practical wireless - britain's best selling amateur radio magazine

pw

www.pwpublishing.ltd.uk

Antenna Review
Sandpiper Multi-Band for 14-50MHz

Technical For The Terrifed
Decibels & Logarithms

Build
A Simple High Voltage Inverter

Operating from EI
Irish Amateur Radio Insight

02 > February 2006
£3.00

WATERS & STANTON UK'S L

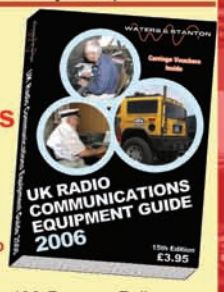
HEAD OFFICE & SOUTHERN STORE • SPA HOUSE, 22 MAIN RD, HOCKLEY, ESSEX, SS5 4QS ENQUIRIES: 01702 206835/204965 FAX: 01702 205843
MIDLANDS STORE • W&S @ LOWE, BENTLEY BRIDGE, CHESTERFIELD RD, MATLOCK, DERBYSHIRE, DE4 5LE ENQUIRIES: 01629 832375 FAX: 01629 580020
SCOTTISH STORE • W&S @ JAYCEE, 20 WOODSIDE WAY, GLENROTHES, FIFE KY7 5DF ENQUIRIES: 01592 756962 FAX: 01592 610451-CLOSED MONDAYS

Visit our eBay shop for more bargains!

eBay

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

NEW UK Radio Communications Equipment Guide 2006



£3.95 + £1.75P&P

• Free Carriage Vouchers • 400 Pages • Full Colour • Articles & Reviews • Detailed Spec on every piece of Ham Gear • Over 4000 Products

NEW YAESU

FT-9000D NOW AVAILABLE

50% DISCOUNT on any Heil Mic when you purchase your FT-9000 from W&S - the UK's largets Yaesu Dealer, Plus **FREE** entry into our £2000 **Yaesu Competition** with 500:1 win chance.

PRICEMATCH!

We will match or beat any UK advertised price on UK sourced and UK guaranteed stock. Items must be in stock with the competitor and brand new - not B-Stock or old stock clearance.

CALL FREEPHONE SALES 08000 73 73 88

PAY NOTHING 'TIL 2006!

BUY NOW PAY LATER AT ALL 3 STORES

AVAILABLE ON ALL SALES OVER £200

You won't find a better deal!

Proof that at W&S you get the best possible deal. On selected items it is now possible to pay nothing for a whole year without incurring any interest charge. Amazing but true. And what's more, you get probably the best prices in the business. Give us a call today or visit one of our branches.

0% APR TYPICAL EXAMPLE OF BUY NOW PAY LATER. CASH PRICE £600. PAY NO DEPOSIT AND PAY THE FULL AMOUNT BY THE DUE DATE. PAY NO INTEREST.

OR

29.8% APR REPAY £31.53 PER MONTH FOR 36 MONTHS, AFTER THE 12 MONTH PERIOD . TOTAL AMOUNT DUE £1135.08. INTEREST IS CALCULATED FROM THE DATE OF THE AGREEMENT.

ALL FINANCE SUBJECT TO STATUS WRITTEN QUOTATION ON REQUEST.

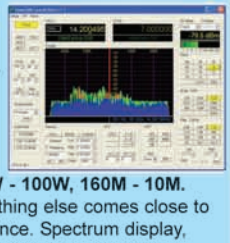
FAST SAME-DAY DESPATCH

www.wsplc.com

FREEPHONE ORDER LINE 08000 73 73 88

NEW SOFTWARE DEFINED TRANSCEIVER

Performs like a £5,000 transceiver but costs 80% less!



SDR-1000 1W - 100W, 160M - 10M. Nothing else comes close to its performance. Spectrum display, superb receiver front end and filter shape factors that are unobtainable with normal rigs. Welcome to the new era in ham radio. It has received rave reviews in the USA. Delivery soon. Check details on www.flex-radio.com

WIN AN FT-1000MK-V

FREE FT-1000MKV!

This radio could be yours FREE!

Purchase **any** Yaesu transceiver or receiver from any Waters & Stanton shop, or mail order or at an outside event, and you will automatically be entered into our competition for this beautiful radio.

You have a 500:1 chance of winning!
Winner will be decided after 500 cards have been issued

AN HF OPEN EVENING WITH YAESU

Thursday 19th January from 6pm

FREE FOOD & DRINK PLUS FREE RAFFLE

A £25 HF VOUCHER For Every Visitor

Yaesu staff **Paul Bigwood G3WYW**, (left) and **Ailsa G7TJC**, demonstrate the new FT-9000DX on air. (G0PEP). Paul is the UK authority on this radio and will give a talk about its design and operation.

Peter Waters G3OJV, gives a talk on antennas for small spaces with some practical designs.

Waters & Stanton are the foremost authority on HF. BE THERE!

Icom HF Transceivers

ICOM IC-756 PRO III

Top of its range of HF transceivers. HF & 50MHz, features large colour LCD with spectrum scope, auto ATU and 32-bit floating point DSP unit. £2099 C

IC-7800 £6400 C
Icom' Flagship HF 200W transceiver. 200W max. The ultimate receiver - the ultimate design! AC psu built in.

IC-7800-PACK £6995 C
The superb transceiver as above plus 17" flat screen, keyboard and SM-20 base microphone.

IC-7400 *Lower Price* £1279 C
HF/VHF 160m - 2m transceiver 5 - 100W. SSB CW FM AM. 12V DC. Nice big display. Lovely price.

IC-706 MkIIGDSP £769 C
It's unbeatable. 160m - 70cm (up to 100W HF) yet so small with detachable head. The ultimate mobile..

IC-718 £449 C
This is a budget class radio HF 160 - 10m at a price that belies its performance. Beautiful display.

IC-703 *FREE IC-703 Logbook* £539 C
Take an IC-706, reduce power to 10W max and get rid of VHF/UHF. 160 - 6m of pure QRP joy!!

Going HF Mobile?

Then check out the great 80m - 6m SIDEKICK magnetic mount whip from USA. No hassel and great performance. £249.95 C

Kenwood HF Transceivers

KENWOOD TS-2000

Top-of-the-range Kenwood transceiver. The Station in a box. 160m-70cm with every feature imaginable inc. DX Cluster. Kenwood fans dream rig. HF/VHF/UHF or up to 23cm with the optional module. Built-in auto ATU, DSP and its unique TNC. *New Lower Price* £1295 C

TS-2000X *Lower Price* £1789 C
Take the TS-2000 and add a superb 23cm module. The best 23cm we know of plus all other bands!

TS-B2000 *Lower Price* £995 C
Designed for the 21st century. You get HF - 70cm with PC software for direct PC control. It works great.

TS-570DG *Lower Price* £799 C
The best budget radio at the price. Superb 100W from 160m to 10m. As used by Peter Waters, G3OJV

TS-480HX *Lower Price* £799 C
Take the TS-480SAT, remove the auto ATU and offer a beefy 200W output. That's a really potent package!

TS-480SAT *Lower Price* £699 C
HF 160m - 6m with remote front panel. Large enough for base use, small enough for mobile. Big display

Buy a TS-480SAT & get Free Of Charge a Heil Microphone Package. To claim send a copy of invoice to Kenwood

Yaesu HF Transceivers

YAESU FT-1000 MKV

200W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC PSU. Acknowledged as one of the finest DX rigs on the market. Superb tailored audio and the ability to select Class A bias for dramatic signal purity. £2099 C

FT-1000 FIELD £1499 C
The HF choice for DXers. With this rigs reputation on DXpeditions what more persuasion do you need?

FTV-1000 *Lower Price* £619 C
6m 200W module for the FT-1000 range. Probably the ultimate for 6m DXing.

FT-897D £649 C
160m - 70cm self-contained portable. 100W and up to 20W from optional internal batts.

FT-857D *Limited Offer* £579 C
160m - 70cm mobile with up to 100W output. Lovely tuning control from remote head unit - and great price!

FT-847 £999 C
Complete station in a box! 160m - 70cm - up to 100W (50W 2m/70cm). Great for satellite work.

FT-840 £399 C
Is there any other radio that comes close to this price? One of our all-time best sellers. 100W 160m - 10m

FT-817ND *SPECIAL OFFER* £489 C
The ultimate QRP self-contained radio. Up to 5W output 160m - 70cm. New low price. UK warranty.

FT-817DSP *SPECIAL OFFER* £559 C
FREE CSC-83 CARRYCASE WITH FT-817ND/DSP

Warning - as a regular advertiser you can be sure all our stock is genuine UK warranted. Check serial numbers!!

Carriage Charges: A=£3, B=£6, C=£10

LOWEST PRICES

ZERO DEPOSIT ZERO INTEREST

Enquiries 01702 206835

Freephone Orderline 0800 073 73 88

Icom
VHF/UHF Mobile/Base

ICOM IC-E208 *LIMITED OFFER*

VHF/UHF FM Dual Band Mobile Transceiver
**Freq range 144-146MHz, 430-440MHz Tx*
**55/50W (3 pwr steps each band)*
**Wideband Rx 118-173, 230-549 & 810-999MHz*
£215 C

IC-910H *Lower Price* **£1087 C**
2m / 70cm 100W Base station all - modes with option for 23cm module (**UX-910 £359**)

IC-910HX *Lower Price* **£1235 C**
As above but with 23cm module ready fitted and a big saving as well.

IC-2725E **£269 C**
Icom's new dual band 2m / 70cm radio. Very easy to operate and install and a lovely detachable head.

Kenwood
VHF/UHF Mobile/Base

KENWOOD TMD-700E

2m/70cm dual band mobile transceiver with APRS. Doesn't need extra high cost boards to function. Only extra if required is a compatible GPS receiver.
Lower Price **£418 C**

TM-G707E **£265 C**
Dual Band 2m & 70cm with detachable front

TM-V7E **£359 C**
Dual Band 2m & 70cm with 50/35W output

TM-271E **£187 C**
Single Band 2m FM 60W mobile transceiver

Yaesu
VHF/UHF Mobile/Base

YAESU FT-7800E *SPECIAL OFFER*

**2m/70cms Dual Band Mobile *High power 50W 2m /40W 70cms *Wide receive inc. civil & military airband *CTCSS & DCS with direct keypad mic. *Detachable front panel *1000 memories plus five one-touch*
FREE YSK-7800 SEPERATION KIT
£229 C

FT-2800M **£149 C**
*2m FM Mobile transceiver * High power 65W * Capable of VHF wideband receiver

FT-8800E *LOW PRICE* **£267 C**
*2m/70cmDualband FM Mobile transceiver * 50W 2m, 35W 70cm * Wideband receiver

FT-8900R **£339 C**
*2m, 70cm, 6m & 10m Quadband FM Mobile transceiver * Independent dial for each band

Watson
On-Glass Antenna

WGM-270

Dual Band 2m/70cm mobile whip. 2.5dB gain and 1.5:1 VSWR. 0.8m long. Complete system including 3.5m cable. No drilling involved. Antenna sticks on glass and interface assembly sticks on inside. Simple and very effective.
£29.95 B

Icom
VHF/UHF Handhelds

IC-V82 *NEW* **£159 B**
2m FM Digital Handheld 7W
IC-U82 *NEW* **£159 B**
70cm FM Digital Handheld 5W

IC-E90 *Limited Offer* **£199 C**
6m / 2m / 70cm handheld transceiver

IC-T3H **£129 C**
2m FM handheld 5.5W c/w BC-01 & BC-146

IC-E7 *DUE IN 2006*
New 2m / 70cm handy wide RX

Kenwood
VHF/UHF Handhelds

KENWOOD 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! This is a great radio to have at all times when you are on your travels.
£237 B

TH-D7E **£299 C**
2m/70cm dualband FM handheld transceiver with data communications

TH-G71E **£179 C**
2m/70cm dualband FM handheld transceiver

TH-K2E **£139 C**
2m FM 5W portable transceiver c/w Ni-MH battery/charger

TH-K2ET **£145 C**
2m FM 5W portable transceiver c/w Ni-MH battery/charger

TH-K4E **£139 C**
70cm FM 5W portable transceiver c/w Ni-MH battery/charger

Yaesu
VHF/UHF Handhelds

YAESU VX-7R
LIMITED SPECIAL OFFER

Totally waterproof, wide frequency coverage 500kHz-900MHz AM/FM. 132x64 dot matrix display providing easy-to-read frequencies and information plus pictorial graphics.
£209 C

***NEW* VX-6E *Offer* £189 B**
2m /70cm Submersible 5W

FT-60E 2m/70cm 5W **£169 C**
VX-2E 2m/70cms min **£119 C**
VX-110 2mhandheld **£94 C**

Alinco
VHF/UHF Handhelds

DJ-C6E *NEW* **£119 C**
2m/70cm FM 300mW handheld transceiver

DJ-V5E **£169 C**
2m/70cm FM 5W dualband handheld transceiver

DJ-193E **£99 C**
2m FM transceiver no keypad, Ni-Cds & charger

DJ-195E **£109 C**
2m FM transceiver with keypad Ni-Cds & charger

DJ-C7E **£129 C**
2m/70cm credit size FM handheld

Linear Amp UK
HF Linear Amplifiers

RANGER 811H

**1.8 - 29.7MHz *800W CW or SSB, 400W RTTY *Uses 4 x811A vertically mounted *Drive 10 - 100W *Toroidial AC Power Transformer *6:1 Reduction Drive on Tuning Controls *"Near Silent" Papst Cooling fan *Front-panel ALC Adjust Control *Built-in AC 230V @ 8A Supply*
£945 B

CHALLENGER III **£1795 C**
HF linear amplifier 10-160m WARC 100W in 1.5kW out

W3FF
NEW Mini Buddipole

Portable 40 - 2m Ant
Just 14" long packed!

£189
Order as W3-MBP

Comes in a case **just 14" long** yet extends to a **highly efficient 4.6m long rigid rotatable dipole.** Great for camping and back-packing. Handles 200W and band changing is just a coil tap away. Supplied with 25' of coax and balun. Centre has standard 1/2" plumbers pipe thread. Optional telescopic mast and tripod available.

SGC
HF Linear Amplifiers

SG-500 **£1399.95 C**
"Power Cube" 1.6-30MHz 500W solid state

Yaesu
HF Linear Amplifiers

VL-1000 QUADRA £3795 C
HF + 6m linear amp. 1kW comes with PSU

Watson
Mobile Antennas

ANTENNAS

W-2LE	1/4 wave 2m 0.48m 200W	£9.95	B
W-285	5/8th 2m 1.33m long 200W	£14.95	B
W-77LS	2m/70cm 0.42m 50W	£14.95	B
W-770HB	2m/70cm 1.1m 200W	£24.95	B
W-7900	2m/70cm 2m/70cm 1.58m	£32.95	B
WSM-270	Dual band mini magnetic	£19.95	B

BASES

WM-08	8cm diam magnetic	£9.95	A
WM-14B	14cm diam magnetic	£12.95	A
W-3HM	Hatch mount	£14.95	A
ECH	Cable kit	£10.95	B

NOTE: All antennas have PL-259 ends. Mag mounts have cable attached. Hatch mount needs ECH cable.

WATSON
Low Noise PSUs

WATSON W-25SM

Competitors models get bad press (see Radcom Dec. P66) But "Watson W-25SM stood out from the others."

£79.95 B

NEW STOCK & OFFERS

YAESU VX-120 & VX-170 *NEW*

< VX-120
A 2m 5W handheld with an 8-key pad, Ni-MH batt & charger
VX-170 >
A 2m 5W handheld with a 16-key pad, Ni-MH batt & charger

£99.95 B **£109.95 B**

YAESU FT-DX9000D *NEW*

Top-of-the-range 200W HF + 6m Deluxe Base Station. Auto ATU, 220V AC PSU, Class 'A' operation for AM & SSB, large TFT data management unit and dual analogue meters, Main/Sub receivers, 32-bit IF DSP. Return of the FT-DX series represents the very best in high power DX-ready base stations.
£7299 D

bhi
DSP Equipment

bhi NES10-2 MkII

NES10-2 Combined speaker and programmable DSP unit. Offers dramatic noise reduction and reduces annoying hetrodynes. 8 filter settings, 12V DC.
£99.95 B

NES-5 **£79.95 B**
DSP Speaker Basic Plug & Go model

NEIM-1031 **£129.95 B**
Noise Eliminating In-Line Module with DSP

ANEM *NEW* **£119.95 B**
"NOISE AWAY" Amplified LS DSP module

NEHM *NEW* **£99.95 B**
"NOISE AWAY" Headphone DSP module

1042 **£19.95 A**
Switch box allowing up to 6 items to connect to one bhi speaker/module.

NEDSP-1061 **£89.95 B**
Small DSP PCB module for retrofitting into rigs

NEDSP-1062-PCB **£79.95 B**
Amplified DSP module to insert in speaker path

NEDSP-1062-KBD **£99.95 B**
As NEDSP-1062 but with small keyboard

NCH **£34.95 B**
ANR Noise Cancelling headphones

WATSON
WM-S Hands Free

WATSON WM-S

Stay legal. Flexible boom microphone mounts under sun visor. PTT box mounts on gear changer. All powered from rig mic socket! **Includes detachable lead to match you radio.**
£39.95 B
To check compatibility, download PDF "WM-S Compatibility" in leaflets section of www.wsplc.com

Carriage Charges: A=£3, B=£6, C=£10

WATERS & STANTON

Freephone Orderline
08000 73 73 88
Enquiries 01702 206835
www.wsplc.com

UK'S LOWEST PRICES!

NEW STOCK & OFFERS

FUJIKON
NOISE CANCELLING HEADPHONES NEW

These Active Noise Cancelling Headphones, from Fujikon, blockout annoying ambient background noise. Powered by an AAA battery noise cancelling is controlled by an on/off switch. NC-4 has a folding design for easy storage.

FUJIKON NC-2 £18.95 B

FUJIKON NC-4 £19.95 B

POCKET MORSE READER MFJ-461

Reads CW
Just hold near receiver speaker

£69.95 B

That's right - just hold this self-contained decoder near your speaker and see the text scroll across the screen. Absolutely amazing

MFJ-936B Loop Tuner

The most amazing antenna we have seen in years. For optimum results take a wire around 1/5th wave long, bend into square loop (14ft on 20m = 3.5ft square) and attach to MFJ-936B. Result: Ultra low indoor noise and VK, ZL & W all on SSB! That's what we achieved in one day's operation! 20m loop works on 15m as well. Now In Stock. Great for QRP and portable as well.

£229.95 B

Antenna Accessories

Dipole Bits			
Kevlar	Strong 400lb strain line 200ft	£22.95	A
FW-PVC-50	50m clear PVC 2mm wire	£39.95	A
Flexweave	50m multi-strand 2mm wire	£29.95	A
HDCW	50m hard drawn 16g copper	£14.95	A
Insul-8	Black ribbed insulator	£0.99	A
WDC-50	SO-239 dipole centre insulator	£6.49	A
Egg-m	Medium ceramic egg insulator	£2.15	A
Egg-s	Small ceramic egg insulator	£1.75	A
WS-2580	25pcs 3" ladder line spacers	£9.95	A
Diamond 50 Ohm Baluns			
BU-50	1:1 1.7MHz 40MHz 1.2kW	£26.95	A
BU-55	1:1 3.5MHz - 75MHz 500W	£34.95	A
Antenna Traps (pairs)			
TR-200-14	200W bands 10m - 20m	£44.95	B
TR-200-10	200W 10MHz	£47.95	B
TR-200-7	200W 7MHz	£49.95	B
TR-200-3.6	200W 3.6MHz	£53.95	B
TR-1000-14	1kW bands 10m - 20m	£59.95	B
TR-1000-10	1kW 30m	£61.95	B
TR-1000-7	1kW 40m	£64.95	B
TR-1000-3.6	1kW 80m	£73.95	B
German Made High Quality Baluns			
HB-1-200	1:1 3.5 - 30MHz 200W	£25.95	B
HB-4-200	4:1 3.5 - 30MHz 200W	£25.95	B
HB-6-200	6:1 3.5 - 30MHz 200W	£25.95	B
HB-1-1	1:1 3.5 - 30MHz 1kW	£34.95	B
HB-4-1	4:1 3.5 - 30MHz 1kW	£41.95	B
HB-6-1	6:1 3.5 - 30MHz 1kW	£41.95	B
Remote 4:11.5kW Balun			
REM-BAL	For coax to ladder line match	£45.95	B
Patch Leads			
WPL-70	V low loss 75cm PL-259	£6.95	A
WPL-50	Standard 50cm PL-259	£2.99	A
WPL-50BNC	BNC version of above	£2.99	A
HQ-66	66cm RG-213 PL-259	£4.99	A
HQ-10m	10m long PL-259	£14.99	A

SGC External Auto ATU's

SGC SG-231

1 - 60MHz. 3 - 100W pep (50W CW). Min wire length, 7m. 50 Ohm feed. Needs 12V at approx 900mA.

£349.95 C

SG-239 £189.95 C
Mini auto ATU 1.8 - 30MHz 1.5 - 200W PEP primarily for long wires - non waterproof. 12V DC

SG-231 £349.95 C
1.8 - 60MHz 100W PEP. A great random wire tuner that you can use outdoors. 12V DC

SG-237 £299.95 C
1.8 - 60MHz 100W PEP. Great for mounting outdoors and feeding long wire. Waterproof. 12V DC

SG-230 £339.95 C
1.8 - 30MHz 200W PEP. The original design that handles end fed or coax unbalanced. Waterproof. 12V

SG-235 £749.95 C
3.5 - 54MHz. A hunky 500W PEP tuner that handles long wires. Great outdoor design. Waterproof.

Icom External Auto ATU's

AH-3 £479.99 C
1.8 - 28MHz. A hunky 120W PEP tuner that handles whips or wire longer than 2.5m. Waterproof.

Alinco External Auto ATU's

EDX-2 £289.95 C
1.8 - 30MHz 150W long wire tuner designed for use with DX-70 transceiver. Waterproof.

MFJ External Auto ATU's

MFJ-993B

*Auto ATU with digital data display *1.8-30MHz *Long wire, coax & balanced line *300W SSB, 150W CW *Cross needle metering

£209.95 C

MFJ-991B £179.95 C
1.8 - 30MHz auto ATU. Similar to MFJ-993 but no digital display. Works with any HF transceiver. 150W PEP.

MFJ-994B £299.95 C
1.8 - 30MHz high power auto ATU. 600W PEP / 300W CW. Tunes wire, coax and balanced feed.

SGC External Auto ATU's

MAC-200 £259.95 C
1.8 - 60MHz 200W PEP. Wire, coax and balanced feeder. Features auto antenna switching.

SG-237PCB £279.95 C
1.8 - 60MHz 100W PEP. Same as SG-237 but without housing for building into your own housing.

SG-211 £189.95 C
1.8 - 60MHz works off internal dry cells. Zero drain wait state. 60W PEP. Ideal for portable (Min 1W).

Yaesu External Auto ATU's

FC-20 £249.95 C
1.8 - 60MHz 100W matched for FT-100/Ft-847. Desk top unit to match transceivers. Coax systems only.

FC-30 £249.95 C
1.8 - 60MHz 100W. Designed for use with FT-857/FT897. Coaxial input / output.

FC-40 £239.00 C
1.8 - 60MHz 100W. New waterproof ATU designed for use with FT-897 / FT-857 and mobile operation.

Icom External Auto ATU's

AT-180 £349.95 C
1.8 - 54 MHZ ATU designed for IC-706. Plugs directly into transceiver for seamless operation. Coax only.

Kenwood External Auto ATU's

AT-50 £319.95 C
1.8 - 30 MHZ 100W ATU specifically designed for use with TS-50 transceiver. Coaxial only.

Cushcraft HF Antennas

MA5V £239.95 C
Vertical 5-band 20m - 10m. No separate radials needed. 250W. Self-supporting. 4.48m tall.

A3-S £469.95 D
The classic 20, 15, 10m 3-el beam. 2kW 8dB gain. 8.45 el. Turn radius 4.72m. F/B ratio 25dB.

A3-WS £379.95 D
Dual Band 3 el. beam for 17m & 12m. 2kW. El length 7.66m. Turn radius 4.4m. Gain 8dB. F/B ratio 25dB.

A4-S £569.95 D
Tri-band 4 element Yagi. for 20m - 10m. DXers delight. 2kW . 8.9dB gain F/B 25dB. Turn radius 5.49m

R-8 £469.95 C
8-band vertical 40m - 6m. No separate radials needed. 1.5kW. Height 8.7m

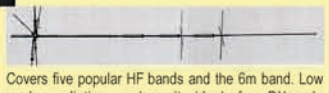
R-6000 £329.95 C
6-band vertical 20m - 6m. No separate radials needed. 1.5kW. Height 5.8m. Great small garden ant.

MA5B £369.95 C

5-band 2 El mini beam. 20m - 10m 2kW. Elements 5.2m Turn radius 2.7m. (Dipole on 17/12m) 5dB gain

Diamond HF Antennas

DIAMOND CP6



Covers five popular HF bands and the 6m band. Low angle radiation makes it ideal for DX work. Outperforms dipoles for long distance contacts and compares favourably with beams located 10m+ above ground.

*Bands: 3.5 -50MHz *Power: 200W *VSWR: Better than 1.5:1 *Socket: SO-239 *Height: 4.6m *Radials: 1.8m rigid adjustable

£239.95 C

Radio Works HF Antennas

CW-160 £129.95 C
8-band 160m - 10m dipole with 22ft vertical radiating feeder. 1.5kW. Balun fed. 265ft long.

CWS-160 £119.95 C
Compact 8-band 160m - 10m dipole with 22ft vertical radiating feeder. 1.5kW. Balun fed. 133ft long.

CW-80 £99.95 C
7-band 80m - 10m dipole with 22ft vertical radiating feeder. 1.5kW. Balun fed. 133ft long.

CWS-80 £109.95 C

Compact 7-band 80m - 10m dipole with 22ft vertical radiating feeder. 1.5kW. Balun fed. 133ft long.

G5RV Plus £59.95 C

Rugged 2kW balun matched G5RV with 102ft element and 31ft ladder line. Requires ATU. Made in USA

Hustler Base Antennas

6-BTV £229.95 C
80 - 6m 6-band vertical. 7.3m tall 1kW. Can be used at ground level with earth stake. Ideal small gardens

5-BTV £199.95 C
80 - 10m 5-band vert. 7.64m tall 1kW. Can be used at ground level with earth stake. Ideal small gardens

4-BTV £169.95 C
40 - 10m 4-band vert. 6.52m tall 1kW. Can be used at ground level with earth stake. Ideal small gardens

Butternut Antennas

HF-2V £229.95 C
80 / 40m high performance vertical. 1kW PEP 9.75m tall. Self supporting for ground mount use.

HF-6V £299.95 C
6 band vertical 80-40-30-20-15-10m. 2kW. 7.9m tall. Use own radials or ground mount.

HF-9V £349.95 C
9-band 80 40 30 20 17 15 12 10 6m vertical 1kW 7.9m tall. Use radials or ground mount

Buddipole Products

LOWER PRICES!

HF Portable at its Best

W3-BP £179.95 B
40m - 2m adjustable dipole. 250W and max length of 4.65m. Packs down to 65cm approx.

W3-MBP £189.95 B
Sames as W3-BP but packs even smaller.

W3-BS £109.95 B
40m - 2m vertical is half a Buddipole. Ideal for QRP and rucksack - as used by Peter Waters G3OJV.

Peter Waters says: *I think these products are great. Superbly engineered and very efficient.* Options include adaptor for dipole to decorators pole £6.95, Field tripod £89.95, 2.45m telescopic mast £49.95, mini tripod for Buddistick.

Super Antennas

MP1-SA £139.95 B
Screwdriver style adjustable HF QRP whip 40m - 70cm. 150W PEP. Max extended 185cm approx

MP2-SA £199.95 B
Electrically tuned version of the above. Requires around 9V - switch control box not included.

MP-80M £29.95 A
Add on 80m coil to extend the LF coverage of the MP1 and MP2.

High Sierra Mobile Whips

HS-1800/PRO
£379.95 C
The ultimate mobile whip. Electrically tuneable 80m - 6m 1kW PEP Includes switch box and 12V cable. Massive 2" coil. Made in USA. Superb!! Available in Black or Grey.

SIDEKICK As used by Peter Waters G3OJV/M
£249.95 C
Get mobile on all bands from 80m to 6m in minutes. This compact screwdriver antenna comes with cables and control box. Designed to go on our 3-way magnetic mount (£39.95 extra) it is an amazing performer and only 1.37m maximum! Available in Black Only.

Carriage Charges: A=£3, B=£6, C=£10

February 2006
On Sale 12 January
Vol. 82 No. 2 Issue 1186
(March Issue on sale 9 February)

Published by
PW Publishing Limited
Ar owsmith Court
Station App oach
BROADSTONE
Dorset BH18 8PW
Directors: Stephen Hunt & Roger Hall

Editorial Department
☎ 0870 224 7810
Fax: 0870 224 7850

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

Production Editor
Donna Vincent G7TZB/M3TZB
donna@pwpublishing.ltd.uk

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

Art Department
☎ 0870 224 7820
Fax: 0870 224 7850

Art Editor
Stephen Hunt
steve@pwpublishing.ltd.uk

Typesetting
Peter Eldrett
peter@pwpublishing.ltd.uk

Sales Department
Fax: 0870 224 7850

Advertisements
Roger Hall G4TNT
roger@pwpublishing.ltd.uk
☎ 0207 731 6222

Advertisement Administration
Joan Adams
joan@pwpublishing.ltd.uk
☎ 0870 224 7820

Book Orders
bookstore@pwpublishing.ltd.uk
☎ 0870 224 7830

NEW Subscription Administration
Webscribe
Practical Wireless Subscriptions
PO Box 464
Berkhamsted
Hertfordshire HP4 2UR, UK
pw@webscribe.co.uk
www.webscribe.co.uk
☎ 01442 879097
Fax: 01442 872279

Finance Department
☎ 0870 224 7840
Fax: 0870 224 7850

Finance Manager
Alan Burgess
alan@pwpublishing.ltd.uk

Finance Assistant
Margaret Hasted

PW Publishing Website
www.pwpublishing.ltd.uk

All our 0870 numbers are charged at the BT Standard National Rate

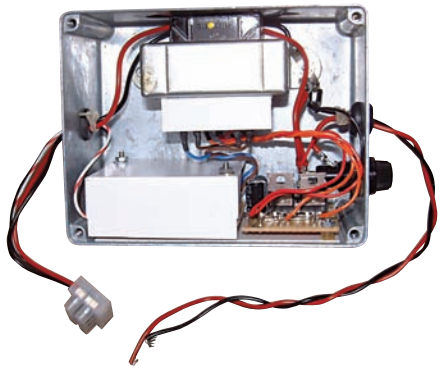
Cover subject

Our front cover this month shows **Brendan Minish EI6IZ** at the special Mayo Radio Experimenter's Group Station at the 2005 Hollybrook Vintage Steam Fair. Find out more about Irish operating in **Rob EI5IW**'s article on pages 18 and 19 of this issue.
Design: Steve Hunt
Main Photograph: John Corless EI7Q
Inset Photographs: John Heys G3BDQ & Antony Langton GM4HTU

The *PW* team would like to wish all readers, contributors and advertisers a Happy and prosperous New Year as we look forward to radio-filled 2006!

february 2006 contents

features



Page 22

regulars

Published on the second Thursday of each month by PW Publ shing Ltd., Arrowsm th Court, Station App oach, B oadstone, Dorset BH18 8PW. Tel: 0870 224 7810 Printed in England by Holb ooks P inte s Ltd., Portsmouth P03 5HX Distributed by Seymour, 86 Newman St eet, London , W1P 3 D, Tel: 0207-396 8000, Fax: 0207-306 8002, Web http://www.seymour.co.uk. Sole Agents for Aust alia and New Zealand - Go don and Gotch (Asia) Ltd.; South Africa - Cent a News Agency. Subscriptions INLAND £32, EUROPE £40, REST OF WOR D £49, payable to PRACTICAL WIRELESS, Subscription Department PW Pub ishing Ltd., Arrowsm th Court, Station App oach, Broadstone, Dorset BH18 8PW. Tel: 0870 224 7830 PRACTICAL WIRELESS is sold subject to the following conditions, namely that it shall not, w thout written consent of the publishers fi s having been given, be lent, re-sold, hi ed out or otherwise disposed of by way of t ade at mo e than the ecommended selling price shown on the cover, and that it shall not be lent, re-sold, hi ed out or othe wise disposed of in a mutilated condition or in any unauthorised cover by way of T ade, or affixed to or as part of any publication or advertising, lite ary or pictorial matter whatsoever. *Practical Wireless* is Publ shed monthly for $50 per year by PW Publishing Ltd., Ar owsm th Court, Station App oach, B oadstone, Dorset BH18 8PW, Royal Mail International, c/o Yellowstone International, 87 Burlews Court, Hackensack, NJ 07601. UK Second Class Postage paid at South Hackensack. Send USA add ess changes to Royal Ma l Inte national, c/oYellowstone Inte national, 2375 Pratt Bouleva d, Elk G ove Village, IL 60007-5937. The USPS (United States Postal Se vice) number for Practical Wi eless is: 007075.

KENWOOD

Listen to the Future

Truly a marvel of electronic engineering, Kenwood's stylish all-mode multibander is packed with top-end features yet compact enough for use at home, in your car, or on a DX'pedition. And a handsome 3D front panel -- featuring backlit keys and large amber display -- makes the appearance of this multibander as distinctive as its performance.

● Optional DRU-3A digital recording unit ● IF and AF DSP filters ● Beat-cancel, noise reduction ● TX/RX equalizer ● CW auto-tune ● Speech processor ● Transverter Mode displays up to 19.99999GHz ● Programmable function key ● Electronic keyer ● Key operation announcement with optional VS-3 voice synthesizer ● Auto repeater offset 144MHz

- All-mode Multibander
- Satellite Mode with Doppler effect frequency correction
- TNC built-in for DX cluster display
- Auto ATU built-in
- Dealer expandable RX coverage on VHF/UHF
- 300 Memory Channels

ALL BAND ALL-MODE TRANSCEIVER

TS-2000

HF/6/2/70cms

TS-2000X

HF/6/2/70/23cms

Available from all official Kenwood amateur radio dealers. For full details of our dealer network and all Kenwood amateur products contact your local dealer or Kenwood Electronics UK Limited. 01923 655284
e-mail comms@kenwood-electronics.co.uk

Kenwood Electronics UK Limited

www.kenwood-electronics.co.uk

rob mannion's keylines

Rob looks at Ofcom's in-house handling of specialised licensing facilities, club news and visits.

The recent announcement from the UK's Ofcom that they will be taking specialising licensing facilities 'in house' themselves, rather than leaving them to be handled by the Amateur Radio hobby itself, will soon cause us problems. Indeed, I fear that the decision taken by this Quango (Quasi Autonomous Non Governmental Organisation) to control and issue such items as Notice of Variation for 5MHz, etc., Special Event callsigns, etc. will soon cost Amateur Radio dearly.

