pF) is chosen to double the double of capacitance but constructors could experiment to find the most useful value.

The variable capacitor (C1) can be placed on the transmitter or antenna side of L by using S2. In practice S2 is a centre-off toggle switch. This may seem an odd choice but in conjunction with S1, it enables the tuner to be switched out of the signal path.

The switch, S1, is wired so that in the first position it selects no turns of the inductor – a short circuit. This connects the transmitter directly to the antenna. The problem is that C1 is connected to L1 and sing a centre-off toggle switch for S2 means that in the centre position of the switch, C1 is removed from the circuit. This enables the signal to pass directly through the tuner. If this facility is not required, S2 could be a conventional change-over toggle switch and the spare switch position on S1 used to add an extra inductance step.

The most difficult part of the construction is making the switched inductor. To allow for compact construction I used a toroidal core, albeit a large one. The coil has a total of 30 turns giving a total inductance of around 10 microhenries; this is sufficient to tune from the 3.5MHz band upwards.

The coil is wound with 24 s.w.g. enamelled wire and

tapped at 0, 1, 3, 5, 7, 9, 12, 15, 18, 21, 25 and 30 turns. When winding on a toroidal core, each time the wire passes through the core counts as one turn. Each tap is made by pulling out a loop wire, about 30mm from the core, and making two or three twists to secure it in place.
When the 30th turn has been made, 10 tapping points should be present. Each tap has to be scraped to remove the enamel coating and tinned with solder. The easiest method is to snip off the end to make two wires, scrape the wires to expose bare copper, twist the wires together and tin them with solder.

Naturally the beginning and end of the coil wire also require scraping and tinning. The inductor L1 is mounted directly on the back of the 12-way switch. Identify the switch tag for the first switch position and solder the beginning of the coil to this tag. Working around the remaining switch tags, solder each tap to the next switch tag and the end of the coil to switch position 12. Try to mount the core quite close to the switch; say about 20mm behind the switch. Finally adjust the turns of wire to lie as evenly as possible around three-quarters of the core circumference.

Plastic Box

My Mini-L tuner was mounted in a small ABS type plastic box measuring 80 by 60 by 40mm deep. This was rescued from a previous project and I made a front panel from p.c.b. material to replace the original lid that had holes from the former project. Plastic project boxes are not difficult to find and it may be worth looking at plastic electrical boxes at d.i.y. stores.

The tuner requires input and output terminations and I used a BNC connector for the input from the transmitter and two push-to-grip terminals for the output. The output will be used with individual wires so separate terminations are required.

Because the box is insulated I connected a thick wire bus bar between the ground of the input connector and the ground output terminal. A metal box could be used but de-tuning may be a problem when a compact layout using a screened box is used.

So far I haven't had a chance to use the tuner 'in the field' – but tests from home suggest it should do all I require and it managed to load up several odd lengths of wire. I began the testing by finding approximate settings using received signals.
I then set C1 about half way and rotated S1 for the loudest output sound. Then I tried peaking the sound by rotating C1 and this will give the approximate tuning point. Final tuning was then be accomplished with a low level transmitted signal and a standing-wave bridge.
For some conditions I found that the extra capacitance provided by C3 is needed. **Note:** In common with many antenna tuners sometimes more than one setting will give a dip in reflected power. It's worth trying the switch positions either side on S1 and retuning to see if a better setting is available. All antenna tuners require a little experimentation and practice to get it 'just right'!.

I'm looking forward to summer outdoor trips with a little transceiver and the Mini-L tuner! ●

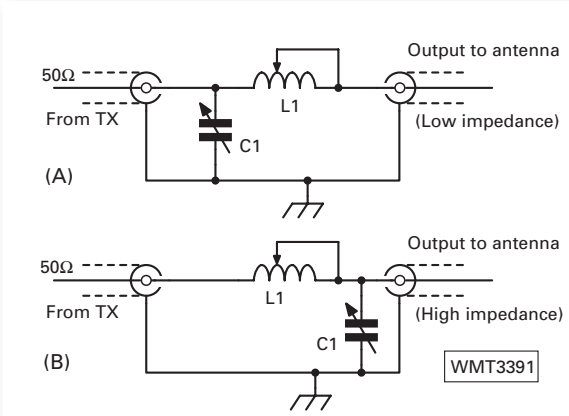
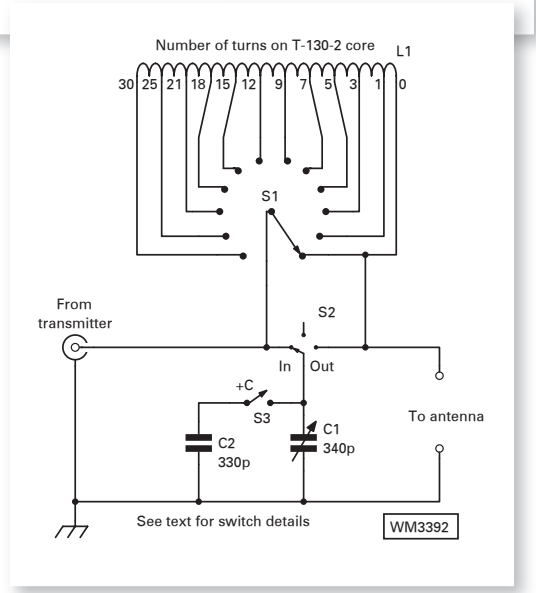
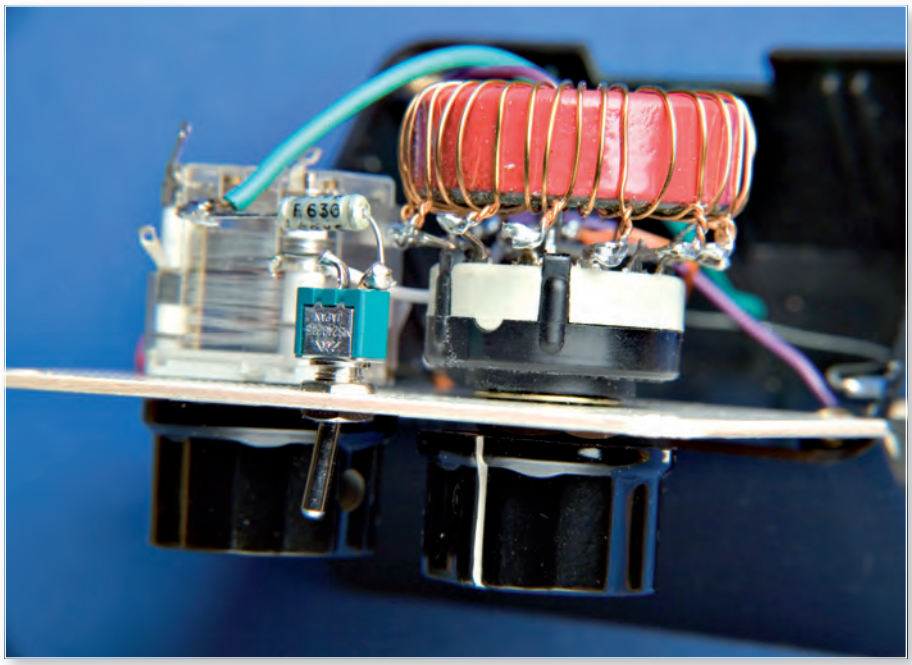


Fig. 2: The versatile L-match antenna matching unit can be made to match differing impedance values.

Fig. 3: The circuit of the L-match, that can be used with most lengths of wire on most bands.





A closer look at the tapped inductor, wound on a medium -sized toroidal core, then mounted close behind a single-pole pole 12-way switch.

Tony Nailer's

technical for the terrified

Antony Nailer G4CFY explains modulation types and various methods of creating and detecting them.

A reader recently purchased a kit for the Double Sideband Receiver for 7MHz. He queried whether it was a direct conversion (DC) receiver, and didn't really comprehend the double sideband terminology.

Well, it's not surprising that readers can get a bit confused about these things when mainstream Amateur Radio modulation types are mainly continuous wave (c.w. or Morse), upper or lower sideband, (u.s.b. and l.s.b.) and frequency modulation (f.m.).

Frequency Modulation

Let's first look at frequency modulation (f.m.). If you have a signal source, such as an oscillator and you waggle the tuning control, the frequency will move up and down. If you employ a device such a transistor or diode to vary the reactance of the circuit, and this device is fed with audio from a microphone, you will vary the frequency of the oscillator, in proportion with the amplitude and frequency changes coming from the microphone. This is frequency modulation. Easy really isn't it.

Decoding an f.m. signal is a really interesting problem but one that has been resolved by the use of a device called a quadrature detector. The quadrature detector develops a signal, which is equal to the mid point of the frequency changes, and feeds it back into itself to mix with the incoming signal.

The new mixing converts the frequency changes into amplitude changes. But it only works cleanly if, the r.f. signal fed into it has no amplitude changes (they're normally removed by signal level clipping).

Amplitude Modulation

With amplitude modulation (a.m.) on the other hand, the signal remains with a fixed frequency, but this time the amplitude is changed in proportion to the modulating audio signal.

If you have a signal source, such as an oscillator with a buffer, followed by an amplifier, there are two main ways in which you can create amplitude modulation. You can either feed audio from a microphone into the amplifier's input as well as the oscillator signal, or you can vary the amplifier's supply rail. Either way you will end up with a whole mix of signals at its output.

At the output of the amplifier, you'll probably have large quantities of the oscillator signal, also large quantities of the audio signal, plus the sum of frequencies and amplitudes of the oscillator and audio, plus the difference of the frequencies and amplitude of oscillator and audio. Due to non-linearities of the amplifier you will also get harmonics of the oscillator and r.f. signal and all the other products as well.

The oscillator signal passes straight through the amplifier and by itself doesn't carry any useful information. The audio signal also passes straight through but it is not going anywhere because it's not at a useful radio frequency. The sum and difference of audio and oscillator each carry both amplitude and frequency changes identical to those of the modulating audio signal.

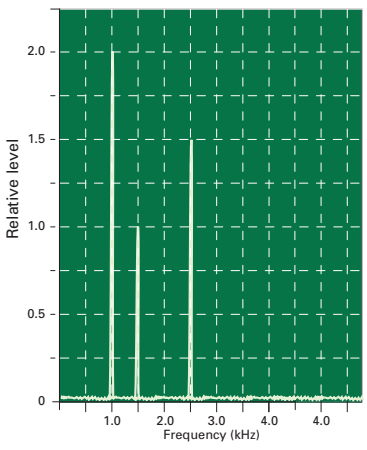


Fig. 1: The audio spectrum containing just three single audio tones at separate levels.

Now if the oscillator signal, together with the sum and difference signals are amplified further and transmitted, this is described as a **double sideband full carrier transmission (d.s.b.)** signal. This type of signal is better known as **amplitude modulation (a.m.)**. and it's probably the least efficient way of communicating information. This is because the sum and difference signals are mirror images of each other, and the amplified oscillator signal, which is also transmitted and now referred to as the carrier, contains no information.

The carrier signal that's present in every a.m. transmission, will make up half the total signal power, in a 100% modulated signal. Each of the two sidebands will contain a quarter of the total power. In reality a 100W peak power a.m. transmission is a waste of 75W of power. This is because any single one of the two sidebands actually carries all the information that's needed.

Let's say that an audio source such as a microphone, at a particular moment is producing three discrete tones. And let's say these tones are 1kHz, with an amplitude of two, a 1.5kHz tone, with an amplitude of one, and a 2.5kHz tone with an amplitude of 1.5. A spectrum is shown in **Fig. 1**.

Amplitude Level

The oscillator signal is 9MHz and has an amplitude level of two. The result of mixing the audio tones and the 9MHz signal is that the amplitude is halved but the relative frequencies are maintained. Assuming the audio band frequencies are now ignored on the spectrum, the sum and difference frequencies and carrier are shown in **Fig. 2**. The full transmitted signal will comprise 9MHz carrier, with upper sideband (u.s.b.) components at 9.001, 9.0015, and 9.0025MHz.

The lower sideband (l.s.b.) components are at 8.999, 8.9985, and 8.9975MHz. and as the frequencies are the mirror-images of the upper

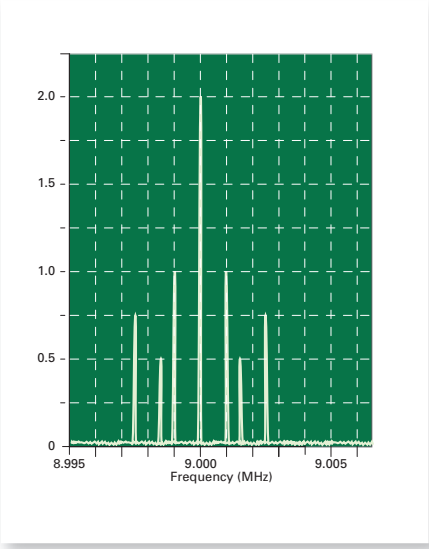


Fig. 2: The radio spectrum of the sum and difference frequencies of the audio signals of Fig. 1 mixed with, and modulating, a 9MHz carrier frequency gives a typical a.m. spectrum.

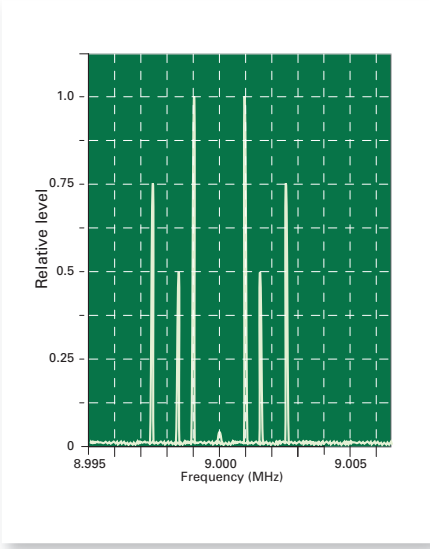


Fig. 3: Using a balanced mixer with the signals of Fig. 1 and the 9MHz carrier, results in a dramatic reduction of the carrier power level. This is a double sideband suppressed carrier signal spectrum.

sideband ones (mirrored around the 9MHz carrier frequency), the highest audio frequency of 2.5kHz gives the l.s.b. frequency signal of 8.9975MHz (the u.s.b. signal will be at 9.0025MHz for the same audio tone).

An a.m. signal is resolved by feeding the complete amplified received signal to any non-linear device, such as a diode or a transistor or f.e.t. biased into a non-linear region of its characteristic. Due to the non-linearity of the device, the upper and lower sideband and carrier all get mixed together again, and produce sum and difference frequencies.

The new sum frequency produced in the device is at twice the frequency fed to the detector so it goes nowhere. The new difference signal is again at audio frequencies, which may be filtered out and amplified. This new audio signal should be a low distortion version of the original modulating signal.

Some multi-mode (non-legal) CB radios generated a.m. in the usual way on transmit, but on receive passed the a.m. signal through the s.s.b. bandwidth filter, thereby shaving off one of the sidebands, and then detected the signal as carrier and just one sideband.

Double Sideband

If you have the oscillator and audio source as before and feed them to a mixer stage, which can balance out both the oscillator signal and audio signal, you get out only the sum and difference signals.

Even though the two new signals produced in the balanced mixer are mirror images of each other, you will have done away with the carrier, which, as we saw earlier, wastes at least half of the transmit power. When just the two sidebands are transmitted, it's referred to as **double sideband suppressed carrier,** usually d.s.b. for short. Such a signal would be as shown in **Fig. 3**.

If a d.s.b signal is applied to an a.m. detector, the result is a new signal, at twice the audio frequency and twice the amplitude changes. There would also be other harmonics and intermodulation products, all at r.f. and none of which are much use!

To receive a true version of the original audio, the incoming d.s.b. signal is fed into a mixer along with a signal carefully inserted where the missing carrier should be. Now the two sidebands will each produce identical difference signals at the original audio frequency.

The missing carrier is produced by what in olden times was called a beat frequency oscillator, or b.f.o., these days it is referred to as a carrier insertion oscillator. For some reason the acronym c.i.o. is not often used.

If the inserted carrier is not placed at exactly the right frequency, there will be two audio signals each with the right amplitude changes but at different tones. The 'trick' in receiving a d.s.b. signal is to get the carrier frequency just right, so the two difference signals add together to recreate the original audio signal.

The easiest way to receive a double sideband suppressed carrier signal on the lower h.f. bands is by using a direct conversion receiver, usually known as a DC receiver, a name that has two interpretations, the first already given. The second interpretation, is because the receiver local oscillator is positioned exactly where the carrier should be, and in effect this is a super-heterodyne (superhet) receiver with a zero frequency intermediate frequency.

Single Sideband, s.s.b.

The sum of modulating audio and carrier frequencies is the upper sideband u.s.b., and the difference of the modulating audio and carrier is the lower sideband, l.s.b. Though the acronym for upper sideband (u.s.b.) has been stolen by the computer boys, we had it and its partner l.s.b. long before they did, so we'll stubbornly continue to use them in our context.

Filter Method

There are three methods of producing s.s.b., the most popular of which is the filter method.
This requires that a d.s.b. suppressed carrier signal is first produced in a double balanced modulator, before being passed through a steep sided filter just wide enough for one sideband, the other being shaved off. By moving the carrier frequency from one side to the other of the filter passband, the upper or lower sideband signal can be separated out from its companion sideband

The reason for the popularity of this method is that the expensive s.s.b. filter can be used on receive, straight after the first mixer, to select just one sideband signal from all the signals within the passband of the receive front end.

Phasing Method

The second method of producing s.s.b. signals is to start by splitting the audio into two paths, and using two networks to phase shift them by 90° to one another. The carrier signal is also split and phase shifted 90° apart.

Each of the audio signals are then

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mixed with one of the carrier signals in another balanced modulator, each producing a d.s.b. signal. These two d.s.b. signals are again mixed and the result is one sideband is cancelled out. By swapping the two audio signals with the two carrier signals determines which sideband is produced.

The Phasing method is only really effective over a very narrow audio bandwidth, because as you move away from the optimum frequency, the phase shift error between the audio paths increases and unwanted sideband starts to come back.

Third Method

The third method is by splitting the audio and the oscillator each into two paths, and then phase shifting one path 90° with respect to the other. They are then fed to a quadrature modulator, where two of the signals add to produce a wanted sideband, while the other two cancel to suppress the unwanted one.

With the advent of quadrature modulation integrated circuits, this has become quite a simple method of producing s.s.b. It is now the method used by nearly all mobile phones and digital communication systems to generate and demodulate r.f. signals. Funny things these digital chaps, they take over existing techniques and give them new names. The method that used to be known as 'The Third Method'. It is now called quadrature modulation and demodulation.

Whatever method is used, the resultant transmit spectrum would be like Fig. 3, either with the upper or the lower sideband but not both.

Receiving s.s.b.

To receive an s.s.b. signal only requires the insertion of a signal at the point where the missing carrier should be. With only one sideband involved there is only one difference signal, which varies in pitch as the carrier is tuned. If the carrier is placed on the wrong side of the received signal, it will not resolve and only produce 'Donald Duck' like noises.

A double sideband receiver will resolve s.s.b. as easily as the designed d.s.b. Similarly an s.s.b. receiver which usually includes a narrow band receive filter, just wide enough for one sideband, will actually remove one of the sidebands from the d.s.b. signal and demodulate the received signal as if it were just an s.s.b. one!

Strangely enough, a frequency demodulation detector will also resolve s.s.b. by reason of it generating a quadrature signal and mixing it back with the original. Conversely though you cannot resolve f.m. using an s.s.b. detector.

Conclusion

Keyed continuous wave c.w. signals referred to as Morse Code were of course the original means of communications, and still has a place in amateur radio communications today. Amplitude modulation was the dominant mode for the broadcast of voice and music, from the early 1900s until the mid 1960s, when f.m. at v.h.f. started to take over.

Amplitude modulation also was popular for amateur communication until in the mid 1960s s.s.b. started to be used, and was found to go much a greater distance for the same power transmitted. In the 1970s surplus f.m. equipment at low and high v.h.f. became available, and quickly took over from a.m. on the amateur v.h.f. bands. The advent of repeaters at v.h.f. further entrenched f.m. as the principle mode on these bands.

On the h.f amateur bands f.m. was not adopted, mainly due to the crowded nature of the bands and the effect when f.m. signals collide with each other. As in the case of repeaters, f.m. works well for channelised operation and was adopted for the legalised UK CB allocation.

Where band occupancy is low and where background noise levels are high, such as on Top Band, f.m. would be an ideal mode to use. This was proved by the use of channels around 1.6MHz for the original legal cordless phones in the UK. Perhaps in a future article in this series, or in the companion series *Doing it by Design,* it might be worth developing an f.m. transceiver for 'Top Band'?

Whilst s.s.b. is the most widely used mode on the h.f. bands, double-sideband equipment is simple and cheap to make. And it's compatible with both d.s.b. and s.s.b. receivers. The modulation method clearly lends itself to home-brew equipment, so it's an obvious mode for the new constructor to get access to the h.f. bands.

Creating s.s.b. signals is slightly more complicated than d.s.b., as it involves the use of complex phase shift networks, or an expensive filter. These needs immediately increase the complexity or cost of home-brew equipment.

Much commercial s.s.b. equipment now almost exclusively use the filter method to generate signals on transmit, and to select signals on receive. With the advent of digital techniques, the third-method, or quadrature modulation & demodulation is also finding its way into more extensive use, even in Radio Amateur equipment. ●

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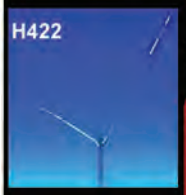

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Harry Leeming's

in the shop

This month Harry Leeming G3LLL chats about equipment faults and finds out how far *PW* travels around the World!

It's surprising to me just how far *PW* travels and to illustrate that, I had an E-mail from **Kevin AA3XV** in the USA who told me about the trouble he was having with his FT-480 144MHz multi-mode. Sometimes, when he switched back to receive the rig was 'dead' and he then had to key the microphone push to talk (p.t.t.) a few times before the receiver came to life.

Replying to Kevin, I suggested that he removed the bottom cover, carefully mark the cover on the relay next to the crystal filter so that he would not forget as to which way it fitted and then removed the cover and clean the contacts. I didn't know as to what cleaning fluids were available in the USA, but as usual I emphasised that whatever he used it must not damage plastic and that it **must not** contain a lubricant.

Kevin E-mailed me back to say that he had removed the cover, poked at the contacts with a plastic trimming tool, and sure enough these proved to be the cause of the trouble! He then applied pure isopropyl alcohol,and operated the p.t.t. a few times – this did the trick, and the rig was now as good as new. For the benefit of *PW* readers Kevin also sent me a photo of the rig, **Fig. 1**, in which the relay in question is clearly shown next to the Yaesu XM10.81.

No Happy Ending!

Another enquiry about the FT-480 didn't have such an happy ending as in the USA story! **Brian** told me that had bought his at a rally, and had used it on narrow band f.m. (n.b.f.m.) for a few weeks. He'd obtained excellent reports as to the speech quality but then he tried to operate on single sideband (s.s.b.).

Unfortunately, the reports Brian got when he was using the s.s.b. mode were far from flattering. The distortion was grim,and the quieter he spoke, the worse it became. When he 'phoned me, I asked him as to what power output he obtained in the f.m. mode with the 480's power switch set at the two different power levels.

"Strange that you ask" Brian said, "At high power I get 13W even though the rig is only rated at 10W – but when switched to low power I get nothing at all."

The fault on Brian's rig is a very common – and expensive problem – with the FT-480 and with many more multimode rigs made at around the same time, that use the M57713 power amplifier (p.a.) module. For s.s.b. or a.m. operation this module should operate in class AB and this is what it normally does. However, for some reason the internal bias system fails and the modules switch over to class C operation. This is perfectly okay for n.b.f.m. operation but causes very considerable distortion on an s.s.b. transmission.

The modules cost around £50, plus the cost of fitting and setting up. Understandably, Brian decided that it would hardly be worth it and so opted to use his rig on the f.m. and c.w. modes only.

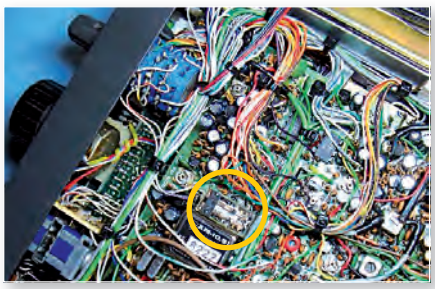

Fig. 1: The sticking relay (circled) that Kevin AA3XV found is next to the filter marked "XM-10.81". Note also the rat's nest of wires in this FT-480.

Fig. 2: By easing the plate away from the body, a small amount of switch cleaner can be squirted into the contacts.

Cleaning Sealed Switches

Looking at Kevin AA3XV's photo of the FT-480, I spotted the blue rotary mode switch and this reminded me of an incident I had with a Yaesu receiver. '**Ruth**' had brought hers into the shop with a spare mode switch. She explained that the switch had become intermittent, and "as it was sealed and could not be cleaned" her boy friend had removed the old one and obtained a replacement intending to fit it.

Somehow he had lost the drawing he had made of the connections, and asked ,"Could you just solder the wires on the new switch?"

Well, first I had to explain to her that I had no more idea as to where the wires went, than she had and that to spend time tracing them all would cost more than the set was worth. (If you are in the Army you just can't lose track of a rifle*, if you are servicing electronic equipment you just don't lose the drawing you make of the wires you take off a switch).

I told Ruth that the only hope was to wait – possibly months – until an identical receiver came in for service and that I would then copy the connections. She was not too pleased about this and took the set away un-repaired – but she would've been even less pleased if I had told her the full story!

The blue rotary switches in question are used on quite a few Yaesu models, are very reliable and in my experience have never needed replacing. Sometimes, they become intermittent and need cleaning but this is quite easy to do, as they are not quite as sealed, as a first glance would indicate.

The rear of the switch has a plate that's riveted in place but as **Fig. 2** shows this can easily be prised open a fraction with the aid of a penknife. The application of some Servisol – or other lubricated cleaner through the gap – along with a few quick rotations will then make the switch as good as new!

Fig. 3: A type of capacitor that was used in some valved rigs that could cause problems.

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Unlucky Capacitor 13

From time to time, I have mentioned C13 on the FT-101 and its equivalent power amplifier (p.a.) grid coupling capacitor in various other Yaesu and Trio/Kenwood rigs. I've now had quite a few E-mails asking for more details and so, as I'm ever willing to oblige – particularly when *PW* is paying me for my trouble! – here goes!

The type of capacitor used in many Yaesu and some Kenwood rigs that is the cause of so much grief is shown in the photo – **Fig. 3**, and a simplified circuit of its position is in **Fig. 4**. This critical capacitor can fail at any time after the first 10 or 15 years of use, otherwise it almost always fails within a few weeks if a rig is put back into service after it has not been used for sometime, or if a set is serviced and the drive peaked up.

As you will see, C13, or its equivalent in other models, goes directly from the anode of the driver valve, to the grid of the p.a. valve, it has a nominal value of either 80 or 100pF, and is rated at 1000V. It's in an extremely important position as the grids of the p.a. valves have to have to be biased at about –50V by the negative bias supply, to stop them taking excessive current.

If the capacitor in this position goes short circuit, or just starts to leak, the +300V supply from the anode of the driver valves will be applied to control grids of the p.a. valves. They then take an enormous current and burn out.

As I've stated previously, the biggest mistake you can then make is to fit a new pair of p.a. valves, as being new they will take even more current and – if you are really unlucky – the p.a. anode choke and the mains transformer will then burn out as well.

Note: the capacitor C131 is switched in parallel on 1.8MHz in the later FT-101s and this should also be replaced, as its failure can be equally catastrophic.

It's important to note that failure of the p.a. valve's grid coupling capacitor, quite often happens when the rig is in the receive mode,

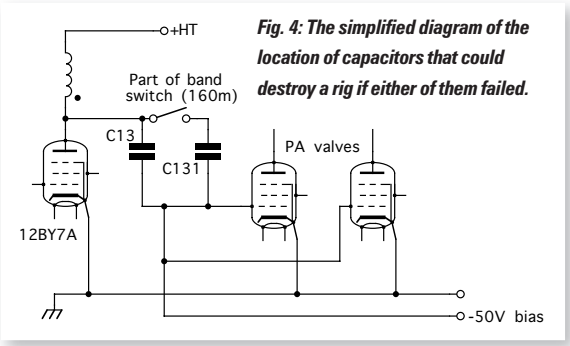


Fig. 4: The simplified diagram of the location of capacitors that could destroy a rig if either of them failed.

Typically I was told, "I just went out of the shack for a few minutes, and when I got back there was a cloud of smoke and a smell of burning", and it's a tale I've heard dozens of times. Remember that at all times when the equipment is switched on – and the p.a. valve heaters are on – you're at risk from failure of this component!

As in most areas of life you can, of course. just wait for disaster to happen. Alternatively you can take the bull by the horns and do something about it! In this case if you have a rig with a valved p.a., so why not have a look at what capacitor is fitted in this position? If it looks like the one shown in Fig. 3, I recommend that you replace it with one of the same value – but rated at least at 2000V working.

In my servicing days customers didn't seem to like paying for repairs, only to have their rig disappear in a cloud of smoke a few weeks later! So for the last 25 years – and perhaps longer – I've made it standard practice to replace the capacitor when carrying out any repair. I warned customers first, of course, and if they didn't wish to pay for the work involved (possibly thinking that I was trying to 'make work'), I politely refused to do the repair.

As '**Fred' –** who E-mailed me after fitting this component – found out, sometimes it isn't just that simple to replace the capacitor. Capacitors normally have a tolerance of plus or minus 10 or 20%, and so if you remove a '100pF' capacitor that's at the top end of its tolerance, and replace it with one at the bottom end of the range, you may have effectively replaced a 120pF capacitor with one of 80pF.

Out Of Alignment

The p.a. grid coupling capacitor is part of the driver stage tuned circuit, hence such a replacement will throw things widely out of alignment. The receiver will peak up at a different position on the pre-selector to the transmitter, and especially on the higher frequency, there will be a drastic shortage of drive.

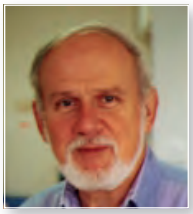
If you are carrying out the replacement simply as a precaution, the best way to proceed is to remove the old capacitor, carefully measure its capacity and then check a few replacements until you find one within a few pF of the same value. This should ensure that you will only have to slightly touch up the alignment.

If you don't have the requisite test equipment to do as I suggest, and you are certain that the original capacitor is still okay and you just want to insure against the damage that failure will cause, there's a dodge that you can do that won't upset the alignment too much. First, disconnect one end of the old capacitor and wire a 0.01μF 2000V working disc ceramic capacitor in series. After you have done this, if the original capacitor fails it will throw out the alignment – but at least it will not put +300V on the grids of the p.a. valves with the resultant 'melt down'.