Although I've often expressed my concerns at the organised public face of Amateur Radio in the UK - there's no doubt that running some (and perhaps all) aspects of the administration of our wonderful hobby is best done by Amateurs themselves. Another, extremely important fact is that voluntary organisations are usually much cheaper than Quangos!

Ofcom is based in horrendously expensive London. So, it's not difficult to imagine what the salary of one person - and perhaps two - would be to do the job previously done by the volunteers and regionally employed staff associated with supporting our hobby centrally.

I've been told that the reasons between Ofcom's decision to take the facilities 'in house' is due to the reluctance to pay a subsidy for the administration to be done elsewhere. However, whatever the reason behind their decision, I feel it will, eventually cost the hobby more money.

Ofcom is set up - minus Civil Servants - to minimise administration costs to Central Government. Eventually, I think the Quango will pass on the full, ever increasing costs of their administration to Amateur Radio. Hopefully, someone in power will realise this and adopt the sensible (and more economical) attitude that Amateur Radio can oversee the administration of some, if not all, much cheaper than a London based Quango.

Club News In PW

Recently in *PW* I asked Clubs/Rally organisers, etc., to provide postal codes when news and promotional material is sent in with a view to publication. The idea being aimed at providing possible visitors/rally visitors with map information via **Streetmap.co.uk** or the increasingly equally popular satellite navigation systems.

Following publication, **Donna Vincent G7TZB** (Group News & Production Editor) and I ended up talking about the way news from clubs is sent into the magazine. We discussed how the various clubs could help us receive, edit and present the news more efficiently, bearing in mind our limited magazine production schedule (lack of time in plain English!).

Donna made it clear to me that by far the most useful thing that clubs, etc. could do for us is by providing everything 'in one basket' so to speak. For example, on every occasion you should provide full contact details about yourself, your club where it is, meeting dates and times, along with full contact details, including the address and postcode. Never leave us to chase up the information from a website (please!). Everything I've requested should accompany every news item from your club each time because we cannot keep individual records of clubs and their input. Regard your item as an advert and that you're 'selling' a product to consumers (possible club members).

If you send in a news item saying; "Hi Rob/Donna: We're having a barbecue in June, usual venue and times, please check our website for details, regards Fred"! - it's not helping us to help you! It's amazing just how many people don't tell us who they are when they E-mail us! Donna then has to find out what club is involved, where they are and other details. As we're busy, such items can be passed over and you could miss out on useful publicity. Instead you could help us by providing all the information needed to tell potential club members of your activities.

Remember - it's a free service that we're pleased to provide - the only 'charge' is your co-operation and time. Just think, that extra bit of information could bring new members to your club, or extra people to your rally!

Club Visits

I'm delighted to announce that more *PW* club visit dates have been finalised. On Friday 3 February, I'm due to visit old friends at the **Cheltenham Amateur Radio Association**.

Next, I'm very pleased indeed to announce that *PW* Technical Projects Sub-editor **Tex Swann G1TEX/M3NGS** is planning to accompany me to the **Junction 28 QRP Rally** in North Derbyshire, on Saturday 11 March. Tex and I, along with **Ian Brothwell G4EAN** will be pleased to meet you at the event, hosted by the **South Normanton, Alfretonand District ARC**. We all look forward to seeing you there!

Rob G3XFD

practical wireless services

Just some of the services *Practical Wireless* offers to readers...

Subscriptions

Subscriptions are available at £33 per annum to UK addresses, £41 Europe Airmail and £50 RoW Airmail.

Components For *PW* Projects

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

Photocopies & Back Issues

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

Placing An Order

Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **0870 224 7830**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **0870 224 7850**.

The E-mail address is **clive@pwpublishing.ltd.uk**

Technical Help

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

amateur radio waves

Packet Radio - A Lost Treasure?

● **Dear Rob**

Back in 1987 I had my first experience of packet radio as it entered its formative stage in the UK. At first I was unimpressed by could see the potential, and to date I've been active on this mode ever since to the point that it can now offer every radio based computer user the same services the internet can offer but within a closed system.

Just imagine a mode, which gives you access to the r.f. equivalent of world-wide Newsgroups, Spam free world-wide E-mail (or should that be r.f.-mail?), file downloads and uploads and chat servers like IRC (Internet Relay Chat) and all for a typical outlay these days of about £10 for a home-brew sound card interface.

These packet systems are run by a group of real enthusiasts who are crying out for people to use their services often provided at their own expense because **they enjoy doing so.** And yet this unique mode has had absolutely no support or publicity from the RSGB or any major Amateur Radio publication for almost 15 years to my knowledge - why?

Why is such a unique mode not even getting as mention? And yet plenty for stuff like the internet linked repeaters that only supply the same boring chat but from a greater distance is beyond me!

We need to act before one of amateur radio's most truly unique mode disappears into the wilderness. I urge all readers to enquire via their local radio clubs about local packet radio activity, read up on packet radio or ask a local packeteer to demonstrate their packet stations at the local club or in their personal shacks (whilst plying the host with a few beers of course!).

It's breaking my heart to see packet radio dwindling through lack of awareness of the mode!

Regards.

Andy Foad G0FTD
Whitstable
Kent

Editor's comment: For many years *PW* ran a specialist, dedicated Packet Radio column but feedback to the authors - and to *PW* editorial staff - was virtually non-existent. The decision to stop the columns, or to change their coverage was directly due to the authors themselves. As the hobby changes (particularly on the electronic data side of things) readers seem to be more interested in other modes. However, as *PW* strives to represent as wide a coverage as possible in our multi-faced hobby, we're always interested in suggestions and ideas. Anyone interested in Packet Radio and in agreement with Andy is invited to contact the Editorial offices, your feedback is important to us!

A Re-think On Transmissions?

● **Dear Editor**

Spark transmissions were eventually banned due to the wide bandwidth they occupied. Then along came a.m. broadcasting, however commercial uses such as the maritime service and the military found a.m. took up too much room so s.s.b. came in.

Now, with the introduction of digital broadcasting it's overlooked that digital transmissions take up more bandwidth than a.m. did. Better the broadcasters had brought in s.s.b. rather than digital do you not think? A sense of deja vue?

Ross Bradshaw G4DTD
St Austell
Cornwall

Lead Free Solder

● **Dear Rob**

More on the solder subject - 60/40 Tin/Lead and 63/37 Fully Eutectic Tin Lead Solders will have to be available for a considerable time yet. This is because they will be essential for maintenance and repair operations on existing equipment.

Lead free and lead based solders are not compatible and should not be mixed if reliable joints are to be made. Thermal stresses and leaching problems mean that joints made with mixtures of lead free and lead based alloy will fail and crack much earlier than those made with 'pure' lead free or lead based alloys.

I would advise anyone considering repairing, or working on any equipment to make sure that they use the correct solder. This also applies to all those salvaged components in the junk box. If they have to be assembled with lead free materials then using a solder pot to re-tin the leads with lead free solder should help. But beware that the higher soldering temperatures may damage the component, particularly polyester capacitors and other plastic packages devices.

The legislation, although ill conceived and badly drafted does allow lead based materials for maintenance purposes; hence also the sale of lead based solders. Additionally, the high reliability requirement and military communities have exemptions since the reliability of joints required by them is so far not achievable in all circumstances with the lead free technologies available.

Best Regards.
John Dunton G1RXC
Haverhill
Suffolk

Comment From ZL on "Why AM?"

● **Dear Rob**

I'm writing from South Africa to comment on the "Why the interest in AM?" **Ray Howes G4OWY** (letters to the Editor, PW December 2005.)

My reply to Ray is based mainly on recruiting new members for Amateur Radio as well as having fun. It's a case of "out of sight, out of mind" or "out of ear-shot, out of mind"! So if the prospective Amateur can't hear them, what encouragement is there to do anything about it!

My earliest memory of Amateur Radio (1953ish) was listening to an Amateur, about half-a-mile away, on my crystal set! His transmission must have been on 160 metres, Top Band in those days! It gave me quite a thrill!

My suggestion is to use the 'primitive' modes of a.m. and c.w. as 'attention grabbers' and 'starters'. This does mean that the beginner should be encouraged to progress to the other modes as well.

All clubs will have to co-operate and transmit or relay their national society's news bulletins on a.m. as well as on the more popular modes.

When helping out at a Amateur Radio stand at a special event or school science week I have slipped in a bit of public relations for the hobby. I have found that using an a.m. (A3E) demonstration has helped to prove the point.

Many special events and contests are held annually so why not have an a.m. category to which the short wave listener or beginners may tune in using the less complex receiver? Many Amateur Radio careers have been started in this way.

On two separate occasions, this year I received **John ZS2OC in** Port Elizabeth (5/9) on 7.070MHz using an old Sanyo transistor portable radio! The distance between the two cities is approximately 400 miles! The old timers may say "so what"? but to the novice it would be an achievement.

As far as c.w. is concerned it is a good "attention grabber" as well! During demonstrations of Amateur Radio to young Guides and Scouts, especially the Cub Scouts, showing them how they can send short messages using whistles or

flashlights never fails to fascinate them.

They are also fascinated to hear that the system of abbreviations in c.w. (i.e. would = wud, could = cud, etc.) are similar to those they use when sending SMS texts on their mobiles!

However, I too, have a confession! A lot of my Amateur Radio has been done using two commercial rigs. This is mainly due the very reasonable price I paid for them. If it weren't for them I would still be using c.w. and my homebrew QRP rigs more often!

Incidentally Rob, knowing of your interest in railways - particularly knowing that your wife Carol has travelled on the famous 'Blue Train', it's a pity you haven't travelled by the Blue Train as well. Very luxurious! I would have to save up a couple of years to travel that way. Come to think of it the train is mainly for the Johannesburg - Cape Town run.

There is another "special" train (green, actually, and really old fashioned!) owned by Rovos Rail Company. This one goes a bit more further afield, Victoria Falls and possibly Namibia. Not sure of the facts, so I will have to check. Travel agents in the UK and should be able to give you info. on it. I hope you can one day enjoy a trip yourself. Regards.
Dave Gemmell ZS6AAW
Irene
South Africa

Editor's wishes: Despite the fact it would blow my travel budget - I'm just waiting for the first invitation to give a *PW* talk to a South African Club Dave! I've not been to South Africa since the early 1960s during my Navy service. The dockside loco drivers couldn't understand why a British sailor was so interested in their engine! I'll be there one day! Rob.

Using dBW In The Log

● **Dear Rob**
Whilst **Arthur Roberts G7EMD** is correct that the Amateur Radio Licence conditions **used** to only require power to be logged in dBW, it has been altered to allow either power or power level in dBW to be recorded. As per Clause 6 of BR68, which says.

6(1) Subject to sub-clause 2(6), the Licensee shall keep a permanent record (the "Log") of all wireless telegraphy transmissions at the Main Station Address and all Temporary Locations showing:

(e) power (or power level in dBW);

I actually still prefer to use dBW as I can keep track of gains and losses via amplifiers and antennas and losses in coaxial cable as it's a case of adding or subtracting from a common value.

For those who are still confused, the following approximations may be useful.

0dBW = 1W
3dBW = 2W
6dBW = 4W
9dBW = 8W
12dBW = 16W
15dBW = 32W
18dBW = 64W
21dBW = 128W
24dBW = 256W

From this it's easy to see that power is doubled every time the dBW figure increases by 3. Conversely, power is halved every time the dBW figure is decreased by 3.

You can also get to some of the more common power and power levels required for the log from the following.

0dBW = 1W
10dBW = 10W
20dBW = 100W

After a while, like any system, you get used to the dBW figures that you commonly used.

Whilst we are on logging, I am sometimes amazed at how many people use 's.s.b.' when they mean J3E or 'f.m.' when they should use F3E. Regards,
Dave G0DJA
Bolsover
Derbyshire

Editor's comments: Thanks Dave - I think some of us already use this short cut - now other can use it too! Please see Technical For The Terrified on page 13 in this issue, where Tony Nailer G4CFY discusses the dreaded deciBels - they can be friends when you know how to use them!

Letters Recieved by e-mail. 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

amateur radio rallies

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

2006

February 5
21st South Essex ARS Rally
Website: **www.southessex.ars.btinternet.co.uk**
The 21st South Essex Amateur Radio Society, Radio & Computer Rally will be held at the Paddocks Community Centre, Long Road, Canvey Island, Essex. (The Paddocks is situated at the end of the A130). Doors Open 1030.

February 12
Northern Cross Rally
Contact: **John G7JTH**
Tel: **(01924) 251822**
Website: **www.wdrs.org.uk**
The Wakefield & District Radio Society will be holding its 15th Annual Northern Cross Rally at teh Thornes Park Atletics Stadium, Horbury Road, Wakefield, West Yorks. Doors open at 1030 (1015 for disabled visitors), ample parking, Bring & Buy. Admission £1.50.

February 26
Swansea ARS Amateurr & Radio Computer Show
Contact: **Roger GW4HSH**
Tel: **(01792) 404422**
The Swansea ARS rally is being held today at Afan Lido, Aberavon Seafront, Poert Talbot, One mile from J41 off the M4. Opening at 1030 the rally will offer plenty for visitors including trade stands, Bring & Buy, Special Interest Groups, Repeater Groups, Catering and Talk-in on 145.550MHz.

March 11
Junction 28 QRP Rally
Contact: **Russell Bradley G0OKD**
Tel: **(01773) 783394**
E-mail: **russel.bradley@ntlworld.com**
The 6th Junction 28 QRP Rally hosted by the The South Normanton Alfreton And District Amateur Radio Club (SNADARC) in Association with the G-QRP Club takes place at the Village Hall Community Centre, Market Street, South Normanton, Nr Alfreton, Derbyshire.The event will be fully signed, just five minutes from the M1 Junction 28 and the A38. Open to the public from 1000. There will be Amateur Radio, electronics and related items, Bring & Buy and special interest group stalls, outdoor flea market (weather permitting), refreshments.

March 12
Aberystwyth Rally
Contact **Ray GW7AGG**
Tel: **(01970) 611432**
E-mail: **ray@clocktower.go-plus.net**
The Aberystwyth Rally Hobbies Fair with Amateur Radio, computers, model railways, model aircraft and doll's houses takes place at Penweddig School, Aberystwyth from 1000 until 1630. There will be h.f. and v.h.f. on the air, hobbies demonstrations, trade stands and special interest groups, refreshments and Talk-in on S22.

March 12
Wythall Radio Club 21st Annual Radio & Computer Rally
Contact: **Chris G0EYO**
Tel: **(07710) 412819**
E-mail: **g0eyo@blueyonder.co.uk**
Website: **www.wrcrally.co.uk**
The Wythall Radio Club 21st Annual Radio & Computer Rally takes place at the Woodrush Sports Centre, Shawhurst Lane, Hollywood, Nr Wythall, Birmingham B47. There will be plenty of radio and computer traders, massive Bring & Buy, refreshments, good on-site, parking. Only two miles from J3 M42. The rally will be open from 1000-1500 and will be under cover in the sports halls. Admission: £1.50. Talk-in on S22 and the location will be well sign posted. Bookings are now being taken and traders are advised to book early.

May 1
22nd Dartmoor Radio Rally
Contact: **Rob 2E0ONO**
Tel: **(01752) 773711**
The Dartmoor Radio Rally is taking place at the Tavistock College, Tavistock, Devon, this is the same locaton as last year with plenty of space for traders. There will be disabled access and plenty of parking on the college site. Featuring trade stands, Bring & Buy, refreshments and Talk-in on S22. Doors open 1030 (1015 for disabled visitors).

Note to Rally Organisers: Please include the postcode of your rally venue (see Keylines).

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off.

amateur radio news & products

A comprehensive look at what's new in our hobby this month

Administration Baton Handed Over

Communications regulator Ofcom took over a series of Amateur Radio administrative tasks from 1 January 2006. The tasks include managing the repeater and packet networks, issuing NoVs for special event callsigns, contest callsigns and operation on 5MHz and providing permits for amateur radio research and Raynet operations.

The roles were previously undertaken by the Radio Society of Great Britain (RSGB) on behalf of Ofcom and its predecessor the Radiocommunications Agency. The Society received an annual subsidy for this work and was therefore able to issue NoVs free of charge. As part of a review of Amateur Radio procedures, Ofcom has decided to take these roles in-house. The management will now be carried out from Ofcom's headquarters in London.

The RSGB General Manager **Peter Kirby G0TWW**, welcomed the changes "I am delighted with this decision. It shows Ofcom's commitment to Amateur Radio and will provide a slicker service to the Amateur Radio community as Ofcom can provide more resources than the RSGB," he said. Peter also said that the shake-up would "allow the RSGB to revert to being a truly representative organisation able to concentrate fully on representing its members and all UK radio amateurs to Ofcom and other governmental bodies".

Ofcom's **Steve Roper G8MXZ**, praised the RSGB for carrying out the administrative roles in the past and for providing a very efficient service over many years. He added: "Ofcom has a duty to manage the Amateur Radio spectrum and is committed to maintaining a good service for Radio Amateurs."

The RSGB staff will work alongside Ofcom representatives to ensure the hand-over of responsibilities goes as smoothly as possible.

Podcast

Dave Ackrill G0DJA notified the Newsdesk to say that he has recently set-up a podcast for Bolsover Amateur Radio Society News. The first issue is out now. To listen to the Podcast go to **http://morseman.podOmatic.com/**

Derek is hoping to get a link put onto the new Bolsover ARS website at **http://www.g4rsb.org.uk** and is planning to try and organise for an RSS feed for the document form of the newsletter. Keep an eye on the website to see how things develop.

Flex-Radio SDR-1000

Waters & Stanton PLC have been appointed as exclusive UK distributors for American manufacturers Flex-Radio. Flex Radio have a reputation in the States for their SDR-1000 Software Defined Radio, which is said to be a big seller. Now thanks to W&S the SDR-1000 is available here.

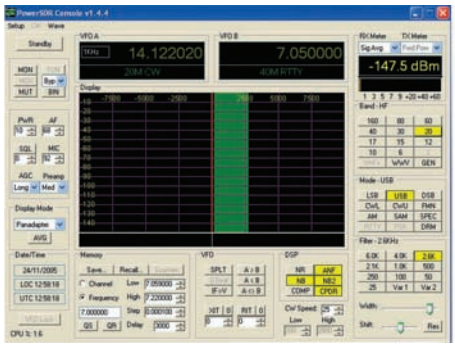
So, what exactly is Software Defined Radio? W&S say: You should not confuse it with a conventional transceiver controlled by software. An SDR goes much further and it's the most exciting development in Amateur Radio for many years and is set to totally change the scene of h.f. radio communications for the future. With an SDR your PC becomes the central processor for the transceiver. The majority of the tasks including IF filtering, s.s.b./a.m./f.m. generation, DSP processing, Audio Tailoring, a.g.c., a.l.c. and Receiver Demodulation are taken out of the hardware transceiver and given over to the PC.

The SDR-1000 is the first commercial software defined radio to become available for use in Amateur Radio. It offers s.s.b., c.w., f.m., a.m. (DRM option) receive from 12kHz to 65MHz and transmits on the bands 1.8-28MHz (including 60m). The i.f. filtering is variable from 6kHz to 25Hz - with steep curves and no ringing! Used with the freely downloadable software, it produces a complete 1W or 100W ready-to-go transceiver.

Using single conversion, with front-end band-pass filters and an i.f. of 12kHz, the SDR-1000, uses a quadrature mixer detector that results in an extremely low noise floor and superb image rejection. The 12kHz i.f. signal is then taken via an appropriate sound card into the PC. After that everything else is done within the PC.

The demodulated receiver a.f. signal comes back out via one of the sound card ports and on transmit the 12kHz modulated transmit signal via the second port. It's then mixed to the final output frequency to produce a 1W r.f. signal. An optional internal 100W amplifier module is available. An optional internal automatic a.t.u. is also available.

To run the SDR-1000 you will ideally need a PC with a processor speed of around 2.8GHz. Slower ones will work but will not provide optimum performance. *Windows XP* is absolutely necessary and a sound card is absolutely crucial for the correct operation of the SDR-1000. (The internal entertainments grade sound card of your PC will not be adequate. You will need a professional 4-in/4-out design as used by the music industry. W&S strongly suggest you purchase the recommended Delta-44 from them.)



The price of the SDR-1000 costs: £650 for the nominal 1W into 50Ω output version; £995.00 for the 100W version with p.a. fitted, the software needed to carry out all operations and processing is **free.** The Delta-44 PCI Sound Card with 4-in/4-out 'break-out' box is £99; set of connecting leads from Delta 44 to SDR-1000, £24.95. The Optional Shuttle-PRO VFO control with 15 control buttons, £99 and the optional automatic a.t.u., £159.

Look out for a review of the SDR-1000 in a future issue of *PW*.

For more details take a look at **www.flex-radio.com** or contact:

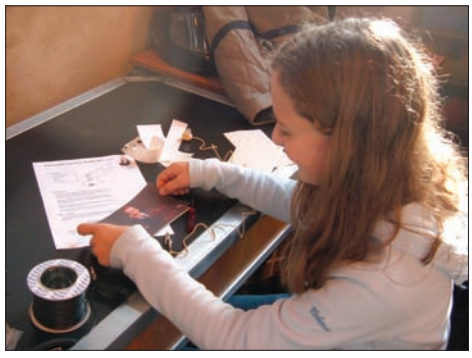
Waters & Stanton PLC
Spa House, 22 Main Road
Hockley, Essex SS5 4QS
Tel: (01702) 206835
E-mail: info@wsplc.com Website: www.wsplc.com

Stop Press: We hope to have an SDR-1000 to evaluate on your behalf soon. Watch this space! **Editor**

Send all your news and club info to
Donna Vincent G7TZB
at the PW editorial offices
or e-mail donna@pwpublishing.ltd.uk

Inspriring Future Communications

Norfolk Amateur Radio Club (NARC) members are always keen to encourage future young communicators, so when Norwich's Inspire Science Centre approached the club to run an interactive activity display during the October half term holiday they were keen to get involved. Inspire is located at St Michael's Church in Norwich and provides a range of interactive 'hands on' science activities for children. Rising to the challenge, NARC members organised an interactive communications exhibit that not only featured live Amateur Radio communications but also a Morse Code Challenge and Postcard Crystal Set construction.



Over the course of the week almost 80 certificates were presented to children who sent and received a simple Morse message using the RSGB's Morse sheets, whilst over 60 basic Postcard Crystal Radio Sets were constructed and taken home by youngsters visiting the display. Throughout the week the NARC members who were volunteering were encouraged by the high level of interest in the activities and the sense of achievement displayed by the children upon presentation of Morse certificates or on discovery that they really had just built a working radio!

Norfolk club members were also surprised by the level of fascination that radio and Morse code in particular provided to the young visitors to the display. As one NARC member noted "What surprises me is how Morse code is still found to be of fascination to children so young they have never heard of it, or really know what it is used for".

The enthusiasm exhibited by the young visitors to the display must have been infectious because another club member said "I found it a most interesting operation and would do it again any time"! Maybe they have spoken too soon as NARC are already planning a similar event as part of the British Academy's Science Festival when it visits Norwich in September 2006! The NARC would like to thank all of the club members who volunteered their spare time to help with the display and **James Piercey** of Inspire for his assistance during the week.

Norfolk Amateur Radio Club is a thriving organisation with over 100 members and anyone interested in radio, communications or electronics is welcome to join. The club meets weekly on Wednesday evenings from 1930 hours at the Norwich Aviation Centre, Norwich Airport. Full club, contact and programme details can be found at: **www.norfolkamateurradio.org**

Take that Noise Away!

British manufacturer bhi have added another d.s.p. noise cancelling module to their popular range. The **A**mplified **N**oise **E**liminating **M**odule (**ANEM**) is the first product in the new bhi 'Noise Away' range.

The **ANEM** is a compact, easy to use stylish in-line module, which simply connects inbetween the communications equipment and extension speaker. It's suitable for a wide range of applications, but is particularly useful for improving voice quality in Amateur Radio, removing unwanted QRM and QRN to give much improved readability and speech intelligibility across all bands.

The **ANEM** is easy to set up and its functions are microprocessor controlled, enabling simple operation via two push-buttons: power on/off audio by-pass and d.s.p. filter on/off. Four or eight levels of noise cancellation are selectable via the push-buttons on power up, the last selected filter level remaining in the memory when the unit is switched off.

Supplied with a fused DC power lead (2.1mm) and a 3.5mm mono plug lead 1.2m long, plus full operating instructions the ANEM costs £119.95 including VAT plus £4.95 P&P and is available direct from bhi or any of their authorised dealers, contact bhi on **0840 240 7258** for more information.

All change at Poole Radio Society

From the start of 2006, Poole Radio Society (PRS) will be meeting on Wednesdays at the Old Chapel Hall, Cabot Lane, Creekmoor, Poole at 1945 for a 2000 hours start. The second Wednesday of each month will be the formal monthly meeting whereas the other Wednesdays will be activity evenings with operation on the air, construction, etc. Starting on Wednesday 18 January, Poole Radio Society will be running a Foundation Course at their new venue, using the smaller room at the rear of the main hall.

Commenting on the move, Poole Radio Society President **Dave Mason G3ZPR** said that "The new premises will provide the society with a welcome opportunity to run more than one activity at a time and in particular run Foundation Courses alongside club meetings. The main hall is much larger than our previous meeting room, so that we will have capacity for a greater number of members".

For more information on the PRS events, courses etc., please contact **Phil Mayer G0KKL** on (01202) 700903 or have a look at the PRS website at **www.qsl.net/g4prs**

Icom Donation

Icom (UK) Ltd., has recently donated two IC-T3H 144MHz v.h.f. hand-held radios to the **Priory LSST School** based in Lincoln. The donation is in appreciation of the school's contribution to an Icom sponsored transatlantic project. This project, in conjunction with **Franklin Elementary School** in Washington, was to produce an Amateur Radio Comic called *The Adventures of Zack and Max - Mady Goes to England*, which is based on the experiences of a American child visiting the UK.

Pupils and teachers at Franklin Elementary school had been working with Icom America and had produced two comics encouraging young people to take the hobby of Amateur Radio in the United States. For the third comic in the series they were seeking a UK school with an active Amateur Radio Club. The comic was to depict a young US Radio Amateur visiting the UK. He, or she, would make friends whilst at school in the UK and the story would focus on the goodwill and international friendship aspects of Amateur Radio. Priory School responded to an advert placed by Icom UK who in turn put them in touch with the American School and the rest is publishing history.

The American and UK schools spent three months writing the story, planning out the scenes, and communicating with their counterparts across the Atlantic. All the children worked very hard putting the story together and gave up their own time to produce the comic. They posted their work to computers and passed scripts back and forth. Importantly, more than just stories were exchanged.; friendships were started.

David Mackinder G4DWP, a Technology teacher at the Priory LSST School said, "The project with Franklin Elementary School in Kirkland, Washington was a very interesting and fun exercise for the students. It was marvellous opportunity and marvelous experience for them to be part of a team working towards a common goal and to produce a professional publication that they would actually feature in as cartoon characters. This was especially so when the other half of the team was in another country half way around the world. We received a piggy bank from Kirkland, based on one of the characters in the comic. In return our pupils manufactured a clock using the school's CAD CAM facilities that was then sent to Washington State. Our students have experienced at first hand how Amateur Radio promotes international friendship. Through the story line in the comic they were also able to appreciate the latest technological possibilities that Amateur Radio has to offer. It's hoped that during the new school year (2005/2006) our radio club students will maintain regular contact with the students in Kirkland Washington using the same technology".

David also said, "The Priory LSST School in Lincoln has an Amateur Radio Club, which was formed in December 2003. The club is very active and has a regular contacts with other school stations in the UK, Europe, USA and Canada. We have a total of 14 students ranging in age from 12 to 17 years who have successfully passed their Amateur Radio Foundation Licence. Each student has given an hour of his or her time each week to obtain this licence".

Thanking Icom, David Mackinder said,"We were extremely pleased to get the opportunity to take part in the project with the Washington State School and now we have something that we can build on.

Thanks for that chance and thanks for donating the equipment. It will all be extremely useful".

Ian Lockyer, Marketing Manager at Icom (UK) Ltd., said, "Icom wanted to say 'thank you' to the pupil's of Priory School for their contribution to this the third, issue of *Zack & Max*. These hand-held radios seemed to be an entirely appropriate way of doing this. To download this third comic go to **http://www.icomamerica.com/amateur/comic_book/default.asp**'

amateur radio clubs

Keep up-to-date with your local club's activities and meet new friends by joining in!

HAMPSHIRE
Andover RAC
Contact: **Terry Cull**
Tel: **(01980) 629346**
website: **www.arac.co.uk**
The Andover Radio Amateur Club meet on the 1st and 3rd Tuesday of each month at 1900 hours. Meetings take place at the Village Hall, Wildhern SP11 0JE, just North of Andover. The next couple of meetings are: **Feb 7:** Chippenham DARC - Mini DXPediton to Lundy Island 2004 by **G0GRI** and **21st**:: Build your own Radio by **G4NWJ**. Why not go along and join in? You'll be made very welcome.

KENT
Hilderstone Radio and Electronics Club
Contact: **Ken Smith G3JIX**
Tel: **(01304) 813175**
Website: www.g0hrs.org.uk
The Hilderstone Radio and Electronics Club meet at the Hilderstone Adult Education Centre, St Peter's Road, Broadstairs, Kent CT10 2JW on the second and fourth Friday of the month. Full details on the club's activities can be found at **www.hilderstone.ac.uk**

NORTH WEST
Macclesfield Wireless Society
Contact: **Ron G0WUZ**
Tel: **(01625) 430433**
E-mail: **gx4mws@gx4mws.com**
Website: **www.gx4mws.com**
The Macclesfield Wireless Society meets every Monday at 2000 hours, at the Pack Horse Sports & Social Club, Abbey Road, Macclesfield SK10 3AU. The weekly club net operates each Wednesday from 2000hours on 145.550MHz +/- QRM. Forthcoming meetings and events include: **Jan 16:** Antenna construction activity; **23rd**: On-air activity evening; **30th**: Talk on Summits On The Air by **Tom M1EYP** and **Jimmy M3EYP; Feb 2:** New Intermediate Licence course starts (continuing subsequent Thursdays); **6th:** On-air activity evening and **13th:** Club evening.

STAFFORD
Stafford & Districts ARS
Contact: **Graeme Boull G4NVH**
Tel: **(01785) 604534.**
E-mail: **graeme.boull@ntlworld.com**
Website: **www.g3sbl.org.uk/**
The Stafford & District Amateur Radio Society meet on Thursday at 2000hours. The shack is located in the AREVA T&D UK Ltd., Factory in St. Leonards Avenue, Stafford. Forthcoming meetings include: **Jan 19:** Shack Night; **20**: New Year Party and **26th**: Buttie Pole Introduction by **Graeme G4NVH.** Why not go along and join in?

Technical FOR THE TERRIFIED!

Tony Nailer G4CFY asks, "Do those dreadful deciBels drive you crazy or are you lost with logarithms"? If they do - this month he's doing his best to remove the mystery for you!

Several *PW* readers have enquired why Ofcom quote the permitted powers usable on the Amateur Bands in dBW (decibels relative to one Watt). First, I must say that I really don't know why Ofcom quotes the power in dBW. Like the reader, I believe it makes no sense in a Licence for Amateur Radio users. My current Amateur Radio Licence has powers in Watts together with powers in dBW in brackets, though until fairly recently I'm sure it was dBW only.

The question from you may be "What are deciBels'? In replying I can say it's a good question, and one to which the answer is not easy! The reply "A dB, as used in electronics, is defined as 10 times the logarithm of a power ratio or 20 times the logarithm of a voltage or current ratio". Now just what does that mean in English? (Not a lot!).

So, as this is Technical for the Terrified, I'm aiming to help remove the dB mystery. And to start let me try to provide an understanding in small steps. Incidentally, the deciBel is one tenth of a Bel (a full Bel is too large a unit for radio/electronics use).

Let's start: 10*10 = 100, No problem. 10*10 = 10^2 (10 squared).

The number 10 is called the base and the power of 2 in this case is the logarithm to the base 10.

From this if $10^2 = 100$, then log(100) = 2.

Similarly $1000 = 10^3$, then log(1000) = 3.

If the ratio, let's say the input and output levels of a unit, is given the symbol A, then the dB figure would be 20*log(A) (voltage or current levels), and 10*log(A) in the case of power levels.

In a voltage amplifier with an input swing of 50mV and an output swing of 1.5V the ratio of output to input is a voltage gain (G) of 1.5/0.05 or 30 times. Applying the formula G = 20*log(30) will give the result in dBV.

3 0 log	1.47712
× 2 0 =	29.542426

To get back from 29.5dBV to a ratio again, we need to use the 'Antilog' function. On many calculators you'll often need the second function facility. The function has the marked symbol 10^x.

2 9 . 5 ÷ 2 0	
= 10^x	29.85

Note: This isn't quite the 30 we started with because I rounded it down a bit from 29.542426.

Try the method it yourself. Using your pocket calculator starting from 29.542426.

2 9 . 5 4 2 4 2 6 ÷ 2 0	
= 10^x	30.000003

Cable Losses

All feeder cables are 'lossy' (you have to put more in than you get out at the far end) and some cable are more lossy than others. With all cables, loss increases with frequency, until a point where each cable becomes unusable as an efficient means of transferring power.

At 144MHz RG58 coaxial cable typically will have a loss of 0.212dB per metre. In a case where there's a 15m run there will be a power loss of (15*0.212)dB = 3.18dB. So, what's this as a real ratio remembering that ydB = 10*log(G). Then G = antilog (y/10).

G = antilog(3.18/10) = antilog(0.318).

3 . 1 8 ÷ 1 0	
= 10^x	2.08

The answer shown should be 2.08. Clearly cable does not have gain so the final displayed figure is a loss factor. The power put in at the transmitter end, will be less than half as it emerges at the other end (the antenna)!

The correct way of doing the calculation is to define loss as negative dBs, and gain as positive dBs. So, RG58 has a loss of 0.212dB per metre, over 15m (total loss 3.18dB). The loss factor (L) will be L = antilog (3.18/10).

3 . 1 8 +/- ÷ 1 0	
= 10^x	0.4808

Antenna Gain

Now let's work out antenna gain! And that's expressed either with reference to an isotropic radiator (dBi), or with respect to a dipole (dBd).

The isotropic radiator is a theoretical point source that radiates uniformly in all directions, which cannot be constructed and tested. So a dipole is the simplest practical reference antenna.

The dipole is said to have approximately 2.25dBi (gain over an isotropic radiator). But this is because the radiated signal does not emit in a perfectly spherical shape, but is concentrated into one 'doughnut shaped' lobe, illuminating less than half the sky. The dipole is a useful reference for other, real antennas

On the other hand, effective radiated power (e.g.) is always given in dBi (relative to an isotropic radiator). A small Yagi antenna might have a gain of 7dBi. This as a ratio (G) will be G = antilog(7/10) or 5.01 times.

Effective Radiated Power

Now to calculate an effective radiated power: If the 15m of RG58 with a loss figure of 3.18dBs is used in conjunction with a Yagi antenna with a gain of 7dBi, the whole antenna system gain will be (7 3.18) = 3.82dB.