If the worst has already happened, and you have to replace a faulty capacitor and other parts, you'll almost certainly need to re-align the rig. In this case you may find that things will not peak up within the range of the driver stage trimmers. The answer is to try a few different samples of replacement p.a. grid coupling capacitor, at around the correct nominal value, until you find one that's suitable and which allows the trimmers to be peaked at around their original settings.

That's all this time – cheerio until next month! **Harry Leeming G3LLL**

Monitoring The Radio Frequency Equation



Important Research Taking Place In Australia

There's a quite erroneous perception that we here in Australia, the Amateur Radio fraternity (as well as other specialist groups) are relatively backward in our thinking. However, in fact much pioneering work is done here! In fact it's not mere sloppy fiddling – to be fair and correct it's properly documented research.

An example is the important research being carried out into the measurement of radio frequency energy, which will soon have far-reaching implications in the operations of our bigger brothers of radio and TV broadcasting. Once again, Amateurs are pioneering techniques that will one day be commonplace commercially.

Consider the radiation of radio frequency (r.f.) energy. Every Radio Amateur knows that in fact energy cannot be created or lost, it is merely transmitted from one place to another using any number of mediums, for radio this is usually space (whether or not it incidentally contains air). This energy starts from the power supplies of a transmitter, and is augmented by the modulation (be it the mutter of a calm "CQ" or the clash of a cymbal!)

Energy Passage

The energy passes through various stages in the transmitter, finishing with the power amplifier (p.a.) stage and is then conveyed to the antenna. The feed arrangements in terms of impedance and other characteristics are generally devised to reduce losses to their lowest level. However, you may ask, 'But didn't you just say 'Energy can't be lost?'

Of course, I'm using the word 'lost' loosely here. What really happens is that some of the energy is wasted in heating effects and is thus 'lost' only as far as the efficient transmission of radio waves is required. In fact most energy 'losses' are inadvertent conversions of energy to heat. The only truly 100% efficient device is a heater! (Think about it!).

At the receiving end, the minute voltages that can be picked up on a similar antenna are fed to the receiver, where they are used in the creation of an image of the original sound. There is usually the insertion of some fresh power of course, in the form of receiver power supplies, and the received signal slightly augments this. In effect the received energy is used to control the receiver power supply and at the end of the receiver chain a loudspeaker or headphones can reproduce sound pressure waves that mirror those originally sent.

If you doubt that actual power is received then look no further than the simple crystal set (or it's modern equivalent, the diode). Such a set is usually constructed without a means of power supply (unless there is a small amplifier added).

A simple crystal set without an amplifier does indeed give audible reception of a nearby radio signal. The headphones create sound pressure waves by movement of their transducer elements, without the aid of any other power than that received via the antenna.

Before The Antenna

Now, for a very long time, we have been able to measure the power output of a transmitter just before the energy reaches the antenna. And by various means we can in fact measure the power seen at the receiver end. It is what happens in between that interests us, and that is where the pioneering work comes in.

It's well known that in the case of a theoretical isotropic antenna, energy is radiated outwards at equal levels in all directions. Any receiver in the path of this rapidly spreading radio wave takes just a tiny amount of that energy to produce sounds in its own loudspeaker or headphones. If many receivers are listening at a given compass point from the transmitter then these effects add and the radiated energy at that point is reduced, or conversely more power is taken from the transmitter in that particular direction.

This is well illustrated by the basic energy equation $Ek = 1/2 (m*v^2)$

Many Amateurs have problems with that concept, but let me ask you, if some energy is used to make the receiver work then how can it possibly fail to reduce the energy left? Remember, energy can't be created. Of course, we don't experience great holes in a radio energy field, even if millions of receivers are used at roughly one point. Why not? The answer

Alan Ford VK2DRR aims to dispel the myth that nothing new comes from Australia or the Antipodes in general!

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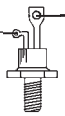

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of course is that the amounts of energy involved in the receiver antennas are very very small compared to that which is transmitted. It is the relative strengths that are so important.

Now the advent of computerisation and miniaturisation in all fields gives us the opportunity to do what was previously thought to be impossible, and that is to measure these small quantities. Not only that, but to have the convenience of measuring the quantities of energy at the transmitter end. Australian pioneers have worked for years on this concept, which was in fact first discussed publicly on air by the Australian Broadcasting Corporation ABC (like the BBC) over ten years ago, to the month. The methods espoused then were crude but computing and electronics have moved on since then and the process is now much refined.

Valuable Tool

Here is a brief outline of the device (I would call it the Listenometer but it would endow a serious technical subject with a degree of levity and that's not appropriate, for here we have a potentially valuable tool in the hands of broadcasting marketers and others).

Instead of a single antenna we create a ring of matched and phased elements, spaced so as to give at least eight distinct directions, and preferably many more. These are individually fed through sensitive devices that while capable of showing the total energy sent to each element (amps or even kiloamps of course) are at the same time able to show minute differences. We say that such a device has a high maximum power capacity and at the same time low granularity — very fine measuring intervals (in the order of micro-micro-microamps).

The whole device is controlled using an advanced computer 's central processing unit (c.p.u.) but in fact a rough experimental rig can be produced using the humble PIC computer chip and it's hoped that *PW* will in due course find space for such a project to be described.

In operational tests, it's been shown that if a distant receiver is turned on while observing the transmit indicator described there will, of course, be no indication. The concept is ludicrous! But if a whole host of receivers (say a thousand) are switched on at the same time, there will be a distinct indication at the transmitter end of more energy flowing from the relevant transmit element!

For those with a mathematical interest this is in turn shown by:

$$E = (-2\pi^2k^2me^4)/(n^2h^2)$$

So, what if we could in some way calibrate this? Can you see the possibilities? At an Amateur level you could see from the device how many people (and from what compass point) were receiving your signals. At a broadcasting level what a marketing tool! You could see precisely how many people were listening to (or viewing) a particular show and no more would you have to rely on those 'sample' survey listeners where the reports of a dozen or so are extrapolated so recklessly into many many thousands.

The concept can be taken further. By carefully observing the instrument as the show progresses, the producer can see at a glance just what speaker or character is popular, what causes people to turn off in disgust, and so on. We could have an interactive programme controller, where the characters, gags and individual songs could be interchanged dynamically to suit the widest audience at any one time.

The script would in effect be totally interactive and lines fed to players on a large screen reflecting the exact mood of the populace. What advertising executive would not pay a fortune for a device that enabled him to continuously monitor and increase listening market share. Or, back at the Amateur level, what true contester would not wish to know how his very intonation (or chosen speed of Morse, say) guaranteed him the maximum rate of QSOs?

Strayed A Little

I'm afraid that in considering the future I've strayed a little from the path I intended to follow as I've described the technical progress being made. Here in Australia we already have the instrument working in fairly crude form. Of course we can't look at a meter at the transmitter and say blithely 'Old Fred's just tuned in'! How absurd that would be. But we can say – with a good degree of certainty – that another couple of dozen have now tuned in on the frequency.

However, none of the developments I've described would be possible without painstaking and unending experimentation. After all, that's what Amateur Radio is all about!

The major experiment runs roughly as follows. At 1100 local time, a transmitter is keyed up, and by prior arrangement at 1110 hours many hundreds of listeners turn on. A distinct rise is then noted in radiated power, as expected. Next, at 1115 hours all listeners abruptly switch off and the transmit power indicator immediately drops!

The result is amazing on its own – but then will come the important 'double-blind' test. After a random pause, the announcer invites all listeners to switch on again and behold the transmit energy throughput rises! This part of the experiment is repeated several times. Listeners are instructed to switch off and after a random time lapse (to prevent co-incidences) they are instructed to switch on again. An amazing degree of repeatability is experienced, leaving observers in no doubt as to the veracity of the device.

The experiment was most recently refined at the start of the month, and next month – May – I hope to repeat it. As they say, watch this space for more news!

In fact, I can tell you that the same team is even now considering the next project, which centres around the concept of converting large and unwanted sounds (or noises) via transducers to feed into the power grid. Energy recovery vans could be parked outside sporting venues or pop concerts, where loud and unwanted noises could be converted to useful electrical energy. What a concept – just imagine how useful it could be to anyone living near a large airport or motorway – free power! It could lead to the prices of houses near noisy locations rising rather than falling as householders take advantage of the free energy! ●

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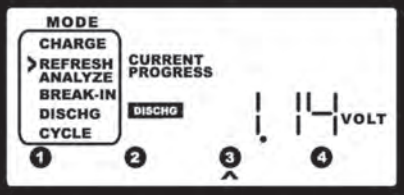

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Colin Redwood's

what next?

Colin Redwood G6MXL looks at the Maidenhead and other Locator systems – often a source of confusion!

This month I'm aiming to take the confusion and mystery away from Locator systems! They can certainly be confusing for anyone having to use them for the first time.

Let's now look at the basics and why we need locator systems within Amateur Radio. For example, If I talk to anyone on the air at any distance, I'll probably want to know where they are. Whilst their callsign will at least tell me in which country they are, and perhaps give me an idea of a region, I'll have to rely on their description of their location and my geographical knowledge to go any further!

Typically, I might be told that someone is 70km from a town or city that I might find on a reasonably detailed map of the country. To do better than this, I could use latitude and longitude – which is difficult to exchange in weak signal conditions, even if both parties know this information. Or we could use a locator system designed for Radio Amateurs.

Locator System

There are four main reasons for having locator systems in Amateur Radio. The first is that the locator defines the location of a station with sufficient accuracy (for most purposes) to determine where the station is located. Indeed, for example, it's more than sufficient to enable me (or any other operator) to know where to point a directional antenna.

So, if anyone hears me calling from IO80XR, then they'll know they have to point their directional antenna in a southerly direction rather than East, West or North from their location.

The second reason for locators is that there are a number of awards available for making contacts with stations in so many locator squares and fields. While most of these awards are aimed at the very high frequency (v.h.f.) operator, the American *CQ* magazine has an award scheme for h.f operators based on 'fields' as locators.

The third reason for using locators is for determining the distance between two stations. In many v.h.f. contests, the distance between stations will be the basis on which points are obtained. For example, if I work a station 100km away in a v.h.f. or ultra high frequency (u.h.f.) contest, then I might get 100 points for that contact.

Finally many contests use locator squares as multipliers, so that for every time I contact a station in a different square during a contest, my overall score increases. So, if – for example – at the end of a contest I have 1000 points and have worked stations in six different squares, my overall score will be 1000 x 6 = 6000 points. (We'll look at how I got the 1000 points on another occasion).

The QSL Card

For all of the reasons I've mentioned, most Radio Amateurs will include their locator on their QSL card. I'm sure, if individual readers do any serious operating on the v.h.f./u.h.f. and super high frequency (s.h.f.) bands that you'll have been asked for your locator. These are given as IO91SB, or JO01AM, etc., and are usually heard on air phonetically as 'India Oscar Nine One Sierra Bravo' or 'Juliet Oscar Zero One Alpha Mike'.

The 6-character locator is divided up with the first two letters known as a 'field'. These are large areas and the British Isles are covered by parts of just four fields, IN, IO, IP and JO, **Fig. 1**. The whole of the world is made up of just 18 x 18 = 324 fields.
Each field is 20 degrees (20°) longitude wide (West-East) and 10° latitude tall (North-South) **Fig. 2**. Combining the first two letters with the middle two digits gives us squares or grids. Each field is divided into 100 squares numbered 00 to 99 in a 10 by 10 matrix. Each square is 2° longitude wide (East-West) by 1° latitude tall (North South).

Each square is divided into 24 x 24 sub-squares, **Fig. 3**, each 5 minutes (one-twelfth of a degree) longitude wide (West-East) by 2.5 minutes (one-twenty fourth of a degree) latitude tall (North South). Finally, by combining the first two letters (field) the middle two digits (squares) and the final two letters (sub-squares) I arrive at the full locator.

Having a mixture of letters and numbers in a given sequence enables the locator to be passed phonetically, which is useful for weak-signals.

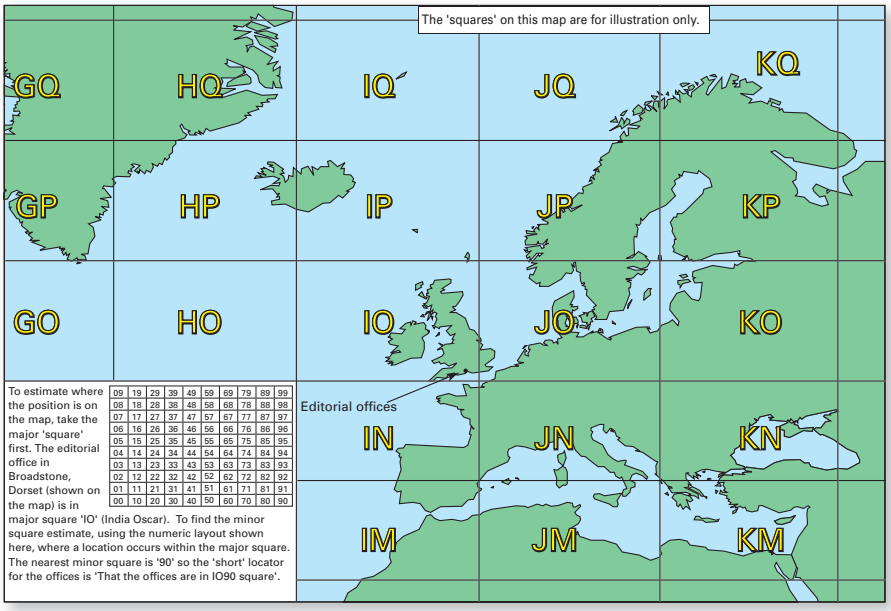

Fig. 1: The area of western Europe, in common with the rest of the world, is divided into 20°(longitude) by 10° (latitude) major 'fields' and each is given a unique two letter identifier.

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WT0300

09	19	29	39	49	59	69	79	89	99
08	18	28	38	48	58	68	78	88	98
07	17	27	37	47	57	67	77	87	97
06	16	26	36	46	56	66	76	86	96
05	15	25	35	45	55	65	75	85	95
04	14	24	34	44	54	64	74	84	94
03	13	23	33	43	53	63	73	83	93
02	12	22	32	42	52	62	72	82	92
01	11	21	31	41	51	61	71	81	91
00	10	20	30	40	50	60	70	80	90

10°
1°
2°
20°

Fig. 2: Each 20°x10° field of Fig. 1 is divided, this time into 100 'squares' of 2°x1°, each is given a unique number between 00 and 99.

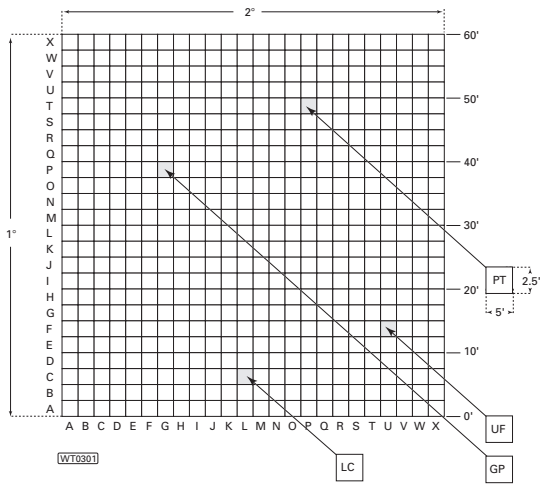

Fig. 3: Each square of Fig. 2, is again subdivided into a 24x24 grid of sub-squares, each being given a unique two-letter identification.

Unlike some of the previous systems, which were not even unique within Europe, these six characters provide the location of an Amateur Radio station with reasonable accuracy anywhere on the planet.

Maidenhead Locator

Readers may be wondering why some people refer to their 'Maidenhead' locator? In answering, quite simply it was at an international conference in 1980 in the town of Maidenhead in Berkshire, England, that the system was formally proposed as a world-wide locator system for Amateur Radio purposes, replacing other systems in use in various parts of the world. The correct term is IARU (International Amateur Radio Union) locator.

Your Own Locator?

How do you find out your own locator? There are many ways! For those readers without a computer, you'll need a detailed map of the locality such as a 1:50,000 Ordnance Survey map in the UK (or equivalent elsewhere in the world).

Next, you should find your location on the map and using the markings on the edge of the map and then determine your latitude and longitude (not the National Grid Reference). **Note**: Having found out your latitude and longitude, make a note of it, as I will also be finding other uses for your individual locator to advise readers when I look at Satellites on another occasion.

In the British Isles, if a station is west of the Greenwich Meridian (e.g. most of England, all of Wales, the Isle of Man, all of Ireland and most of Scotland) the field will be IO. However, if the station is east of the Greenwich Meridian (e.g. Essex, Suffolk, Norfolk etc.) the field will be JO. **Note:** There are a few exceptions for outlying parts.

For those operators in the Channels Islands, The Isles of Scilly and the Southern tip of the Lizard peninsular of Cornwall – you are in field IN. If you live in the the Shetland Islands, your field is IP. However, if you live outside the British Isles, I suggest you obtain a locator map of your part of the world from you national Amateur Radio society.

Now that I have already established which field the individual readers are in, together we need to work out which square you're in and the tables, given here will help any operator who is located anywhere in the British Isles.

Table 1
The third Character of Locator for stations located in British Isles

Longitude	Character
0 to 2° East	0
0 to 2° West	9
2 to 4° West	8
4 to 6° West	7
6 to 8° West	6
8 to 10° West	5
10 to 12° West	4

Table 1. Use this table and your latitude and longitude to find the third character of your location's six-character Maidenhead locator.

Table 2
The fourth Character of Locator for stations located in British Isles

Latitude (°N)	Character
49 to 50	9
50 to 51	0
51 to 52	1
52 to 53	2
53 to 54	3
54 to 55	4
55 to 56	5
56 to 57	6
57 to 58	7
58 to 59	8
59 to 60	9
60 to 61	0

Table 2. Use this table and your latitude and longitude to find the fourth character of your location's six-character Maidenhead locator.

Isle Of Wight

To make sure that I have helped readers understand and have 'got the idea', I've provided a worked example using the southern tip of the Isle of Wight. The longitude is 1°, 17 minutes and 48 seconds west of Greenwich (1°17' 48'' W, and the latitude is 50°, 34 minutes and 25 seconds north (50° 34' 25''N). The field is **IO** as it's west of the Greenwich Meridian and not one of the few exceptions I mentioned earlier.

From **Table 1** I've shown that as the longitude is between 0 and 2° west, the third character of the locator will be **9**. From **Table 2**, I've shown that as the latitude is between 50 and 51° north, the 4th character will be **0**. So, the square is **IO90**. From **Table 3** the longitude us between 1° 15 minutes and 1° 20 minutes west **in the square**, so the 5th character is **I**, and finally, from **Table 4**, the latitude is between 32.5 and 35 minutes north **in the square,** so the 6th character is **N**. So, the locator, of our station located on

the southern tip of the Isle of Wight is **IO90IN**.

If readers have access to a computer connected to the internet, there are a number of web sites which will help to find the locator. Whilst all of these have their merits, whatever technique the individual chooses, I ask you to please bear in mind that these are all **only as good as the data you feed in!**

Note: Please be careful with those web sites that find a locator based on post-code! While they're very easy to use, if your home home in a built area, I've some doubts as to their absolute accuracy as postcodes can straddle locators. On the other hand, in country districts individual operators may struggle to find the post code of a remote hill top that is miles from the nearest house!

My favourite method is to use the **http://f6fvy.free.fr/qthLocator** web site. The full screen version superimposes the full six-character locator onto Google Maps. Basically, as long as it's possible to find the location on Google Maps, it's possible to obtain the locator! This is really useful if a detailed map of a particular area isn't available, or for country districts or when an expedition to operate abroad is being planned.

Note: No matter what method is chosen, if a station is located very close to the border of a locator, the assistance of a more detailed Ordnance Survey map may be required to be absolutely certain. However, if a Global Positioning System (GPS) unit is available, the user may be pleased to find that one of the options (often buried in the menu system) of some GPS units is to display the location as the Maidenhead locator, **Fig. 4**. But even if a GPS doesn't have this option, it will almost certainly be able to display the Latitude and Longitude.

Fig. 4: Some GPS units, such as the Garmin GPSIII, make it easy to find your locator as shown in the lower left section of the display.

Locator Map

I would like to suggest that What next? readers buy a locator map covering at least most of Europe – down to square level. These are available as A4 laminated sheets or larger posters in either black and white or colour from several sources including the RSGB.

The maps are also included in the RSGB *Yearbook*. (Many other national societies will have maps of their part of the world available for purchase). My advise is that readers try to study the locator map for a while and get to know where the main fields are. Next, move on to the individual squares closest to your own area. Finally, as stations are heard on the air exchanging locators, look them up on the map and – with practice – keen What Next? readers will soon get the idea of where these stations are located.

Microwave Bands

For anyone interested on operating on the higher microwave bands, where distances worked can be quite short and antennas very directional, the six-character Maidenhead Locator may not provide sufficient precision. For these purposes only, a further two digits were proposed a few years. This seems to work well for those that need the extra precision. However, unless operations on bands from 10GHz and above is likely, it is unlikely that many readers will need to use the extra precision, although some computer programs include the facility to use these eight-character locators.

That's it for this time! I look forward to chatting to you next month. ●

Table 3
The fifth Character of Locator for stations located in British Isles from Greenwich 0° meridian

West		Character	East	
from	to		from	to
1° 55'	2° 00'	A	0° 00'	0° 05'
1° 50'	1° 55'	B	0° 05'	0° 10'
1° 45'	1° 50'	C	0° 10'	0° 15'
1° 40'	1° 45'	D	0° 15'	0° 20'
1° 35'	1° 40'	E	0° 20'	0° 25'
1° 30'	1° 35'	F	0° 25'	0° 30'
1° 25'	1° 30'	G	0° 30'	0° 35'
1° 20'	1° 25'	H	0° 35'	0° 40'
1° 15'	1° 20'	I	0° 40'	0° 45'
1° 10'	1° 15'	J	0° 45'	0° 50'
1° 05'	1° 10'	K	0° 50'	0° 55'
1° 00'	1° 05'	L	0° 55'	1° 00'
0° 55'	1° 00'	M	1° 00'	1° 05'
0° 50'	0° 55'	N	1° 5'	1° 10'
0° 45'	0° 50'	O	1° 10'	1° 15'
0° 40'	0° 45'	P	1° 15'	1° 20'
0° 35'	0° 40'	Q	1° 20'	1° 25'
0° 30'	0° 35'	R	1° 25'	1° 30'
0° 25'	0° 30'	S	1° 30'	1° 35'
0° 20'	0° 25'	T	1° 35'	1° 40'
0° 15'	0° 20'	U	1° 40'	1° 45'
0° 10'	0° 15'	V	1° 45'	1° 50'
0° 05'	0° 10'	W	1° 50'	1° 55'
0° 00'	0° 05'	X	1° 55'	2° 00'

Table 3. Use this table and your latitude and longitude to find the fifth character of your location's six-character Maidenhead locator.

Table 4. Use this table and your latitude and longitude to find the sixth character of your location's six-character Maidenhead locator.

Table 4
The sixth character of Locator for stations located in British Isles

Latitude (°N) Minutes	Character
0 to 2.5	A
2.5 to 5	B
5 to 7.5	C
7.5 to 10	D
10 to 12.5	E
12.5 to 15	F
15 to 17.5	G
17.5 to 20	H
20 to 22.5	I
22.5 to 25	J
25 to 27.5	K
27.5 to 30	L
30 to 32.5	M
32.5 to 35	N
35 to 37.5	O
37.5 to 40	P
40 to 42.5	Q
42.5 to 45	R
45 to 47.5	S
47.5 to 50	T
50 to 52.5	U
52.5 to 55	V
55 to 57.5	W
57.5 to 60	X

Colin's waiting to hear from You!

I like to solve problems with anything to do with Amateur Radio! I can answer questions and publish my findings here for the benefit of all *PW* readers.

Remember the mains supply is potentially lethal. Unless you really know what you are doing, always pull the mains plug out, do not just switch off at the wall socket, when working on equipment.

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David Butler's

vhf dxer

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

This month David Butler G4ASR takes a look at recent band conditions and has a report of a very low power Moon-bounce contact.

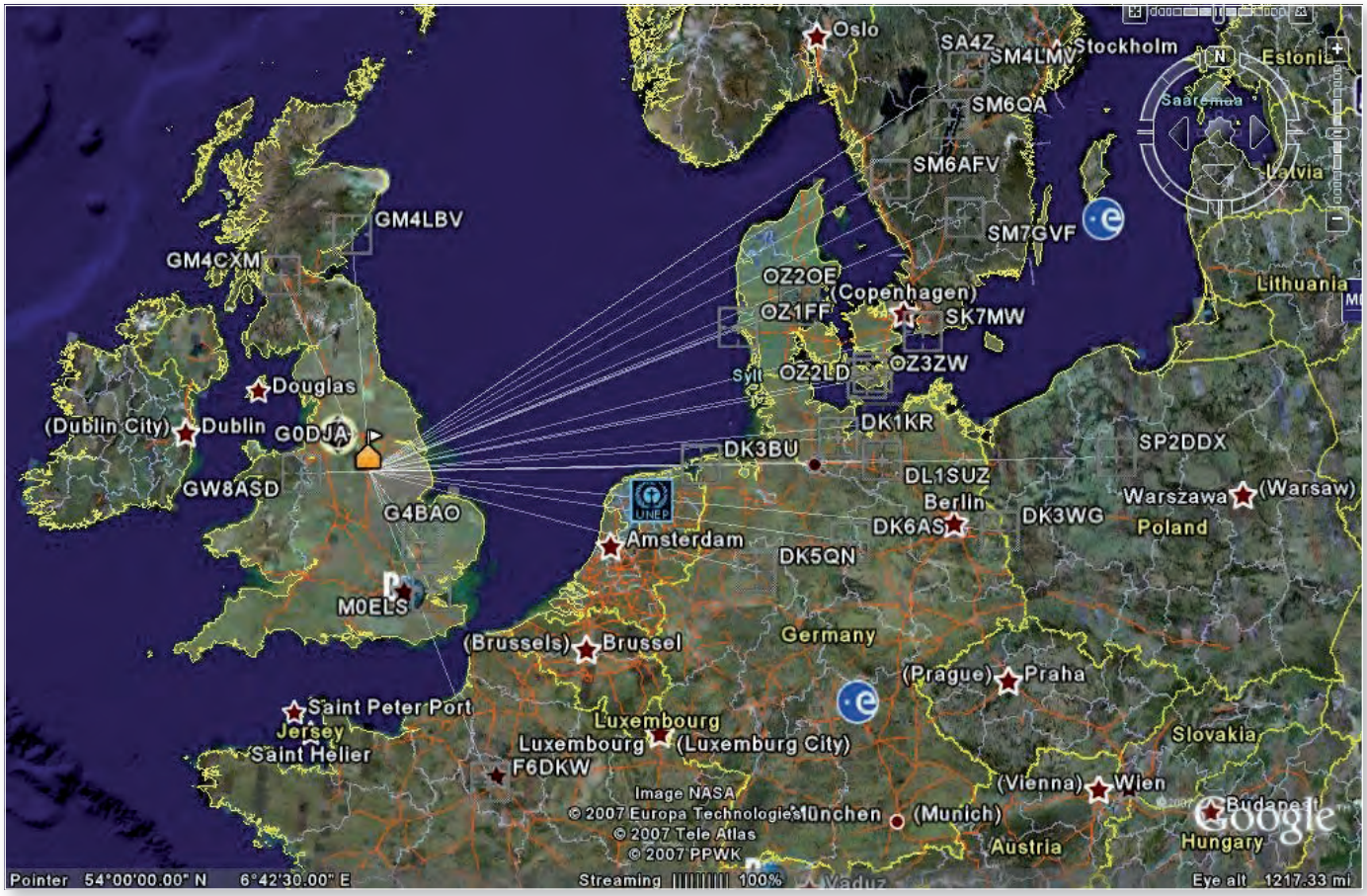
Propagation on the v.h.f. bands during January was predictably quiet. The peak in the winter Sporadic-E (Sp-E season was still evident with 50MHz openings being reported during six days of the period, two of which reached the 70MHz band. Tropospheric propagation on the 144MHz band was quite uninspiring apart from a five-day period at the end of January that ended with an evening opening into Austria, Switzerland, Poland and the Czech Republic. And there's a report of a low power Moon-bounce contact.

Sporadic-E Propagation

During the winter solstice period there is always a small increase in Sp-E propagation. A total of five Sp-E openings were reported on the 50MHz band during December and a further six events were reported on 5th, 11th, 13th, 15th, 16th & 27th January. Most of these were quite brief although they did provide DX contacts with stations in Ceuta (EA9IB), Italy, Morocco (CN8KD), Portugal, San Marino (T77EB), Sardinia (IS0GQX) and Spain.

An event on 15th January started around 1730UTC lasting for over three hours before fading out around 2150UTC. Stations located in Northern Ireland (IO74), Wales (IO83) and all the way down to the south coast of England (IO90) reported making QSOs into central and southern Europe. Contacts were made using c.w. and s.s.b. in the lower part of the band between 50.097 to 50.175MHz with stations situated in Austria (OE), Croatia (9A), Czech Republic (OK), Germany (DL), Hungary (HA), Italy (I), Poland (SP), Serbia (YU), Slovakia (OM), Slovenia (S5) and Switzerland (HB9).

During the opening on 15th January the maximum usable frequency (m.u.f.) extended up to the 70MHz band with contacts being made into Slovenia. The station of **Ivan Dobnik S51DI** (JN76) reports that the band was open at his QTH between 1844-1927UTC and that contacts were made with G6CRV (Lancashire IO84) and G7RAU (Isle of Wight IO90) on 70.200MHz s.s.b., G3VYF (Essex JO01) on 70.202MHz c.w. and G0BHD (Shropshire IO82) on 70.450MHz f.m. The Irish station EI7IX (Co. Mayo IO53) was also contacted



All the QSOs made by G0DJA on 1.3GHz, the screen was created from within Ham Radio Deluxe which called up the appropriate area on Google Earth.

(Reproduced courtesy of Google Earth).

The impressive array of Sam Sam Dubovtsev RN6BN with 64 combined 15-element Yagi antennas for 144MHz e.m.e. working. This is, as you might expect, the world's largest array for e.m.e. work on 144MHz.

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by using f.m. telephony, a mode that works really well on this band.

Another good Sp-E opening was reported between 1525-1710UTC on January 27 with 50MHz stations as far apart as MM0AMW (Argyll IO75) in the north, to MU0FAL (Guernsey IN89) in the south, getting in on the DX action. Contacts were reported between 50.095 to 50.163MHz with stations in Croatia, Germany, Italy, Portugal, Slovenia and Spain.