With a 20W output, a 144MHz transmitter, has an output power of 13dBW (= 10*log(20)). The e.r.p. will then simply be 13+3.82 = 16.82dBW.

Well that wasn't very hard was it? But what's it in real watts? The answer can be found by W = antilog (16.82/10) = 48.08W.

1 6 . 8 2 ÷ 1 0	
= 10^x	48.084

Antenna Gain Alternative

Alternatively, work out what the antenna system gain is, in this case 3.82dB. Convert that to a ratio, G = antilog (3.82/10) = 2.41. Then multiply it directly by the power coming out of the rig, 20W and the result is 48.2W. Again there are slight differences here, due to rounding errors.

It isn't usually necessary to use too many decimal places in the calculations. This is because in any practical antenna system there are also losses due to connectors and mismatches and it's good practice to assume up to 0.5dB for these.

I hope that the calculations included in this article will enable you to determine just how much effective radiated power you're running. Hopefully, this month's exercises will also give you new insight into the range achievable for actual radiated power. **PW**

Corresponding & Subscribing

If you wish to correspond regarding this article or previous ones subscribe to the list **pw g4cfy on @pwpublishing.ltd.uk** by sending a blank E mail with the word subscribe in the subject box. When you receive confirmation from the server you can send an E mail to **pw g4cfy@pwpublishing.ltd.uk** and your comments will be answered by myself or the *PW* team.

MOONRAKER

Manufacturers of radio communication antennas and associated products

Log Periodic

MLP32 TX & RX 100-1300MHz one feed, S.W.R. 2:1 and below over whole frequency range p ofessional quality (leng h 1420mm) **£119.95**
MLP62 same spec as MLP32 but wi h increased freq. range 50-1300 Leng h 2000mm..... **£189.95**

Mobile HF Whips (with 3/8 base fitting)

AM-PRO 6 mt *(Length 4.6' approx)*..... **£16.95**
AM-PRO 10 mt *(Length 7' approx)*..... **£16.95**
AM-PRO 17 mt *(Length 7' approx)*..... **£16.95**
AM-PRO 20 mt *(Length 7' approx)*..... **£16.95**
AM-PRO 40 mt *(Length 7' approx)*..... **£16.95**
AM-PRO 80 mt *(Length 7' approx)*..... **£19.95**
AM-PRO 160 mt *(Length 7' approx)*..... **£49.95**
AM-PRO MB5 Multi band 10/15/20/40/80 can use 4 Bands at one time *(Length 100")*..... **£69.95**
SPX-100 'plug n go' multiband 6/10/12/15/17/20/30/40/80mtrs. Band changing is easy via a flylead and socket and adjustable telescopic whip section 1.65m when fully extended..... **£49.95**

Slim Jims

SJ-70 430-430MHz slimline design wi h SO239 connection. Leng h 1.00m..... **£19.95**
SJ-2 144-146MHz slimline design wi h SO239 connection. Leng h 2.00m **£24.95**

VHF/UHF Mobile Antennas

MICRO MAG Dual band 2/70 antenna complete with 1" magnetic mount 5mtrs of mini coax terminated in BNC **£14.95**
MR700 2m/70cms, 1/4 wave & 5/8, Gain 2m 0dB/3.0dB 70cms Leng h 20" 3⁄8 Fitting..... **£7.95**
SO239 Fitting..... **£9.95**
MR 777 2 Metre 70 cms 2 8 & 4 8 dBd Gain (5⁄8 & 2x5⁄8 wave) (Length 60") (3⁄8 fitting)..... **£16.95**
(SO239 fitting)..... **£18.95**
MRQ525 2m/70cms, 1/4 wave & 5/8, Gain 2m 0 5dB/3 2dB 70cms Leng h 17" SO239 fitting commercial quality..... **£19.95**
MRQ500 2m/70cms, 1/2 wave & 2x5/8, Gain 2m 3.2dB/5 8db 70cms Leng h 38" SO239 fitting commercial quality..... **£24.95**
MRQ750 2m/70cms, 6/8 wave & 3x5/8, Gain 2m 5.5dB/8.0dB 70cms Leng h 60" SO239 fitting commercial quality..... **£39.95**
MRQ800 6/2/70cms 1/4 6/8 & 3 x 5/8, Gain 6m3.0dB /2m 5.0dB/70 7 5dB Length 60" SO239 fitting comme cial quality **£39.95**
GF151 Professional glass mount dual band antenna. Freq: 2/70 Gain: 2 9/4 3dB. Length: 31"..... New low price **£29.95**

Single Band Mobile Antennas

MR 214 2 metre straight stainless 1⁄4 wave 3⁄8 fitting ..**£4.95**
SO239 type..... **£5.95**
MR 258 2 Metre 5⁄8 wave 3.2 dBd Gain (3⁄8 fitting) (Leng h 58") **£12.95**
MR 268S 2 Metre 5⁄8 wave 3.5dBd gain Leng h 51" S0239 fitting..... **£19.95**
MR 290 2 Metre (2 x 5/8 Gain: 7.0dBd) (Length: 100"). SO239 fitting, " he best it gets"..... **£39.95**
MR 625 6 Metre base loaded (1/4 wave) (Leng h: 50") commercial quality..... **£19.95**
MR 614 6 Metre loaded 1⁄4 wave (Leng h 56") (3⁄8 fitting)..... **£13.95**
MR 644 6 Metre loaded 1⁄4 wave (Leng h 40") (3⁄8 fitting)..**£12.95**
(SO239 fitting)..... **£15.95**

Single Band End Fed Base Antennas

70 cms 1⁄2 wave (Leng h 26") (Gain: 2.5dB) (Radial free)..... **£24.95**
2 metre 1⁄2 wave (Length 52") Gain 2.5dB) (Radial free)..... **£24.95**
4 metre 1⁄2 wave (Leng h 80") (Gain 2.5dB) (Radial free) **£39.95**
6 metre 1⁄2 wave (Length 120") (Gain 2.5dB) (Radial free)..... **£44.95**
6 metre 5⁄8 wave (Leng h 150") Gain 4.5dB) (3 x 28" radials)...**£49.95**

Mini HF Dipoles (Length 11' approx)

MD020 20mt version app ox only 11ft **£39.95**
MD040 40mt version app ox only 11ft **£44.95**
MDO80 80mt version app ox only 11ft **£49.95**
(slimline lightweight aluminium construction)

Vertical Fibreglass Co-Linear Antennas

New co-linear antennas with specially designed tubular vertical coils that now include wide band receive! Remember, all our co-linears come with high quality N-type connections.

SBQBM100 Mk.2 Dual Bander **£39.95**
(2m 3dBd) (70cms 6dBd) (RX:25-2000 MHz) (Leng h 39")
SQBM110 Mk.2 Dual Bander (Radial FREE!) ...**£49.95**
(2m 3dBd) (70cms 6dBd) (RX:25-2000 MHz) (Leng h 39")
SQBM200 Mk.2 Dual Bander..... **£49.95**
(2m 4.5dBd) (70cms 7.5dBd) (RX:25-2000 MHz) (Leng h 62")
SQBM500 Mk.2 Dual Bander Super Gainer..... **£64.95**
(2m 6.8dBd) (70cms 9.2dBd) (RX:25-2000 MHz) (Leng h 100")
SQBM800 Mk.2 Dual Bander Ultimate Gainer..... **£119.95**
(2m 8.5dBd) (70cms 12.5dBd) (RX:25-2000 MHz) (Leng h 5.2m)
SQBM1000 MK.2 Tri Bander **£69.95**
(6m 3.0dBd) (2m 6.2dBd) (70cms 8.4dBd) (RX:25-2000 MHz) (Length 100")

Single Band Vertical Co-Linear Base Antenna

BM33 70 cm 2 X 5⁄8 wave Length 39" 7.0 dBd Gain...**£34.95**
BM45 70cm 3 X 5⁄8 wave Leng h 62" 8.5 dBd Gain....**£49.95**
BM55 70cm 4 X 5⁄8 wave Leng h 100" 10 dBd Gain...**£69.95**
BM60 2mtr5⁄8 Wave, Leng h 62", 5.5dBd Gain..... **£49.95**
BM65 2mtr 2 X 5⁄8 Wave, Length 100", 8.0 dBd Gain..... **£69.95**

MFJ Products

New lower prices on ALL MFJ Tuners. See our website for full details.

Automatic Tuners
MFJ-991 1.8-30MHz 150W SSB/100W CW ATU.... **£179.95**
MFJ-993 1.8-30MHz 300W SSB/150W CW ATU..... **£209.95**
MFJ-994 1.8-30MHz 600W SSB/300W CW ATU..... **£299.95**
Manual Tuners
MFJ-16010 1.8-30MHz 20W random wire tuner **£46.95**
MFJ-902 3 5-30MHz 150W mini travel tuner..... **£65.95**
MFJ-902H 3 5-30MHz 150W mini travel tuner with 4:1 balun **£89.95**
MFJ-904 3 5-30MHz 150W mini travel tuner wi h SWR/PWR..... **£99.95**
MFJ-904H 3 5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun..... **£109.95**
MFJ-901B 1.8-30MHz 200W Versa tuner..... **£72.95**
MFJ-971 1.8-30MHz 300W portable tuner **£89.95**
MFJ-945E 1.8-54MHz 300W tuner wi h meter **£99.95**
MFJ-941E 1.8-30MHz 300W Versa tuner 2 ..... **£109.95**
MFJ-948 1.8-30MHz 300W deluxe Versa tuner..... **£119.95**
MFJ-949E 1.8-30MHz 300W deluxe Versa tuner with DL..... **£135.95**
MFJ-934 1.8-30MHz 300W tuner complete wi h artificial GND..**£159.95**
MFJ-974 3.6-54MHz 300W tuner with X-needle SWR/WATT **£159.95**
MFJ-969 1.8-54MHz 300W all band tuner **£169.95**
MFJ-962D 1.8-30MHz 1500W high power tuner..... **£249.95**
MFJ-986 1.8-30MHz 300W high power differential tuner **£299.95**
MFJ-989D 1.8-30MHz 1500W high power roller tuner..... **£329.95**
MFJ-976 1.8-30MHz 1500W alanced line tuner with X-needle SWR/WATT mater..... **£429.95**

HB9CV 2 Element Beam 3.5dBd

70cms	(Boom 12")	**£19.95**
2 metre	(Boom 20")	**£24.95**
4 metre	(Boom 23")	**£34.95**
6 metre	(Boom 33")	**£44.95**
10 metre	(Boom 52")	**£69.95**
6/2/70 Triband	(Boom 45")	**£64.95**

Halo Loops

2 metre (size 12" approx)..... **£14.95**
4 metre (size 20" approx)..... **£24.95**
6 metre (size 30" approx)..... **£29.95**
These very popular antennas square folded di-pole type antennas

Guy Rope 30 metres

MGR-3 3mm (maximum load 250 kgs)..... **£6.95**
MGR-4 4mm (maximum load 380 kgs) **£14.95**
MGR-6 6mm (maximum load 620 kgs) **£29.95**

Crossed Yagi Beams (fittings stainless steel)

2 metre 5 Element
(Boom 64") (Gain 7.5dBd) **£89.95**
2 metre 8 Element
(Boom 126") Gain 11.5dBd)..... **£109.95**
70 cms 13 Element
(Boom 83") (Gain 12.5dBd)..... **£79.95**

Yagi Beams (fittings stainless steel)

2 metre 4 Element
(Boom 48") Gain 7dBd) **£29.95**
2 metre 5 Element
(Boom 63") Gain 10dBd) **£49.95**
2 metre 8 Element
(Boom 125") (Gain 12dBd) **£69.95**
2 metre 11 Element
(Boom 185") (Gain 13dBd)..... **£99.95**
4 metre 3 Element
(Boom 45") Gain 8dBd)..... **£59.95**
4 metre 5 Element
(Boom 128") (Gain 10dBd)..... **£69.95**
6 metre 3 Element
(Boom 72") Gain 7.5dBd)..... **£64.95**
6 metre 5 Element
(Boom 142") (Gain 9.5dBd)..... **£84.95**
70 cms 13 Element
(Boom 76") Gain 12.5dBd)..... **£49.95**

ZL Special Yagi Beams (Fittings stainless steel)

2 metre 5 Element (Boom 38") (Gain 9.5dBd)...**£39.95**
2 metre 7 Element (Boom 60") (Gain 12dBd)....**£49.95**
2 metre 12 Element (Boom 126") (Gain 14dBd)**£74.95**
70 cms 7 Element (Boom 28") (Gain 11.5dBd)..**£34.95**
70 cms 12 Element (Boom 48") (Gain 14dBd) **£49.95**
The biggest advantage with a ZL-special is that you get massive gain for such a small boom length, making it our most popular beam antenna

G5RV Wire Antenna (10-40/80m) (Fittings stainless steel)

	HALF	FULL
Standard (enamelled)	**£19.95**	**£22.95**
Hard Drawn (pre stretched)	**£24.95**	**£27.95**
Flex Weave (original high quality)	**£29.95**	**£34.95**
Flexweave PVC (clear coated PVC)	**£34.95**	**£39.95**
Deluxe 450 ohm PVC	**£44.95**	**£49.95**

Double size standard (204ft) **£39.95**
TS1 Stainless Steel Tension Springs (pair) for G5RV **£19.95**

G5RV Inductors

Convert your half size G5RV into a full size with just 8ft ei her side. Ideal for he small ga den..... **£19.95**

Reinforced Hardened Fibreglass Masts (GRP)

GRP-125 1.25" OD leng h: 2.0m Grade: 2mm **£14.95**
GRP-150 1.5" OD Length: 2.0m Grade: 2mm **£19.95**
GRP-175 1.75" OD Leng h: 2.0m Grade: 2mm **£24.95**
GRP-200 2.0" OD Length: 2.0m Grade: 2mm **£29.95**

Mobile Speaker

PMR-218 Small extension speaker **£8.95**
PMR-250 Medium extension speaker **£10.95**
PMR-712 Large extension speaker..... **£14.95**

Portable Telescopic Masts

LMA-S Length 17.6ft open 4ft closed 2-1" diameter **£59.95**
LMA-M Leng h 26ft open 5.5ft closed 2-1" diameter **£69.95**
LMA-L Leng h 33ft open 7.2ft closed 2-1" diameter..... **£79.95**
TRIPOD-P Lightweight aluminium tripod for all above **£39.95**

Rotative HF Dipoles

RDP 3B 10/15/20mtrs leng h 7.40m **£119.95**
RDP-4 12/17/30mtrs leng h 10.50m **£119.95**
RDP-40M 40mtrs length 11.20m **£169.95**
RDP-6B 10/12/15/17/20/30mtrs boom leng h 1.00m. **£239.95**

CHECK ON-LINE FOR ALL UPDATES, NEW PRODUCTS & SPECIAL OFFERS

www.amateurantennas.com

★ Postage is a maximum of £7.00 on all orders ★
(UK mainland only)

Mounting Hardware (All galvanised)

6" Stand Off Bracket *(complete with U Bolts)*.....**£6.00**
9" Stand off bracket *(complete with U Bolts)* **£9.00**
12" Stand off bracket *(complete with U Bolts)*..**£12.00**
12" T & K Bracket *(complete with U Bolts)*.....**£14.95**
18" T & K Bracket *(complete with U Bolts)*.....**£17.95**
24" T & K Bracket *(complete with U Bolts)*.....**£19.95**
36" T & K Bracket *(complete with U Bolts)*.....**£29.95**
Chimney lashing kit.....**£12.95**
Double chimney lashing kit.....**£24.95**
3-Way Pole Spider for Guy Rope/ wire.....**£3.95**
4-Way Pole Spider for Guy Rope/wire.....**£4.95**
1" Mast Sleeve/Joiner.....**£6.95**
1.25" Mast Sleeve/Joiner.....**£7.95**
1.5" Mast Sleeve/Joiner.....**£8.95**
2" Mast Sleeve/Joiner.....**£9.95**
Earth rod including clamp (copper plated).....**£9.95**
Earth rod including clamp (solid copper).....**£14.95**
Pole to pole clamp 2"-2".....**£4.95**
Di-pole centre (for wire).....**£4.95**
Di-pole centre (for aluminium rod).....**£4.95**
Dog bone insulator.....**£1.00**
Dog bone insulator heavy duty.....**£2.00**

5ft Poles Heavy Duty (Swaged)

20ft Heavy Duty Swaged Pole Set
These heavy duty aluminium (1.8mm wall) have a lovely push fit finish to give a very st ong mast set
1.25" set of four 5ft sections.....**£24.95**
1.50" set of four 5ft sections.....**£34.95**
1.75" set of four 5ft sections.....**£39.95**
2.00" set lof four 5ft sections.....**£49.95**

Cable & Coax Cable

RG58 best quality standard per mt.....**35p**
RG58 best quality military spec per mt.....**60p**
RGMini 8 best quality military spec per mt.....**70p**
RG213 best quality military spec per mt.....**85p**
H100 best quality military coax cable per mt.....**£1.10**
3-core rotator cable per mt.....**45p**
7-core rotator cable per mt.....**£1.00**
10 amp red/black cable 10 amp per mt.....**40p**
20 amp red/black cable 20 amp per mt.....**75p**
30 amp red/black cable 30 amp per mt.....**£1.25**
Please phone for special 100 metre discounted price

Connectors & Adapters

PL259/9 plug (Large entry).....**£0.75**
PL259 Reducer (For PL259/9 to conv to PL259/6).....**£0.25**
PL259/6 plug (Small entry).....**£0.75**
PL259/7 plug (For mini 8 cable).....**£1.00**
BNC Screw type plug (Small entry).....**£1.25**
BNC Solder type plug (Small entry).....**£1.25**
BNC Solder type plug (Large entry).....**£3.00**
N-Type plug (Small entry).....**£3.00**
N-Type plug (La ge entry).....**£3.00**
SO239 Chassis socket (Round).....**£1.00**
SO239 Chassis socket (Square).....**£1.00**
N-Type Chassis scoket (Round).....**£3.00**
N-Type Chassis scoket (Square).....**£3.00**
SO239 Double female adapter.....**£1.00**
PL259 Double male adapter.....**£1.00**
N-Type Double female.....**£2.50**
SO239 to BNC adapter.....**£2.00**
SO239 to N-Type adapter.....**£3.00**
SO239 to PL259 adapter (Right angle).....**£2.50**
SO239 T-Piece adapter (2xPL 1XSO).....**£3.00**
N-Type to PL259 adapter (Female to male).....**£3.00**
BNC to PL259 adapter (Female to male).....**£2.00**
BNC to N-Type adapter (Female to male).....**£3.00**
BNC to N-Type adapter (Male to female).....**£2.50**
SMA to BNC adapter (Male to female).....**£3.95**
SMA to SO239 adapter (Male to SO239).....**£3.95**
SO239 to 3/8 adapter (For antennas).....**£3.95**
3/8 Whip stud (For 2.5mm whips).....**£2.95**
Please add just £2.00 P&P for connector only orders
PLEASE PHONE FOR LARGE CONNECTOR ORDER DISCOUNTS

Baluns

MB-1 1:1 Balun 400 watts power **£24.95**
MB-4 4:1 Balun 400 watts power **£24.95**
MB-6 6:1 Balun 400 watts power **£24.95**
MB-1X 1:1 Balun 1000 watts power **£29.95**
MB-4X 4:1 Balun 1000 watts power **£29.95**
MB-6X 6:1 Balun 1000 watts power.....**£29.95**
MB-Y2 Yagi Balun 1.5 to 50MHz 1kW.....**£24.95**

Tri/Duplex & Antennas Switches

MD-24 HF or VHF/UHF internal duplexer (1.3-225MHz) (350-540MHz) SO239/PL259 fittings **£22.95**
MD-24N same spec as MD-24 but "N-type" fittings.**£24.95**
MX2000 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz).....**£59.95**
CS201 Two-way di-cast antenna switch. Freq: 0-1000MHz max 2,500 watts SO239 fittings.....**£14.95**
CS201-N Same spec as CS201 but wi h N-type fittings.....**£19.95**
CS401 Same spec as CS201 but4-way **£39.95**

Antennas Rotators

AR-31050 Very light duty TV/UHF **£24.95**
AR-300XL Light duty UHF\VHF.....**£49.95**
YS-130 Medium duty VHF.....**£79.95**
RC5-1 Heavy duty HF.....**£349.95**
RG5 3 Heavy Duty HF inc pre set cont ol box.....**£449.95**
AR26 Alignment Bearing for the AR300XL.....**£18.95**
RC26 Alignment Bearing for RC5-1/3 .....**£49.95**

Complete Mobile Mounts

All mounts come complete with 4m RG58 coax terminated in PL259 (different fittings available on request).
3.5" Pigmy magnetic 3/8 fitting **£7.95**
3.5" Pigmy magnetic SO239 fitting.....**£9.95**
5" Limpet magnetic 3/8 fitting.....**£9.95**
5" Limpet magnetic SO239 fitting **£12.95**
7" Turbo magnetic 3/8 fitting.....**£12.95**
7" Turbo magnetic SO239 fitting.....**£14.95**
Tri-Mag magnetic 3 x 5" 3/8 fitting **£39.95**
Tri-Mag magnetic 3 x 5" SO239 fitting.....**£39.95**
HKITHD-38 Heavy duty adjustable 3/8 hatch back mount **£29.95**
HKITHD-SO Heavy duty adjustable SO hatch back mount **£29.95**
RKIT 38 Aluminium 3/8 rail mount to suit 1" oof bar or pole **£12.95**
RKIT-SO Aluminium SO rail mount to suit 1" roof bar or pole ...**£14.95**

Antenna Wire & Ribbon

Enamelled copper wire 16 gauge (50mtrs).....**£11.95**
Hard Drawn copper wire 16 gauge (50mtrs)..**£13.95**
Equipment wire Multi Stranded (50mtrs) **£9.95**
Flexweave high quality (50mtrs).....**£27.95**
PVC Coated Flexweave high quality (50mtrs) **£37.95**
300Ω Ladder Ribbon heavy duty USA imported (20mtrs).....**£15.00**
450Ω Ladder Ribbon heavy duty USA imported (20mtrs).....**£15.00**
(Other lengths available, please phone for details)

Miscellaneous Items

CDX Lightening arrestor 500 watts.....**£19.95**
MDX Lightening arrestor 1000 watts.....**£24.95**
AKD TV1 filter.....**£9.95**
Amalgamating tape (10mtrs).....**£7.50**
Desoldering pump **£2.99**
Alignment 5pc kit.....**£1.99**

Telescopic Masts (aluminium/fibreglass opt)

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ App ox 20ft erect 6ft collapsed **£99.95**
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ App ox 40ft erect 6ft collapsed.....**£189.95**
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ App ox 20ft erect 6ft collapsed **£99.95**
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★App ox 40ft erect 9ft collapsed.....**£189.95**

HF Yagi

HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m LONGEST ELEMENT:13.00m POWER:1600 Watts.....**£399.95**

ADEX-3300 3 BAND 3 ELEMENT TRAPPED BEAM
FREQ:10-15-20 Mtrs GAIN:8 dBd
BOOM:4.42m LONGEST ELE:8.46m
POWER:2000 Watts **£329.95**

ADEX-6400 6 BAND 4 ELEMENT TRAPPED BEAM FREQ:10-12-15-17-20-30 Mtrs GAIN:7.5 dBd BOOM:4.27m LONGEST ELE:10.00m
POWER:2000 Watts.....**£599.95**
40 Mtr RADIAL KIT FOR ABOVE.....**£99.00**

HF Verticals

VR3000 3 BAND VERTICAL
FREQ: 10-15-20 Mtrs
GAIN: 3.5dBi HEIGHT: 3.80m POWER: 2000 Watts (without radials)
POWER: 500 Watts (wi h optional radials).....**£99.95**
OPTIONAL 10-15-20mtr radial kit.....**£39.95**

EVX4000 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs GAIN: 3.5dBi HEIGHT: 6.50m POWER: 2000 Watts
(wi hout radials) POWER: 500 Watts
(wi h optional radials).....**£119.95**
OPTIONAL 10-15-20mtr radial kit.....**£39.95**
OPTIONAL 40mtr radial kit **£14.95**

EVX5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 7.30m POWER: 2000 Watts (without radials) POWER: 500 Watts (wi h optional radials).....**£169.95**
OPTIONAL 10-15-20mtr radial kit **£39.95**
OPTIONAL 40mtr radial kit.....**£14.95**
OPTIONAL 80mtr radial kit.....**£16.95**

EVX6000 6 BAND VERTICAL FREQ: 10-15-20-30-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 5.00m RADIAL LENGTH: 1.70m(included) POWER: 800 Watts.....**£299.95**

EVX8000 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) GAIN: 3.5dBi HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included)
POWER: 2000 Watts **£319.95**
80 MTR RADIAL K T FOR ABOVE.....**£89.00**
(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

Trapped Wire Di-Pole Antennas
(Hi grade heavy duty Commercial Antennas)

MDT-6 FREQ:40 & 160m LENGTH: 28m POWER:1000 Watts.....**£59.95**
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts..**£49.95**
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts.....**£59.95**
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts.....**£99.95**
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts.....**£44.95**
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts.....**£89.95**
(MTD-5 is a crossed di-pole with 4 legs)

Patch Leads

STANDARD LEADS
1mtr RG58 PL259 to PL259 lead.....**£3.95**
10mtr RG58 PL259 to PL259 lead **£7.95**
30mtr RG58 PL259 to PL259 lead.....**£14.95**
MILITARY SPECIFICATION LEADS
1mtr RG58 Mil spec PL259 to PL259 lead **£4.95**
10mtr RG58 Mil spec PL259 to PL259 lead.....**£10.95**
30mtr RG58 Mil spec PL259 to PL259 lead.....**£24.95**
1mtr RG213 Mil spec PL259 to PL259 lead.....**£4.95**
10mtr RG213 Mil spec PL259 to PL259 lead **£14.95**
30mtr RG213 Mil spec PL259 to PL259 lead **£29.95**
(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)

ALL PICTURES ARE FOR REFERENCE ONLY

radiouser™

ShortWaveMagazine SWM & Scanning Scene

incorporating the very best of short wave magazine & radio active

radio ACTIVE

radiouser January 2006 issue.

84-pages filled to the brim with radio, radio and more radio!

More columns, more features, more pages - everything the radio listener could possibly want in one magazine.

Just look at what's in this issue!

Military Matters: Kevin Paterson looks behind the scenes at three Special Forces Operations in the UK.

Scanning Scene: Bill Robertson dips into the latest Tetra news on the Fire and Rescue services with plenty of frequencies to try.

In-depth Reviews: The Elad FDM-77 is an all-mode HF software defined radio. Chris Lorek takes a close look at what this piece of kit can do.

Airband Basics: Godfrey Manning goes Sky High and explains all you need to know to enjoy airband listening.

Scanning in Action: As the Lake District is one of the UK's most popular locations for mountain activities, we look at the work of the Mountain Rescue Teams.

Broadcast Matters: Chris Brand will delve into the **Long, Medium and Short Wave bands** looking for the most interesting broadcast signals.

Neighbourhood Wardens: Using GPS and two-way radio, Knowsley have made a real difference to the local community. We reveal how the system works.

Off the Record: with Oscar the Engineer for a regular look at 'non-licensed' and underground radio broadcasts.

New Products: All the latest and most interesting radios and accessories to interest the scanning, airband and broadcast listener.

Comms from Europe: Simon Parker, based in Bulgaria, looks at CB and some of the record-breaking PMR 446 activities from Europe.

Software Spot: All the latest and very best listening software compiled exclusively for the radiouser reader.

Reviewed: A range of broadcast, DAB and satellite radios - and a few surprise gadgets too!

Maritime Matters: All things marine from low frequency to satellite are covered by Robert Connolly, including lots of frequencies to try.

Info in Orbit: Howard Long, AMSAT-UK committee member, looks at the world of the *International Space Station*.

News: If it affects radio listeners from clubs to airshows and frequencies to new books, you'll read about it in radiouser.

Feedback: Your letters. Got anything you want to share with other readers? Drop radiouser a line and start a debate.

Join in: Join the radiouser E-mail Forum. Send an E-mail to radiouser-on@pwpublishing.ltd.uk and join like-minded readers in discussion, debate and information exchange.

... at your newsagent NOW!

With all the best features, articles, news and reviews from two superb magazines together in one place, radiouser is not only a terrific read but also marvellous value for money.

On sale NOW! Only £3.25

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

Waterford & Mayo 2005

Rob Mannion EI5IW/G3XFD describes his brief Irish visit in November - 1,137 miles in five days - to see old friends at the Waterford Club and attend the annual Mayo rally at Knock. Although exhausted after the trip, it seems - as usual - he had a great time!

Most unusually for my November trip to the Republic of Ireland I had great weather! Normally, when I take the car over on the Irish Ferry's service from Pembroke Dock to Rosslare at that time of year there's rough weather and much rain. Not this time though - it was wonderful although high pressure in November brings fog - more on that problem later and an enjoyable benefit of high-pressure weather on 144MHz!

Its seems traditional that whenever I'm passing through Waterford, that I pay a visit to the **South Eastern Amateur Radio Group** (**SEARG**), hosted by **Mark Wall EI7IS** and friends. This time I wasn't delayed, and I soon found my way to the Waterford Crystal Sports and Social Club. Everyone was waiting for me to start and we had a delightful social evening, talking about things that have happened over the past year since my last visit.

The photograph, **Fig. 1**, shows a rather tired EI5IW/G3XFD sat in front of the keen and alert group! You can always be assured of a great welcome at SEARG and I left my friends, looking forward to the 2006 trip, as I headed for my Hotel

Longer Day

Next morning - Friday 18 November was to be another long, but enjoyable day as I drove from County Waterford, into Tipperary, Limerick, Galway and County Mayo. My original plan was to visit **Eamonn Kavanagh EI3FFB** in Bansha, County Tipperary sometime around midday. However, as it turned out - I was going to be very late!

I'd decided to go across country via Carrick-on-Suir, and shortly after leaving the main Waterford to Cork road, I passed over a railway bridge. I immediately realised it was Kilmedan Station - the operational centre of the new - 3ft narrow gauge - Waterford & Suir Valley Railway.

Thanks to Mark EI7IS and *The Railway Magazine*, I have followed the new railway's progress. Built on to the Waterford end of the long closed Irish Standard gauge - 5ft 3in - route to Dungarvan, the 12km railway is purpose-built to provide a major tourist attraction.

Turning the car round I drove down the long ramp to the station. The boss, **Dan Donovan**, introduced himself. A master craftsman, he'd spent almost 50 years working for CIE - the Irish State railways. I was invited to visit the loco band rolling stock, stored some way from the station. The walk for me was difficult, but worth it. When we got to the train sheds - my guide **Tosh Smith** (a local man, despite his English sounding nickname) announced he was getting the train out and we were going to Waterford - my own private train!

Down & Return

On the trip down to Waterford I squeezed into the loco's cab with Tosh. On the return trip I sat on the veranda of the coaches - acting as flagman - as the loco pushed us back. The whole railway passes through the most wonderful scenery- and even though it was autumn it was possible to see just what an attraction there will be for any visitor.

After being dropped off on the station platform at Kilmedan, the Boss Dan Donovan invited me to look over their new acquisition - a former CIE main line coach that's being converted into a comfortable restaurant. Inside this coach, minus its wheels, I could see another of Dan's skills - the beautifully polished wooden floor. Next time I go there I hope to enjoy a meal!

Bansha Arrival

Eamonn EI3FFB had almost given me up when I arrived in Bansha - but he was amused when I told him why I was so late. His farm, just outside Bansha has many attractions for me. It has superb views of the mountains, is beautifully set not far from the main road and has the not-so-busy single track Limerick Junction to Waterford railway passing by outside!

In fact, while Eamonn was showing me his latest addition to his antenna farm, Eamonn - who seems to have a time-table built into his head - told me a train was approaching. The heavy loco rumbled by, and a train of sugar beet - the main cargo staple on this line - passed by with a cheery wave from the driver. The beet was on its way to Mallow Junction not far from Cork, to a huge sugar processing plant that's supplied by rail.

Eamonn and I enjoyed a late lunch, and as usual, he was keen to get me into the shack to see his latest equipment. If it's on the market and suits his purpose - Eamonn intends to get it eventually! More on this remarkable station and its proud owner, in a future *PW*.

Long Run

Leaving Eamonn in Bansha after a good lunch, I then worked him on 144MHz for a

Fig. 1: The Waterford based SEARG make Rob EI5IW welcome once again. The group includes (from left to right) Gareth EI7FZB, Kieran EI9DHB, Eddie EI9DJB, Mark EI7IS, Michael EI5DCB, Nicky EI3JB, David EI7FYB, Robbie EI8FZB. (Photo courtesy John EI8JA)

short while before I drive through Tipperary Town and onto Limerick Junction (some 22 miles from Limerick). There may be far fewer people in Ireland than the UK, but on this Friday it seemed as though every one of them was on the road at the same time and all going my way!

Still in heavy friday traffic I drove on through County Galway. It was well past 9pm before I arrived at the home of **Oliver** and **Briege** Norris, on the outskirts of Westport, with its stunning views of the Croag Patric Mountain. Although I bully Oliver (now retired after a long career in the Irish Army Corps as a fuel engineer) to get his Amateur Radio licence - they always make me very welcome. I was to stay with them until Monday morning, a glorious three nights in peaceful surroundings and exhilarating scenery.

Next morning, the Saturday and the day before the Mayo Rally at the Belmont Hotel in Knock, very close to the famous religious shrine site. I decided to drive up to see how the preparations were going for the rally on the Sunday. It was an exceedingly sunny, bright day- but of course bright and cold weather in November often means fog, but fortunately this didn't cause too many problems on my 40-mile trip via Castlebar and Claremorris to see my friends.

All hell was being let loose at the Hotel! Banging hammers, power tools screaming away and handsaws were to be heard. Earnest negations, for tables and where they were to go were being discussed - it was no place to be in the way! So, after briefly chatting to everybody, I made myself scarce to leave them to complete their work unhindered by me!

Fig. 2: The Waterford & Suir Valley Railway runs from Kilmedan, alongside the truly beautiful River Suir into Waterford. Built along the road bed of a main line railway, the track has been re-laid in the most professional way possible. Rob EI5IW's special private train was driven by Tosh Smith (see text).
(Photograph courtesy of W&SVRC Ltd.)

The Rally

Again, it was a truly beautiful but sunny day for the rally. The event seems to be drawing visitors from all over the Irish Isle and I met friends from Cork to Belfast and even beyond - including several Continental visitors. I sat at the *PW* tables not far from the Bring & Buy Stand, where I soon met **Terry Barnes GI3USS** and many other *PW* friends.

The **Mayo Radio Experimenters Group** has a superb venue for their rally. It may seem - at first glance- to be so far away from anything, but to me it's a very special site for a rally and every excuse to make it a short holiday. And, as usual when I'm busy at a rally - the day shot by and I was already thinking about next years' event.