Tropospheric Propagation

During the five day period 17th to 21st December 2007 many UK amateurs experienced some excellent tropospheric propagation conditions on the v.h.f. and u.h.f. bands. The tropo lift was particularly favourable in the North of England and along the East coast of Scotland with stations on the 144MHz band working into DL, ES, EW, F, HB9, LA, LY, OH, OH0, OK, ON, OZ, PA, SM, SP, UA, UA2, UR and YL.

Ron Adam GM4ILS (Morayshire IO87) mentions that he was active on both the 144MHz and 430MHz bands with equal success. He operated mainly on c.w. making 51 contacts on the 144MHz band with stations in Denmark, Norway, Sweden, Belgium, Netherland, Germany, Czech Republic, Poland and Kaliningrad. His furthest distance contacts on the 144MHz band included the stations of UA2FL (KO04) 1498km, RA2FF (KO04) 1501km and SO5AS (KO02) at 1607km.

On the 430MHz band Ron used a Kenwood TS2000 transceiver and a 21-element F9FT Yagi to make 29 contacts with stations in DL, OK, OZ, PA, SM & SP. His contacts included the u.h.f. stations of SP1FJZ (JO84), SP1MVG (JO73), SP1NQN (JO81), SP1O (JO73), SP2IPK (JO93), SP6IWQ (JO80) and SP5WCK (KO12) over a path of 1715km.

Dave Ackrill G0DJA (Derbyshire IO93) reports that he was active on the 1.3GHz band during the December opening. Running only 10W into an array of 4 x 23-element Yagis he made c.w. QSOs with the stations of OZ1FF, OZ2LD, OZ2OE, OZ3ZW, OZ9KY, SM4LMV, SM6AFV, SM6QA, SA7Z, SK7MW, SM7GEP and SM7GVF. His best DX of the opening was with the station of SP2DDX over a 1268km path. The diagram in **Fig. 1** shows his 1.3GHz contacts. It was created from his log book contained within the *Ham Radio Deluxe* software program and a screen grab produced with *Google Earth* that was also launched from the same program.

Ray James GM4CXM (Dunbartonshire IO75) is also active on the 1.3GHz band and you can see his antennas and shack on You Tube (**http://www.youtube.com**) by searching for the GM4CXM callsign. During the period 17th to 21st December he made 36 c.w. and s.s.b. contacts with operators in Germany, Netherlands, Denmark, Sweden and Poland. His longest distance contacts were made with the 1.3GHz stations of DL6ABC (JO62) at 1204km, DL7YC (JO62) 1213km, DK3WG (JO72) 1294km, SM7LCB (JO86) 1296km, SM1HOW (JO97) 1407km and SP4MPB (KO03) for best DX of the opening at 1613km.

It wasn't just the UK that enjoyed excellent tropo propagation during December, in two spectacular openings on the 144MHz band a new Australia to New Zealand record was also set. On 29th December the station of VK4DMC running 200W into an 11-element Yagi worked ZL1CN at a distance of 3549 kilometres. Then on 9th January there was an opening from VK5 to ZL that resulted in several contacts, the best being between the stations of VK5BC and ZL1TWR over a distance of 3482km.

Tropospheric propagation in the UK during January was quite flat for much of the time apart from the 5-day period 24th to 28th January that ended with an opening into HB9, OE, OK and SP. Some of the stations worked on the 144MHz band included HB9QQ (JN47), OE5MPL (JN78), OK1FPR (JO80), OK1TEH (JO70), OK2POI (JN99), OK2ZAW (JN79) and SP6IWQ (JO80).

Low Power Moonbounce

Angus Young M0IKB (North Yorkshire IO94) reports that he recently made an Earth-Moon-Earth (e.m.e.) contact with the 144MHz station of KB8RQ in Ohio, USA. Nothing particularly unusual about that other than Angus was only using 25W into a 7-element Yagi located in his loft under a red pantile roof! The contact made at 2211UTC on 13th January was accomplished as the Moon was setting and passing through the vertical beamwidth of his 7-element Yagi. In practice the loft-mounted antenna detects e.m.e. signals when the Moon is between 5–15° above the horizon giving around an hour in which to make an e.m.e. contact.

Angus' 7-element Yagi was designed using the free WA7RAI *Quickyagi* modelling software obtainable at **http://www.raibeam.com**. Although it is quite an old DOS-based program it is user friendly, highly accurate and loaded with many features such as auto design and optimise, gain, v.s.w.r. and polar plots. The antenna will never be used outside it's constructed from quite flimsy material. The boom is made

from 22mm p.v.c. pipe, the parasitic elements are 6mm aluminium tube and the driven element is 8mm tubing, all bought from a local building supplies store for the under £20.

To stop the boom from bending under gravity, a length of non conductive cord is passed down through the boom then tied back up to the mast in the middle. To keep power losses to an absolute minimum a 10m length of Andrew LDF4-50 Heliax coaxial cable is used to bring signals down into the shack located below the attic.

A lightweight rotator, bought off eBay for £30, is used to turn this and other Yagis located in the loft. Actually Angus has gone a little overboard in this respect in that he also has a 3-element Yagi for 50MHz, a 6-element vertical Yagi for 144MHz f.m., two vertically stacked 15-element Yagis for 430MHz s.s.b. and two horizontally stacked 14-element Yagis for 430MHz f.m. usage. Then, if they weren't enough, there are a pair of 29-element Yagis for the 1296MHz band. So although it's very crowded in the attic he has no problems with the neighbours and he sleeps very well when the wind blows hard.

The only downside to the setup in the loft, is possible attenuation caused by the roof tiling although Angus seems to think his tropo performance on the 144MHz and 430MHz bands is very similar to an outside antenna. He suspects that it is greatly reduced on the 1296MHz band but even so, he has made contacts over 400km on that band running 1W output from his transverter. If anyone knows the attenuation of red pantile tiles at these frequencies Angus would be very interested. I suspect that it's higher in wet weather than in dry conditions!

The 144MHz station at M0IKB consists of a Yaesu FT817 transceiver with 5W output, driving into a Microwave Modules linear amplifier delivering 25W into the home-made antenna. The modulation system employed for the QSO with KB8RQ was JT65B which is a part of the WSJT computer program designed for weak-signal v.h.f. communications. In addition to contacting the station in Ohio Angus reports that he has also worked the 144MHz station of RN6BN and decoded signals from K1JT, SM5CFS, S52LM, W5UN and YU7AA.

Angus has also been using FSK441 to make meteor scatter contacts on the 144MHz band with stations such as HA5LV (Hungary), IW3HRT (Italy), OK2PMS (Czech Republic), SP6RGB (Poland), S54T (Slovenia), YU7EW (Serbia), 1A0KM (via Sp-E) and 9A1CCY (Croatia). The success of making these contacts and the 750,000 kilometre trip to the Moon and back with only 25W and an indoor 7-element Yagi is really tremendous and he's to be congratulated on his DX achievements.

Down To Earth

But now down to Earth! In reality hundreds of *JT65B* QSOs via the Moon are being made by stations running around 100W to a single long boom Yagi and contacts have been made with as little as 5W output. So how is this possible? There are two main reasons for this. The first is the use of *JT65B* for e.m.e. communications instead of using Morse code. This state of the art digital signal processing technique enables contacts to be made with signals that are more than 15dB weaker than those needed for conventional c.w. and in many instances are totally inaudible in the noise.

In simplistic terms it means that your station sensitivity has been increased by at least 15dB, the equivalent, for example, of changing from a single Yagi antenna system over to a 32-Yagi antenna system! Each time a Yagi system is doubled the original gain increases by 3dB so by doubling the antenna system 5 times (5 x 3dB) the overall gain is increased by 15dB. Conversely it could also mean that if you needed 800W of c.w. to contact a particular station via the Moon then it is possible to work them using only 25W in *JT65B* mode.

The second reason why it's possible to make low power e.m.e. contacts is by taking advantage of the antenna gain at some of the World's largest e.m.e. stations. The 144MHz station of KB8RQ **http://www.spasalon.com/kb8rq** uses a 312-element array consisting of 24x13-element Yagis, each antenna boom being 13m long. The station at **W5UN http://web.wt.net/~w5un** is slightly larger with a 544-element array consisting of 32x17-element Yagis. At one time W5UN had an array of 48 x 17-element Yagis but even that doesn't come close to the World's largest 144MHz e.m.e. station. That privilege belongs to **Sam Dubovtsev RN6BN http://www73.ru** who runs a massive 64-Yagi array, each antenna consisting of 15-elements in the vertical plane and 15-elements in the horizontal plane. You can see his 1920-element 144MHz system in the photograph, **Fig. 2**. With this antenna system he can work any 144MHz station running as low as 5W into a simple small Yagi antenna.

So forget all you've read in the past that only large c.w. stations with a four Yagi antenna array and a kilowatt amplifier were capable of working via the Earth-Moon-Earth path. Nowadays thanks to the JT65B digital mode provided by the *WSJT* program, any station having a 144MHz s.s.b. transceiver capable of delivering 50W, or more, and a directional antenna can make many successful e.m.e. contacts. And furthermore, no c.w. knowledge is required! In order to make an e.m.e. contact the most important requirement is that both stations can see the Moon simultaneously.

If you have a typical Yagi antenna the chances are that you are not capable of elevating it, but you can still make e.m.e. contacts when the moon is near the horizon. A single Yagi antenna pointing at the horizon will see the Moon up to 18° or so above the horizon. If you have a clear take off towards your moonrise and moonset this means about three hours (two 90min periods) of possible operation every day when the moon is visible. So why not follow the example set by M0IKB and start working some real DX on the 144MHz band.

Deadlines

That's it for this month. Tropospheric propagation during March is normally quite subdued and the best of any openings will be towards France and Spain. There will be little if any ionospheric propagation on the 50MHz and 70MHz bands. It won't be until May that these bands will start coming alive again. Please send reports or any news to me before the last Saturday of each month.

73 David G4ASR

Carl Mason's

hf highlights

Share your news, views and reports with fellow readers. Reports to Carl by the 15th of each month please.

It seems the UK isn't the only country to be suffering higher postal rates as Canada's International postal rates went up on 14th January this year. The new rate to Europe will be Ca$1.60 and covers items up to 30g in total weight. Sales tax is also charged by the Canadian Post Office on their stamps which means at the current rate of exchange, $1 is now not enough to send for a QSL card – so please bear this in mind if you send for any cards direct.

Most Wanteds

The *DX Magazine's* **www.dxpub.com** has published the results of its annual 'Most Wanted' survey and the top ten DXCC entities this year include North Korea, Yemen, Navassa Island, Glorioso Islands, Bouvet Island, Marion Island, Desecheo Island, Scarborough Reef, Crozet and Heard Island.

The results of previous years surveys are available for comparison at **www.dxpub.com/dx_news.html** A full breakdown by continents was published in the January/February 2008 issue of The *DX Magazine* and a full breakdown by mode will be published by the time you read this column in the April '08 issue of *PW*.

The DX News

On to this month's DX news now and to Aruba SA-036, a 34km (21 mile) long island of the Lesser Antilles in the southern Caribbean Sea. This is where **Garry Fisher K9WZB** and his wife **Sharon K7WZB** will be operating as **P40ZB** until the 24th April. They plan to operate both s.s.b. and c.w. with some RTTY on 7, 14, 18, 21 and 28MHz when time allows. If you work them you can QSL direct to **3628 Tarpon Drive, Lake Havasu City, AZ 86406, USA**.

American operator **Reidar Larsen K2PT** has obtained the callsign **YI9PT** and will begin operating from Iraq initially on 14 and 18MHz using a wire antenna until a SteppIR yagi arrives. Once fully operational, activity will be on all the h.f. bands. At this time a support team is trying to raise funds to obtain an amplifier for him. Further information and updates and logs can be found at the **Stafford DX Association's** website **www.stafford-dx-association.org** and the QSL route is via **Samuel Harrel N4XP, 2737 Shoal Creek Road, Monroe GA 30656, USA**. Take a look at the Steppir website **http://steppir.com/oldindex.htm** there you'll find a photo gallery that has some very impressive antennas in it.

Active from the Argentinian base 'Orcadas' LU1ZA on Laurie Island, part of the South Orkneys AN-008, will be operator **Raul** who can be found on the Antarctic DX Net between 2300 and 0200UTC 7093kHz ±QRM. The QSL route is via **Horacio (Henry) Ledo LU4DXU, POB 22, Martinez (1640) - Bs.As., Argentina** and it is requested you do not use IRCs as there are problems changing them!

On 1st January 2008 the official currency of the Republic of Cyprus changed, from the Cyprus Pound to the Euro. To celebrate this event, members of the Pafos District of the **Cyprus Amateur Radio Society** will use the call **C4EURO** throughout 2008 and you can expect the call to be active on most h.f. bands using s.s.b., c.w. and digital modes. QSL is via **George Beasley 5B4AGC, POB 61344, Paphos, Cyprus**.

Other Special Calls

There are also some other special calls to look out for and all will run until the end of the year. The first of these is **HG550REX** which will be aired by members of radio clubs HA5KKC in Budapest and HA8KVK in Janoshalma until 31st December. The call celebrates the 550th Anniversary of the accession of King Matthias Corvinus, the most popular Hungarian sovereign.

Matthias Corvinus (Matthias the Just) lived from 23rd February 1443, until 6th April 1490 and ruled Hungary in the years between 1458 and 1490. He was crowned King of Bohemia in 1469 and ruled Moravia, Silesia and Lusatia and later he became Duke of Austria in 1486. QSL cards will be available via the bureau

Leyton Smart GW0LBI's shack when he's operating in the 'wee small hours'.

Celebrating the 160th anniversary of the 1848/9 Hungarian Revolution against the Habsburg Empire.

Carl Mason GW0VSW
2, Golwg-y-Bryn,
Woodland Road,
Skewen,
Neath Port Talbot,
SA10 6SP
Tel: 01792 501176
E-Mail: gw0vsw@btinternet.com

or direct to **Vincze Istvan, Lencz u.8, Debrecen, Hungary**.

Also in Hungary is **Zoltan Borbely HA3HK** who will operate as **HG1848I** until the end of December to commemorate the 160th anniversary of the1848-49 Hungarian Revolution, one of many revolutions in the Habsburg areas that year. The revolutions grew into a war for independence from Habsburg rule. Many of its leaders and participants included men like Lajos Kossuth, István Széchenyi, Sándor Pet'fi and Józef Bem who are amongst the most respected national figures in Hungarian History and the anniversary of the revolution's outbreak on March 15th is one of Hungary's three national holidays.

A QSL Card is available 'direct only' to Zoltan at **Rakoczi 31, POB 76, H-8700 Marcali, Hungary**. A colourful laminated award will be available to licensed Amateurs and short wave listeners who contact, or hear, three two-way QSOs or two QSOs for DX stations, with HG1848I on different bands or different modes and the award requires just a log extract and the fee of five Euro, five IRCs or $7 to HA3HK.

In Belgium the very special callsign **ON1000NOTGER** will be aired on all h.f. bands throughout the year by the UBA Section LGE to commemorate the 1000th anniversary of the death of Notger in 980 and who became the first prince-bishop and founder of the Principality of Liege. The QSL routes are via the bureau to **ON5VL** or direct to **Paul Delmelle ON6DP, Grand Route 58, Neupre B-4122, Belgium**.

Six Specials

Finally, six special callsigns will be aired from Blekinge, Skane (Scania) and Halland in southern Sweden at various times throughout 2008 to celebrate the 350th anniversary of the Treaty of Roskilde when these former Danish provinces were ceded to Sweden on 26th February 1658.