Heading Home On A High

The perfect ending for my short Irish trip came on the trip to Rosslare via Tuam Athlone, Port Laois, etc. My journey was made much shorter by a great 'lift' on 144MHz. Working via the Dungarvan repeater between Waterford and Cork I had QSOs with stations in Devon, Cornwall, Northern Ireland and beyond as I drove through the Irish Midlands on my journey home

My only problem with the Mayo Rally is that I can only stay for a short time, but I do achieve something each time I attend - and that includes meeting *PW* readers and friends. It makes the long journey worth it. I headed back for Bournemouth, over 500 miles away by road, looking forward to seeing Oliver & Briege Norris, John Corless EI7IQ, **Padraic Baines EI9JA** and everyone again soon. Any rally in EI is special - and this one is very special! **PW**

Sandpiper Aerial Technology's Versatile Multi-band Portable Antenna for 14 -50MHz

John Heys G3BDQ - has an enormous amount of experience using antennas, but has been doing something unusual by evaluating a portable antenna system. John enjoys using home-brewed antennas but this Sandpiper Aerial Technology system impressed him!

As I write, deep winter is not very far ahead and idle thoughts turn towards those hazy, lazy days that often tempt Radio Amateurs towards portable operations from favourite high spots. Especially those that have a sloping aspect down towards the sea.

The antenna that I've had on loan for testing is a new product from **Sandpiper Aerial Technology**. The antenna can be arranged to operate on any band from 14 to 50MHz (20 down to 6 metres).

After a hasty unpacking, the antenna parts were laid out, **Fig. 1**, to check. Everything was present and correct. Amazingly, I soon discovered that the kit lived up to its name for when it had been assembled the dipole - set up for the 20 metre band weighed just 750gm (approx. 1.65lb) and could be easily balanced upon one finger.

Tests On 14MHz

I'd decided upon 14MHz for my tests. For at that time the higher frequency bands were seldom open, and when they did open up a little the signals heard were not very exciting.

The Sandpiper antenna has an aluminium centre tube section, which is a little under one metre in length, and a one piece insulated middle part, which provides the means to clamp the dipole to a 29mm (1in) diameter mast.

There's a sturdy socket to receive a PL259 connector for a 50Ω coaxial cable feeder. This socket was outdoors in my garden through all kinds of weather, and when the dipole was dismantled after a couple of months use it had remained in perfect un-oxidised condition.

The additional 'arms' of the dipole used lengths of telescoping fibre-glass tube, and the complete end-to-end length of the dipole was just 6.9m (22ft 8in). This gives a turning radius of just under 3.5 metres.

The System

To assemble the system you have to make up a separate wire dipole for each band. Each length (when made up) can then be quickly held in place along the antenna's fibre-glass tube 'arms'.

The Instruction Sheet for the antenna is brief but adequate and gives clear and concise instructions and details making up the wires for each band. (wire is supplied with the kit and there are also four small plastic coil formers provided) are used as loading inductors (not traps) on 14 and 18MHz (No coils are used on all the other bands).

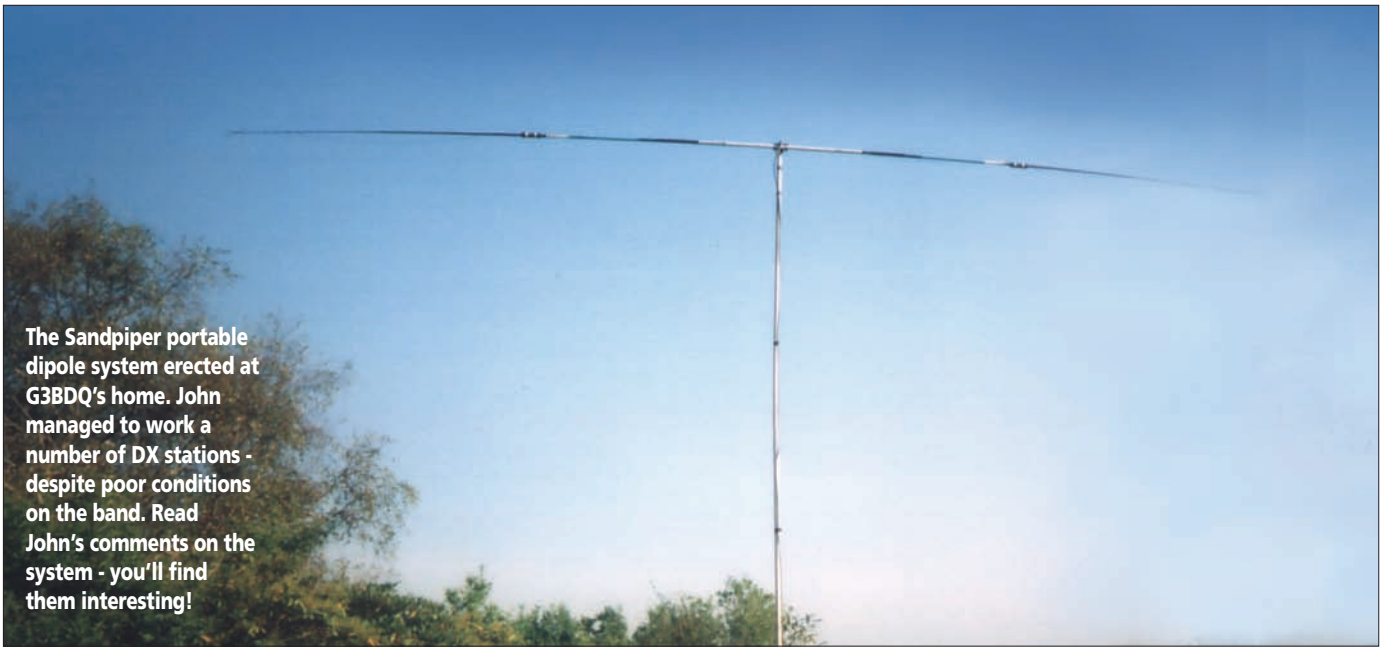
I measured the inductance of the 14MHz coils when wound and discovered that they each had an inductance of 4µH. The positioning of the coils along the dipole, arms' is given in the instructions and this position is critical if antenna resonance and a good v.s.w.r. are to be achieved.

Rapid Assembly

The antenna has been designed for a rapid assembly and dismantling. The use of tags (supplied) and bolts with wing nuts to position the wire elements to the aluminium centre section allows for quick work.

I found that the assembly operations took just a few minutes and needed no tools. Of course the coils have to be prepared beforehand and everything tested at the home base before taking the completed antenna out for portable operations.

The only tool used when preparing the



The Sandpiper portable dipole system erected at G3BDQ's home. John managed to work a number of DX stations - despite poor conditions on the band. Read John's comments on the system - you'll find them interesting!

antenna was a pair of side-cutters. These were used to snip off the wires to their correct lengths when first making the antenna up.

Testing & Setting Up

Sandpiper's instructions provide the exact lengths of the wires needed for the different bands. However, they add a proviso that different locations and different antenna heights may need small changes to the wire lengths given.

I took a chance and stuck to the suggested measurements, placing the dipole atop a six metre plus (20ft) self-supporting mast. This mast had its base joined to much shorter vertical section that was well and truly 'firmed' to the ground.

I prudently attached a couple of 'clamp on' ferrites to the coaxial cable up close to the centre connector. This prevents r.f. running down the outer shield of the coaxial itself and is something I always do when using a coaxial cable fed antenna.

The RG-58 50Ω feeder lives permanently between shack and a point well down my garden with a total length of about 40 metres. This feeder length using RG-58 can result in some noticeable power loss on 24 and 28MHz but the loss is negligible on 14MHz.

My initial tests were made using a transmit power of just 5W and the results were quite rewarding. The s.w.r. at the extreme low frequency (l.f.) end of the 20m band (14MHz) was an unexpected 1: 1. This rose to 1:1.1 on 14.050MHz, to 1: 1.4 at 14.098MHz (to avoid the International Beacon Project frequency on 14.1MHz), to 1:1.7 on 14.2MHz and a just acceptable 1:1.8 on 14.25MHz.

The results told me that there was no need to take the antenna down and prune the dipole wire lengths. This is because much of my h.f. operating is on the c.w., lower sections of the bands.

On Air Testing

My On-Air testing began on 3 September using my TS-2000 transceiver running at 100W. Within minutes I was receiving an RST599 report from **RX9CJ** in Western Siberia. Several more European stations then entered my log (the time was 1100hrs).

Operations continued the next day when I went on to single sideband (s.s.b.) and had QSOs all over Europe and into 4X4 (Israel). On the 5th I worked a UX in Eastern Siberia for the best DX to that date.

My antenna switching arrangements let me compare received signals when using the Sandpiper antenna with those from my well elevated and far-end grounded long wire. The dipole was positioned to have its maximum radiation East and West. And although about half the stations worked were between half and a whole 'S' point down when using the dipole, quite often that signal strengths were exactly the same. There were even times when the dipole was better than the long wire.

Fig. 1: Experienced with antenna systems and kits - John G3BDQ takes the precaution to lay the components on a blanket. Nothing was missing and the system worked well (see text).

The best DX worked using the Sandpiper dipole included many North Americans, Ethiopia, West Malaysia, Honduras Republic, Arab Emirates, South Korea and a couple of Japanese stations. The antenna is rated as able to handle up to 300W of r.f. using s.s.b. and I found that the full legal limit of 400W on c.w. gave no signs of trouble or distress.

On receive I found the dipole had a superior signal-to-noise ratio. This is because my long wire picks up all kinds of atmospheric and man-made noise.

The G3BDQ Opinion

The keen /P operator, backpacker or **Summits On The Air** (SOTA) enthusiast would find the Sandpiper portable system ideal. However, I cannot recommend its use as a permanent fixture at the home QTH.

Towards the end of the testing period East Sussex experienced several spells of rain and high winds. Eventually, I noticed that the dipole's centre fixing at the mast top had worked loose, and the antenna began to gyrate in various directions in the wind. Eventually, it even slid about two metres down the pole. Despite the rough weather conditions I found on dismantling the antenna that it was completely undamaged!

I can certainly recommend this versatile dipole to anyone contemplating future outdoor portable operating. The antenna can be made up ready for use on several of the h.f. bands, home tested, and then taken out to /P locations with any band changing taking just a few minutes on site.

Incidentally, there are extra parts available from Sandpiper which allow the antenna to be up-graded into a 2-element Yagi beam on the seven h.f. bands. This would of course increase its weight but would be fine for operations from a car or caravan.

Finally, I would like to thank Sandpiper Aerial Technology for the opportunity to test and use this excellent little antenna. I'm sure that many of them will soon be in use by the outdoor operating fraternity.

PW

Product
Sandpiper Aerial Technology portable dipole system for h.f. and v.h.f.

Company
Sandpiper Aerial Technology

Pros
Light and very easy to use, provides good results...an excellent little antenna. I'm sure that many of them will soon be in use by the outdoor operating fraternity".

Cons
I wouldn't recommend this antenna for a permanent installation. (Note: see update panel for further comments).

Price
For details of various options see update panel.

Supplier
John G3BDQ acknowledges his thanks to Sandpiper Aerial Technology of **Unit 5 Enterprise House, Combat Industrial Estate, Aberdare, Mid-Glamorgan, South Wales CF44 0AE. Tel: (01685) 870425, FAX: (01685) 876104, E-mail: sales@sandpiperaerials.co.uk, Website: www.sandpiperaerials.co.uk**

Update From Sandpiper

After he'd seen the courtesy copy of John G3BDQ's review- **Chris Foster GW6MKR** of Sandpiper Aerial Technology provided this up-date on the portable system: "I have beefed up the centre fixing so it can now be used for permanent use as well now. The Mark II version also closes down to 400mm when packed away! And it also includes a base/ground mount that converts one arm to an h.f. vertical. The price of dipole is £45 +£7.50 P&P. The two element version packs down to 700mm price is £75 +£10 P&P. There is also a choke balun available at £20".

Stop Press: As we closed for press Chris contacted *PW* to announce, "I will also be producing coils for the dipole for 3.5 and 7MHz and a new 5MHz band coil at £10 per pair".

A Simple High Voltage Inverter

Anthony Langton GM4HTU was interested in the h.t. supply for Radio Basics 1in oscilloscope project. Anthony then devloped his 'fully repeatable' 12V d.c.-to-d.c. h.t. inverter design specifically for the project, presented for you this month.

It might not look much hidden in its box - but the h.t. inverter was designed and built by Tony GM4HTU, specifically for the Radio Basics 1in 'scope project. It helps provide portability by permitting operation from a 12V d.c. source!

The Radio Basics oscilloscope, published in March 2005 *Practical Wireless*, is proving a popular project. Some readers have asked for the new version to be portable, like the original Mullard version.

The battery operated high voltage inverter circuit used in that design is deceptively simple. To reproduce it would mean using exactly the same ferrite core as the original. As the Mullard circuit is around 40 years old this could prove difficult.

Additionally, winding a new transformer for a similar circuit would require a detailed knowledge of ferrites and transformers. There's a bewildering array of cores available! Have a look at the various websites dealing with ferrite cores and you'll see what I mean.

And, even if you find the original ferrite, or come up with a new design, the secondary winding will require several hundred turns of wire. From experience, I know that some readers have a reluctance to wind even small coils, and a transformer, such as this would be a challenge for anyone.

Loading regulation			Variation of $V_{out(reg)}$ with V_{in}		
V_{in}	V_{out}	Load (mA)	V_{in}	V_{out}	V_{out} (reg)
398	294	0	11.0	369	270
388	293	2.6	12.0	403	279
378	290	5.2	13.0	438	289
359	285	10.2	14.0	474	297
348	282	14.1			
334	277	17.8			

The Inverter Circuit

The Radio Basics h.t. inverter project circuit, **Fig. 1**, takes a much simpler approach than the complicated method I've already mentioned. In this -wave of around 60Hz. This drives two power f.e.t.s in push-pull operation are connected to an ordinary low voltage mains transformer, used in reverse.

The resulting output, a 240V square-wave, is rectified to produce the required high voltage. Incidentally, the parts used are all industry standard, off the shelf items. No coil winding is involved!

The use of a mains transformer restricts the switching frequency to around 50Hz. A transformer designed for 50Hz will work quite safely at 60Hz or higher. A transformer designed for 60Hz will eventually fail if run at 50Hz.

Switch mode power supplies use frequencies of many kilohertz because transformer size, weight and cost decrease with frequency. If your 300W computer power supply worked on 50Hz it would be extremely expensive and very heavy.

There's nothing to be gained here by using a higher frequency than the transformer was designed for. I tried a range of frequencies but ended up using around 60Hz. This was chosen so that component tolerances would not take the frequency below 50Hz.

Now the safety bit! The authorities in the USA and Europe (and probably elsewhere) consider any voltage over 30V as high and this circuit will generate over 400V. If you 'get across it' you could get a very nasty shock or even a fatal one. **If you do not have much experience in building or working with high voltage equipment get advice or help from someone who has**.

Note also the fuse in the supply line. A lead-acid battery can deliver a huge current if it has to - just think of a car starter motor. Should a short circuit occur in the inverter the fuse will blow and prevent the wiring from melting or catching fire. The diode that follows is there to blow the fuse if the battery is connected with the wrong polarity.

Anti Surge Fuse

For the fuse I used a 1A anti-surge type. Next, the safety diode. Mine is a salvaged item. Choose one rated at 3A, as it has to survive long enough to blow the 1A fuse. Any voltage rating will do as it is only working at 12V.

For the oscillator I chose a c.m.o.s. 4047 configured in a stable mode. It has push-pull outputs, ideal for this design. The frequency of oscillation is determined by R1 and C1 and I measured 57Hz with the components shown.

The two outputs drive a pair of power f.e.ts. These generate an alternating current in the transformer primary. They were chosen for their very low 'on' resistance and because of this they don't require heat sinks. They are better in this respect than the more common IRF510 and are also cheaper. I tried a range of transformers

with the components mentioned and they all gave much the same results.

Rectifier Circuit

The rectifier circuit is a conventional voltage doubler using ordinary diodes. As the switching frequency is low there's no need for anything special. I had some BY127s acquired from a junk sale, but the traditional 1N4006 or 1N4007 will do.

The resistors R3 and 4 are there to discharge the capacitors if the inverter is fired up with no load. Without these there's only leakage to discharge them, and good capacitors can hold their charge for a very long time, with the possibility of providing a very nasty shock if you touched the terminals!

Be aware that resistors have a voltage rating as well as the more familiar power rating. Two resistors are used in series to bring the voltage across each down to a safe level. A 1W resistor should handle over 250V.

Note that the output is 'floating', so either rail could be connected to ground. For the miniature oscilloscope the negative line would be connected to the negative line of the battery.

The regulation is not especially good with any voltage doubler circuit. This one is equivalent to a 435V battery in series with a 4.4k resistor. This might not be too much of a problem as the manufacturer's data shows tube current to be less than 1mA at 500V.

The valve circuit shown in the Mullard original can only draw about 9mA as an absolute maximum. In practice it would probably take only half this when working and not vary too much during operation. The supply, therefore, only has to deliver a steady, low current.

Simplest Regulator

The simplest regulator would be no regulator, just use a resistor to drop the inverter output to the correct level. However, don't forget to include the inherent 4.4kΩ in your calculations.

An improvement would be a simple Zener diode for regulation/stabilisation. It's ideally suited for use in a circuit drawing a small, steady current. I tried a 270V Zener rated at 3W. This was the highest single value I could get. It worked well enough and gave adequate regulation over a range of 10mA.

Note: Don't expect the millivolt control you get with low voltage supplies. These high voltage Zeners have a higher effective resistance, and a percentage variation looks a lot more at this level. Incidentally, I also tried two 160V diodes in series, for a higher output. (It's easy enough to trim the voltage by using a series combination).

Finally, I tried a simple regulator using an MJE340 transistor, which is rated at 300V working. It could deliver over 25mA but needed a small heat sink for continuous use at this level.

I 'soak tested' the inverter for many hours in using the MJE340 configuration. The transformer and transistor, with heat sink, were the only components, which got just perceptibly warm. For better regulation, you could try two of these circuits in series, or add a feedback amplifier transistor.

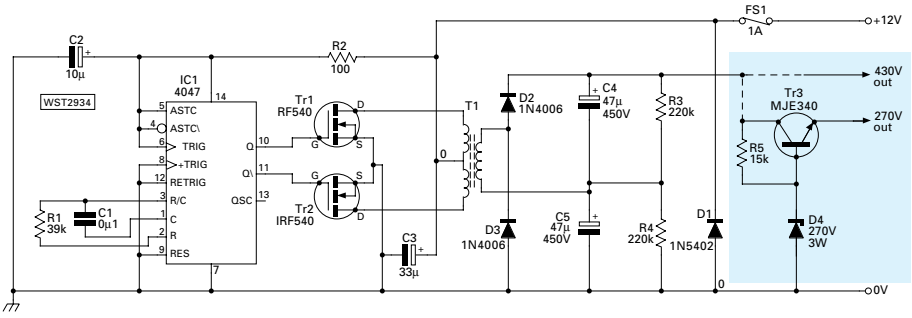


Fig. 1: The inverter circuit. The hatched lines on the tinted panel indicate the alternative outputs (see text).

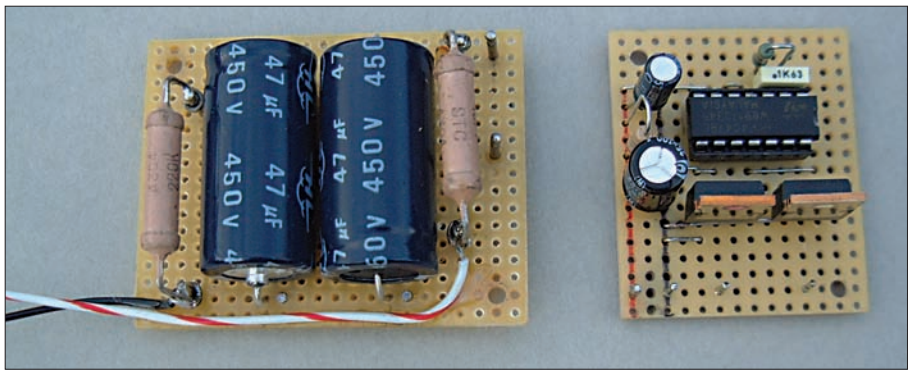


Fig. 2: Showing the separate board assembly system (using Veroboard) used by the author (see text).

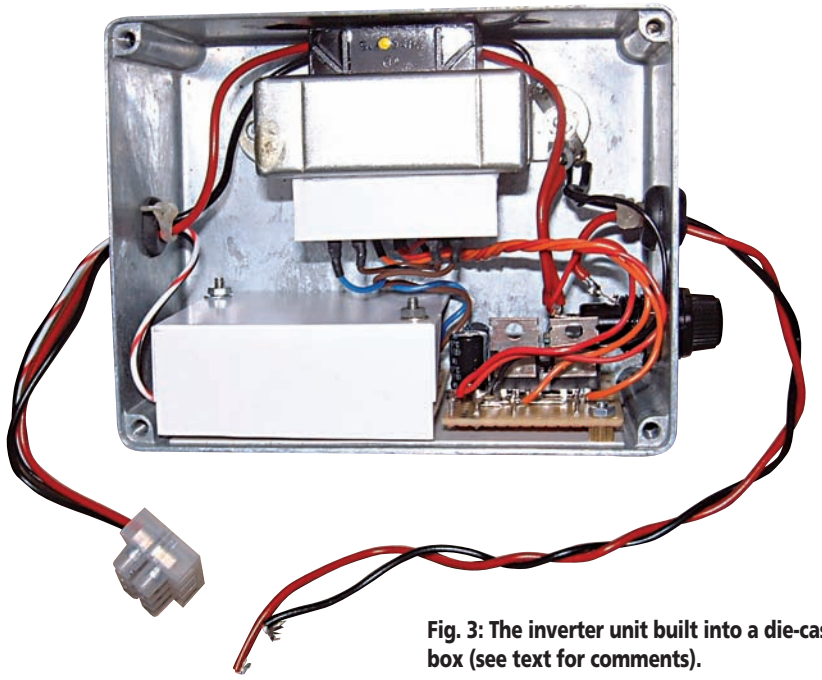


Fig. 3: The inverter unit built into a die-cast box (see text for comments).

There is plenty of room for experiment with regulation, depending on how stable you want the output. The textbooks have circuits of how regulators used to be built, before three pin devices made it a waste of time and money. All you have to do is just scale up the voltage to that required.

Price Under £10

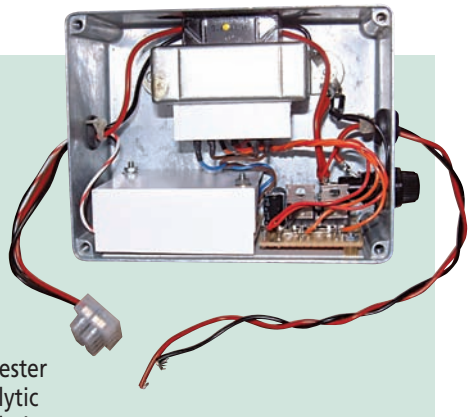
Cost of the parts should be under £10 if you buy everything new, more if you have to buy a box. I used a die-cast box, (heading

photograph) from an old project although this provides no magnetic screening. (A steel container is being investigated). Mount the power unit behind the tube to minimise the effect of the magnetic field.

Note: I came across many websites while researching this project. Two especially interesting ones were **www.du.edu/~etuttle/electron/elect29.htm** which deals with the physics of 'scope tubes. It has a simple circuit for a two inch tube. The other was **www.tubecollectors.org** where the DH3-91 page discusses operating voltages and how low you can go.

Shopping List: I used a 1% resistor for R1 but a 5% would be satisfactory. The capacitor C1 is a polyester capacitor. The rest are electrolytic and the values are not critical.

The rectifier diodes should have a peak inverse voltage rating of at least 600V. I used BZT03Cxxx Zener diodes. These have a 3W rating at differing voltage levels and are available in many outlets. I hope you enjoy the project as much as I did! **PW**



Full Shopping List

Resistors

R2	100Ω	0.5W 5%
R5	15kΩ	0.5W 5%
R1	39kΩ	0.4W1%
R3/4	220kΩ	1W5%

Capacitors

C1	100nF	63V d.c. working	10% polyester
C2	10µF	25V d.c. working	Electrolytic
C3	33µF	25V d.c. working	Electrolytic
C4/5	47µF	450V d.c. working	Electrolytic

Diodes - IC - Semiconductors

D1	1N5402	3A	rectifier
D2/3	IN4006	600V 1A	Rectifier
D4	BZT03C270	270V 3W	Zener
IC1	4047	CMOS Oscillator	
Tr1/2	IRF540	Power MOSFET	
Tr3	MJE340	High voltage transistor	

Transformer & Fuse

T1	12-0-12V	6VA mains transformer
F1	1A anti-surge fuse (20mm)	

Half-Sized G5RV Analysed

Vince Lear G3TKN/ZL1VL takes a closer, more technical and practical look at the half-sized G5RV antenna.

The G5RV multi-band doublet was designed by the late **Louis Varney, G5RV**, back in 1946. There have been various updates over the years in different magazines in addition to a vast amount of information relating to the antenna on the Internet. Many companies now market 'ready-made' versions for those who prefer not to make up their own.

A popular variation of the G5RV is the half-sized G5RV. This antenna is composed of a 15.54m centre fed top, and is often described as being able to operate between 7 and 28MHz. Despite the popularity of the antenna, I have never used a G5RV myself. I decided therefore, that it would be an interesting exercise to analyse the antenna in some detail, to help new and prospective users of this popular antenna to have a better understanding of its operation.

Theory of Operation

The theory of operation of the half-sized G5RV has two main 'lobes', to suit the two main ways of feeding it. The preferred method of feeding the antenna is to use open wire line (or 300/450Ω ladder line) all the way from its centre to a balanced antenna tuner unit (a.t.u.) at the operating position, **Fig. 1**.

The balanced feed method is the one recommended by G5RV in his original article, and he gives more detailed information about the design of balanced a.t.u.s for use with this feed arrangement at the same time.

If the antenna is fed as in Fig. 1, from a matching point of view, the actual length of the twin feeder becomes relatively unimportant, since a well designed balanced a.t.u. should match the wide range of impedances encountered on **all** amateur bands between 7 to 28MHz.

The impedances encountered will be a function of both antenna and feeder length. However, it may be advantageous not to have a length of open wire feeder that will produce a very high impedance (and hence high r.f. voltage) at the a.t.u. end. Were this the case, then on some frequencies of operation the high impedance could lead to arcing in the variable capacitors of the a.t.u. It can also sometimes cause r.f. feedback problems within the shack.

Second Method

The second method of feeding the G5RV, is to use coaxial cable coupled to the base of a 4.65m length of matching stub as shown in **Fig. 2**. This arrangement is the one most used for most commercially manufactured G5RVs in use.

The theory of operation for this second feed method is, that at 7MHz the antenna itself, plus the stub, function as a λ/2 dipole with its centre folded up. By this method, the matching stub offers inductive loading at the centre of the antenna.

On 14MHz, each leg plus the matching stub is approaching three quarters wave in length. This arrangement therefore gives a reasonably low impedance point, (although reactive).

On 28MHz, the top forms three half-waves, fed at the centre. (*Each half of the antenna may be viewed as an end-fed λ/2 antenna, with a λ/4 matching stub. The two halves of the antenna are effectively in series.* Ed.)

At the stub, which is near half-wave long on 28MHz, the impedance seen at the feedpoint of the antenna is reflected down to the base of the matching stub, where it's connected to the coaxial cable feeder.

However, the feedpoint impedance at the centre of a three half-wavelength (3λ/2) doublet is normally in the 90-100Ω region. So, the match to 50Ω coaxial cable, is slightly poorer, than when the coaxial cable is connected to the centre of a single half-wavelength antenna.

While on no band, does the antenna offer a perfect match, it does offer a workable match on the 7, 14 and 28MHz bands provided an a.t.u. is used! The purpose of the a.t.u. is to allow the transmitter to see a 50Ω non reactive and so deliver full power. The a.t.u. will in no way reduce the actual s.w.r. or losses on the coaxial cable feeder connected to the matching stub.

Radiation Pattern

With any centre-fed horizontal wire, the radiation patterns produced by the antenna on each frequency band, will depend on the antenna's overall length. That is assuming of course there's no radiation from the feeder itself (an unlikely case in real locations).

I used the antenna modelling programme *EZNEC* to analyse the free space patterns and gains for a 15.54m centre-fed wire. The radiation patterns for the horizontal wire

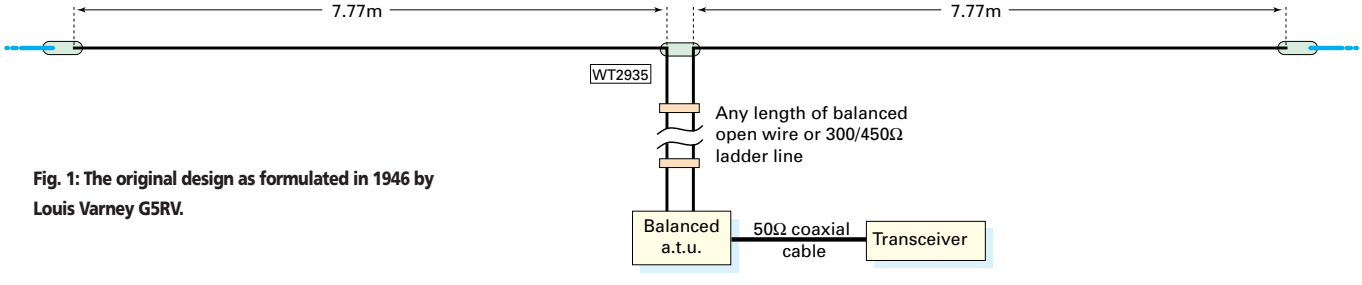


Fig. 1: The original design as formulated in 1946 by Louis Varney G5RV.

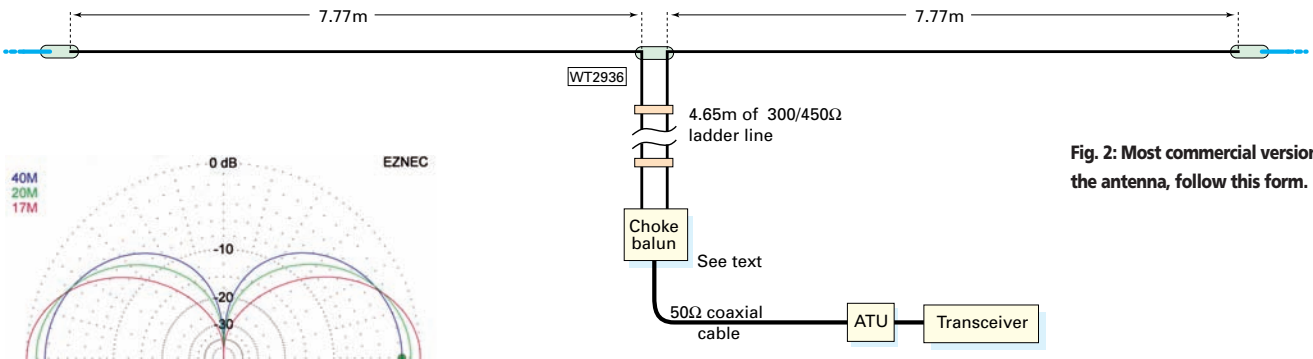


Fig. 2: Most commercial versions of the antenna, follow this form.

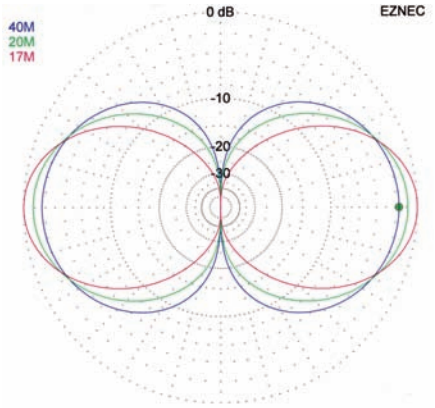


Fig. 3: The radiation patterns of the half-sized G5RV with the antenna mounted horizontally and fed with twin feeder .

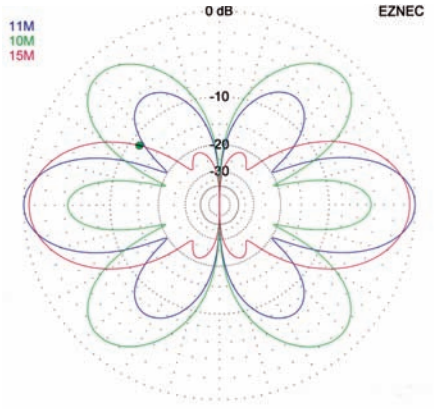


Fig. 4: The radiation patterns of the half-sized G5RV when fed via a coaxial feeder.

are shown in **Fig. 3** and **Fig. 4**. The gain figures are shown in **Fig. 5** for both horizontal and inverted-V configurations.

On 21 and 24.9MHz. when the half-sized G5RV is mounted horizontally, it behaves almost as if it's a double extended Zepp antenna It provides useful gain at these frequencies, although the broadside lobes become narrower, as seen in Fig. 4.

I found it rather disappointing to see how the calculated gain dropped off when the antenna's configured as an inverted-V with a 120° angle between the legs. However, on the plus side, *EZNEC* pattern analysis does show a broadening of the lobes in the inverted-V configuration. This has the advantage of filling in some of the deeper nulls that result when the antenna is completely horizontal.

It's important to realise that the *EZNEC* pattern analysis is calculated for a free space analysis. It will vary, perhaps widely, in a real location! In reality, antenna height, ground conditions and the general environment in which the antenna is placed, will affect its performance and the shape of the radiation lobes.

To obtain efficient operation on bands other than 7, 14 and 28MHz, the antenna must be fed with open wire line to a balanced a.t.u. at the shack end.

Computed Feedpoint

I modelled the antenna as if mounted 9m above an average ground to arrive at a computed feedpoint figure. The antenna was connected to a 4.65m matching stub and **Fig. 6** shows the impedances obtained at the base of the matching stub when it is made from both 300 and 450Ω slotted ribbon or ladder line. In practice, the impedances shown will vary somewhat depending on the height of the antenna above ground.

For the benefit of those not familiar with impedance presented in Cartesian form of (x±jy)Ω, the first number represents the resistive part of the impedance, while the second number (preceded by the letter j) represents the reactive part of the impedance. If the second part is 'plus' then the reactance is inductive. Whilst if the second part is negative, then this shows the reactance to be capacitive.

In a resonant system, the inductive and capacitive reactances cancel, so leaving just a pure resistance. If we are feeding an antenna with 50Ω coaxial cable, then ideally we want the resistive part to be as near 50Ω as possible.We would also want the reactance should be as near zero as possible.

Mismatched Line Loss

Inspection shows that feeding the stub with coaxial cable, rather than bringing the twin feeder to a balanced a.t.u. at the shack end, has the least merit. Coaxial cable is designed to be connected to a non reactive load whose resistive component is as near as possible to the characteristic impedance of the coaxial cable.

Failure to match the load to the characteristic impedance of the cable, results in a loss known as the mismatched line loss. These losses will increase with any combination of increasing: s.w.r., cable length or frequency. This extra loss is in addition to the normal matched line loss of the cable.

The actual impedance seen at the transmitter end of the coaxial cable will now be a function of the length of coaxial cable, since it is not operating in a matched condition. To highlight why I don't recommend feeding the matching stub with coaxial cable, let us look at the following example.

Consider the half-sized G5RV antenna fed at the base of its matching stub with 21m of RG213/UR67 (10mm dia cable). Using a matching stub of 450Ω ladder line, the impedance seen at the base of the matching stub at 14MHz is (90.45 – j206.8)Ω, Fig. 6. I then used **N6BV**'s *Transmission Line* programme to compute the impedance seen at the input (transceiver) end of the coaxial cable, as well as both the matched and mismatched line losses.

The impedance at the input end of the coaxial cable is now (83.86 – j140.16)Ω that results in an s.w.r. of 6.73:1. The matched case line loss is 0.546dB while the mismatched line loss is 1.881dB. The total loss on the feed system is now 2.427dB. In practice, it would be necessary to use an external a.t.u. (or auto tuner in the transceiver) to enable the p.a. stage to see a 50Ω resistive load to enable to deliver full power. However, as stated previously, this will not reduce the losses in the feeder system.

Although the antenna itself has a very free space gain of almost 0.6dBd, due to its increased length at 14MHz, this gain is wiped out by the feeder losses. In fact a resonant dipole would now give better performance. The situation becomes even worse if RG58/UR43 (5mm dia) coaxial were used. The total feeder for this cable is 4.554dB at 14MHz. On 7MHz the situation is not quite so bad, and total losses are calculated as only 0.525dB for RG213/UR67 feeder.

If the antenna is fed as shown in Fig. 1, the open wire feeder (450/300Ω ladder line) will still be operated in a mismatched condition. However, the major difference now is that the mismatched line loss is considerably less than for coaxial cable.

Into Practice

To put the computations into practice, I made up an half-sized G5RV as shown in

Frequency	Horizontal	Inverted V
7MHz	1.86dBi	1.81dBi
10MHz	2.21dBi	1.93dBi
14MHz	2.69dBi	2.17dBi
18MHz	3.52dBi	2.53dBi
21MHz	4.43dBi	2.83dBi
24.9MHz	4.91dBi	2.68dBi
28.5MHz	3.33dBi	2.0dBi

Fig 5: Free space main lobe gain of a 15.54m horizontal centre fed wire as predicted by EZNEC v3. The inverted V modelled had a 120° enclosed angle between its legs. dBi is reference to an isotropic radiator. A dipole has a gain of 2.15dBi. So, the gain in dBd (reference to a dipole) can be found by subtracting 2.15 from the above figures.

Frequency	450Ω	SWR	300Ω	SWR
7.1MHz	(19.77+ j20.6)Ω	3.026:1	(12.97 - j33.53)Ω	5.672:1
14.15MHz	(90.45 - j206.8)Ω	11.735:1	(38.15 - j69.54)Ω	4.381:1
28.5MHz	(107.1 - j49.5)Ω	2.697:1	(107 + j11.66)Ω	2.173:1

Fig. 6: Impedance as seen at the base of the matching stub for a horizontal half-sized G5RV at 9m over average ground as predicted by Eznec v3

Fig. 2. I fed the base of the matching stub via about 36m of 50Ω RG213/UR67 cable. Although, as I've said that this configuration has the least merit, it's the one that many amateurs choose to use. This is understandable, since it's easier to route coaxial cable than twin feeder.

I included an r.f. current mode choke balun at the base of the stub. More information on current mode choke baluns can be found in reference books. The r.f. choke balun was there to prevent any common mode current from flowing on the outer of the coaxial cable.

The antenna was erected at heights ranging from 6-12m. I also arranged the antenna in different configurations, from fully horizontal to an inverted-V form with an apex angle around 120°. These changes merely varied the s.w.r. slightly, and gave very minor changes of resonant frequency.

Connecting a MFJ Antenna Analyser to the base of the matching stub, I found the antenna showed resonances at around 6.9, 15.3MHz, and 27.6MHz. This was fairly close to the predicted resonances found using *EZNEC*.

The auto a.t.u. in my transceiver allowed me to run 100W into the antenna on 7, 14 and 28MHz. I was surprised to find that the auto a.t.u. in fact also allowed the transceiver to run 100W into the system on 18, 21 and 24MHz. Signals seemed well down on these bands when compared to dedicated resonant dipoles. The mismatched line losses on these frequencies would be quite high because of the severe mismatch on the coaxial feeder.

My general feeling was that the half-sized G5RV fed with 36m of coax gave its best performance on 7MHz. Computer predictions indicate it to be only slightly down on a full sized dipole at this frequency.

The antenna worked in a satisfactory manner on 14MHz, but comparisons against a dipole on a regular contact into Canada indicated that the dipole was better by at least 1 to 2 S units. It was unfortunate that at the time of testing the half-sized G5RV there was no propagation on the 28MHz band, so no contacts were made.

However, the match on 28MHz is reasonable since the antenna is three half-waves on this band and the half-wave matching stub simply reflects the near resistive match at the centre of the antenna to the bottom of the matching stub where it is connected to the cable. I calculated the total line losses to be 1.88dB on 28MHz when feeding the antenna with 36m of UR67 cable.

Recommendations By G5RV

As I've already mentioned, Louis Varney recommended the use of balanced feeder all the way between the antenna and a balanced a.t.u. And there's no doubt that this is the optimum way of feeding any G5RV antenna, particularly when it is used on the higher frequencies.

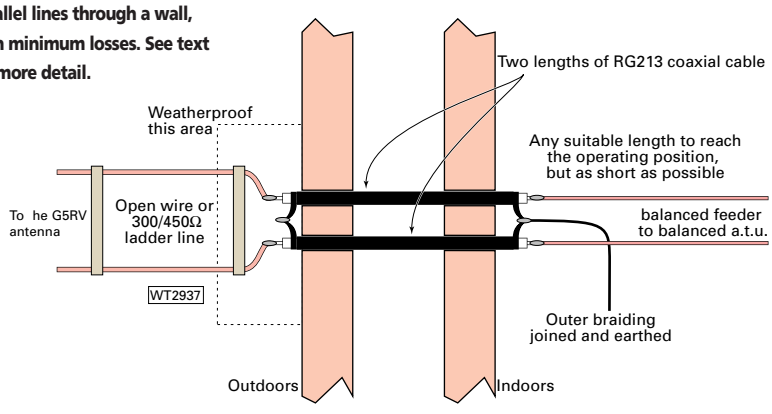
It's an unfortunate fact that many commercial a.t.u. manufacturers incorporate a 4:1 balun to achieve balanced to unbalanced conversion. This is the least desirable way to achieve this since the balun is likely to see highly reactive loads and will introduce further losses into the system. For a fuller discussion on the correct use of baluns see **www.w8ji.com** and look under Antennas.

A number of different circuits have been published for proper balanced a.t.u.'s. Louis Varney described an improved Z-match design to work with the G5RV antenna. But in more recent times, a number of commercial manufacturers have started to market balanced a.t.u.'s (without the use of a 4:1 balun) although their prices tend to be rather high.

If coaxial feeder is used between the base of the matching stub and transmitter, then it should be RG213/UR67 (10mm dia) and as short as possible. The antenna is really only suitable for use on 7, 14 and 28MHz when used in this way, as there's a very high mismatch on the 10, 18, 21 and 24MHz bands.

However, another solution for those not able to bring the balanced feeder right into the shack might be to use the arrangement shown in **Fig. 7**. The balanced feeder is connected (just prior to entering the shack) to the inner conductors of two short parallel lengths of RG213 coaxial cable. The outer braids of the two cables are strapped together at each end, but only at the transmitter end are the outer braids actually earthed.

Fig. 7:A method of feeding parallel lines through a wall, with minimum losses. See text for more detail.



Conclusion

In conclusion, the purpose of this article has been to analyse the half-sized G5RV, and suggest ways that it may be used more efficiently. It should be appreciated that most multiband antenna systems are compromises, and there is no one perfect antenna that will do everything.

However, the half-sized G5RV, if erected in a horizontal configuration and fed with balanced feeder to a well designed balanced a.t.u., is capable of providing seven band coverage between 7 to 28MHz inclusive. It also has the added advantage of a fairly predictable broadside pattern up to 24MHz, and some useful gain above 14MHz. **PW**

Further reading

HF Antenna Collection – Erwin David (G4LQI)
Backyard Antennas – Peter Dodd (G3LDO)
And for those with Internet access:
www.w8ji.com

RADIOWORLD

www.radioworld.co.uk
42, Brook Lane,
Great Wyrley,
Walsall, WS6 6BQ.
Tel. 01922 414796.
Fax. 01922 417829.

ALINCO - AOR - BHI - CUSHCRAFT - DIAMOND - HEIL - ICOM - KENT - KENWOOD - MFJ - RADIOWORKS - WATSON - WEST MOUNTAIN - YAESU - YUPITERU

KENWOOD TS-2000

HF 6m 2m 70cm 23cms Option. DSP

UT-20 23cms Unit .. £369.95
DRU-3A Rec Unit £99.95
VS-3 Voice Synth ... £45.95
SP-23 Ext Speaker . £68.95
MC-60 Desk Mic £117.95
MC-90 DSP Mic £187.95

1 YEAR WARRANTY **£1,295.00**

KENWOOD TS-480SAT

WITH FREE HEIL MH5 + Cable

New HF+6m. HX-200W - £1099.00

VGS-1 Voice Unit ... £64.95
SP-23 Ext Speaker . £68.95
MC-60 Desk Mic £117.95
PG-4Z Ext Cable £44.95
PS-53T 23A PSU .. £229.95
SO-3 TCXO £109.95

1 YEAR WARRANTY **£699.00**

KENWOOD TM-271E

2m 60W FM Tansceiver

PG-5A Data Cable .. £11.95
MJ-88 Mic adapter....£22.95
MC-60A Desk Mic . £117.95
PG-2N DC Lead £9.95
PS-52T 23A PSU .. £229.95
SP-50 Speaker £27.95

1 YEAR WARRANTY **£187.00**

KENWOOD TS-570DGE

100W Base HF. 1.8-30MHz. DSP ATU.

VS-3 Voice Unit ... £45.95
SP-50 Ext Speaker . £27.95
MC-60 Desk Mic £117.95
MB-430 Bracket £44.95
PS-53T 23A PSU .. £229.95
SO-2 TCXO £122.95

1 YEAR WARRANTY **£789.00**

KENWOOD TS-50S

100W Moble HF. 1.8-30MHz.

AT-50 TS-50 ATU . £319.95
SP-23 Ext Speaker . £68.95
MC-60 Desk Mic £117.95
MB-13 Bracket £39.95
HS-5 Del Phones £52.95
SO-2 TCXO £122.95

1 YEAR WARRANTY **£594.00**

KENWOOD TMD700E

2m & 70cms. Dual Band. APRS. TNC

SP-50B Speaker £27.95
PS-33T DC PSU ... £199.95
MC-58DM DTMF £44.95
PG-4X Ext Cable £61.95
PS-53T 23A PSU .. £229.95
VS-3 Voice Unit £45.95

1 YEAR WARRANTY **£424.00**

KENWOOD TMG707E

2m & 70cms. Dual Band. Det Front

SP-50B Speaker £27.95
DFK-3C Panel kit £34.95
MC-58DM DTMF £44.95
PG-4X Ext Cable £61.95
MB-12 Mount £14.95
MB-201 Mount £14.95

£265.00

KENWOOD Handhelds

TH-F7E 2&70 .... £237.00
TH-D7E 2&70 .... £289.00
TH-22E 2m £135.00
THG-71 2&70 .... £219.00
TH/K2E 2m £139.00
TH/K4E 70cms .. £139.00
Plus much more phone...

www.radioworld.co.uk

YAESU FT-1000MP

HF Base DSP. MkV 200w £2099.00

SP-8 Ext Speaker . £136.95
MD-100 Base Mic . £116.95
TXCO-6 TXCO £124.95
DVS-2 Voice Unit .. £199.95
FH-1 Keypad £33.95
E-DC-20 DC Cable . £11.95

FT1000MP FIELD **£1,699.00**

YAESU FT-847

HF 6m 2m 70cm. DSP. ATU Option

ATAS-120 Act ant . £259.95
ATAS-25 Man ant . £189.00
FC-20 ATU £249.95
FVS-1A Voice Unit £199.95
MH-36D8 DTMF £54.95
MMB-66 Bracket £32.95

2 YEAR WARRANTY **£989.00**

YAESU FT-897D

HF 6m 2m 70cm.100W Transportable

FP-30U AC supply £199.95
FNB-78 Batt pack ... £99.95
FC-30 Ext ATU £249.95

MMB-80 Bracket £15.95

2 YEAR WARRANTY **£649.00**

YAESU FT-857D

HF 6m 2m 70cm.100W. Mobile

ATAS-120 Act ant . £259.95
FC-30 Ext ATU £249.95
MH-36E8J DTMF £57.95
CT-39 Packet cab ... £14.95
TCXO-9 TXCO £69.95
YSK-857 Sep kit £45.95

FREE DSP **£579.00**

YAESU FT-817ND

HF 6m 2m 70cm. Portable / Mobile

FP-30U AC supply £199.95
FNB-78 Batt pack ... £99.95
FC-30 Ext ATU £249.95
TCXO-9 TXCO £69.95
MMB-80 Bracket £15.95

FREE BATTERY & CHARGER **£449.00**

YAESU FT-840

100w Mobile / Base 1.8-30MHz.

FIF-232C CAT cab . £99.95
FM-747 FM unit £49.95
MD-100 Desk Mic . £110.00
SP-6 Ext Speaker . £146.95
TCXO-4 Temp Osc . £41.95
YH-77STA Hdphs ... £49.95

2 YEAR WARRANTY **£389.00**

YAESU FT-8800/8900

FT-8800 Dual Band Mobile. 2/70
£269.00

Quad Band Mobile. 10/6/2/70 **FT-8900**
£329.00

2 YR WARRANTY

YAESU FT-2800M

2m Mobile. 137-174 MHz RX. 65W. VHF Rugged Mobile TX.

MH-48A6J DTMF ... £39.95
SP-7 Speaker £34.95
MLS-100 Ext spkr ... £29.95
FP-1030A PSU £199.95
DC Power cord £17.95

2 YEAR WARRANTY **£159.00**

www.radioworld.co.uk

ICOM IC-7800 FLAGSHIP

HF+6m Flagship 200W. 32Bit DSP. ATU. LCD Scope.

Keboard&Monitor . £469.95
SM-20 Base Mic ... £144.99
SP-20 Ext Spkr £164.99
CT-17 CI-V Conv £99.95

2 YEAR WARRANTY **£6,400.00**

ICOM IC-756 PROIII NEW

HF+6m 100w ATU. 32 Bit DSP.

AH-4 100W ATU ... £359.95
SM-20 Base Mic ... £144.99
SP-20 Ext Spkr £164.99
PS-125 25A PSU .. £295.95
CT-17 CI-V Conv £99.95
UT-102 Voice unit ... £32.99

2 YEAR WARRANTY ~~**£2099.00**~~
call for the latest price

ICOM IC-7400

HF 6m 2m 100W ATU. 32 Bit DSP.

AH-4 100W ATU ... £359.95
SM-20 Base Mic ... £144.99
SP-20 Ext Spkr £164.99
PS-125 25A PSU .. £295.95
CT-17 CI-V Conv £99.95
CR-338 TXCO £43.48

2 YEAR WARRANTY **£1,279.00**
Inc. SP-21 & SM20

ICOM IC-706 MkII G

Last Few Remaining

HF 6m 2m 70cm 100W DSP Mobile.

AT-180 ATU £329.95
MB-62 Bracket M £17.99
MB-63 Bracket F £9.99
MB-72 Handle £9.95
OPC-581 Sep Cab . £32.99
UT-86 Voice unit £41.13

2 YEAR WARRANTY **£749.00**

ICOM IC-7000 (NEW)

HF, VHF & UHF Mobile Transceiver

AT-180 ATU £329.95
CT-17 Level Conv.....£99.95
HM-151 Rem Con Mic.....£POA
MB-105 Controller bracket.£POA
MB-106 Carrying Handle...£POA
OPC-589 Mic Adapter..... £16.95
SM-20 Desktop Mic £144.99

2 YEAR WARRANTY **£POA**

ICOM IC-718

HF 100W TX. Dual VFO. Auto Notch.

AH-4 100W ATU ... £359.95
MB-5 Bracket £35.25
MB-23 Carry strap £9.99
UT-102 Voice unit ... £32.99
OPC-599 ACC Cab £32.99
UT-106 AF DSP £84.99

2 YEAR WARRANTY **£439.00**

ICOM IC-910H / X

All mode 2 & 70. 100W. 9600bps op.

AG-25 Preamp £159.95
MB5 Bracket £35.25
CR-293 TXCO £89.99
UT-102 Voice unit ... £32.99
UX-910 23cms unit £349.99
UT-106 AF DSP £84.99

2 YEAR WARRANTY **£1087.00**

ICOM & YEASU Handhelds

IC-T3H 2m FM .. £129.00
IC-E90 6/2/70 .... £199.00

FT-60E 2&70 ..... £169.00
VX-2E 2&70 ..... £119.00
VX-6R 2&70 ..... £189.95
VX-7R 6/2/70 .... £199.00
VX-110 2m FM £99.95

www.radioworld.co.uk

01922 414796

ORDER HOTLINE

Email: sales@radioworld.co.uk

Mon - Fri - 09:00 - 17:30,
Sat - 09:30 - 1600.

Most Goods are shipped for 24Hr delivery. [UK Mainland] is £10 P&P unless otherwise stated.

Credit Cards Accepted

MasterCard VISA VISA Electron SWITCH SOLO

Order Hotline - 01922 414796
Order Online - www.radioworld.co.uk

MFJ. Tuners

Tuners, Meters, Analysers.

MFJ-989C 3Kw	£319.95
MFJ-986C 3Kw	£299.95
MFJ-993 Intelliturner	£209.95
MFJ-971 QRP	£89.95
MFJ-969 300w	£169.95
MFJ-962D 1.5Kw	£249.95
MFJ-949E 300w	£135.95
MFJ-948 300w	£119.95
MFJ-945E Mobile	£99.95
MFJ-941E 300w	£109.95
MFJ-934 ATU+AG	£159.95
MFJ-921 2m	£59.95
MFJ-924 70cms	£59.95
MFJ-914 Extender	£56.95
MFJ-901 200w	£72.95

Reads SWR + Resistance(R) & Reactance(X) or Magnitude(Z) & Phase(degrees). Coax cable loss(dB) Coax cable length and Distance to fault... plus more.

Analysers

MFJ-249 1.8-170 Dig	£219.95
MFJ-259B 1.8-170 Rm&Dig	£199.95
MFJ-269 HF/VHF/UHF	£269.95

Dummy Loads

MFJ-250 1kw Oil filled	£69.95
MFJ-250X 1kw without oil	£44.95
MFJ-260C 300w PL259	£33.95
MFJ-260CN 300w N-Type	£39.95
MFJ-264 1.5kw PL259	£59.95
MFJ-264N 1.5kw N-Type	£69.95

MFJ-418
Morse Decoder / Tutor
£69.95

Learn Morse code anywhere, anytime with this MFJ Pocket Morse Code / CW Tutor! Take it everywhere! enjoy code at home, going to work, on vacation, on a plane or in a hotel. A large LCD display reads out letters, numbers and punctuation in plain English.

Heil. Audio.

Microphones, Headsets, Accessories.

Pro-Set-Plus Headset	£155.95
Pro-Set-Plus-IC Headset	£169.95
Pro-Set-HC-4/5 Headset	£109.95
Pro-Set-HC-IC Headset	£119.95
Goldline GM-4 Stick mic	£109.95
Goldline GM-5 Stick mic	£109.95
Goldline Vintage Stick mic	£129.95
HM-10-4 HC4 Reg stick mic	£69.95
HM-10-5 HC5 Reg stick mic	£69.95
HM-Dual HC4+5 Stick mic	£119.95
HM-10-I Icom Stick mic	£89.95
HMM-1C Icom Hand Mic	£59.95
HMM-K HC4/5 Ken hand mic	£74.95
HMM-Y HC4/5 Yae hand mic	£74.95
Traveller-817 Yaesu headset	£79.95
Traveller-706 Icom headset	£79.95

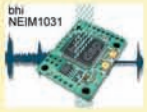
Call for Leads and Accessories

Adonis Microphones

AM-708E
Variable Compression
2 Microphone Outputs
£129.95

Adonis AM-7500E	£Phone
Adonis AM-708E	£129.95
Adonis AM-508E	£79.95
Adonis AM-308E	£69.95
Adonis FX-10	£59.95

bhi DSP



Noise Cancelling Solutions for Amateur Radio & SWL

NES10-2 Speaker with dsp	£99.95
NES1031 Inline dsp module	£129.95
NES1061 817 dsp module	£89.95
NES1061 817 brd inc fitting	£115.95
NES1062 dsp module	£89.95
NES1042 Switch Box	£19.95

Watson Supplies

W30-AM

0-15VDC
30/35A Peak
£119.95

W25-XM
NEW

13.8VDC
25A Switchmode
£99.95

W-25AM 25A Supply	£89.95
W-10AM 10A Supply	£59.95
W-5A 5A Supply	£29.95
W-3A 3A Supply	£22.95
W-25SM 25A Supply	£79.95
W-10SM 10A Supply	£49.95

Diamond Supplies

GZV4000
5-15 VDC
40A Peak
£154.95

GZV-6000 60A Supply *NEW.*	£299.95
GZV-4000 40A Supply	£154.95
GSV-3000 30A Supply	£144.95
GZV-2500 25A Supply	£114.95

Frequency Counters

Will tune AR-8200, AR8000 & IC-R10
Super Searcher
£99.95

FC130	£79.95
Hunter	£59.95

Call for further details

* 10Hz-3GHz
* Imp - 50 Ohms
* LCD readout
* 10-Digit display

Super Hunter
£149.95

Daiwa Accessories

Cross-needle meters

CN101L HF/VHF	£59.95
CN103N VHF/UHF	£65.95
CN801H HF/VHF	£109.95
CN801V VHF/UHF	£119.95

Coax Switches 2/4 Way.

CS-201 2-Way	£24.95
CX401 4-Way	£49.95
CS401N 4-Way NType	£Call

Avair Meters

AV-200
HF / VHF PWR SWR meter

AV-201 HF/VHF	£49.95
AV-401 VHF/UHF	£49.95
AV-601 HF/VHF/UHF	£69.95
AV-1000 HF/VHF/UHF	£89.95
AV-20 HF/VHF	£29.95
AV-40 VHF/UHF	£29.95

Palstar Tuners

TThe AT1500CV is an antenna tuner that can handle up to 1500 watts (1500 watt PEP) with low profile construction and bullet proof operation

AT-1500CV ***£389.00***

AT-1KD Digital Display	£299.95
AT-1KM Regular Display	£289.95
AT-1500BAL 1500w Bal	£599.95
AT-1500CV 1500w ATU	£389.95
BT-1500BAL Dual Bal	£569.95

Palstar ZM30 - Antenna Analyser
Micro-controlled SWR antenna analyzer
£289.00

Watson Antennas

Watson W2000
Bands 6m/2m/70cm
Gain 2.15/6.2/8.4dB
Power 200W (50W 6m)
Type 1/2, 2x5/8, 4x5/8
Length 2.5m
£69.95

W-30 2/70 Base	£39.95
W-50 2/70 Base	£49.95
W-300 2/70 Base	£64.95
W-2000 6/2/70 Base	£69.95
WBV-70 4m 1/2 Wave Base	£39.95

Bencher Antennas

Butternut HF-6V
Bands: 80/40/30/20/15/10
Height (Adj): 26 ft (7.9 m)
Weight: 12 lbs (5.4 kg)
Impedance: Nom 50 ohms
VSWR: 1.5:1 or less
£299.95

Butternut HF-2V 40/80m	£229.95
Butternut HF-6V 80-10m	£299.95
Butternut HF-9V 80-6m	£349.95
Butternut HF-5B 20-10m	£319.95
30-MRK 30m ad for HF2V	£89.95
A-17-12 17&12 ad for HF6V	£49.95
A-6 6m ad for HF6V-X	£14.95
TBR-160S 160m HF2/6/9V	£114.95

Hustler Antennas

Hustler 5-BTV
5 Bands - 80-10m
Height 7.64m - Weight 7.7kg
SWR 1.15:1 - Power 1kW
£195.00

Hustler 4-BTV 4 Band Vert	£169.00
Hustler 6-BTV 6 Band Vert	£225.00

West Mountain Radio

RIGblaster Pro	£209.95
RIGblaster Plus	£119.95
RIGblaster M8	£89.95
RIGblaster M4	£89.95
RIGblaster RJ	£89.95
Nomic 8P	£59.95
Nomic 4P	£59.95
Nomic RJ	£59.95

Tonna Antennas

Tonna - 20655
23cms (1296 Mhz) 55 element 21.5 dbi gain "N" 4.64m long.

Tonna 20505 6m 5el	£89.95
Tonna 20809 2m 9el	£54.95
Tonna 20811 2m 11el	£79.95
Tonna 20817 2m 17el	£99.95
Tonna 20909 70cm 9el	£45.95
Tonna 20919 70cm 19el	£59.95
Tonna 20921 70cm 21el	£74.95
Tonna 20635 23cm 35el	£64.95
Tonna 20655 23cm 55el	£89.95
Tonna 20745 13cm 25el	£69.95

Diamond Antennas

HF10FX 10m Mobile	£39.95
HF15FX 15m Mobile	£39.95
HF20FX 20m Mobile	£39.95
HF40FX 40m Mobile	£39.95
HF80FX 80m Mobile	£42.95
CR8900 10/6/2/70	£72.95
CP6 Base 6m-80m	£239.95
X50 Base 2/70	£54.95
X200 Base 2/70	£84.95
X300 Base 2/70	£99.95
X510 Base 2/70	£124.95
X700 Base 2/70	£249.95

Cushcraft Antennas

X-7 - 20/15/10 7el Yagi	£669.95
A3S - 20/15/10 3el Yagi	£499.95
A4S - 20/15/10 Yagi	£569.95
A3WS - 12/17 3el Yagi	£379.95
ASL-2010 13-32MHz Log	£749.95
MA5B - Mini Beam	£369.95
D3 - 20/15/10 Dipole	£249.95
D3W - 30/17/12 Dipole	£249.95
D4 - 40m Rotary Dipole	£349.95

TGM Antennas *Mini Beams*

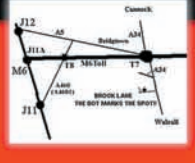
** Call for prices on TGM upgrade kits.*

MQ-24SR 6-20m 2el	£329.95
MQ-34SR 6-20m 3el	£449.95
MQ-3 6-20m 3el	£379.95
MQ-26 6-20m 2el	£389.95
MQ-26SR 6-20m 2el + EH	£419.95
MQ-36SR 6-20m + Dir	£559.95

Radioworks Wire Ants

CW-160 160-10m (252ft)	£129.95
CWS-160 160-10m (133ft)	£114.95
CW-80 80-10m (133ft)	£89.95
CWS-80 80-10m (66ft)	£109.95
CW-40 40-10m (66ft)	£84.95
CW-20 20-10m (34ft)	£89.95
G5RV+ 80-10m	£59.95
Radioworld G5RV Fullsize	£29.95
Radioworld G5RV Halfsize	£27.95

ALINCO · AOR · BHI · CUSHCRAFT · DIAMOND · HEIL · ICOM · KENT · KENWOOD · MFJ · RADIOWORKS · WATSON · WEST MOUNTAIN · YAESU · YUPITERU



RADIOWORLD
If You Don't need it, we won't sell it to you.

price match
Find a lower price? We'll try to match it!*

www.radioworld.co.uk

RADIOWORLD

42, Brook Lane,
Great Wyrley,
Walsall, WS6 6BQ.
Tel. 01922 414796.
Fax. 01922 417829.

ALINCO - AOR - BHI - CUSHCRAFT - DIAMOND - HEIL - ICOM - KENT - KENWOOD - MFJ - RADIOWORKS - WATSON - WEST MOUNTAIN - YAESU - YUPITERU

LDG Electronics

AT-1000

1KW Auto ATU - 1.8-54MHz - 1-8 secs Tune - Approx SWR Rating of 10:1

£449.95

LDG Z-100

100w Auto ATU - 1.8-54MHz - 0.5 - 6 secs

£115.00 ***BEST SELLER****

LDG TW-1 TALKING WATTMETER *New*

Speaks Fwd - Rev power in Watts & SWR
Continuous tone for amplifier adjustments
Power range: 0 – 2000 watts PEP

£109.00

LDG AT-100Pro *New*

100w Auto ATU - 1.8-54MHz
1-5 seconds Tune - 2 Pos Ant switch

£169.95 ***New***

LDG RBA 1:1 & 4:1

1:1 or 4:1 Balun - Covers 1.8 - 30Mhz
Power rating 200w

£29.95

LDG AT-897

100w Auto ATU for FT-897 - 1.8-54MHz

£199.95

Accessories:

K-OTT Kenwood Interface	£49.95
Y-OTT Yaesu Interface	£54.95
Icom-IC1 Icom Interface	£29.95
Alinco-IC1 Alinco Interface	£29.95
AC-1 Cable	£19.95

W4RT Electronics

One-Plug-Power

One-Plug Power is the internal FT-817 battery solution you have been waiting for until now.

OPP-817 £54.95

NEW! 2300 mAh Large Capacity FT-817 Internal Battery Soluion Still use Internal 817 Charger

OPP-897 £89.95

One Plug Power for the FT-897 4500 mAh; Fully Compatible with the FT-897 and Yaesu Charger.

NEW!

One-Plug Power is the internal FT-817 battery solution you have been waiting for until now. One-Plug Power comprises a 1800 mAh NiMH battery pack, both over-termperature and over-current protection, connection to the FT-817 Molex connector, and a modified Yaesu battery cover door featuring a power jack that allows connection of a battery charger such as the Maha MH-C777 or MH-C888.

One-Big Punch

One BIG Punch (OBP) is a custom add-on accessory for the Yaesu MH-31 microphone commonly used with many Yaesu amateur radios

OBP £49.95

Speech Compressor for the Yaesu MH-31 mic and FT817 FT857, FT897. Improve the TALK POWER.

MAX PUNCH £165.95

You can also enjoy the "MAX PUNCH" option that features the HC-4 with the OBP and the HC-5 (w/o OBP). The TONE switch is used to select which element is operational.

HAND MIKE £57.95

W4RT Electronics Microphone with One BIG Punch Speech Compressor included.

The One BIG Punch is an AF-based speech compressor specifically configured to provide remarkable increase in talk power while maintaining good audio quality. The OBP is NOT a clipper, but a compessor providing great voice compression, high-level limiting, and noise gating. The unit can be mounted inside the MH-31, requires no additional electrical power, and can be turned on or off by using the MH-31's TONE switch.

One-Board-Filter

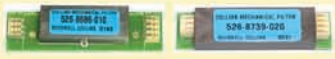
The One-Board Filter (OBF) affords you the opportunity to have both the Collins CW and SSB mechanical filters available in your FT-817 together!

OBF £229.95

Replace two filters in the space of one. OBF includes the two optional filters and fitting.

Collins Mechanical Filters
for the Yaesu FT-817, 857 & 897.

500 Hz CW - £94.95 ***2.3kHz SSB - £94.95***



This is the option that many, many FT-817 owners have requested. The OBF utilizes Collins Mechanical Filters that are the same as used in the optional Yaesu filters for the FT-817. The bandwidth of the 7-pole CW filter is 500 Hz and the 10-pole SSB filter is 2.3 kHz. The One-Board Filter is NOT available for installation by FT-817 owners. This is not a "do-it-yourself" option. The One-Board Filter must be installed by RADIOWORLD, or a competent engineer . If in doubt please call for details.

One-Touch-Tune

At the touch of a button, you have the carrier needed for tuning. One-Touch Tune (OTT) is totally transparent to the FT-817 and to any external equipment that you have attached to the rig.

OTT-817 £54.95

It requires no external power and works with both manual and automatic tuners.

W4RT OTT-FT817	£54.95
W4RT OTT-FT100/857/897	£54.95
W4RT OTT-FT847	£54.95
W4RT FT817 One Fast Charger	£Call
W4RT Antenna Boss	£139.95

NEW* FT-817 Stand

£19.95

Simply snaps into position. Adjust for desired height. Complete with non slip feet and allen wrench.

Professional-Grade FT-817 Stand

W2IHY Technologies

*Available and IN STOCK now**

Finally, professional audio processing technology is applied to the unique requirements of amateur radio operators! The W2IHY 8 Band Audio Equalizer and Noise Gate is an easy-to-use, sophisticated unit loaded with high-performance features.

W2IHY 8 Band Audio EQ Noisegate

£229.95

If You Are Ready for New Adventures in High-End Transmit Audio Then You're Ready for – *EQplus by W2IHY*

£299.95

W2IHY 2 Band Processor

2 Band Audio Processor, You can adjust Bass and Treble of your transmit audio for rag chew, dx and contest style audio

£119.95

Adapter cables to fit Icom - Kenwood - Yaesu £22.95

ATX Walkabout

ATX Walk--about PL-259

£47.95

The ATX Walkabout covers all bands (including WARC bands) from 80-6m, 5W guaranteed, 25W max. When fully telescoped it is about 65 inches long. This makes it ideal for the FT-817 or any other portable HF radio.

ATX Walkabout BNC	£47.95
ATX Walkabout PL259	£47.95
ATX Walkabout Universal	£54.95

The Miracle Whip

RX - 0.6 to 460 Mhz
TX - 40,30,20,17,15,12, 10, 6, 2m & 70cm

Power Limits 25W PEP 10W Cont.

£127.95

In Stock*

* The Miracle Whip will transmit on almost any frequency you are licensed to use including WARC, MARS/CAP, Alaska Emergency, Citizens Band, Marine, and most commercial HF SSB and VHF/UHF channels

** The Miracle Whip is optimized for for best receive rather than lowest swr on 80 and 160, as no short antenna will present good transmitting opportunities at these frequencies

Portable Masts

Telescopic Masts Inc Guy Rings

Small 17' 6"	£55.95
Medium 26' 0"	£65.95
Large 33' 0"	£75.95
Tripods to fit masts	£25.95

Mobile Mounts

Solarcon MAGZ-17 TRI-MAG

£39.95

An extremely strong magnet base which actually consists of 3 x 5" chrome magnets that are interconnected with metal strips to form one very large mount. Suitable for very large mobile antennae such as ¼ wave tank whips.

Siro MAG125 3/8	£17.95
Siro MAG125 PL	£17.95
Siro MAG 145 3/8	£22.95
Siro MAG 145 PL	£22.95
Solarcon Magz-17	£39.95

RM Amplifiers

RM HLA-150
HF - 1.5-30MHz
Power Amplifier
150 WATTS

£249.95

RM HLA-300
HF - 1.5-30MHz
Power Amplifier
300 WATTS

£329.95

01922 414796

ORDER HOTLINE

Email: sales@radioworld.co.uk

Mon - Fri - 09:00 - 17:30,
Sat - 09:30 - 1600.