An award is available to both amateurs and listeners and you can expect activity from SB1658OZ (QSL via SK7JC), SC1658OZ (QSL via SK7BQ), SH1658DK (QSL via SK6JX), SH1658OZ (QSL via SK6KY), SK1658DK (QSL via SK7CE) and SK1658OZ (QSL via SK7BQ) on most h.f. bands.

Further information on these calls and operating times and details of the 'Roskilde 1658 Award' sponsored by **Kristianstads Radioamatorer (SK7BQ)** can be found at **www.sk7bq.com/roskilde/index.php**

Your Reports

On to your reports now and it's the log of **Leighton Smart GW0LBI** in Trelewis, Mid Glamorgan that starts us off. Using his Yaesu FT-100 5W c.w. into a 21m long wire antenna Leighton logged LX200ZL (Luxembourg), DL7UCW (Germany), ES2QT (Estonia), HB0/DL2OBO (Lichtenstein), YL7X (Latvia) and ZB2FK (Gibraltar). A change of power led to 100W QSO's with NP4A (Puerto Rico) for a new country on the band, TA3D (Turkey), CU1CB (Azores Island) EU-003 and TF3CW (Iceland) EU-021 between 2000 and 0030UTC.

Dropping to 3.5MHz and using a Trio R-600 receiver, yielded ZL3SV (New Zealand), KD2RD (USA) in Beverly, West Virginia, VP2VW (British Virgin Islands) NA-023 between 0800 and 0855 followed later by ZD7X (St Helena) AF-022 operated by Tom Callas who is leaving the island in June at 2338UTC.

Eric Masters G0KRT, in Worcester Park Surrey, was also on 3.5MHz and using his Yaesu FT-817 at just under five watts c.w. into a modified W3EDP antenna 25.5m long and tuned via an SGC211 auto tuner for two way QRP contacts with DF2HL/P (Germany) 0802, ON8STEG (Belgium) 0808, F8ALX (France) 1726, SP9DUX (Poland) 2010 and OK1WF (Czech Republic) at 2255UTC.

The 7, 10 & 14MHz Bands

On to the log of new reporter **Steve Pursey M3SXA** in Greenford, Middlesex who has discovered BPSK31, 63 and 125 after a year of operating on the h.f. bands and has made just over 100 contacts using this mode to date. His station includes an Icom IC-706MKIIG and SGC-230 tuner and his computer uses *Mixw* software with a Signalink USB interface. Contacts on the 7MHz band, included LA5AKA (Norway) 1331, OK2PKY (Czech Republic) 1415, DG2GAW (Germany) 1516, IK1AWJ (Italy) 1540, F8BUO (France) 1443, RW3DQC (European Russia) 1453, SP3AXJ/3 (Poland) 1548, S51AY (Slovenia) 1616, YU7NW (Serbia) 1620, OE9PKV (Austria) 1649, EA3ANE (Spain) 1626 and EA6OI (Balearic Islands) EU-004 at 1709UTC. On 10MHz Steve made two contacts one with SA7AKE (Sweden) 1331 and DL6DWT (Germany) at 1355UTC while on 14MHz UN9M (Kazakhstan) made the log at 1313UTC

Martyn Medcalf M3VAM in Chelmsford, Essex used his Icom IC-746, SGC-237 auto tuner and half-size G5RV once again and worked s.s.b. stations HG1S (Hungary) 0913, DA1A (Germany) 0953, T70A (San Marino) 1515, SX7W (Greece) at 1833, a special call for a Field Day Contest operating from Nigrita's Alpine Club Mountain Shelter at nearly 1700 feet asl. OM5DP (Slovak republic) 1857, VE3AT (Canada) in Islington, Ontario at 2212 and DJ8OG (Germany) followed at 2234UTC.

Using c.w. again was Eric G0KRT who listed IS0SDX (Sardinia) 1033, OF7QR (Finland) 1143 and HG9DUX

(Hungary) at 1249UTC amongst his contacts and all were two-way QRP.

THE 21MHz BAND

Finally on 21MHz Martyn logged s.s.b. calls IS0/K7QB (Sardinia) EU-024 at 1518, AO3K (Spain), the Contest CALL of EA3GHZ for major contests at 1536, HB9BLQ (Switzerland) 1546, T93J (Bosnia - Herzegovina) at 1713 QSL via T98U or OE1EMS and OE7AJT (Austria) at 1744UTC.

Signing Off

Well, that's about it for another month and thanks go to all our reporters for their logbooks. There is just enough space to mention the successful operation by *PW* reader **Geoff Pendrick M5GAC** who lives in Spondon, near Derby. Geoff is recovering from a spell in hospital at the moment but says his DXpedition, operating the Special Event Callsign **GB5BBS**, from Whiting Bay on the Isle of Arran EU-123, on behalf of **Broadway Baptist Scouts, 135th Derby Scouts and the Scouts on the Isle of Arran** mentioned in this column last July was a great success. The DXpedition made well over 400 contacts with 23 countries and a QSL card is still available if you worked this special event via his home call. Get well soon Geoff!

As you can see at the top of the column I have a new address, phone number and E-mail so please use these from now on if you wish to contact me or send in reports etc. Thanks also go to **Mauro Pregliasco I1JQJ/KB2TJM** editor of the *425 DX Newsletter* for the DX information. Until next time I wish you all good DX.

73, Carl GW0VSW

As usual, information, reports and photographs to me please by the 15th of each month please.

Graham Hankin's

in vision

This month Graham Hankins G8EMX, looks at the Caradon Hill ATV repeater, but first the next general meeting!

It's Biennial General Meeting (BGM) year again! The British Amateur Television Club is due to hold its BGM and Amateur Television Rally (that's why we just call it the BATC BGM) some time in 2008 and to speed up the process this time, 'yours truly' G8EMX has volunteered to organise it. The BGM in 2006 became substantially delayed while the club anxiously looked for both an organiser and a venue.

Eventually, like buses, both came together – BATC chairman **Trevor Brown G8CJS** 'volunteered' to make the meeting happen and one of our members offered a village hall. So, the lesson was - start early. Just before Christmas Trevor reminded the BATC committee that 'bienniel' means 'every two years' so I put my hand up: "Please sir, I'll do it"! Perhaps the best lesson is 'take more water with it' hi!

First step to organising a national meeting is to find a suitable place and finalise a date. The date is likely to be 'later rather than sooner' (to give me more time!) so what would be a suitable venue? For a full wish List go to the 'What's New' section of the BATC's web site **www.batc.org.uk** but the main points to note are: It should be cheap – ideally free – use of exhibition space, minimal entrance fee. It should have a separate room available for the lectures, plenty of mains power for exhibitors, accessible location by car and adequate parking, close accommodation for visitors arriving on the Satuday, basic food and drink available on site.

Working Range

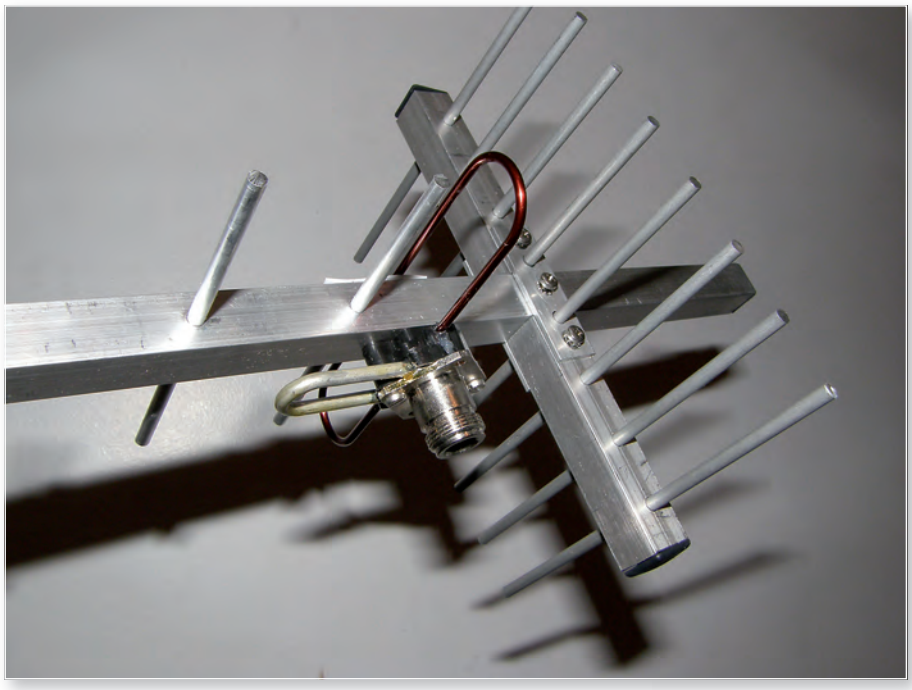
As we are an Amateur TV club, it would be good to fine a venue that would be within the working range of at least one ATV repeater. So, the RSGB 2008 *Yearbook* was consulted for callsigns and addresses of each of the ATV Repeater Keepers. Now as I understand it, the Keeper is responsible for monitoring the performance of a repeater and is the 'public contact' for anyone who wants information. So why are so many Keepers 'Particulars Withheld' in the listings?

Okay, moan over! A posted letter was sent to all contactable Keepers of 24cm and 13cm units, asking for information about their boxes, photos too, to use in these pages. The letter also asked if they knew of any good rally locations in the area. Good news, bad news. The bad news is that, several weeks later, I have had just a few replies. The good news is that one of those has suggested a possibly viable venue, which is being investigated, but I am still open to suggestions.

If many of the ATV repeater groups haven't come to me yet, then I'll go to some of them! The ATV kit was taken on a recent trip to Torquay to at least receive its 24cm repeater GB3TB and maybe work some of the local ATV stations – well, you never know your luck. Parking up on the handy high spot known as Daddyhole Plain, the antenna and rotator were mounted on the car's roof rack, receiver connected and the antenna set turning.

After a few vague, noisy images of a test card drifted across the screen, a fully locked colour picture appeared – well, I should think so too – I was only a few miles from the repeaters location! The next hour or so was spent watching the changing test pattern and occasionally calling on 144.750MHz, but no stations replied. As it was gradually becoming darker and colder (it was early February) personal comfort prevailed, but at least I had some photos to prove the expedition. Perhaps it would be good to know when the Torbay ATV group has its main activity times? Still, to quote a well-known film actor: "I'll be back"!

One of the repeater groups I have heard from, looks after GB3WV in north Devon; its keeper **Dave G1NSV** said: "Hi Graham, here's a brief life history of the 24cm ATV repeater GB3WV. The repeater was originally built by **John G4NTS** and was transferred to the west country on his move from Dorset to Ogwell near Newton Abbott. A group was formed and a site was found at North Hessary Tor Dartmoor.



The feed-point of Graham's 24cm (1.2GHz) antenna.

Out ATV repeater hunting on 1.2GHz in Torbay, Devon.

The test card received from GB3TB the Torbay ATV repeater group's station.

Graham Hankins G8EMX
84 Shirley Road
Acocks Green
Birmingham B27 7NA
E-mail: g8emx@tiscali.co.uk

Cyber Membership

Finally for now, the BATC has made some changes to its 'Cyber membership' - a somewhat weird term of membership. Cyber members pay a reduced subscription for an E-mailed version of the club's quarterly magazine 'CQ-TV'. 'Cyber' was originally introduced several years ago just for overseas members, who usually received a posted magazine several weeks after publication and at significant postal cost.

So, for those content with just an E-mailed attachment – of several megabytes incidentally – this could be sent for just £4 a year. Anyway, after many committee E-mails to and fro each day for about three weeks, 'cyber' membership at £4 is now available to anyone, which of course brings in UK members.

The BATC's web site has been changed to show the payment options more clearly, and includes the ability to use PayPal, which is a payment service now very common for on-line transactions.

See you all next time.

73 de Graham G8EMX

Share your news, views and reports with fellow ATV readers. Send your information to Graham.

Escalating Costs

But due to the escalating costs on the change-over of mast management the repeater was taken off air. **Tony M0AVP** came to the rescue with an offer of a site at Caradon Hill, in Cornwall but then emigrated to a sunnier part of the globe. So I (G1NSV) took over as repeater keeper, since I'm only about 5km from the site. The repeater is maintained by us with one or two donations of equipment by users."

Dave continues: "At the beginning of 2007 we heard that our site was being sold, however, everything turned out all right as thanks to the generosity of our new landlord **Phil Hardacre** we are able to continue under our original agreement. The antenna is an Alford slot and we have good take off all round the area as the antenna is at approx 380m above sea level (a.s.l.), we welcome users and comments and as we are ideally suited in an holiday area, any Amateur on holiday might be able to convince their wife or partner it might be worth taking a mobile system on holiday!"

The signal received from the Caradon Hill (Cornwall) ATV repeater.

TRADERS TABLE

The equipment for sale on this page is secondhand or ex-demonstration

Disclaimer

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YAESU FT 8100 ..... £195
ICOM IC F12 (PMR) £99
KENWOOD TS 850S (AT) £575
KENWOOD TR 751E £225
YAESU FT 920 ..... £599
ALINCO DJ-599 2m/70cm FM £75
TEN-TEC ARGOSY £225
6x MAXON VHF PMR C/W Charger £399

RECEIVERS

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BPL CELESTE WORLD SPACE ..... £POA
ICOM IC8500 ..... £795
HEATHKIT SW7800 0-30MHz £139
BEARCAT UBC 278 BASE EX DEM £139
BEARCAT UBC 278 BASE £90
BEARCAT UBC 780 ..... £135
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SANGEAN AT818 ..... £85
HITACHI WORLD SPACE £55
YAESU VR120D £120
GRE PSR 225 ..... £159
GRE PSR 216 ..... £75
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RADIO SHACK PRO28 ..... £55
AOR EM8200 MEMORY £35
RADIO SHACK PRO 63 ..... £75
ALINCO DJX3 ..... £70

ACCESSORIES

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PALSTAR AA30 ACTIVE ANT £45
GLOBAL AT200 ATU £49
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DAIWA PS120M PSU £35
MFJ 986 3k TUNER £185
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KENWOOD LF 30A LOW PASS FILTER £30
ICOM BC133 (2 of) Drop In Charger inc PSU .. £OFFERS

NEVADA

023-9231 3090

TRANSCEIVERS

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MMT 144/28 10W TRANSCEIVER £89
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BASE SCANNERS

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BEARCAT 9000XLT BASE SCANNING RX £145

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ACCESSORIES

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MFJ 784B DIGITAL NOISE FILTER £149
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VCI PM30 2KW POWER METER £59
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ZETAGI HP700 METER £59
ZETAGI M27 ANTENNA MATCHER £20

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BEARCAT 69XLT HANDHELD SCANNER £49
BEARCAT 92XLT HANDHELD SCANNER £89
BEARCAT 3500XLT CLOSE CALL SCANNER £129
BEARCAT 230XLT SCANNER £79
BEARCAT 72XLT CLOSE CALL SCANNER £69
BPL CELESTE WORLDSPACE/FM RADIO £29
ETON SOUND 102 DAB/FM W/iPod DOCK £99
GENUS GEO DAB/ALARM RADIO £49
GOODMANS GPS280 DAB/CD STEREO £69
ITEC CUBE DAB CLOCK RADIO £29
MAYCOM AR108 AIRBAND/MARINE H/H £54
NEVADA ND210E DAB RADIO £39
NEVADA SINFONIE DAB (BLACK) £49
NEVADA SINFONIE DAB (WHITE) £49
NEVADA SINFONIE DAB (BLUE) £49
PERSTEL DR301 DAB/FM SD SLOT £125
PERSTEL DR201 DAB/MP3 PERSONAL £39
PERSTEL DR101 PERSONAL DAB £49
PRESIDENT HARRY 80 CH CB RADIO £69
PURE TEMPUS 1XT DAB RADIO £49
YAESU VR120 AM/FM/WFM H/HELD £99