Most Goods are shipped for 24Hr delivery. [UK Mainland] is £10 P&P unless otherwise stated.

Credit Cards Accepted

MasterCard VISA VISA Electron SWITCH SOLO

Do a great deal better @ RADIOWORLD

01922 414796 - www.radioworld.co.uk

price match — Find a lower price? We'll try to match it*

Linear Amp U.K.

Challenger Mk3 **£1795.95**

Challenger MK3 HF	£1795.95
Ranger811H HF	£945.95
Discovery 2-31 2m 1KW	£1395.95
Discovery 2-35 2m 1.5KW	£1595.95
Discovery 6-31 2m 1KW	£1395.95
Discovery 6-35 2m 1.5KW	£1595.95
Discovery70 70cms 700w	£1495.95
LA-STNM Bal Super Tuner	£345.00
LA-STWM Bal Super Tuner	£395.00

SGC. Smartuners

SGC-230 200Watts **£359.95**

SGC-230 HF	£359.95
SGC-231 HF+6m	£359.95
SGC-235 HF-500w	£749.95
SGC-237 HF+6m	£299.95
SGC-237 Porta	£589.95
SGC-237 PCB	£299.95
SGC-239 HF	£185.95
MAC-200	£339.95

Rotators

YAESU

G-2800SDX Rotator	£999.95
G-450C Rotator	£299.00
G-550C Rotator	£309.00
G-650C Rotator	£379.00
G-1000DXC Rotator	£429.00
G-5500C Rotator	£569.00

Feeders & Wire

RG-213 Military Spec High grade 50 Ohm coaxial Cable **£84.95** A 100m Drum

RG58U	£0.50 per Metre
RG8 Super	£0.70 per Metre
RG213	£1.00 per Metre
W103 Westflex	£1.30 per Metre
RG-8 75 Metre Drum Special	£39.95
Flexweave 50m Flex	£29.95
Flexweave-PVC-50 50m	£39.95
Enamelled Copper Wire 50m	£12.95
Hard Drawn Copper Wire 50m	£14.95

Rotator Cable: - Color coded Cable

3 core	£0.45 per Metre
7 core	£0.79 per Metre
8 core	£1.09 per Metre

DC Connecting Cable

5A DC Cable	£0.50 per Metre
10A DC Cable	£0.75 per Metre
20A DC Cable	£1.00 per Metre
25A DC Cable	£1.10 per Metre

Wonder Wand *New

Wonder Wand MonoBand Antenna. Mono Band QRP antenna High Quality Mono Band antenna. Available for 3 x Bands.

MB-160 Mono 160m	£49.95
MB-80 Mono 80m	£49.95
MB-60 Mono 60m	£49.95
Wonder Wand 40m-70cm	£89.95
C-POISE Wander-Wand Tunable Counterpoise System	£40.00

The UK's No.1 Used Equipment Trader

Second Hand List.

Quality Used Equipment. 3 Month Warranty. Best prices paid on your used equipment.

432-50 70cms Amp 50w £99.00
AEA PK-12 Packet Terminal £69.00
AEA PK-232MBX-DSP £199.00
AEA PK-900 £199.00
AKD 6001 6m FM Trx £135.00
Alan HQ-2000 SWR / Watt Meter £25.00
Alinco DJ-G5 Dual Band Handy £159.00
Alinco DJ-V5 Handheld £99.00
Alinco DJ-X10 Wide Band Rx £200.00
Alinco DJ-X2000 Intelligent Receiver £275.00
Alinco DX-77E HF Transceiver £389.00
Alinco EDX-2 Auto ATU £219.00
AOR 350L Bar Element £30.00
AOR 350M Bar Element £30.00
AOR 8200-PC Computer lead £45.00
AOR AR-1500 Wideband Receiver £89.00
AOR AR-2002 Receiver £199.00
AOR AR-3000A Wideband Receiver £450.00
AOR AR-7030 HF Receiver £550.00
AOR AR-8200 2 500kHz -2040MHz Receiver £199.00
AOR AR5000A+3 HF Rx £1599.00
AOR AR8000 500kHz - 1900MHz Receiver £189.00
AOR LA-350 Loop Antenna £129.00
Avair AV-200 VSWR/POWER Meter £30.00
Bearcat UBC-120XLT Scanner £69.00
Bearcat UBC-278 XLT Scanner £99.00
Bearcat UBC-780XLT Scanner £199.00
Bnos 20AMP PSU £89.00
BNOS LP50-3-50 6m linear amplifier £99.00
Codan 9360 SSB transceiver £399.00
Comet CD-270D Meter £49.00
Commtel Comm-225 Rx £150.00
Daiwa CNA-1001 £149.00
Daiwa CS-201 2 Way Switch £10.00
Datong FL-2 Multimode Filter £69.00
Dewsbury Electronics Supa-Tuta £35.00
Diamond SX-100 Meter £65.00
Diamond SX-200 Meter £69.00
Drake R8E HF Receiver £425.00
Fujion F-2000A Finder F 2000 A £99.00
GRE PSR-214 FM Base Scanner £89.00
Heil BM-10-5 Headset £50.00
Hi-Mound Manipulator Paddle Key £30.00
Hora C-150 2m FM Handheld Transceiver £79.00
IC-7400 HF, 6m & 2m transceiver £899.00
ICE 413 2m Band Pass Filter £30.00
Icom AH-4 Auto ATU 80m - 6m £189.00
Icom IC-Δ1E £249.00
Icom IC-2KL 500W Solid state HF Linear Amp £750.00
Icom AT-500 500W ATU £275.00
Icom IC-207H 2 / 70 cm Mobile transceiver £199.00
Icom IC-24ET Dual Band Handy £139.00
Icom IC-703 HF, 6m Portable £399.00
Icom IC-706MKIIG Multi Band Multi Mode Mobile £649.00
Icom IC-718 HF Transceiver £379.00
Icom IC-740 HF Transceiver £389.00
Icom IC-7400 HF, 6m & 2m Transceiver £899.00
Icom IC-746 HF / 6 / 2 Transceiver £875.00
Icom IC-756Pro HF / 6m Transceiver £995.00
Icom IC-E90 Tri Band Handy £149.00
Icom IC-R72 Receiver £350.00
Icom IC-R8500 100kHz - 2000MHz Receiver £899.00
Icom IC-T7E Dual Band Handy £139.00
Icom IC-W31E Dual Bander £160.00
Icom PS-55 Power Supply £99.00
Icom SP-20 Loudspeaker £99.00
ICS AMT-2 Terminal Unit £49.00
Jil SWR Meter £15.00
JPS NIR-10 Noise Unit £99.00
JRC NRD-345 HF Receiver £285.00
JRC NRD-545 DSP Receiver £899.00
Junker Pump Key £75.00
Kamtronics KAM Multimode £140.00
Kantronics KPC-3+ TNC £129.00
Kent Straight Key £45.00
Kenwood AT-50 ATU £175.00
Kenwood BO-9 Base Unit £39.00
Kenwood IF232 £50.00
Kenwood MB-201 £20.00
Kenwood MC-60A Microphone £80.00
Kenwood PS-31 Power Supply £129.00
Kenwood SO-2 Hi-Stab Oscillator £69.00
Kenwood TH-F7E Dual Band Handy £189.00
Kenwood TH-G71E Dualband Handie £129.00
Kenwood TH-K2E 2m Handie £99.00
Kenwood TM-G707E Dual Band Mobile £189.00
Kenwood TS-570D HF Transceiver £525.00
Kenwood TS-570DG/E HF Transceiver £675.00
Kenwood TS-690S /AT HF -6m Transceiver Inc ATU £599.00
Kenwood TS-850S /AT HF Transceiver Inc ATU £699.00
Kenwood TS-870S HF Transceiver £849.00
Kenwood TS-950SD HF Transceiver £1099.00
Kenwood TSU-8 CTCSS encoder £30.00
Kenwood VS-1 Voice Synthesiser £39.00
Kenwood VS-2 Voice Synthesizer £30.00
Kenwood YG-455C IF Filter £65.00
Kenwood YK-88SN-1 SSB Filter £40.00
LDG Z-11 Auto ATU (Low Power) £89.00
Linear Amp Challenger II amplifier £1199.00
M/Mods 144/100 2m 100W Linear Amp £119.00
M/Mods 432/50 70cm 50W linear Amp £99.00
Maplin YN48C Dip Meter £49.00
MFJ-1272B TNC / Mic Switch £20.00
MFJ-1701 6 Way Antenna Switch £40.00
MFJ-442 Elec + Memory keyer £89.00
MFJ-722 CW / SSB Filter £59.00
MFJ-784 DSP Filter £149.00
MFJ-9015 15m cw Trx £84.26
MFJ-912 Remote Balun £20.00
MFJ-914 Tuner Extender £39.95
MFJ-921 VHF 200 Watt ATU £50.00
MFJ-931 Artificial Ground £69.00
MFJ-948 ATU £89.00
MFJ-949E Versa Tuner £109.00
MFJ-962D Versa Tuner £220.00
Microset PC2S 30 Power Supply £99.00
Microset PT 135 PSU £120.00
Microset R50 2m Amp £79.00
Mizuho Receive ATU £40.00
MML432-30L 70cm 30W Linear Amp £89.00
MML432-50 70cm's Linear Amplifier £79.00
OptoElectronics X Sweeper £1199.00
Palstar PS-30N PSU £79.00
Pro.Sis.Tel Rotator and Head Unit £289.00
Proset-Plus Heil Headset £109.00
Realistic Pro-2006 Scanner £129.00
Realistic Pro-2012 Scanner £79.00
Realistic Pro-26 Scanner £89.00
Rexon RL-501 Dual Band Handy £89.00
SMC 150PL Dummy Load £29.00
Snooper S5-R Safety Alert System £119.95
Standard C-156E 2m Handheld £125.00
Standard C468 70cm Handy £59.00
Target HF3 Receiver £99.00
Tentec Paragon HF Base Inc. Speaker £700.00
TenTec RX-350 HF Receiver 350 £799.00
Timewave DSP-59+ Filter £129.00
Timewave PK-12 Packet £99.00
Tokyo Hy-Power HT-106 6m Transceiver £199.00
Tokyo Hy Power HL-50 HF/6m Linear Amplifier £199.00
Tono Theta 777 TNC £49.00
Trio (Kenwood) YK-88C IF Filter £40.00
Vibroplex Vibro Keyer Deluxe £119.00
Watson W-25SM 22A Power Supply £59.00
WELZ DL-600 Dummy Load £49.00
Yaesu FC-20 ATU for FT-847 £175.00
Yaesu FL-2025 25W Linear Amplifier £99.00
Yaesu FP-707 PSU £110.00
Yaesu FR-101 HF RX £399.00
Yaesu FRG-100 HF Receiver £299.00
Yaesu FRG-7700 HF Receiver £199.00
Yaesu FRG-9600 VHF-UHF Receiver £199.00
Yaesu FRT-7700 Receive ATU for the FRG-7700 £70.00
Yaesu FRV-7700 Converter £60.00
Yaesu FT-1000 "CLASSIC" HF Transceiver £1399.00
Yaesu FT-1000MK V 200W HF Transceiver £1499.00
Yaesu FT-1000MP AC HF Base £999.00
Yaesu FT-1000MP Mark -V Field £1349.00
Yaesu FT-101ZD HF Transceiver £325.00
Yaesu FT-2800M 2m Transceiver £119.00
Yaesu FT-290MkII 2m Multi-mode Trx £250.00
Yaesu FT-212RH 2m FM Mobile Transceiver £89.00
Yaesu FT-416 2m Handy £79.00
Yaesu FT-41R Handheld Transceiver £120.00
Yaesu FT-470R Dual Band Handheld £129.00
Yaesu FT-51R Dual Band Handy £149.00
Yaesu FT-690Rmk2 6m Multi mode £275.00
Yaesu FT-707 HF Transceiver £220.00
Yaesu FT-7100M Dual Band Mobile Trx £159.00
Yaesu FT-736R 23cms Module £399.00
Yaesu FT-736R 2m/70cm Base mode £499.00
Yaesu FT-736R 6m, 2m & 70cm Base £699.00
Yaesu FT-736R 2/70 +6m+23cms £899.00
Yaesu FT-747 HF Transceiver £299.00
Yaesu FT-767GX HF, 6m & 2m trx £599.00
Yaesu FT-76R 70 cms Handheld Transceiver £99.00
Yaesu FT-7800 2/70 mobile £189.00
Yaesu FT-817 Portable Transceiver £375.00
Yaesu FT-847 Multi-Band Transceiver £849.00
Yaesu FT-857D Multi-band Mobile £499.00
Yaesu FT-8900 Quad Band Mobile Trx £279.00
Yaesu FT-897 Multiband Portable Trx £539.00
Yaesu FT-900/AT HF Transceiver £549.00
Yaesu FT-902DM HF transceiver £325.00
Yaesu FT-920AF HF / 6M Base £899.00
Yaesu FT-990 /AC HF Transceiver £899.00
Yaesu FT857 Multiband Mobile £425.00
Yaesu FTV-901R 2m / 6m Transvertor £275.00
Yaesu FV-901DM VFO £175.00
Yaesu MD-1 Desktop Microphone £75.00
Yaesu MH-29 Speaker Microphone £49.00
Yaesu MMB-31 Mobile Mounting Bracket -31 £15.00
Yaesu MW-1 Remote Control Mic £60.00
Yaesu NC70 Battery Charger £60.00
Yaesu PA-11C SH PA-11C £20.00
Yaesu VR-5000 Receiver £389.00
Yaesu VX-110 2m Handy £79.00
Yaesu VX-1R Handie £89.00
Yaesu VX-2E Dual Band Handy £99.00
Yaesu VX-5R Tri-Band Handy £149.00
Yaesu VX-7R Tri Band Handy £169.00
Yaesu XF-10.9M-202-01 Filter £30.00
Yaesu XF-455K-251-01 CW filter £30.00
Yupiteru MVT-225 Air Band Scanner£149.00
Yupiteru MVT-3300EU Scanner £99.00
Yupiteru MVT-7100 Scanner £149.00
Yupiteru MVT-7300 Scanner £179.00
Yupiteru MVT-9000 MK2 Scanner £249.00
Yupiteru MVT-9000 Scanner £199.00

CLICK AND BUY USED ONLINE !

www.radioworld.co.uk

The UK's No.1 Used Equipment Trader - Call 01922 414796

ALINCO · AOR · BHI · CUSHCRAFT · DIAMOND · HEIL · ICOM · KENT · KENWOOD · MFJ · RADIOWORKS · WATSON · WEST MOUNTAIN · YAESU · YUPITERU

42 Brook Lane
Great Wyrley
Walsall WS6 6BQ

We are Premier UK Dealers for ICOM, Kenwood, Yaesu.
Full UK Warranty with full peace of mind.

RADIOWORLD

Building A Remote Antenna Switch

Mike Brett M3JTX - despite this newish callsign - has been enjoying radio for many years. With many antennas to choose from and feed to the shack, Mike installed a remotely controlled antenna switch to take full advantage of his system and reduce the number of cables required.

The remotely controlled antennas switching box laid out prior to installation.

I've always loved experimenting with antennas and trying out different ideas. These used to be mostly receiving only on the v.h.f. bands, but since December 2002 when I obtained my M3 Licence, I have concentrated mainly on transmitting antennas for the h.f. bands.

The project described here came about after a move from East London to my present location, Wisbech in Cambridgeshire. You see my last shack, in London had lots of holes through the wall to accommodate the many feed cables to the different antennas. However, besides looking a mess, it made it difficult to assess the tributes of one antenna over another when I had to unscrew connectors to swap cables.

With the remote antenna idea, **Fig. 1** and **2,** I can connect as many antennas as I like, to the outside relay box with just two or three cables having to go through the shack wall. With a flick of a switch, I can change from one to another for easy comparison.

My unit is built as a dual circuit relay box, as I wanted two h.f. sockets at 50Ω and three 75Ω v.h.f. sockets. And of course, the project could just as easily be built as h.f only or v.h.f. only, depending on individual requirements.

Mains Powered

The unit is mains powered via a step down transformer that resides in the internal control box. Output is rectified by four IN4007 diodes to supply a little over 12V under no load conditions.

Positive current is fed to the external relay box via 12 position rotary switches. I've installed a 12V l.e.d. in series with each switch position as a visual aid that all's well and current is being fed to that relay. Switching current is fed from the control box to the external unit via six core burglar alarm cable. (That means there is one wire for each of the five relays, plus a common return.

Construction Details

Let's now look at the construction details. Any box, plastic or metal, which is large enough to take the transformer, will do for the internal control box. You should fit the transformer securely to the base and wire the diodes as shown. I've used connecting blocks to join both ends of the six core cable to the units. This is a great help when it comes to installing the units in situ. When fitting the rotary switches, adjust the collar on the switch shaft for the number of relays used and switch positions needed.

Now we can move to the external relay box. Here, the relays could be mounted directly on to the stripboard, but I prefer to solder 16-pin dual-in-line (DIL) sockets to the board and plug the relays in. **Note:** If you ever have to change the relays due to a malfunction, this will make the job much simpler.

Before fixing the DIL sockets, cut the tracks on the board as in the photograph **Fig. 3**. Fix the wire links as shown and fit the printed circuit board pins into position. Note that the connection pins are pushed into the board from the blank side.

Any unused pins on the DIL socket can be snipped off although I did leave a couple of extra pins on, to make the DIL sockets more secure. Solder these to the unused tracks.

Mount the board in your chosen box vertically, with all the signal cables on the opposite side to the relays, **Fig. 4.** This will lessen the chance of any unwanted interference. The relays are 12V miniature double pole double throw (DPDT) signal relays and if using a substitute, make sure they have gold plated switching contacts. **Note:** Use the appropriate screened cables for all the connections to the antenna sockets.

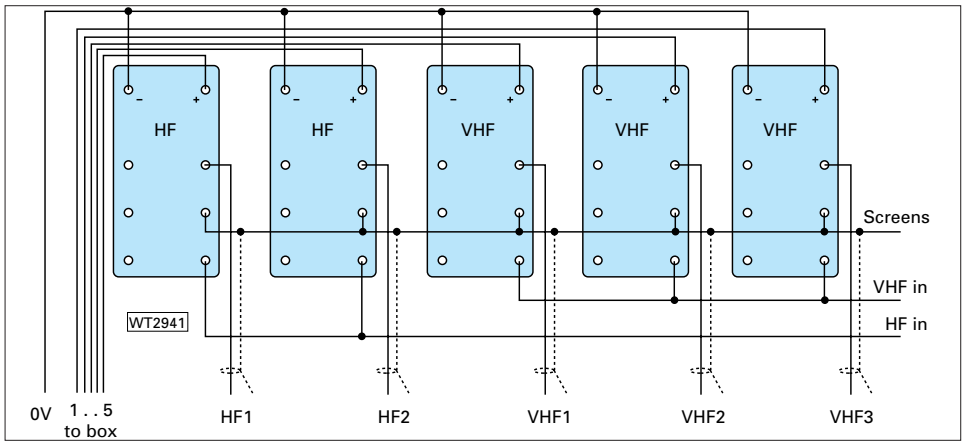


Fig 1: The remote controlled antenna switching box circuit as built by Mike Brett M3JTX (see text).

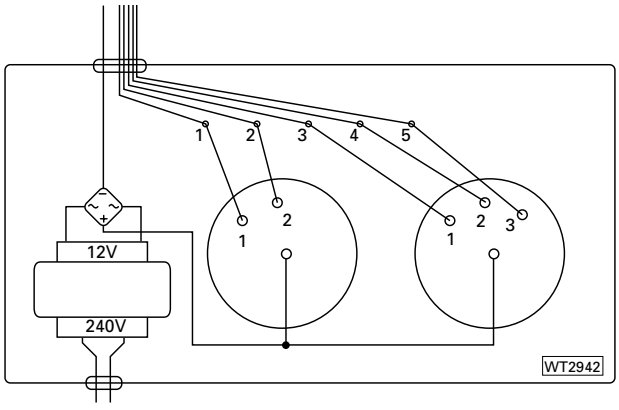


Fig. 2: Circuit of the shack end controller.

Fig. 4: The complete relay system built and ready for use.

Weather Proof Housing

When it came to finding a housing for the external unit, I had the usual problem of trying to keep it weather proof and easily accessible. But most importantly - fully screened.

Aluminium, if exposed to the vagaries of the British weather, soon deteriorates, not to mention the damage to the antenna connections. Housing the unit in an aluminium box and then placing this inside a weatherproof plastic box solves the problem.

Cut holes large enough to take a PL259 plug in the bottom of the plastic enclosure, adjacent to every socket. Although you will still have to remove the cover to connect a cable, you'll not be doing this very often. Any holes not being used could be covered with gaffer tape!

Buying everything new, my unit cost a little over £60, but you may have some of the components already in your junk box. Also, depending on the distance from your transmitter to your antennas, you'll be saving on coaxial cable too.

Well that's it folks. I do hope you will give this unit a try. If any of you have any queries or comments, you can E-mail me at **mike.brett@paulbrett.plus.com** and I will do my best to answer promptly. Also, if anyone would like to E-mail me a picture of his or her version of this unit they've built, it would be much appreciated. **PW**

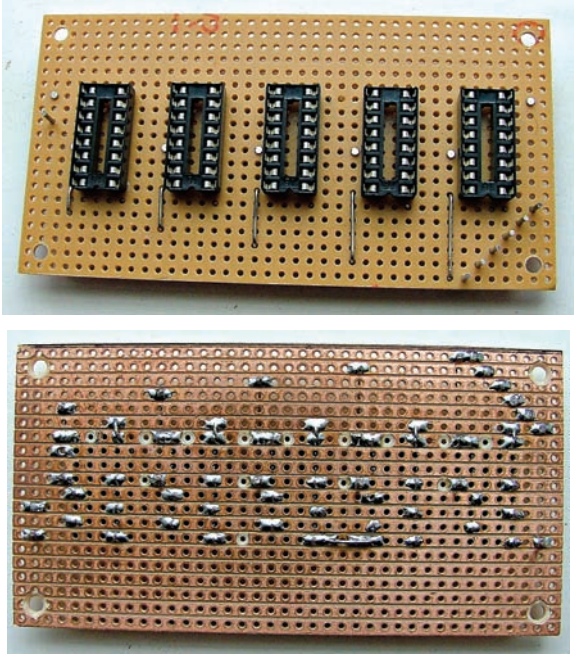


Fig. 3: The author uses DIL sockets for interconnecting relays (see text). Close up view showing pattern of track cutting adopted by author on the Veroboard used for the circuitry.

ML&S martin lynch & sons

Suppliers of Communications Equipment

Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS

TEL: 0845 2300 599 FAX: 0845 2300 339

E-MAIL: sales@hamradio.co.uk

WEB: www.hamradio.co.uk

MFJ Products at Lower Prices!

MFJ-461 Pocket size Morse Code Reader with built in display. Just place in front of your speaker to copy CW - instantly! Fully self contained, battery powered. **£69.95**

MFJ-418 Pocket size Morse Tutor with built in display. Random sending of Morse characters with confirmation on screen of what has been sent. Fully self contained, battery powered. **£69.95**

MFJ-1704 Probably the best 4 way antenna switch available. Cast Alloy construction, Power 2.5kW ● Isolation 60dB at 30MHz, 50dB at 500MHz ● Range DC ->500MHz. **£59.95**

MFJ-971 An ideal QRP ATU. Easy to use and very compact. QRP Portable ATU ● 1.8 - 30MHz ● 300W/30W 6W selectable ● Cross needle meter ● 12V DC Ext ● SO-239 sockets ● Tunes wire, coax, balanced lines ● Terminals & earth post ● Size 160 x 150 x 60mm ● Weight 870g. **£89.95**

MFJ-902 Tiny Travel Tuner. Tiny 4½ x 2¼ x 3 inch tuner handles full 150 Watts! Covers 80-10 Meters, has tuner bypass switch, tunes nearly anything! **£65.95**

MFJ-904H Tiny Travel Tuner/ SWR/Wattmeter & Balun. Tiny 7½ x 2¼ x 3 inch tuner handles full 150 Watts! Covers 80-10 Meters, has tuner bypass switch, tunes nearly anything! **£109.95**

MFJ-949E 300 Watt Antenna Tuner. More Hams use MFJ-949's than any other antenna tuner in the world! Why? Because the world's leading antenna tuner has earned a worldwide reputation for being able to match just about anything. **£139.95**

MFJ-974H 160 Thru 6 Meters Balanced Line Antenna Tuner. The MFJ-974H 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-993 300 Watt IntelliTuner Automatic Antenna Tuner. The MFJ-993 IntelliTuner 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. **£209.95**

MFJ-994 Similar to 993 above but 600 Watts. 1.8-30MHz Auto ATU **£299.95**

MFJ-259Z Special * With Batteries, Charger & Loop * Range: 1.8-170MHz. MFJ's favourite Antenna Analyser with HF frequency coverage. It's simple to operate and keeps your antennas in check. MFJ-259B gives you a complete pictures of your antenna's performance. You can read antenna SWR and Complex Impedance 1.8 to 170MHz. **£199.95**

MFJ-259B As above without battery, charger and loop. **£189.95**

MFJ-269 Range: 1.8-450MHz. MFJ's latest Antenna Analyser with UHF frequency coverage. Based on the successful MFJ-259B it combines all of the features plus more. **£269.95**

You can buy any product over £250 from ML&S and not pay a penny for a whole TWELVE MONTHS?

No Catch - pay NOTHING, keep the money in your bank earning interest. In 12 months time settle the amount in full. Offer subject to status.

Take Away Now and Pay NOTHING Until This Time Next Year!!

Having many years of experience offering specific finance packages for our customers, we can now offer various options on payment. We have added "Take-Away Now & Pay Later" to all our products over £199. It works like this: 0% APR An example of our Take-Away Now: Discounted price of £300. Pay no interest provided you pay by the date the amount is due, in full. After the 12 months period has expired pay £15.76 for 36 months. TAP £567.43 Please note that interest is calculated from the date of the original agreement. 29.8% APR.

Call us 6 days a week, mon-sat 9.30-5.30

0845 2300 599

local call number

ML&S for Ham Radio Top Sellers, Antennas & Accessories

The replacement for the IC-706. HF/VHF/UHF All-mode Transceiver.

IF-DSP technology comes to a new multi-bander.
The very best Full DSP mobile/base available NOW.
Limited stock: £999.95 - please call first for availability.
For latest information see: www.IC-7000.com

Yaesu FTdx9000D
ML&S were the first UK company to supply the new FTdx9000D & continue to offer the earliest deliveries. 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

FT-1000MP mkV 200W + MD-100 & SP-8
Identical to the FT-1kField but 200 Watts and external PSU. With Desk Mic & Speaker.
Package Price: £2099 (Rig only £Call)

Yaesu FT-1000MP mkV Field + MD-100 & SP-8
The FT-1k Series has never been such good value. Offered with the matching Desk filtered Speaker and Base Microphone at an even bigger saving.
Package Price £1699 (Rig only £1499)
LIMITED STOCK

Yaesu FT-847 + LDG AT-100 & MP-250A Bundle! FREE MD-100 Base Mic!
Still our best selling All Band Base Transceiver. Bundled with the new LDG AT-100Pro Auto ATU, MyDEL MP-250 metered 25A PSU & a FREE MD-100 Desk mic. **Please note that this offer is very limited.**
Total Package £1249.95 (Rig only £999)

Yaesu FT-897 + LDG AT-897 + MP4128 Package
High Power version of the FT-817. Use as a transportable, (20W) or as a base/mobile (100W). Now bundled with the LDG bolt-on Auto-Tuner & compact MP-4128 22AMP ATU.
ONLY £895 (Rig Only £Call)

Yaesu FT-857+ ATAS-120A
Nobody can match the flexibility of the 857 & ATAS-120A Auto Antenna. Just plug the ATAS into the FT-857 & operate anywhere from 7MHz-432MHz, without having to change or touch the antenna! (Duplexer is required for 2/70). **We can even offer a professional car install service. Only £799 for both**
(Rig only: £579)

Yaesu FT-817ND Latest Version
The latest FT-817ND comes complete with HF+6+2+70 and Metal-hydride batteries, charger, mic & antenna.
Call for best price (FT-817ND-DSP Version available)

Yaesu FT-2800M
2M brick-built 65W rig. **RRP: £179, ML&S: £159**

Yaesu FT-7800
Bar make the tea it'll give you 2m/70cm @ 50W/40W.
RRP: £239, ML&S: £239

Yaesu FT-8800 Similar to the FT-7800 but can receive on 2 & 70 simultaneously.
RRP: £289, or 48 x £8.26 p/m

Yaesu FT-8900
One-stop solution to high-power FM on 10m, 6m, 2m & 70cm. When your local repeater is busy, slip onto 10m & work DX! **Only £339**

Yaesu VX-2E Micro Handie 2/70 with scanner. Complete with Li-ion battery, charger & antenna.
NEW LOWER PRICE Now only £119

NEW Yaesu FT-60E Latest Twin Band 5W Handie from Yaesu. **Only £169** Or buy the FT-60E with a lapel speaker microphone for only **£189.95!**

Yaesu VX-7R The U.K's best selling Triple Band Handie.
Only £209 or with lapel microphone: Only £229

Kenwood TS-2000E Just superb on all bands 160m-2m with optional 23cm (X-Version).
RRP: £1699, ML&S: £1299

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

Kenwood TS-480SAT The best selling Kenwood H.F. Can be used mobile or base. Includes ATU.
ML&S: £699.95

Kenwood TS-480HX with As TS-480SAT but 200 Watts, no ATU. **ML&S: £799.95**

Kenwood TS-570DGE Still the ideal choice if you are keen on H.F. and want an easy to use radio.
RRP: £999, ML&S: £799 or 48 x £23.64 p/m

Kenwood TS-50S It's been around 10 years but if you want an HF rig in a compact package with excellent performance then buy one of these. As used by the recent DX-pedition FT5XO to Kerguelen Island.
Only £595

Kenwood TMD-700E The unique 700E is not only a dual-band FM rig but has APRS and TNC built-in.
RRP: £519, ML&S: £439 or 48 x £12.99 p/m

Kenwood TH-D7E A 2/7- Handie with TNC and APRS capability. **RRP: £359, ML&S: £299 or 48 x £8.85 p/m**

Kenwood TH-F7E 2/70 Handie with Gen Cov RX. If you must have SSB RX on your dual-bander then buy one! **RRP: £289.95, ML&S: £249**

Icom IC-7800
The worlds best H.F. Transceiver? Probably.
RRP: £6400.00

NEW Icom IC-756Pro mkIII The latest in the IC-756Pro Series
RRP £2495 ML&S £2099 or 36 x £76.31
Package deal: IC-756ProIII, SM20 Microphone, SP-23 New Base Speaker with filters.
RRP £2768, ML&S £2299
(Rig only: £2099)

Icom IC-7400 + SM-20 + SP-21 + MP-250A
What a package! New IC-7400 with Matching Desk Mic, Speaker & MyDEL Metered Base PSU. **Only £1349**

Icom IC-718 Basic ready to go 100W HF Transceiver supplied with Microphone & DC Lead.
RRP: £649, ML&S: £449 or 48 x £13.29 p/m

Icom IC-703 10W Portable/Base HF Transceiver with built-in ATU. **RRP: £703, ML&S: £449**

Icom IC-910X The best 2/70 & 23cm dedicated all mode base. 23cm included.
RRP: £1675, ML&S: £1239 or 48 x £36.66 p/m
Basic Version (without 23cm). also available **£1089 or 48 x £31.93 p/m**

Icom IC-E208 2/70 mobile 50/55W Transceiver with host of additional features. Remote head leads included.
RRP: £365, ML&S: £239

Brand New IC-E90 Triple Band Handie.
Only £199.95! or with 4m and extra antenna £239.95 (Limited Stocks)

Happy New Year to all our customers

Don't forget! ML&S are approved stockists for the following: AOR, bhi Ltd., Icom, Kenwood, Maldol, M

· much more on show at the store

"Classic" Finance example: Kenwood TMD-700E. RRP: £519. Payment illustration: Zero deposit and 48 payments of £12.99 per month. Total amount payable: £623.52. APR: 19.9%. ML&S is a licenced credit broker. Finance offered subject to status. Full written details on request. E&OE.

Apply now for your very own ML&S Store Card Conditions Apply

LDG Tuners & Accessories

ML&S have been appointed Main Distributor for the US built LDG Product range.

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

LDG AT-1000 1kW Auto Tuner, wide tuning range (10:1 SWR) 160M-6M **Only £499.95**

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

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

LDG RT-11 Waterproof remote ATU 1.8-54MHz **£149.95**

LDG RBA-1:1 & RBA 4:1 Probably the best 1:1 & 4:1 baluns out there. **£29.95 each**

LDG TW-1 & TW-2 Talking Wattmeters! TW-1 HF 0-2kW TW-2 6/2/70 250W. **£109.95 each**

LDG DTS-4+4R & DTS-6+6R Remote Antenna Switchers. 1.5kW 1-54MHz. Either 4 or 6 way, **£89.90 & £119.90**

If you see LDG advertised cheaper in this magazine (or on the web) from a UK stockist we will try and BEAT it! Please call.

For the full range of LDG Products visit our web site!

DAIWA METERS

Daiwa CN-101L: SWR/PWR Meter 1.8-150Mhz
Power range: 15/150/1.5kW ..... **ML&S only £59.95**

Daiwa CN-103LN: SWR/PWR Meter 140-525MHz
Power range: 20/200W ..... **ML&S only £65.95**

Daiwa CN-801H: SWR/PWR Meter 1.8-200Mhz
Power range: 20/200/2000W ..... **ML&S only £109.95**

Daiwa CN-801:V SWR/PWR Meter 140-525MHz
Power range: 20/200W ..... **ML&S only £119.95**

Daiwa CN-801S SWR/Power Meter 0.9-2.5Ghz
Power rating: 2/20 watts ..... **ML&S only £139.95**

MIRACLE ANTENNAS

Miracle Whip Others try & copy it but never quite get there. £109.95

Miracle Ducker Like the Miracle Whip but has BNC socket in lieu of whip to connect random wire. £109.95

Miracle Ducker IL Latest model! Identical to Ducker but has BNC plug for mounting instead of PL-259. £109 95

QPAK The best QRP ATU money can buy. £149 95

HUSTLER 6-BTV Only £229.95

We have literally sold hundreds of these with fantastic customer reports. At last a vertical that gives you REAL PERFORMANCE on 80m and 40m, as well as the other bands. No radials required. Just mount 18 inches above the ground, connect to a decent earth spike close by and operate.

MyDEL MultiTrap

Forget the G5RV. Install a proper TRAPPED wire dipole MutiTrap for 80-10M. Only 66'. Must be centre supported. **£99.95**

MyDEL MegaTrap

Same as Multitrap but 160m/80/40m, 105' long . **£109.95**

NEW ! MyDEL ML-S Hands Free Mic

Complete system for Yaesu, Icom & Kenwood transceivers.

The New MyDEL ML-S Mobile Microphone with gooseneck boom fits under the sun visor hinge. Features a PTT remote control with rubber O-Ring for connecting to gear lever. Unit is powered from transceiver. Includes FREE connecting lead to your rig.

£39.95

TIGERTRONICS

Tigertronics Sound Card - Radio Interface

For all available Digital modes, the SignaLink SL-1+ also supports the latest Voice modes such as Internet Repeater Linking (EchoLink, VOIP, etc.), Remote Base, and Voice Keyer operation. We sell four versions of the enhanced model the SL-1+8R with 8-pin round mic. connector, the SL-1+RJ45 with RJ-45 mic. connector, the SL-1+RJ11 with RJ-11 mic. connector and the SL-1+6PMD with 6-pin mini Din Data Port connector SL-1+8xxx Interface with rig lead (you specify!)

£69.95

Extra leads £14.95 (8 Pin, RJ-45, RJ-11, 6-pin mini DIN) **£19.95** (SL-CAB-13I 13-Pin Icom), (SL-CAB-13K 13 Pin Kenwood)

SMALL GARDEN? NO GARDEN?
Install an EH Antenna for HF today.

Introducing a new range of antennas from Arno Electronics. Available for any band 10m-160m, ML&S stock this exciting new product available for immediate despatch.
All antennas are beautifully built and pre-tuned at the factory. Supplied with fixing clamps & clear installation instructions. Easily fine tuned with outer ring sleeve. You will be totally amazed at how well they work. No ATU required. Just plug-in and work!

Cobra 10	28-29.8MHz,	2kW	90cm long	(500W RTTY/AM)	**£105.00**
Cobra 12	24.890-24.990	2kW	90cm Long	(500W RTTY/CW)	**£105.00**
Cobra 15	20.7-21.7MHz	2kW	90cm long	(500W RTTY/AM)	**£105.00**
Cobra 17	18.068-18.168MHz	2kW	90cm long	(500W RTTY/CW)	**£105.00**
Cobra 20	13.8-14.8MHz	2kW	90cm long	(500W RTTY/AM)	**£105.00**
Cobra 30	9.9-10.3MHz	2kW	93cm long	(500W RTTY/AM)	**£105.00**
Cobra 40	7-7.2MHz	2kW	93cm long	(500W RTTY/AM)	**£105.00**
Venus 80	3.5-3.8MHz	2kW	248cm long	(500W RTTY/AM)	**£179.00**
Venus 155	1.913-1.933MHz	2kW	248cm long	(500W RTTY/AM)	**£179.00**
Venus 160	1.830-1.850MHz	2kW	248cm long	(500W RTTY/AM)	**£179.00**

Delivery and Insurance: Cobra £20, Venus £25. (England & Wales, phone for other destinations)

MYDEL POWER SUPPLIES

A new rage of PSU's from MyDEL. The neatest smartest looking desk top power supplies that money can buy. Ideal for powering any main rig or accessory requiring 13.8V DC at up to 25 Amps.

MyDEL MP-250A

25 Amps maximum, 22Amps constant, ideal for most modern HF Transceivers

- Variable Voltage 9-13.8VDC
- 110-234V input
- 2 x outputs: 25A Binding Posts, 7A Cigar Socket
- Fan cooled, speed variable to voltage supplied
- Two huge back-lit meters, Volts/Amps
- Fully protected, supply shut off if more than 25A is drawn, re-setable by switching off for 25 seconds.
- Only 5 3/4"W x 4 1/2" H x 6" D in size
- Less than 35mV peak-to-peak ripple under full 25AMP load
- Full exchange warranty for 2 Years

Only £89.99 incl VAT!

MyDEL MP-4128

Another new switch mode PSU from MyDEL. Similar in spec to the MP-250A but without meters or cigar lighter o/p. 22-25 AMP output with heavy duty binding posts on the front panel and push on terminals for lower current output on rear. Fully protected. **£69.99**

Yaesu FP-1030A

A power supply for Life? Probably.

25 30 Amp £179.00

BUDDIPOLE

W3-BP Buddipole Compact Portable Dipole 40m-2M **£179.95**
W3-BM Buddipole Mast for Buddipole **£44.95**
W3-BPT Tripod for Buddipole **£79.95**

For the full range, please see our website.

PALM KEYS

MP-817 The smallest retractable paddle key - ever! **£59.95**
Code Cube Bolt-on memory keyer for Mini-paddle. **£79.95**

POWER AMPLIFIERS FROM TOKYO-HYPOWER

HL-1KFX A sturdy 240 volt powered 500W linear amplifier all mode with protection against over-drive, over heat, high drain voltage, and faulty band setting. ALC out. Remote TX control, all for a very attractive price. **£1399.95**
NEW! HL-2KFX Latest HF+6M 1kW version (650W on 6M) of the HL-1K. Full QSK & built-in PSU. **£2599.95**
New models arriving soon, including 2.5kW HF & 1kW auto-tuner for Yaesu, Icom & Kenwood.

FJ, Miracle Antenna, Hustler, Tokyo-Hypower, Tom Tom, Diamond, Yaesu and many more!

ML&S martin lynch & sons
Suppliers of Communications Equipment

Tivoli Audio
New at ML&S

Elad FDM77 SDR HF Receiver

Now only £399.95

FDM-77 all mode LW, MW and SW Software Defined Radio Receiver.

Decodes DRM digital transmissions straight out of the box!

- RF front-end with SO239 and BNC inputs (for external and indoor antenna)
- 50 KHz to 60MHz continuous coverage
- 1Hz to 1MHz tuning steps and keyboard direct frequency input
- USB 2.0 full speed interface to the PC
- 12KHz output to the PC sound card
- ELAD software radio for AM, LSB, USB, FM, CW, DRM demodulation
- Graphical User Interface for W2K/XP environment

As reviewed by Peter Hart in Radcom October '05 and look out for the main feature by Chris Lorek in radiouser magazine, on sale now!

Model DAB - Available in different colours

The easy to set timer ensures you will wake up on time providing sound quality that will gently lull or rouse. Also featured are a twenty minute sleep timer, a snooze button and the option to be woken by the alarm or the radio. The optional additional matching clock speaker, with independent alarm, will give full stereo reproduction. Also, you can add the MODEL CD and MODEL SUBWOOFER for a complete music system. **£229**

Model One AM/FM Table Radio

Where performance and simplicity are paramount but space is sparse, the Model One

mono table radio fits the bill. With just three knobs, it is the antithesis of today's ever more complex electronic products. But behind the Model One's simple, innocent appearance, hides a multitude of technology facilitating higher sound reproduction and better reception over anything else near it in size or cost. **£99.95**

Model Two AM/FM Stereo Radio

Stereophonic reproduction involves the separation of the left and right audio channels. So why then do most "stereo" radios closely-space two speakers in a single cabinet? The two-piece Model Two does stereo right–and left. Placing the matching stereo speaker, with its 15' of cord, several feet from the main unit provides the detailed imaging and accurate soundstage that is so essential for true stereo reproduction. **£169.95**

iSongBook Portable iPod Music System

The ultimate iPod music system! Not just another

"jump on the bandwagon" iPod audio system, the iSongBook brings new and innovative features to the table. The iSongBook utilizes the new "Universal Docking Station" from Apple that fits all iPod models. The flip-down dock charges your iPod while it plays and stows away when not in use. The second speaker detaches from the main unit for true stereo imaging, up to 6 feet with the built-in cord. **£295.00**

RadioCombo

Need a compact system with a big sound? Look no further than RadioCombo. This system, which pairs our critically acclaimed Model Two AM/FM stereo radio with the Model CD player, will fit any room and any budget. **£439.00**

AM/FM Alarm Clock Travel Radio

Whether traveling for business or pleasure, in today's world, having access to news and

music is increasingly becoming a necessity rather than a luxury. SongBook delivers the wealth of programming that FM and AM has to offer, in our hallmark high-fidelity sound. Add that to the sensitive digital tuner, alarm clock, sleep timer, and built-in charger for NiMH/NiCAD batteries, and you have a first class portable clock radio. The unique rubberized coating helps to protect SongBook from Mother Nature's elements and from everyday wear and tear. We've even included a rear keyhole cut-out for easy wall mounting. And with multiple colors to choose from, you're sure to find one that suits your style. **£159.00**

PAL (Portable Audio Laboratory)

Everyone needs a PAL. Ever wish you could enjoy the Model One's trademark sound quality and reception outdoors? You can, if you have a PAL. The Henry Kloss Portable Audio Laboratory's treated 2.5" magnetically shielded driver and rubberized cabinet are weather resistant,

so your PAL can keep you company by the pool or the patio. And its environmentally-friendly rechargeable Nickel Metal Hydride battery pack has no memory and fully charges in about 3 hours, providing many hours of cordless playback*. The clever little green LED serves as both a power and battery status indicator. **£129.00**

More models available!
See web site

And just in case you were wondering, we have set up Tivoli in a separate area from our Ham Radio showroom!

Outline House, 73 Guildford Street,
Chertsey, Surrey KT16 9AS

Tel: 0845 2300 599

FAX: 0845 2300 339 local call number

Web: www.hamradio.co.uk

E-MAIL: sales@hamradio.co.uk

Open 6 days a week, mon-sat 9.30-5.30

SBS-1 Real-time Virtual Radar

Combining state-of-the-art electronics and new technological advances has enabled Kinetic Avionic Products Limited to produce the revolutionary SBS-1.

For the first time aircraft enthusiasts worldwide are 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.

Key Product Features

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

ML&S are appointed distributors for the SBS-1 and associated products.
For full details see our website:
www.SBS-1.co.uk
Overseas distributors required
E-mail: **Kinetic@SBS-1.co.uk**

As Reviewed in October 2005 Short Wave Magazine

£499.95
plus £10 P&P

VSWR Problems at VHF

by Fred Judd G2BCX

The late Fred Judd G2BCX was a prolific author for PW and the following article is presented in our occasional 'VHF Classics' series. This time Fred deals with voltage standing wave problems - something we'll all encounter at some time or another. Fred's work always helped me and I hope it does for another generation of readers. Rob Mannion G3XFD

The subject of Voltage Standing Wave Ratios (v.s.w.r.) is frequently discussed by Radio Amateurs but somehow it rarely seems to be fully understood. Is a low v.s.w.r. really important and if so what is the maximum ratio tolerable? Often that 1:1 reading, technically a perfect match, may be quite misleading, for reasons that we will consider later in the text.

Many factors determine the loss of radiated power between transmitter and antenna. These include poor insulation, non-resonance, antenna too close to others, or even the choice of metal from which the antenna is made.

Two areas that are often overlooked are the feeder cable (where inferior construction will cause problems) and the possibility of a mis-match between transmitter and feeder, feeder and antenna, or a combination of all these parameters. All radio frequency (r.f.) feeders, such as open lines, exhibit a degree of loss, coaxial cables usually producing the worst effects. This, together with varying degrees of v.s.w.r. often gives rise to ambiguity when determining the effect of the v.s.w.r. itself.

Transmission Line

Virtually any cable that carries power from A to B could be regarded as a transmission line: for example, a pair of wires, from battery to a lamp becomes a transmission line. Considering this example further, it will be appreciated that as the length of the 'transmission line' increases so does its resistance, and in consequence the lamp grows progressively dimmer.

A similar principle can be applied to the cable connecting a transmitter to an antenna but in this case the source of energy would be high frequency, and not direct current (d.c.). Therefore the inductive and capacitive properties of the feeder combine to produce an impedance to the transfer of power. This is referred to as the characteristic impedance of the cable, and it remains almost constant, virtually irrespective of frequency.

Purely resistive losses cannot be completely disregarded of course, but steps can be taken to prevent radiation loss. For example, if the characteristic impedance of the line equals both the source and load impedance then two conductors can be employed, close enough together for their respective electro-magnetic fields to cancel out.

Transmission lines favoured by Radio Amateurs include open line, which consists of two parallel conductors spaced a small fraction of a wavelength apart. Another is coaxial cable, in which one conductor is effectively shielded by the other, whilst electrically behaving as an open two-wire line.

Coaxial Cable

The concept of coaxial cable is shown in **Fig. 1**, in which the currents I_1 and I_2 are flowing. If the current I_1 at the opposite point (P_2) the fields thus produced will be equal in amplitude but, as they are moving in different directions, out of phase. This will not necessarily be 180º, so in some instances there may be a small amount of radiation, although for practical purposes it can be disregarded.

Certain conditions can exist, which will cause an appreciable difference in the phasing of the two line currents however. And in such circumstances far more radiation can take place.

Let's now consider **Fig. 2(a)**. Here we have connected one end of a transmission line to a generator of equal impedance, the other being terminated in the purely resistive load R, which has the same ohmic value as the line impedance Z_0.

Under the stated conditions any current travelling down the line will flow into the resistance, which presents itself as an extension of the line. Since a pure resistance has no inductive or capacitive reactance, the line will be returned to the generator. An infinitely long transmission line would exhibit the same characteristics provided its impedance remained constant, although the power would ultimately be absorbed in overcoming the resistance of the line itself, of course.

Now we'll turn to **Fig. 2(b)**. Here the resistance of load R does not equal the line impedance in value, and so the power not dissipated is reflected back. The power absorbed by R decreases as the difference between R and Z_0 increases and so under these conditions a greater mis-match exists.

To make the position

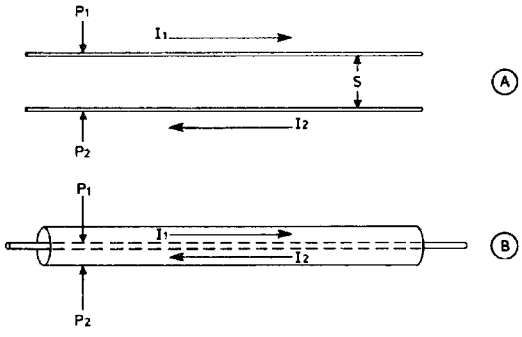


Fig. 1: Configuration of commonly used transmission lines. (A) open wire (B) coaxial cable. See text for explanation with regard to currents I_1 and I_2.

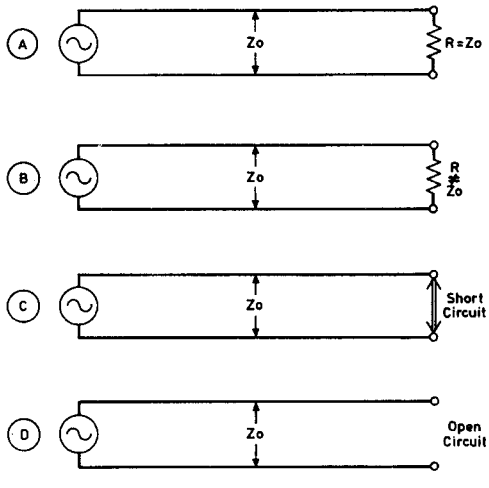


Fig. 2: (A) line matched to load, R = Z_0. (B) Line partially matched, R greater or smaller than Z_0. (C) and (D) Line with short or open-circuit. See text.

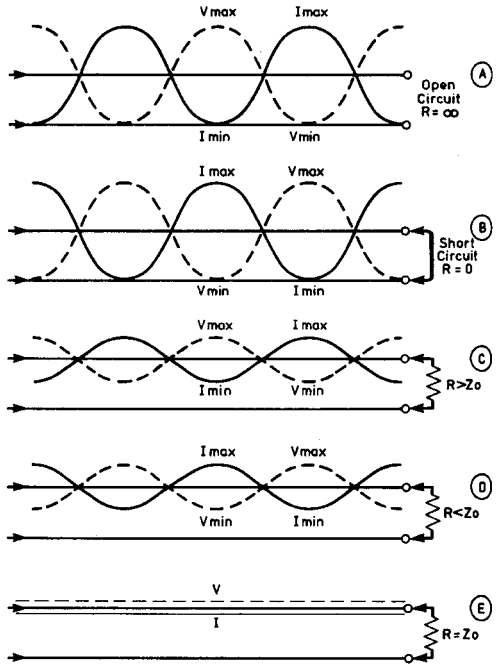


Fig. 3: (A, B, C, D) Voltage and current distribution of standing wave due to mis-match. (E) Line matched: V and I become a travelling wave.

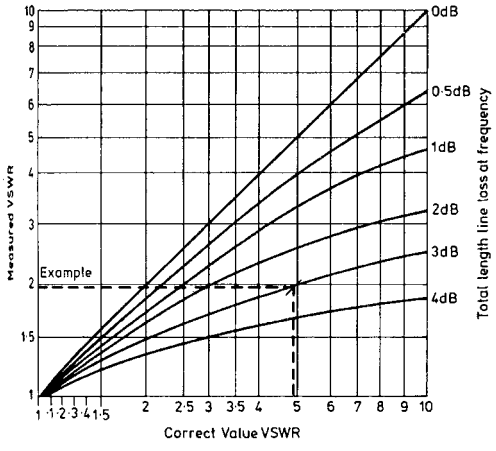


Fig. 4: Reflected power plotted against v.s.w.r. (see text).

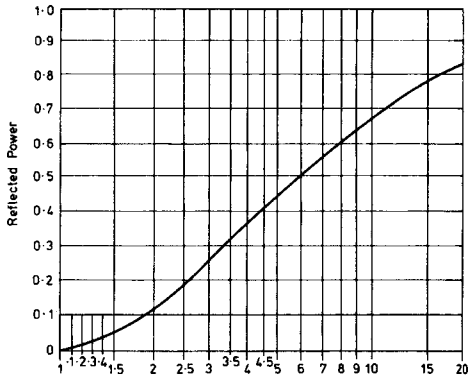


Fig. 5: True v.s.w.r. is dependent on transmission line loss (see text).

Standing Waves

Let's now take a look at standing waves. The diagrams, **Fig. 3**, serve to illustrate how standing waves are formed when varying degrees of mis-match are encountered.

In **Fig. 3(a)** there's an open circuit at the end of the line, which prevents the flow of current. The current waveform at this point has zero amplitude and in effect cancels itself, due to the reversal of polarity.

Current travels along the line, but the voltage is across it of course, and so is not reversed by the reflection. The electric fields of the forward and reflected waves add up to twice the amplitude, and if line losses are ignored, the total power can be thought of as being returned to the generator.

When R is a short circuit, **Fig. 3(b)** illustrates the prevailing conditions. The amplitude of the standing wave pattern can be seen to be the same as for open circuit conditions, except that it has moved along to meet the zero voltage state at the end of the line.

In **Figs. 3(c)** and **3(d)** we can see the conditions produced when R is greater or smaller than Z_0 by a given amount, creating a standing wave of lesser amplitude due to the fact that only part of the forward power is reflected. Finally, **Fig. 3(e)** shows the situation where $R = Z_0$. Here no power is reflected and the line carries a uniform travelling wave.

The ratio of the maximum (V_{max}) to minimum (V_{min}) voltage of the standing wave is referred to as the voltage standing wave ratio (v.s.w.r.) and is calculated from the expression $R:Z_0$ when R is greater than Z_0 or $Z_0:R$ when R is the lesser quantity.

The perfect match, rarely achieved in practice, which would have a v.s.w.r. of 1:1. When a mis-match exists, this ratio becomes much larger until, with an absolute open or short circuit it becomes infinite. Such a situation should be avoided, especially in the case of transistorised apparatus, where high levels of reflected power will almost certainly result in damage unless some form of protection is provided.

Effects of VSWR

It's possible that the loss of power to an antenna due to standing waves on the transmission line may not be as serious as many are led to believe. Provided the line is of low-loss construction the attenuation due to a v.s.w.r. of, say, 2:1 may only be around 0.5dB.

The graph, **Fig. 4**, shows the percentage of returned power (lost to the antenna) for varying values of v.s.w.r. some slight discrepancy may occur, which must be attributed to the natural losses of the transmission line, and this will affect both forward and reflected power readings. For example, the dotted line in **Fig. 5** shows that for a measured v.s.w.r. of 2:1 and a line loss of 3dB along the total length, the true v.s.w.r. is about 5:1. This represents a considerable additional loss due to reflected power and clearly demonstrates the need to use low-loss transmission line.

You should really aim for a v.s.w.r. of less than 1.5:1, especially if the total cable loss is likely to be greater than about 2dB. With around 30m of cable having as attenuation of 2.5dB the additional losses due to a measured v.s.w.r. of 1.5:1 will be less than 1dB.

When line losses are high, the additional loss caused by standing waves tends to be constant - the amount of power reflected from the antenna is reduced in proportion to the overall attenuation in the feeder. As an example, if the line loss is 6dB only 25% of the applied power will actually reach the antenna.

Should the v.s.w.r. at the antenna be 4:1, due to a mis-match, then 36% of the power applied to it would in fact be reflected. However, we have already established that only 25% of the original power has reached the antenna, so the true reflected power is:

0.25 x 0.36 = 0.09 (9%)

The transmission line characteristics further reduce this by 6dB, so we have

0.09 x 0.25 = 0.02 (2%)

This represents the actual power arriving back at the transmitter, and would result in a low v.s.w.r. reading at the transmitter end of the feeder – in this case, something like 1.3:1.

On the other hand, with a very low-loss line, a high v.s.w.r. may cause a higher

clearer, the term 'Incident Power' is given to the power transferred to R, while that which is returned to the source is referred to as the Reflected Power. Therefore we can produce a mathematical ratio of reflected to incident power, which gives an indication of the degree of mis-match in the circuit.

When R becomes zero, as shown in **Fig. 2(c)**, all the power will be reflected. This will also be the case if R is regarded as an open circuit (**Fig. 2(d)**). Power will flow in both directions however, and when a mis-match does occur, the reflected portion will be dependent on phase differences between the incident and reflected voltages and currents. These interact to produce a standing wave.

power loss, although the total may be relatively small by comparison with that actually reaching the antenna. A v.s.w.r. of 10:1 (True) on a line having a loss of only 0.3dB would result in an additional loss of about 2dB.

Low Readings

Low v.s.w.r. readings do not necessarily indicate a 'Go' situation, and should be closely examined if transmission line losses have not been taken into account. For example, with a 15m length of UR43 coaxial cable having a true v.s.w.r. of 2:1, the reading obtained could be as low as 1.1:1.

With old or otherwise inferior coaxial cable exhibiting high loss, virtually no reading at all could occur. On the surface of it, this would suggest a v.s.w.r. of 1:1.

A typical v.s.w.r. readout for a well-matched antenna covering the 145MHz band is given in **Fig. 6**. With above-average line losses, the response could easily be represented by the dotted curve.

The relationship between transmission line loss and v.s.w.r. can be demonstrated in an alternative way, based on a method of assessing losses in coaxial cable by measuring v.s.w.r. when the cable is terminated in a short-circuit. **Note:** This technique should never be employed when transistorised r.f. power amplifiers!

From example A, **Fig. 7,** you can see that a v.s.w.r. of 1.5:1 would indicate a cable loss of 6-7dB for the total length. This is because the forward power is attenuated in the first instance, and consequently there's a reduction in the quantity of power reflected, which itself is attenuated and results in a low v.s.w.r. reading.

Example B on the same drawing shows that the cable loss is much lower, and the high v.s.w.r. of 4:1 indicates that most of the power travelling along the cable is also reflected. the attenuation of the cable is only a little over 2dB, so this serves to qualify our preceding conclusions.

Transmitter & Antenna

Ideally, power and v.s.w.r. measurements should be made both at the transmitter and at the antenna. Otherwise, erroneous reading could be obtained due to other considerations, such as the length of the line in relation to the frequency being used.

If the reflected voltage happens to be at or near a minimum at the transmitter end, than low v.s.w.r. figures could be obtained. By the same rule, it is often possible to reduce an otherwise high v.s.w.r. buy pruning a short length off the transmission line – or, indeed, by adding to it. This technique will not effect a cure as such. However, please remember that it does not remove a standing wave that results from a mis-match.

Using VSWR meters

Really accurate v.s.w.r. and power meters suitable for v.h.f. applications tend to be on the expensive side. The type of power meter fitted to Amateur Radio transmitters and transceivers can rarely be relied on for particularly good accuracy.

In fact, occasionally some instruments can actually introduce a problem due to poor matching with the feed cable. Incidentally, so also can external r.f. power amplifiers, which incidentally should never be in circuit when first testing an antenna for a match.

Obviously, low grade meters should be checked against a known standard and with a dummy load known to provide an accurate match with the transmitter output. In this way v.s.w.r. approaching 1:1 should be obtained and full output power indicated if the meter is provided with this facility.

New Antenna Testing

Initially, a new antenna should be tested with only a short feeder, to establish that a good v.s.w.r. is possible. A preliminary check with a receiver is also worthwhile, if only to ensure that the antenna is giving some sort of results before applying r.f. power.

If possible - start the tests with fairly low power levels. This will prevent damage to the transmitter power amplifier (p.a.) stage if a serious problem should arise. When the antenna has proved satisfactory, the full length of feeder should be fitted and maximum power applied.

One of the most simple and effective methods of checking for the presence of r.f. alongside the antenna is a small fluorescent tube, of the type often used in caravans. These are usually rated at about 6 watts, and when touched against a voltage point on an aerial to which a 10W transmitter is attached, should light almost to full brilliance*.

Working with antennas is great fun and I hope you enjoy it as much as I have done preparing this article for you.

PW

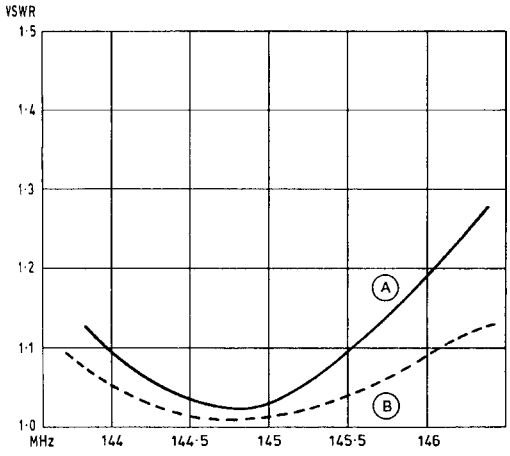


Fig. 6: Typical v.s.w.r. (A) From a well matched line and antenna. (B) Curve flattened due to line loss.

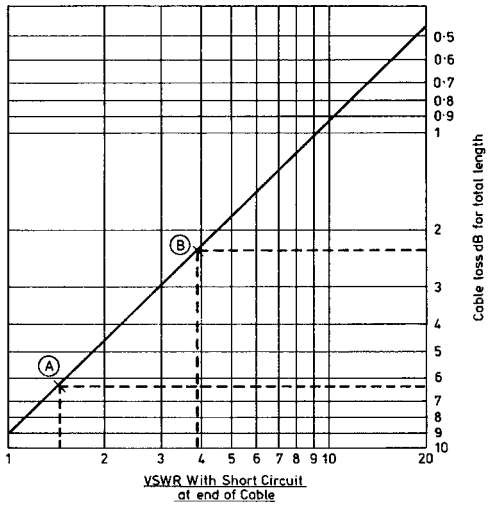


Fig. 7: Attenuation loss in dB for a given length of cable by reading v.s.w.r. into short-circuit termination. (See text regarding application of this test).

***Safety note:** Many Radio Amateurs use neon tubes and small fluorescent tubes in tests such as Fred G2BCX mentioned. However, I strongly recommend that a 'fluorescent wand' be made up. The tube can be mounted on the end of a short length of broom handle or plastic tubing. The tube will still light and you will be in no danger. Alternatively, a miniature Edison screw (m.e.s.) or leaded type of mains indicator neon can be used. However, I advise that one half of the glass bulb be pained in matt black paint to assist seeing the orange glow of the small neon, making it easily visible from ground level. Incidentally, the same neons are extremely useful in adjusting h.f. mobile antennas. Used in conjunction with a s.w.r. meter it's simple - the brighter the neon the more r.f. is being radiated. In practice the system provides an extremely useful, practical r.f. tuning indicator.

Editor

Valve & Vintage

Ben Nock G4BXD welcomes readers to his first column of 2006. Ringing the changes this time Ben describes a complete project undertaken in 2005, and if you remember the famous 'Command' equipment, this article is for you!

The completed 3.5/7MHz station, transmitter left, p.s.u./modulator, receivers on the right.

A very warm welcome to 2006 and I hope you all had a good Christmas and New Year! Looking back, it was an interesting year here during 2005 in Kidderminster, with quite a few new additions to the collection, and a number of new restoration projects started and completed.

By way of a change rather than describe several sets this time in V&V I'll describe a complete project undertaken here last year. I've no doubt memories will come flooding back for some readers!

The Command receiver (RX) and transmitter (TX) have been a popular item of ex military equipment used in Amateur Radio ever since the end of The Second World War. As they were supplied to the United States Army Air Force and Navy in most of their heavy bombers and smaller aircraft, there must have been a tremendous number built.

Many Radio Amateurs bought the Command equipment surplus and modified them to the point of being unrecognisable. I even have a receiver that has been 'transistorised' with each valve being replaced with two or three transistors.

It's getting difficult to find unmodified examples of these sets now. Many sets around have been 'got at' in some way. Having amassed a small collection of sets, I thought I'd try and make a working station and bring back a little nostalgia to the bands. A working station usable on the 3.5 and 7MHz Amateur bands was decided upon.

Although I have the airborne power unit and modulator it was felt that a rotating generator in the house would be a little noisy! So, I decided to build mains powered supply unit (p.s.u.) incorporating a modulator at the same time. In fact the p.s.u. and modulator were so constructed that they could be used with other equipment in the collection at a later date.

Brief History

The Command set is a general title for radios that provided air-to-air contact. The term 'Liaison' was used for sets used between air and ground.

The 'Command' name though soon got affixed to a particular group of receivers and transmitters, more specifically called the SCR-274N in the American Army role, or ATA/ARA or AN/ARC-5 in the US Navy role. It was a bit confusing, both the Army and Navy had aircraft, it was only later that the US Airforce came about.

In aircraft, the Command units were used for air-to-air contacts, some Air-to-Ground communications and for receiving Navigation signals. They are unique in that most radios of that period would use a band switch to change to a different frequency band; this design selects a completely different receiver or transmitter.

The SCR-274N series of equipment came in either black crackle paint or natural aluminium finish. The ARC-5 was produced in black crackle only. Externally, they look identical; and internally they are very similar, with only minor differences. The SCR-274N series had BC-454 type designations and the ARC-5 had R25 and T20 designations for the receivers and the transmitters.

Some of the low frequency receivers have a different antenna connection, so that a loop can be used. Electrically they are almost the same, with only a few small changes because of the frequency coverage.

The valve line up is the same, except that some ARC-5 receivers use a 12SF7 second intermediate frequency (i.f.) valve instead of the 12SK7, which was more common. Note that the power sockets on the rear of the recievers and transmitters are slightly different between Army and Navy sets, a difference that prevents total flexibility.

Power & Installation

The equipment - as originally installed - used 24V d.c. The receivers each had rotary generators supplying the 250V high tension (h.t.) needed. The transmitters were powered from a rotary generator mounted on the modulator chassis.

Equipment racks were used to mount the sets in the aircraft. These comprised single, twin, triple or quad receiver racks and the same for the transmitters racks. Installation in an aircraft involved a great many separate parts to the system; switching boxes, control, remote tuning, antenna current meters, relays and so on.

The receiver needs are straightforward; 24V heaters and 250V h.t. The transmitter requires 24V heaters and relay supplies, 200V h.t. for the oscillator and power amplifier (p.a.) screens with approximately 500V h.t. for the anodes. The transmitter is screen modulated, and the modulator unit houses the rotary h.t generator as I've previously mentioned.

Over the years I've rarely seen an unmodified set, the least that has been inflicted is the heater circuit has been rewired for a more 'normal' 12V operation. So, it was a surprise then when I sorted out a couple of transmitters for this project, one was still in its 24V configuration and was reluctantly changed to 12V.

Transmitter Power Supply

I used a 500-0-500V transformer, 250mA rating, with several 6.3V 3A or so windings for the project. Two of the 6.3V windings were wired in series (I checked the phasing of the winding of course). The supply was rectified, and with a very large smoothing capacitor it supplied the 12V d.c. required for the heaters and the relay control. (Obviously, if you have unmodified sets then

use a 24V supply in place of the 12V I used).

The modulator is fed with 6.3V for the heaters. Half of a double-pole switch is used (SW1a), to connect the high voltage centre tap to ground to energise the h.t.

Note: One point about the relays inside the transmitter. Originally, 24V there's the possibility that they'll not pull in on the 12V supply. There are two relays to deal with, one switches the oscillator h.t. on and p.a. cathode to ground, and the other is in the antenna output feed.

The h.t. relay may need its actuating arm to be slightly bent to reduce the force needed to pull it in. On the other hand the antenna relay can have a small spring removed, this then frees up the relay to be activated by the lower supply voltage. (With the alterations done the relays in this transmitter both operated satisfactorily.)

Regulator Valves

Two VR105 regulator valves are wired in series to give 210V stabilised. This feeds the oscillator and the screen grids via the modulation transformer.

In the Morse (c.w.) mode the screen grid is fed via the main h.t. with a suitable dropping resistor. The screen dropper, the regulator dropper and the modulator dropper are all dependent upon the actual final h.t. voltage the transformer used.

Receiver Power Supply

The receiver power supply is quite straightforward, 12.6V 1.5A and 250V 40mA; any 250-0-250V transformer with a couple of 6.3V winding could be pressed into service. Incidentally, as both recievers chosen for this project had already had their heaters rewired for 12V operation. As there are no relays in the receiver, a basic 12.6V a.c. supply can be used.

If the TX/RX racks can be obtained it does make life easier. The connections at the rear of the receiver and transmitter are designed to be a push-fit into matching plugs mounted on the rack assemblies. The sockets on the equipment are quite difficult to connect to otherwise - this has led to many being modified - the most common fit being an octal valve base as a replacement.

On The Rack

Luckily, I had both racks and though the correct plugs to fully use the original rack connectors are hard to find, modifications to the rear of the racks are not quite so obtrusive, so it can be considered. Other connectors can be fitted to the racks to allow the required connections, either period types, octal or similar, or modern day equivalents.

On the twin receiver rack there's a switch to select individual receivers but there's no corresponding switch on the transmitter rack. I therefore wired up only the left-hand

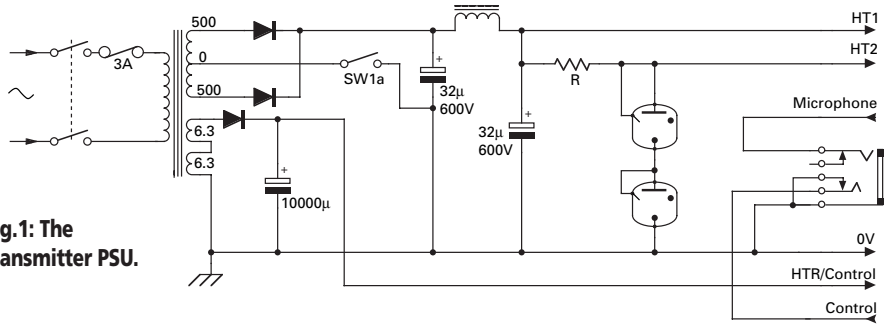


Fig.1: The transmitter PSU.