WATERS & STANTON

01702 206835

Kantronics KAM Multimode Data TNC £55
Icom PS-85 13.8V 20A (max) Matching PSU £129
SEC 1212 13.8V Switch Mode Regulated 12A (max) PSU £45
Alinco DJ-496E 70cm FM H/Held Transceiver with CTCSS, DTMF keypad, NiMH & charger £99
Mirage RC-1 Line ar Remote Control Unit for Power, Mode & Preamp with 25' of cable £29
Kantronics KAM-98 Multimode Digital Data Controller with Pactor, GTOR, AMTEXT & NMEA-0183 GPS £89
Icom IC-2100H 2m FM Mobile Transceiver 55W 113ch. + CTCSS ..£149
Alinco DJ-X7 100kHz-1300MHz AM, FM, WFM Hand Held Receiver 1000Ch + 8.33kHz step £79
Alinco DJ-491T 70cm FM H/Held Transceiver 40ch. + DTMF keypad & CTCSS £115
Uniden UBC-68XLT 66-512MHz (with gaps) FM Receiver 80Ch. 4 x AA or 12V DC £59
Uniden UBC-105XLT 25-960MHz (with gaps) AM,FM Receiver + 8.33Mhz step 100Ch. 4 x AA or 9V DC £49
SSE PSU-101 Desk Stand with 2 x 12V DC outputs 240V AC £29
Realistic Pro-43 68-999MHz (with gaps) AM,FM Hand Held Receiver 200Ch £69
Optoelectronics Digital Scout 60MHz-2.6GHz Digital Frequency Counter + Field Strength, Reactive Tuning & 1000 Memories £259
Steepletone MBR-2000 Portable FM Stereo,MW & SW Radio 20ch £14
Realistic Pro-43 68-999MHz (with gaps) AM,FM Hand Held Receiver 200Ch £69
Icom PS-85 13.8V 20A (max) Matching PSU £129
Oregon Scientific BA-312E Radio Controlled Clock with Temperature and Weather Forecast £19
Garmin GPS-II plus 12Ch. 500 Waypoints,BackTrack £79
Hora C-408 70cm FM Micro Transceiver via 2 x AA batteries (not supplied) £39
Icom IC-R10 500kHz-1300MHz All Mode Hand Held Receiver1000Ch. + RS-232 ..... £149
Icom IC-2000H 2m FM Mobile Transceiver 50W, 10W + Alphanumeric Memories £119
Garmin St.Pilot 2620 12Ch In-Car GPS Navigator + Touch Screen Colour Display, Voice Prompt, Remote & Europe Map £289
Garmin St.Pilot 2620 12Ch In-Car GPS Navigator + Touch Screen Colour Display, Voice Prompt, Remote & Europe Map £289
Uniden UBC-60XLT 66-512MHz (with gaps) FM Hand Held Receiver 80Ch. 4 x AA cells £55
Icom IC-A22E Airband Hand Held Transceiver + NAV/COM with Ni-Cd & charger £249
Icom IC-2800H 2m,70cm FM Mobile Transceiver 50W,35W Full Duplex, CTCSS, DTMF, Remote Head + 3" colour LCD & Video In..£249
Kantronics KPC-3 Single Port VHF/UHF Packet TNC £79
Maycom EM-27 Mobile CB radio £55
Icom IC-MB12 Mobile Mounting Bracket for Receivers and Transceivers R71, R7000, IC-740, R8500, IC-745 etc £20
Kenwood TH-K2E 2m FM 5W Hand Held Transceiver 100ch. Alpha tag, CTCSS and DTMF £99
Diamond SX-600 1.8-525MHz 200W SWR,PWR meter + 2 sensors..£99
Alinco EDX-2 1.6-30MHz Automatic 200W Weatherproof ATU for DX-70, DX-77 ..... £199
Yaesu PA-10A Mobile Mount and 12V Regulated Power adapter for Yaesu FT-11R, FT-41R, FT-51R £25
Yaesu AT-1000 2m FM Mil. Spec. Hand Held Transceiver 5W + Full CTCSS & DTMF memories £69
Alinco DR-605E 2m,70cm FM Mobile Transceiver 50W,35W + CTCSS £149
Tokyo HX-240 HF Transverter 3.5-28MHz with 2m IF 40W £125
Icom IC-R8500 100kHz-2GHz All Mode Communications Receiver 1000ch. 12V + PSU £899
LDG AT-1000 1.8-54MHz Automatic ATU 6-800 ohm 1000W max (100W 6m) with X-Needle Meter 12V at 1A £279
Yaesu VX-150 2m FM Mil. Spec. 5W Hand Held Transceiver + Full CTCSS & DTMF keypad £79
Yupiteru MVT-7300EU 521kHz-1320MHz All Mode Hand Held Receiver 1000Ch. + 8.33kHz step £139
Icom IC-756pro HF + 6m All Mode Base Transceiver + ATU, DSP & Gen.Cov. 12V £999
Radio Shack Pro-528 25-1300MHz (with gaps) AM,FM Hand Held Receiver + Trunk Traking 1000Ch.Alpha & PC input £69
Garmin GPS-12XL Hand held 12Ch. GPS with 500 Waypoints, BackTrack + Mag Mount Ant, Case & DC lead £50
Optoelectronics M-1 10Hz-2.4GHz Frequency Counter + AC Adapter £119
Icom IC-R10 500kHz-1300MHz All Mode Hand Held Receiver 1000Ch. + RS-232 ..... £149
Watson W-10SM 12V 10A (max) Switch-Mode PSU £35
Yupiteru MVT-9000 MkII 0.5-2039MHz All Mode Hand Held Receiver 1000Ch. + voice inverter £179
Icom IC-R8500 100kHz-2GHz All Mode Communications Receiver 1000ch. 12V + PSU £899
Yupiteru MVT-7300EU 521kHz-1320MHz All Mode Hand Held Receiver 1000Ch. + 8.33kHz step £139
Kenwood TH-K2ET 2m FM 5W Hand Held Transceiver 100ch. Alpha tag, CTCSS and DTMF Keypad + KSC-24 ..... £129
Alinco DJ-G5E 2m/70cm FM Transceiver + Wide RX, DTMF keypad & CTCSS £129
Yaesu FC-30 1.8-30,50-54MHz Auto ATU for FT-897 100W 17-150ohm £179
Uniden UBC-785XLT 25-1300MHz AM, FM, WFM Desk/Mobile Receiver 1000Ch. 12V + psu £129
Jesan SWR-25 HF PWR/SWR meter 10W £9

WATERS & STANTON

01702 206835

Zetagi V2 2-Way Antenna Switch £9
Trident TRX-200 100kHz-2149MHz All Mode Hand Held Receiver + Bandscope 1000ch. £129
SGC SG-235 1.8-30MHz Microprocessor controled ATU 500W with SmartLock pro Controller £499
Yaesu FC-30 1.8-30,50-54MHz Auto ATU for FT-897 100W 17-150ohm £179
Yaesu FC-30 1.8-30,50-54MHz Auto ATU for FT-897 100W 17-150ohm £179
MFJ MFJ-993RC Remote Control Unit for MFJ-993 Auto Tuner £25
MFJ MFJ-1026 All Mode QRM Eliminator with Active Antenna £115
M.Modules MML144/30-LS 2m 1-3W in, 30W out Linear with Preamp £69
Watson WM-S-RW Mobile Boom Microphone + Control Box with cable for Yaesu Modular £25
President LINC-10 10m "Lincoln" All Mode Transceiver 10W (20W SSB) 12V £129
Sony NV-U70T GPS Navigation System + Europe Map Database, Touch Screen, Traffic Info, 1GB memory £199
Intek M-110 Plus 40ch 4w CEPT CB AM/FM Mobile Transceiver £25
Icom IC-F25SR PMR-446 Hand Held Transceiver 16 memories + Scan £79
Heil SM-1 Shock Mount Assembly for 1" Mics £25
AOR AR-8000 500kHz-1300MHz All Mode Hand Held Receiver 1000Ch £149
Palstar R-30 1KHz-30MHz AM, SSB Communications Receiver £379
Icom IC-R71E 100kHz-30MHz All Mode communications Receiver Mains £299
Realistic Pro-2006 25-520,760-1300MHz AM, FM, WFM Base Scanner 400Ch. Mains or 12V DC £119
Hi-Mound Manipulator Morse Paddle Key £39
Radio Shack DX-394 150kHz-30MHz AM,CW,SSB Receiver 160Ch. Mains/12V £99
Alinco EDX-2 1.6-30MHz Automatic 200W Weatherproof ATU for DX-70, DX-77 ..... £199
Kenwood TM-G707E 2m,70cm FM Mobile Transceiver 50W,35W + Full CTCSS & Remote Head feature £149
AOR AR7030 0-32MHz All Mode Communications Receiver 12V + PSU £449
MFJ MFJ-260CN DC-650MHz 300W max Dummy Load with N Type Connector £29
Yeasu FT-920AF HF,6m All Mode Base Transceiver + Auto ATU, Gen.Cov. FM option & AM Filter 100W 12V £749
Yaesu VR-500 100kHz-1300MHz All Mode Hand Held Receiver 1000Ch.Alpha £119
Yaesu FT-2800M 2m FM Mobile Transceiver 65W + CTCSS & DTMF mic £99
Alinco DR-130 2m Mobile Transceiver 35W, 20Memories + DTMF mic £79
Uniden UBC-780XLT 25-1300MHz AM, FM, WFM Desk/Mobile Receiver + Trunk Tracking 500Ch. 12V + psu £149
Yaesu VR-5000 100kHz-2600MHz All Mode Receiver with Spectrum Scope 2000Ch. 12V £359
Alinco DJ-X2000 100kHz-2150MHz All Mode Hand Held Receiver + CTCSS, Alpha 2000Ch. £189
Tokyo HX-650 6m 50MHz Transverter with 28MHz IF 50W £149
Daiwa PS-304 II 13.8V Variable 30A PSU with A/V meter £79
MFJ MFJ-956 Shortwave Preselector £39
Alinco DJ-X3E 100kHz-1300MHz AM, FM, WFM Hand Held Receiver 700Ch + 8.33kHz step £69
MFJ MFJ-202B 1-100MHz Receive Noise Bridge £45
MFJ MFJ-212 Antenna Matchmaker to Tune Antennas without Transmitting £59
Diamond SX-200 1.8-200MHZ SWR,PWR meter 200W £49
AOR AR-8200 530kHz-2040MHz All Mode Hand Held Receiver 1000Ch.+ Accessory Card Socket £199
AOR AR-8200 III 530kHz-3GHz All Mode Hand Held Receiver 1000Ch. Alphanumeric £259
Icom IC-R72E 100kHz-30MHz AM,CW,SSB Base Communications Receiver mains or 12V £299
Kenwood TS-870S HF All Mode Base Transceiver with Gen. Cov. + ATU & DSP in the IF, 100W 12V £899
Kenwood TS-570DG HF All Mode Base Transceiver with Gen. Cov. + ATU & DSP filter 100W 12V £599
Yaesu FT-290R II 2m All Mode Portable Transceiver 2.5W 12V or 9 x C cells £169
Microset SR-200 2m 8-50W in,200W out all mode + GaAsFET Pre-amp £199
Nissei RS-502 1.8-525MHz SWR/PWR meter 5/20/200W £49
Kenwood TS-50S HF Mobile/Base All Mode Transceiver with Gen.Cov.RX 100W 12V £329
MFJ MFJ-945E 1.8-30MHz Mobile ATU + meter 300W with Mobile Bracket £69
Alinco DJ-X10 100kHz-2000MHz All Mode Hand Held Receiver 1200Ch £129
Alinco DJ-V5 2m/70cm FM Palm Transceiver 5W + wide RX £139
Kenwood TM-271E 2m FM Mobile Transceiver 50W + CTCSS £119
Maldol Aerial and Clamp (simular to Diamond) £32
Yaesu FT-920 HF,6m All Mode Base Transceiver with Gen.Cov. 100W 12v £749
Kenwood TS-2000X HF,6m,2m,70cm & 23cm All Mode Transceiver + Auto ATU & DSP £1,299
Kenwood MC-60A Electret Desk Mic with Preamp, Dual Impedence £89
Icom IC-R72E 100kHz-30MHz AM,CW,SSB Base Communications Receiver mains or 12V £299
Kenwood TS-870S HF All Mode Base Transceiver with Gen. Cov. + ATU & DSP in the IF, 100W 12V £899

RADIOWORLD

01922 414796

Yaesu FT DX9000 D Transceiver £5495
Tentec Orion II HF transceiver with ATU £2795
Yaesu VL-1000 QUADRA 1kW HF + 6m Linear Amplifier £2499
IC-756PRO-MKIII Icom HF + 6m Trx £1599
Yaesu FT-2000 IN STOCK 100W with internal power supply £1550
Icom IC-775DSP HF Base Transceiver £1499
Yaesu FT-1000 "CLASSIC" HF Transceiver £1399
Yaesu FT-1000MK V 200w £1299
Yaesu FT-1000MP Mark -V Field £1199
OptoElectronics X Sweeper £1199
DISCOVERY-70 Linear Amp UK 700W 70cm Linear Amplifier £1100
NEUMANN U 87 Ai condenser microphone £1100
Kenwood TS-950SD HF Transceiver £1099
DISCOVERY-2-31 Linear Amp UK 1.0kW 2m Linear Amplifier £999
Kenwood TS-2000 All Mode Multibander Transceiver £999
EXPLORER 1200 Linear Amp UK 1200W HF Linear Amplifier £899
Yaesu FT-990 /AC £899
Yaesu FT-920AF HF / 6M Base £899
IC-7400 HF, 6m & 2m transceiver £899
Kenwood TS-790E Dual-Band Base/Mobile Transceiver £799
Icom IC-746 HF/6m Transceiver £799
Icom IC-765 HF Base Transceiver £799
Yaesu FT-920 ..... £799
Icom IC-7000 1.8 - 70cms Mobile Transceiver £749
Yaesu FT-847 Multi-Band Transceiver £749
Kenwood TS-870S HF Transceiver £749
Kenwood TS-850S /AT £699
AOR AR-7030+ HF Receiver £699
Icom IC-736 HF 6 ..... £699
Yaesu FT-736R 6m, 2m & 70cm Base £699
Kenwood TS-570DG/E £675
Kenwood TS850S HF £550
AOR AR-7030 ..... £550
Icom IC-R7000 Mint Condition £550
Kenwood TS-690SAT HF -6m Transceiver £549
Icom IC-706MKIIG £499
Yaesu FT-897D Multiband Portable Transceiver £499
Yaesu FTV-1000 200 W Transverter £450
Icom IC-R7000 ..... £449
Yaesu FT-857D Multi-band Mobile £425
Icom IC-706MkII Mobile Transceiver £425
Yaesu FT-980 HF Transceiver £425
Yaesu FT-857 Mobile Transceiver £425
Icom IC-706mk1 ..... £399
Kenwood TS-680S HF / 6m £399
Yaesu FR-101 HF RX £399
Icom IC-R72 Receiver £399
Kenwood TS-50 ..... £399
Icom IC-740 HF Transceiver £389
Alinco DX-77E HF Transceiver £379
Icom IC-703 HF, 6m Portable £379
Icom IC-718 HF Transceiver £359
AOR AR-3030 HF Rx £350
Yaesu FT-101ZDmkIII HF Transceiver with FM fitted £350
AOR AR-3000 Wide Band Receiver £350
Icom IC-R1500 Receiver £349
IC-R71E HF Receiver £349
Kenwood TM-255E 2m Mobile £329
Yaesu FT-902DM HF transceiver £325
Trio (Kenwood) TS-830S £325
Kenwood TR-751E 2m Multi-mode transceiver £299
Icom IC-735 HF all mode transceiver £299
LDG AT-1000 Autotuner £299
Trio TS-530SP £299
Yaesu FT-726R VHF Base Transceiver £299
Icom IC-2800H Dual Band Mobile £289
Icom IC-PCR1500 ..... £289
Yaesu FT-757GX MkI £285
Yaesu FT-690R II 6m transceiver £275
AOR AR-8200Mk3 ..... £275
Lowe HF-225 HF receiver £275
Icom PS-125 ..... £251.87
Yaesu FT-290MkII 2m Multi-mode transceiver £250
Kenwood TM-V7E 2m/70cm FM Mobile Transceiver £250
Kenwood TR-9130 VHF transceiver 144-146 MHz £249

Classified Ads

To advertise on this page see the booking form below.

DISCLAIMER Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. *Practical Wireless* advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The publishers of *Practical Wireless* wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

Aerials

GAREX ELECTRONICS VHF/UHF accessories and aerials, PMR equipment and spares. www.garex.co.uk Tel: 0771 4198 374 PO Box 52, Exeter EX4 5FD.

G2DYM/G4CFY AERIALS Custom made low noise, low TVI dipoles and trap dipoles. PVC covered stranded wire and 75 ohm feeder properly made-off. Epoxy potted traps. Centre piece and dog-bone insulators included. Spectrum Communications. Tel 01305 262 250. www.spectrumcomms.co.uk

G4TP QRP PORTABLE MAGLOOPS ML-40, 40-20 metres, ML-20, 20-10 metres. No ATU needed. Details at www.g4tph.com

Repairs

REPAIRS TO ALL AMATEUR AND VINTAGE Rx/Tx Cost effective service. Phone or call in for details. Medway Aerials, Rear of 14 Luton Road, Chatham, Kent ME4 5AA. Tel: 01634 845073.

For sale

Qtz x-tals 455kHz to 150MHz Std 10.106, 10.245, 10.7, 11.155MHz £1.00/unit. Callg 3.56, 7.030, 21.06, 28.06 £1.00/unit. 1.4MHz fltrs £14.00. 10.7MHz 10kHz fltrs £3.25 P&P £1.00 + VAT. IQ Electo 0208 391 0545. vincent@jakomin.fsnet.co.uk

REMEMBER THE PIRATE RADIO STATIONS? Caroline, London, City, Laser and RNI? Get a free pack of rare offshore radio stickers, postcards, photos when you subscribe for six months to *Radio Review*, the regular newsletter for the radio enthusiast. For a free sample issue and more information, send a medium size SAE to: Radio Review, Dept. PW, P.O. Box 46, Romford RM7 8AY.

QSL cards

FULL COLOUR QSL CARDS for all your QSL needs. Shirts and caps with callsigns and also ham cartoons by GW3COI. For free samples contact Chris M0DOL. E-mail: qslers@aol.com P.O. Box 184 Northampton NN3 9JH.

Valves

VALVES:- OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAE for FREE list to: Wilson Valves, (Jim Fish G4MH), 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ.
Tel: 01484 654650/649380/650725.
Mobile:- 07733 283084.
E-mail: wilsonv@zoo.co.uk
Visa etc. Fast & personal service.

VALVES AND ALLIED COMPONENTS IN STOCK Ring for free list. Valves/books/magazines wanted. Geoff Davies (Radio). Tel: 01788 574774.

TOP PRICES PAID

for all your valves, tubes, semi-conductors and ICs.

Langrex Supplies Ltd.
Unit 4, Daux Road, Billingshurst, W. Sussex RH14 9SJ
TEL: 01403 785600. FAX: 01403 785656.

ORDER FORM FOR CLASSIFIED ADS

PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979, Fax: 01202 659950.

Please insert this advertisement in the ..... **issue of *Practical Wireless*** (if you do not specify an issue we will insert it in the next available issue of *PW*) for ..... insertion/s. I enclose Cheque/P.O. for £.....(42p per word, 12 minimum, please add 17.5% VAT to total).

Name: .....

Address:.....

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Telephone No.:.....

Box Number @ 70p: Tick if appropriate ☐

Category heading:.....

Please photocopy this form or write on a separate sheet if you prefer

BARGAIN BASEMENT

SEND YOUR ADVERT TO:-

***PRACTICAL WIRELESS*, BARGAIN BASEMENT, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW**

For your advert in Bargain Basement please remember to include your dated, coloured corner flash from this page along with your entry.

Bargain Basement rules - £4 per advert

Please write your advert **clearly** in **BLOCK CAPITALS** up to a maximum of **30 words**, plus **12 words f**or your contact details on the form provided and send -it together with the dated corner flash and your **payment of £4 (subscribers** can place their advert **free of charge** as long as they provide their **subs number and corner flash),** cheques should be made payable to **PW Publishing Ltd.**, credit card payments also accepted.

Send your advert to **Bargain Basement, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or E-mail your advert to **peter@pwpublishing.ltd.uk** (If you don't want to include your credit card details on your E-mail, just 'phone us on **0845 803 1979**.

Please help us to help you by preparing your advert carefully. Any advert which contains **??** marks indicates that the advertiseing dept. could not read/interpret the wording.

Please avoid FAXing your advert - it could delay publication.

Advertisements from traders or for equipment that it is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. **No responsibility will be taken for errors and no correspondence will be entered into on any decision taken by the Editor on any of these conditions.**

You should state clearly in your advert whether equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

For sale

A COMPLETE STATION 990 AC IC-746 PSUs, MFJ-986 tuner, Yaesu FL-2100B, Asom 4 meter. Other bits and pieces plus shack cuboard, all working. Will not split, sell for £ 2000. No offers.
Tel: 0121 520 1232 (West Midlands).

DJ-596E boxed, £70. Dual-band free 7005E, 70cm. Kenwood TH-26E, £20. Three Phillips PR-710, 2 metres, HSA needs re-programming, £15. Buyer collects.
Tel: 01606 597342 (Cheshire).

EX-BBC IBA EQUIPMENT 500 watt amplifier x 4. 20-50MHz. Rhowe & Schwartz Polyscope I. Rhowe & Schwartz Polyscope III. Power supplies for amps, quantity valves, HV capacitors, etc. Yaesu PWR meter, 747 & HP oscilloscope (wkg).
Tel: Dr. Keith Bartlett 01694 781545. Felhampton Court, Felhampton, Near Church Stretton, Shropshire SY6 6RJ.

ICOM IC-756 PRO3 mint, unused, new January 2008. going QRT, £1400. Tel: 01279 815020 (Essex).

JRC NRD-535 RX. Racal RA-17, 500kHz-30MHz. Yaesu FRG-7 RX, 500kHz-29.9MHz. Yupiteru MVT-700 multi-band RX. All good working order and good condition. Plus manuals, any reasonable offers. Tel: Rob 01273 834355 (West Sussex).

KENWOOD TS-790E 2m/70cm multi-mode 35W-2m, 30W-70cm. Good condition, boxed. Prefer buyer collects, £475. Tel: 01740 651938 (Co. Durham).

MARK 123 SPY SET with bag and spares offers? Also, 10W and 25W VHF Bird 43 wavemeter elements. Will swap for any HF elements QRO or QRD.
Tel: Colin 01634 250427 (North Kent).

MM3 BY JAY BEAM 3 element tri-band yagi, 10, 15, 20 metres, £150. Buyer collects and inspects.
Tel: Des 01249 658025 (Wiltshire).

R210 MILITARY RECEIVER 2-16MHz with 24V rechargeable battery and home brew. 240AC/24V DC PSU good working order, £75 o.n.o. Tel: Paul 01780 740699 (Stamford).

VALVE AND PARTS Clear out list. E-mail: G3LLL@talktalk.net

YAESU FR-101 RECEIVER AM, FM, VHF, 6 meters, 2 meters, also HF, FM, USB, LSB, CW, SSB. 25-999.999MHz, memories, RTTY, CW-N, AM-W, AM,N, STBY, VFO, AGC. Only £80, buyer collects, heavy.
Tel: Frank 01608 663745 (Warwickshire).

YAESU FT-90R Micro Commander dual-band FM mobile transceiver, £120. Diamond super gainer SG-7900 dual-band mobile antenna plus mag. Base/coax, £40. Alinco DJ-446 professional PMR, boxed, £30. Tel: Paul M0BCL 01823 256090 (Taunton).

YAESU FT-857D excellent condition. Non-smoker, complete with new separation kit. Dealer modified for 5MHz, £325 carriage paid.
Tel: G3NQX 01772 703957 (Preston).

YAESU FT-101E transceiver. 160-28m, lovely condition, full O/P. AM, SSB/CW, good starter radio easy to use. Eddystone 730-4 no mods, working crystal calibration marker. Crystal filter, variable IF M/W 30MHz. Tel: Roy 01282 866181 after 7pm (Lancashire).

Wanted

KENWOOD R-820 RX in top condition only. Also, control board X53-356X A4 Kenwood TS-870 complete. Tel: 01279 815020.

NRD-515 CW filters CFL-230 and CFL-260 on PCB.
Tel: 01352 771520. E-mail: jhj43@tiscali.co.uk

OLD HALF INCH FERRITE RODS must be half inch, 12.7mm, in diameter and be six inches long or more. Will pay very good money for the rods. Tel: Peter Tankard 0114 2316321 between 9am and 9pm (Sheffield).

YAESU FT-212RH (1980s) at a fair price. Should include its CTCSS board, microphone and non-cut off lead (some don't). Sale to include postage. Tel: 01986 896387 or e-mail: wendy-michael@wmevans.wanadoo.co.uk

Bargain Basement order form

Please insert this advertisement in the next available issue of Practical Wireless.

☐ **For Sale** ☐ **Wanted** ☐ **Exchange**

PLEASE NOTE: as a security measure, you must include your house number and postcode.

Name .....

Address .....

.....

..... Post code .....

Telephone Number .....

PLEASE WRITE IN BLOCK CAPITALS

CARD NUMBER

VISA SWITCH AMERICAN EXPRESS MasterCard

Signature..... Security number

LAST THREE DIGITS ON THE BACK OF THE CARD

Switch issue number (if on card) .....

Start date of card..... Expiry date of card.....

My Subs Number is.....(or mailer label) .....

		(30)	

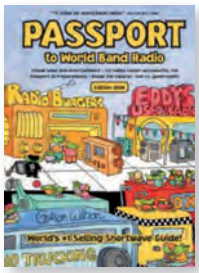
CONTACT DETAILS FOR ADVERT. Please only write in the contact details you wish to be published with your advert, ie. do you want your name & address, or just your telephone number? Your advert, you decide! **PLEASE - No FAXed Ads!** (12)

B.B. Apr '08

THE PW PUBLISHING
RADIO BOOKSTORE

mail order...huge range in stock...fast delivery...

PASSPORT TO WORLD BAND RADIO



Passport to World Band Radio is a #1 seller. Each edition is welcomed by established and emerging readers alike, as Passport delivers in nearly 600 pages what world band listeners seek:
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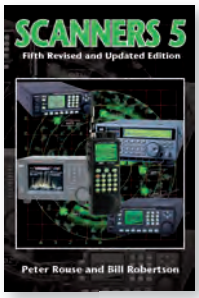
SCANNERS 5



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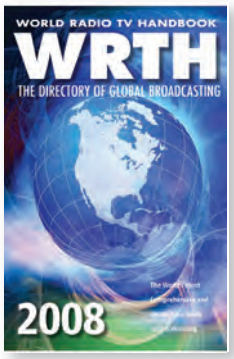

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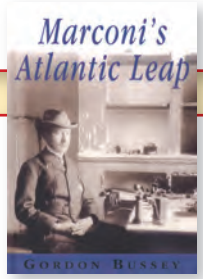

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topical talk

This month Rob talks about re-using old components and recycling electronics for use in the radio hobby.

The letter (Reader's letter this month) from **Keith Hamilton**, from Kinson in Bournemouth brought back many memories for me of my own salvage operations to re-use radio and TV components. I first met Keith at the Longhams recycling centre in Bournemouth where he – a *PW* reader and keen constructor – and I spent quite a while chatting about the way we both approach the radio hobby.

Appropriately enough Keith was at the recycling centre to dump a plastic TV cabinet to be recycled after he had stripped the main circuit boards of their useful components. He even pointed out to me that he re-uses the wiring looms as connecting wires! This retired TV engineer really enjoys building equipment.

Woolston Dump

Keith's letter and the topic of recycling took me back over 50 years to the days when I visited the large Woolston dump, high above and overlooking the River Itchen in Southampton – to recover components from dumped equipment. As I sat there cutting away, I could often see the *RMS Queen Elizabeth*, *Queen Mary*, or the United States Lines *United States* or *America* either arriving or sailing from the 'Old' Eastern Docks.

The landfill site was where all the scrapped part-exchanged televisions, radios, and gramophones were legitimately dumped by such people as Currys and locally based TV and radio shops. Sometimes the van drivers would hand me a almost complete set to work on.

Riding straight from my school I would arrive with my small collection of tools to strip as much as I could from the large and heavy chassis – they were all too large to take home on my bike! And although I was very keen on the transformers, resistors, capacitors, loudspeakers and all the components you'd expect to find I also managed to strip down the old clockwork 'wind up' gramophones that had been dumped. Looking back from the 2008 viewpoint it seems a shame to have broken them up – but they were considered useless then!

My bike's saddle bags were always full as I cycled home to start cleaning up the components – always dirty because of the circuit heat in valved equipment – but I always had enough components to build what I wanted, albeit with shorter than normal leads where I had snipped them out! However, I quickly learned about the dangers associated with recovered higher capacity electrolytic capacitors!

After one or two minor explosions in my bedroom shack I realised I had to treat such capacitors with care. The very old 'wet' electrolytics were time bombs waiting to explode until I learned to 'reform' them slowly with an idea – using a 60W light bulb in series with the capacitor to current limit during the reforming – that I'd collected from the *TV & Radio Engineers Repair Book* where **Pat Hawker G3VA** was one of the Editors!

Very Useful!

My stock of recovered components proved useful over many years and I still have some – all easily identifiable by their shorter leads! My eldest Grandson **Freddy** has enjoyed identifying the resistors using the colour codes and my ohm-meter, although they can still make our fingers very dirty! I think it's a great shame indeed that the vast majority of recoverable electronic components end up being exported abroad. Surely that defies 'green' logic with the huge amount of fuel used to get recoverable components abroad to Africa, India and Asia and especially China?

Of course, most modern electronic scrap contains surface mount devices but despite this, traditional wire ended components are still used. Perhaps we should reconsider ceasing the export of such material in an effort to maintain our own recycling industries, which are invariably linked to electronic production where many skilled radio and electronic engineers are employed?

Personally, I think it really is time to reconsider the logic of exporting material to be recycled – especially to countries where staff safety and possible pollution aren't real concerns! Radio enthusiasts have an important part to play in recycling and I'm keen to be an Amateur Radio version of a 'Womble' as I'm the right shape!

Rob Mannion G3XFD/EI5IW

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