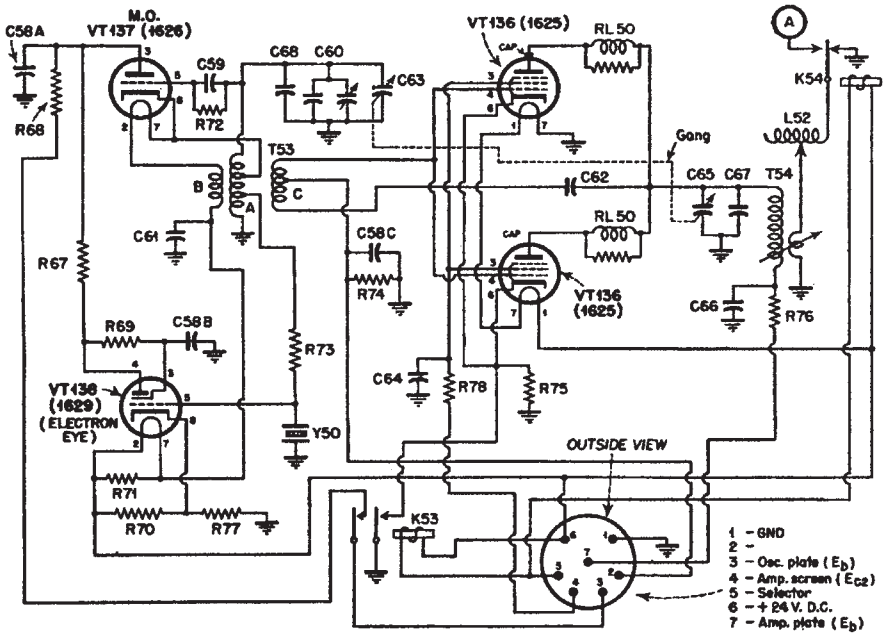


Fig. 2: Original transmitter circuit diagram.

socket on the transmitter rack; band changing would entail simply swapping the two transmitters around.

Relay Control

The relay control line is fed from the rack to the power supply then to the send receive switch, SW1b, then to the key/microphone jack. A stereo jack socket with a built-in switch that breaks when the plug's inserted is used. The body of the plug being grounded, the ring is used for the microphone connection and the tip for the Morse key.

With no plug inserted, the transmitter is switched on by the send/receive switch alone (ideal for testing). With a plug inserted the built-in switch opens and the transmitter can be keyed. If amplitude modulation (a.m.) is selected the tip can either be wired to the push-to-talk (p.t.t.) control on the microphone, or shorted to ground inside the jack plug. The main switch is then used to turn the transmitter on or off. (I'll continue with theme, describing the modulator and operation next time).

On The Air

Working on the air answered a station calling "CQ" recently and was pleased to make contact with **Bill G6NB**. It turned out Bill had worked on the Wireless Set 11 (mentioned in the November 2005 issue).

Bill recanted the tale of when he was sent out to see why the transmit-receive switch was failing during the 11 set's field trials. It turned out the rather lazy signallers were using their great clumping army boots to kick the switch over! That taught the designers not to put a big switch on the front. Always expect the unexpected!

As usual I can be contacted via E-mail at **miltary1944@aol.com** or via the old fashioned way at **62 Cobden Street, Kidderminster, Worcestershire DY11 6RP**. Pictures of other sets from my collection are on my website at **www.qsl.net/g4bxd** I look forward to being with you again real soon. Cheerio. **PW**

Parts List

Power supply
500-0-500 @ 250mA transformer with at least two 6.3v 3A windings
h.t. diodes 1N4007, h.t. choke 5H 250mA
l.t. diodes, any 5A type, 2 x VR105/OC3 regulators
h.t. capacitors around 32µf at 650V, or lower voltage types wired in series (with bleed resistors across them).

Carrying On The Practical Way

This month the Rev. George Dobbs says he's taking a look down 'memory lane'. His memories involve his 26 year old son Stephen and the SCD transmitter!

"May you never forget what is worth remembering, or remember what is best forgotten". **Irish Blessing**

Over the years, for good or ill, I've turned out many little Amateur Radio circuits; lots of them in this column. Most have disappeared in the sands of time and might that be a fitting place for them perhaps?

However, there have been a few which simply won't lie down and people still write, or E-mail, me about them. This can be an interesting exercise when someone rings me and enquires about the value of R34 in a circuit I produced in 1995!

So readers beware, for I've usually forgotten what I did even three months ago. My wife would be surprised that I can remember things that long ago!

Popular Circuits

It's surprising how some circuits to hang around and are still popular with people still building them. The commonest is probably the 'Sudden' direct conversion (DC) receiver, which first appeared in late 1989. Versions of it are being made and I get regular enquiries about the Sudden.

Another little circuit that won't lie down is the 'SCD' transmitter, which first saw the light of day in January 1980. As I write this I am supplying a reader with copies of the original article.

The project appeared in the old style *Short Wave Magazine* in January 1980, long before it became a sister to *PW* and more recently with *Radio Active* merging with it - to become the new *RadioUser* magazine.

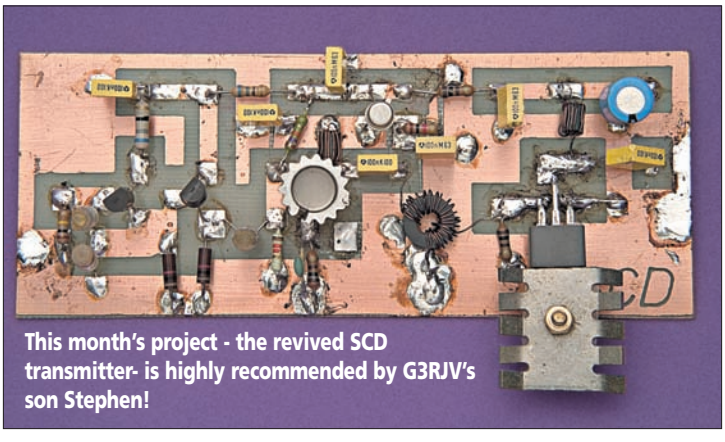
My enquirer suggested to me that the SCD ought to appear again. So this encouraged me to offer it to *PW* readers as a reprise of an old, but reliable, circuit that has stood the test of time.

I do actually remember the SCD project because of the circumstances of its naming. In those days the *Short Wave Magazine*, indeed like *PW* today, liked projects to have a name. (Not always an easy task for the author). However, my son, **Stephen**, had been born just before the article was published so I called it the 'SCD' after **Stephen Christopher Dobbs**!

Before you ask....my other son, **Ben**, did have a project named after him - also in the *Short Wave Magazine*. I designed a little c.w. transceiver for the arrival of the 10MHz (30 metre band) and that was called 'Ben – the little transceiver for 10'.

Complete Transceiver

The objective of the SCD project was to offer a complete Amateur bands transceiver that could be built on the kitchen table with simple hand tools and requiring to specialist test equipment. I'm only going to revive the transmitter here as the receiver, with its dual-gate m.o.s.f.e.t. mixer, is somewhat dated in design and components.



This month's project - the revived SCD transmitter- is highly recommended by G3RJV's son Stephen!

The transmitter is still viable and the parts are still available. It can be run on the 3.5 and 7MHz bands and some builders have used it on 14MHz. The circuit was inspired by the **W6YBP** 'Knobless Wonder', which goes even further back into Amateur Radio history. As I recall it that appeared in the *Milliwatt*; the predecessor of all the QRP club journals that followed later.

The circuit diagram for the SCD is shown in **Fig. 1**. **Note:** This is in fact a somewhat later version of the original of 1980. I have actually built several variations of this simple theme and they all seem to have achieved decent results. This is a forgiving circuit and the active devices and many passive components can be varied slightly and it will still work.

The oscillator, Tr1, is a Colpitts circuit using a cheaply available f.e.t. directly coupled to an untuned f.e.t. buffer, Tr2. The idea of the circuit was to keep the basic design untuned. This was so that the band could be changed simply by using a different crystal in the oscillator and an appropriate low-pass filter on the output.

The oscillator is crystal controlled, but the variable capacitor C1 enables variable crystal control (VXO) of the frequency. The amount of frequency variation will depend upon the value of C1 and individual examples of crystal.

Limits To VXO

Please remember that there are limits to VXO operation. If too great a variation in frequency is attempted the crystal will lose its ability to maintain frequency stability. I suggest a value of no greater than 100pF for C1 In fact I used about 60pF.

It's possible to increase the variation even further by adding some inductance in series with C1 and XL1. Trying a small moulded axial choke of, say, about 20µH might work well – I leave the reader to experiment.

My versions of the SCD have almost always used the 2N3819 f.e.t. that has sometimes been described as 'the cockroach of f.e.t.s.", I think due to its wide range of manufactured specifications. They did seem to work fine for me but the MPF102 is a good alternative. If the oscillator is sluggish, try increasing the values of C4 and C5. If polystyrene, or NPO capacitors can be used for C3 and C4 this may be an aid to stability.

The buffer feeds the signal, via C6, into an untuned driver stage (Tr3). This is a

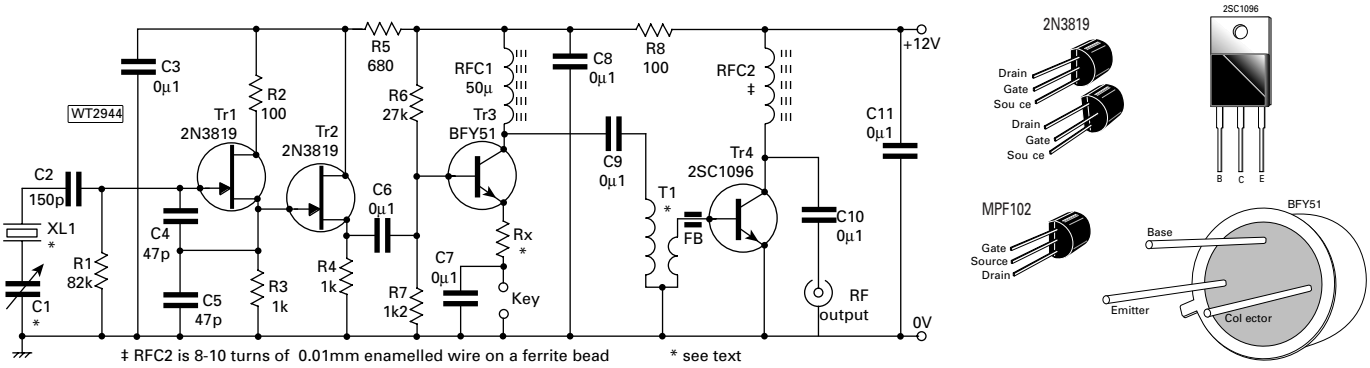


Fig. 1: The circuit diagram for the SCD . Note: This is in fact a somewhat later version of the original of 1980. This is a forgiving circuit and the active devices and many passive components can be varied slightly and it will still work (see text).

little more critical as might be seen by the surreptitious marking of 'Rx'. The value of Rx is used to control the amount of r.f. drive signal going to the power amplifier (Tr4).

I choose to key the driver stage, although the power amplifier could be keyed. The simplest way is to place the key between Rx and ground, but I'll suggest an alternative method later. I have quoted the BFY51 transistor for Tr3, these are still available but later equivalent or better devices could be used.

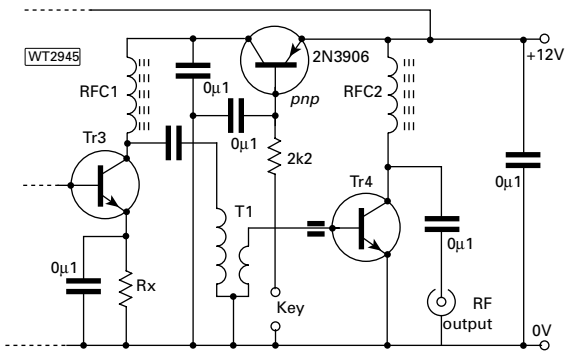


Fig. 2: A useful improvement to the basic SCD. Here a *pnp* transistor acts as a d.c. switch to turn the driver stage on and off via the 12V line voltage.

Power Amplifier

The output from the driver stage is coupled to the power amplifier (p.a.) via a small r.f. transformer (T1). This is wound on a ferrite core. I have used the FT37-43 core although the original circuit used the same number of turns, but of 22s.w.g. wire, on a T50-2 powdered iron core.

The p.a. is as simple as it could be with a home-made r.f. choke as the collector load. How do you get 8 or 10 turns of wire through the centre of a ferrite bead? The answer is with care!

In the original SCD I used another BFY51 as the power amplifier and usually managed to coax between 1 and 2W from the amplifier. This later version uses a 2SC1096 which is capable of more power with less discomfort to the transistor.

As a precaution against high frequency instability a small ferrite bead may be fitted on the base lead of Tr4. In any case, Tr3 and Tr4 should be fitted with a heat-sink. The output from the p.a. goes to a socket, into which can be plugged a low-pass filter for the band being used.

The value of Rx determines the transmitter output by controlling the amount of r.f. drive to the power amplifier which operates in class C. Don't be too greedy with the SCD and try to operate it with about 2W of output power.

I suggest the constructor begins with a value of about 100Ω and reduces this value for a suitable output. My values for Rx in this circuit have usually been in the range 100 to 33Ω.

Useful Improvement

A useful improvement to the basic SCD is shown in **Fig. 2**. Here a *pnp* transistor acts as a d.c. switch to turn the driver stage on and off via the 12V line voltage. The common 2N3906 *pnp* device is capable of handling the current in the driver stage but any similar device could be used.

When the key is open the transistor does not conduct and the supply will not reach Tr3. When the key is closed the transistor is biased into forward saturation and Tr3 conducts. The 2.2kΩ resistor is essential for the transistor's survival, but experimentation with the capacitor between base and ground might produce a more pleasant keying sound.

The output from the transmitter requires a low-pass filter for the band being used. The ideal solution is a plug-in version of the W3NQN standard capacitor value 7-element filters.

Avid *PW* readers will know these as my standard filters. The diagram, **Fig. 3**, gives the values for 3.5 and 7MHz and I've also added 10 and 14MHz for those who want to venture the SCD on those bands. The wire gauge is not critical - the aim is to get the windings to fill about three-quarters of the core's circumference.

Band (MHz)	C1/C7 (pF)	C3/C5 (pF)	L2/L6 (turns)	L4 (turns)	Core	Wire (mm/s.w g.)
3.5	470	1200	25	27	T37-2	0.38/28
7.0	270	680	19	21	T37-2	0.45/26
10.1	270	560	19	20	T37-6	0.45/26
14.0	180	390	16	17	T37-6	0.60 /24

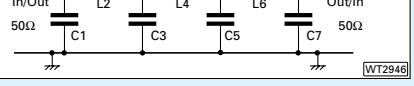


Fig. 3: Details for the G3RJV 'standard' filter for 3.5 and 7MHz (see text).

Built Any Style

The SCD can be built almost any style. The earnest can etch a printed circuit board (p.c.b.) and the casual can use 'ugly' construction. My original version, and indeed my subsequent versions, all used a surface mount technique on a simply etched board.

The heading photograph shows an example. I covered a piece of blank p.c.b. material with sticky-backed address labels and drew the layout on the paper with a pencil.

It's easy to lay the actual parts on the board to get the correct spacings. I then tidied up the design with a pen and ruler to make a series of islands and pads for the interconnections.

The sections corresponding to the unwanted areas of copper can be cut away with a sharp modelling knife, and the board etched in ferric chloride or similar enchant. The parts are then surface mounted on the etched board.

The SCD has been a worthy little transmitter over the years and is still worth building for a simple, easy to get going, QRP transmitter. I have a 26 year old son who agrees with me! **PW**

WEB DIRECTORY

Antenna Workshop

Fishing for DX

Ben Nock G4BXD plays the field, as he describes using an all-in-one fishing rod to improve his signals. Read on as he tells you how!

You know what it's like, as you walk around the car boot sale, you try to keep the (X)YL away from all the wonderful tat masquerading as antiques, dodge the Mongolian hoards scrambling around a newly arrived table as though crisp new fivers were being sold for 10p. You try to avoid the van selling off potential salmonella-poisoning cheap. You also have to dodge the dog-draggers, the pushchair drivers and the skipping kids.

Then, you see something and an idea immediately springs into your mind. It's a good idea of course, unlike the one such as the wonderful 16th century photograph of a Chinese girl with flowers in her hair that the YL thought would look nice over the fireplace. This new idea's not like when you bought 300 flower pot tubs, as you were: 'bound to use them in a myriad of applications'.

No, your idea's a great idea to do with radio. As we know, all radio ideas are great ideas. So, after buying the treasure, you scurry back to the car, parked three miles away in the near(ish) mud drenched field, to examine the find and extend your idea.

Treasure

So, it was on one Sunday that my 'treasure' and I arrived back home. I had purchased a fishing rod. Now, I've not been fishing for 35 years or more and I had no intention of taking it up again. What! Sit there all day waiting for a water-inhabitant with a 7-second memory retention to eat a worm attached to a big shiny hook. That's no longer a pleasure to me.

My intention was to sit in a field all day, awaiting that elusive bit of DX while surrounded by cud-chewing bovines. The type of DX that could only be heard in such a noise free environment away from the rubbish associated with modern day town dwellers.

All the other buyers at that boot sale on the day, saw only a fishing rod! In my mind's eye, I saw a portable antenna support. It's a fishing rod that has the interesting ability to be quickly collapsed down to just 680mm long, but it can be extended to 4.5m long. Being made of a hard plastic type material it is very light and with a substantial rubber grip that should also be well insulated, **Fig. 1**.

The eyelets, through which the fishing line normally runs, are actually equally insulated, as the inner metal ring in each eyelet is mounted in a plastic grommet. The base cap on the handle, unscrews to provide a space, if needed, for various small insulators to be stored.

After more thought, it crossed my mind that, while a sectional metal whip is also compact and easy to stow away this new pole would easily replace it. The beauty of the fishing pole and the wire option was that, not only could one erect a simple vertical but, if space permitted, a longer wire antenna could be easily accommodated.

Having sold all of my fishing tackle many years ago, I needed to find a reel to hold the intended antenna wire. I thought the open reel fly-fishing type would be better. It would probably hold more wire than the 'spinning-reel' type. I actually managed to find a vintage wooden reel to help with the insulation needs for such a project.

Fig. 1: The portable antenna and wire container, otherwise known as Fishing Rod and reel!

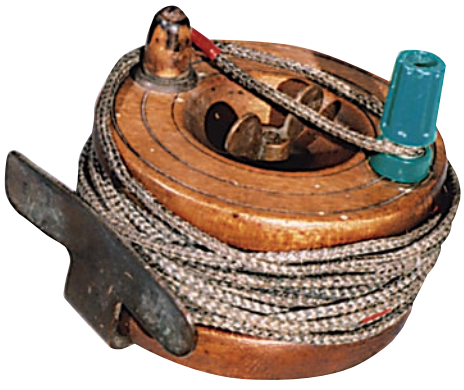


Fig 2: The wooden fly reel, open and easy to wind wire around.

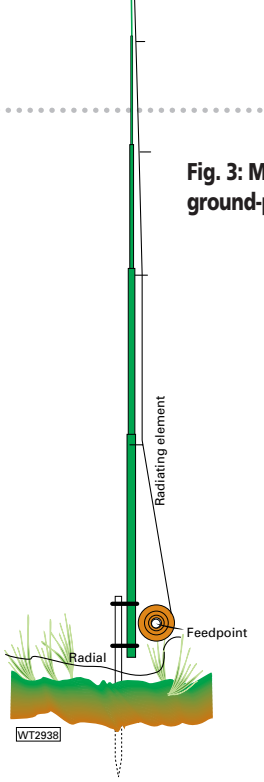


Fig. 3: Mounted on a ground-post ...

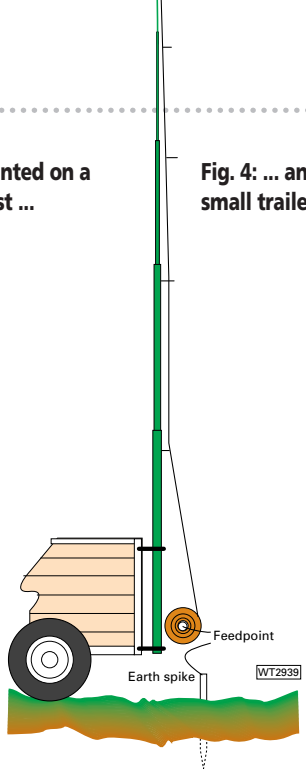


Fig. 4: ... and on a small trailer.

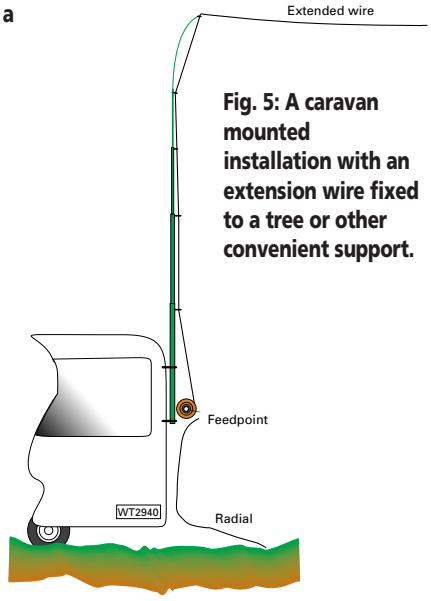


Fig. 5: A caravan mounted installation with an extension wire fixed to a tree or other convenient support.

Construction & Modifications

The fly reel, **Fig. 2**, was modified in that one of the small winding stubs was removed and a 4mm 'banana' socket fitted. One end of the wire being used was attached to the inside of the reel and a quantity of the wire wound onto the reel. The wire used is of a very flexible military specification.

The wire I used has a string like quality, very flexible and strong as it's interwound with metal strands. It's ideal as a portable antenna wire. The amount of wire you will get onto the reel depends upon the size of the reel but as the idea was to produce a short vertical whip, with the possibility of extending the top section to any suitable handy support, long length was not considered.

Having used some of the wire from a military portable wire antenna I kept the remainder on its original holder to spread out and to act as a ground-plane. The original holder even had a frequency and antenna length chart and the wire had coloured marker bands fitted every foot (305mm) along its length, though really of no use for my short vertical it might be used if the long wire option is erected.

Portable Operations

In use there would seem to be several ways of using the rod antenna. Simply extending the rod to its maximum length, threading the wire though each eyelet with a small knot at the top would see a plain 4.5m vertical whip. Mounting the whip as a free standing vertical is possible using a length of piping and a couple of the springy type bicycle clips used to hold pipes to walls, small one used to hold the pump to a bicycle.

With the clips attached to the top of the pipe this could be knocked into the ground, **Fig. 3,** there is little weight and wind resistance of the rod so, great strength is not needed. Alternatively, if it was used trailer or vehicle-mounted, the antenna could be fed against ground or a vehicle acting as a ground plane, **Fig. 4**.

Another way would be to use the rod to lift the wire to 4.5m then attach the wire to a suitable point, tree branch etc, with a suitable insulator, to make a longer inverted-L antenna. The total length of the antenna would then depend upon the amount of wire you could get on the reel.

Another idea could be to pass the wire through the eyelets to the top and tie off in a knot. Then to twist the rod sections as they are extended winding the wire around the body of the rod and making in effect a loaded whip antenna. The rate of twist might be a matter of trial and error but as this particular wire has a marker every foot then some idea of wire used would be possible.

For caravan operators, **Fig. 5**, the two clips could simply be screwed to the side of the van and the rod inserted when operating. Anyone with a trailer could also mount the clips on that. Indeed, for the price of a couple of cycle clips various mounting positions for home, holiday locations or portable operation could be fitted.

I chose to fit a 4mm banana type socket to the reel, most of the portable sets I would be using were designed to be used with whip antenna of various lengths but fitting a BNC socket could be done. If a connection on the reel was added so that a ground plane or ground spike could be attached close to the BNC then a coaxial feed could be used though matching would be an issue.

A Day Out

On a nice sunny day I erected the support in the garden. I attached two clips to a length of steel tube, better for knocking into hard ground than aluminium tubing. I erected the fishing rod with the wire fed through the eyelets to the top.

Using one of my military manpacks, a PRM-4031, I tuned up on the various bands, 3.5, 7 and 14MHz. Though band conditions were not great the antenna peaked nicely and using a good length of radial I managed to work several stations on each band.

I then tried twisting the wire around the pole as it was extended to increase the length of wire in the air. The length used went from 4.5m to 7.5m of wire. This changed the tuning point on the set's built-in a.t.u. and did appear to give better performance, particularly on the lower bands. Due to the time it took to alter the antenna it was not easy to get a really definitive comparison but this could be done over a period of operating.

I then tried the whip in its support role. The wire was taken from the top eyelet and connected to a suitable support a several metres away. This produced a much longer antenna with equally different tuning points on the set tuner. The lower bands, 3.5MHz in particular, responded better to the extra wire length and good reports were obtained. The ground radial was laid under the antenna wire.

I would have thought that on the higher bands, 14 and 21MHz for instance, there might be a peak in directivity towards the direction the top section is supported. Further experimentation will be made to see if the antenna could be so arranged so as to give some degree of directivity.

Future experiments will also include winding a coil around the rubber grips above the point where the reel fits. This could be tapped at various turns and used to load the whip for different frequencies. Indeed, if you had a favourite band then a purpose made loading coil could be fitted to the shaft of the rod, and the coaxial cable feed utilised.

Given such a simple and cheap method of holding up the antenna, this one cost me just £5 from a car-boot sale, the experimentation and options available should keep me busy for quite a while. Not only that, it's a healthy way to play radio.

PW

ICOM

IF-DSP TECHNOLOGY COMES TO NEW MULTI-BANDER!

IC-7000

HF/VHF/UHF ALL-MODE TRANSCEIVER

Features of this soon to be available multi-bander include...

- 2 x DSP
- Improved AGC loop performance
- Digital IF filters
- 2 x MNF (Manual Notch Filter)
- Digital voice recorder (DVR)
- Flexible installation with detachable panel
- Remote control Microphone
- 2-mode band scope
- 2.5-inch colour TFT display
- One-touch operation
- Memory Keyer
- and much, much more!

- AGC display

- Multimeter display

- Digital IF filter display

Icom UK Ltd.
Sea Street, Herne Bay, Kent CT6 8LD. Telephone: 01227 741741.
Fax: 01227 741742. e-mail: sales@icomuk.co.uk Website: www.icomuk.co.uk

VHF DXer

REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

DAVID G4ASR TAKES A LOOK AT YOUR RECENT ACTIVITY REPORTS

After a number of months of enhanced DX activity it's now obvious even to the casual listener that activity on the v.h.f. bands has slowed down. This is not unexpected for a number of reasons. At this point of the solar cycle, very close to sunspot minimum, there is a reduction in the number of ionospheric openings such as auroral (Au) backscatter and auroral-E (Au-Es), trans-equatorial (t.e.p.) and F2-layer propagation.

From a seasonal point of view there are virtually no Sporadic-E (Sp-E), field-aligned irregularities (f.a.i.), ionospheric scatter (iono) openings and during the wet and windy season very little tropospheric (tropo) enhancement. The good news though is that this situation won't last for long and in a few months time many of the DX propagation modes will return. Although propagation during November was fairly quiet with only six auroral, two auroral-E and a few tropospheric events being reported a large number of meteor scatter (m.s.) and Earth-Moon-Earth (e.m.e.) contacts were made by v.h.f. DXers primarily because of the Leonids meteor shower and the second leg of the world-wide ARRL e.m.e. contest.

Last month I reported that no auroral backscatter openings occurred on the v.h.f. bands during October. However, as luck would have it an event took place a few hours after I had written this column! It occurred on October 31 at 1645UTC and lasted for about three hours before fading out. It generally favoured stations located in northern England and Scotland, although switched-on DXers with **real** antennas located over much of central and southern UK also managed to get into the action. Contacts using c.w. and s.s.b. were made with stations in Denmark (OZ), Norway (LA), Sweden (SM) and northern Germany (DL). Unusually, no Scandinavian DX was reported on the 50MHz band possibly because all contacts appear to have been made using s.s.b.

Among the stations active from Scotland during the auroral backscatter event were GM4WJA (IO87), GM7PBB (IO68), GM8VJS (IO89), MM0AMW (IO75), MM0BSM (IO86) and MM5AJW (IO88). Towards the end of the opening GM-stations reported hearing the beacons JX7SIX (Jan Mayen, a Norwegian Island near Greenland), OH9SIX (Finland 50.067MHz) and TF3SIX (Iceland 50.056MHz).

On the 70MHz band a number of UK operators reported making contacts with the stations of OZ2LD (70.100MHz), MM5AJW, GM4JYB (IO88) and GM4VVX (IO78). There was much more DX to be found on the 144MHz band with most stations using c.w., which is the optimum mode for this type of propagation. Some of the stations worked from the UK included DL1SUN (JO53), DK4U (JO42), LA0BY (JO59), LA4YGA (JO48), OZ0TE (JO55), OZ8FR (JO55), SM2ILF (KP04) and SK4AO.

Auroral backscatter openings on the 50MHz band were reported on November 1, 3, 13, 19, 24 and 29 but little activity was noted apart from the reception of beacon stations. Auroral-E openings were also reported on November 3 and 24, consisting yet again only of beacon reports. This is rather worrying, as it now appears that relatively few stations are prepared to eke out transitory DX openings whereas the majority of so-called DXers are just happy to plug in their laptops and 'watch' JT6M or FSK441 contacts being made via meteor scatter (and I've got my doubts whether some stations understand they're actually making m.s. contacts!).

To confirm my assertions here are some statistics I've made from my records of spots inputted to the UK DX Cluster network during November. On the 50MHz band there was only one tropo spot and that was for a beacon. Other propagation modes fared little better with five auroral-E spots reporting beacons and six spots for auroral openings, surprisingly only one being for a real station! However, 106 spots were inputted for digital mode JT6M stations with 90 of these operating on 50.230MHz. It was a similar situation for the 144MHz band with only one spot for a station heard in an aurora and 32 spots for stations heard via tropo propagation but 10 of those were for beacon stations. However, a total of 83 spots were recorded for stations using the digital FSK441 mode on 144.370MHz.

Don't get me wrong as I think that the *WSJT* software by K1JT (JT6M or FSK441) is brilliant but the downside is that a large majority of stations are now stuck on 50.230MHz or 144.370MHz just watching a computer screen. Yes, I accept there's been a temporary downturn in various propagation modes but only a few years ago many more v.h.f. DXers would have created considerable activity from even the weakest of events. Now it just appears to be 'plug and play' DXing and many operators are missing the traditional propagation modes and forgetting the operation skills (including c.w.!) required to make the most of these exciting openings.

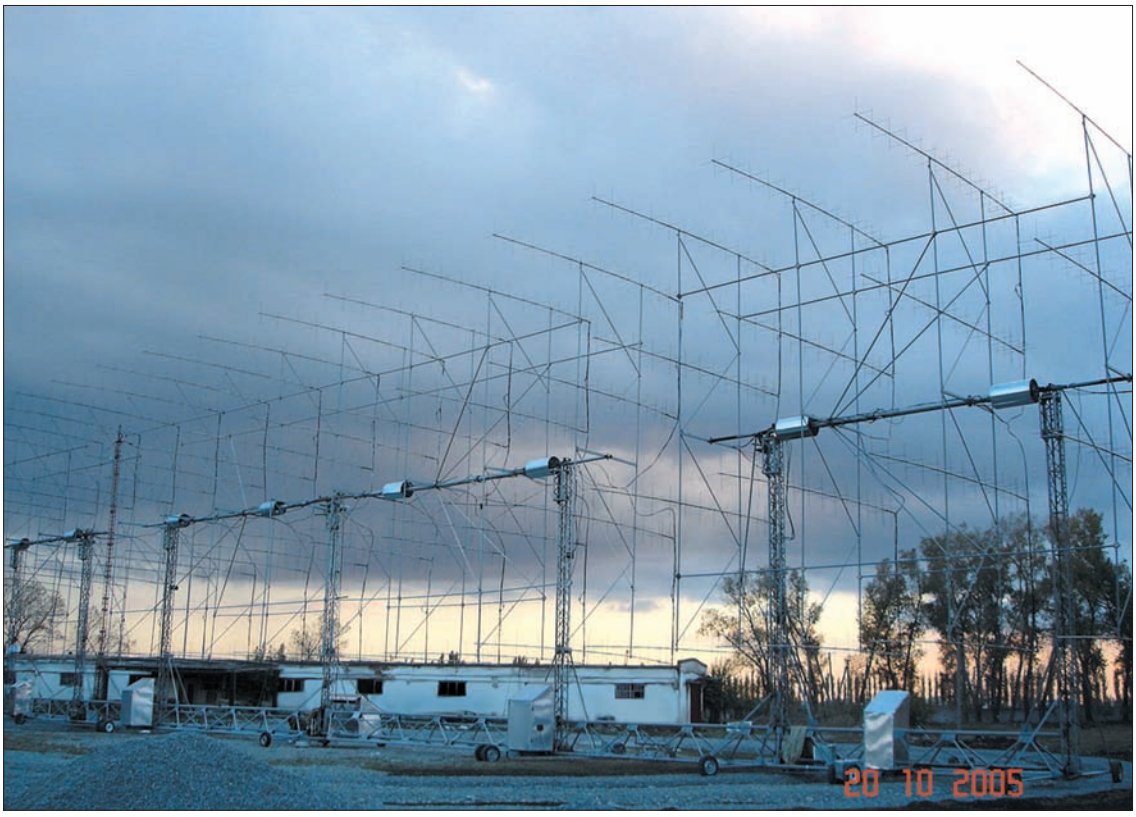
METEOR SCATTER

Although the daily sporadic meteor rate was quite low during November there was an increase in m.s. activity as a number of minor showers occurred during the month. Helping to boost the daily rate was the Taurids shower that occurred between October 20-November 30 with maximum activity on November 7. Next up was the Cepheids stream that impacted the Earth between November 7-11 with maximum activity on November 8. This was followed by the Casseopids shower that lasted between November 8-13, peaking on November 9 and finally the well-known Leonids shower that occurred between November 15-19 with maximum activity on November 17.

Activity on the 50MHz band was quite brisk with many European countries being contacted by UK stations. Amongst those worked via JT6M f.s.k. were EA3AXV (Spain), EA9IB (Ceuta and Melilla), HB9QQ (Switzerland), IO1HOC (a special event station in Italy), LA7AJ (Norway), LX2SM (Luxembourg), OE5MPL (Austria), OH6KTL (Finland), OZ1DJJ (Denmark), SM3BEI (Sweden), SP9HWY (Poland) and S59F (Slovenia).

Incidentally, when the 50MHz band was first released to Spanish operators they were all required to use 'EH' as a prefix to their callsign. But now the authorities have changed this ruling and you should be hearing Spanish stations using their original EA and EB callsigns on the 50MHz band. Those Spanish stations holding the old EH-prefix permit may keep using it until the latest 5-year license period expires. Any new 50MHz applicants must use their normal callsign, EA for 1st class operators and EB for v.h.f. and u.h.f. class operators.

There were no reported m.s. contacts on the 70MHz band although there are a few countries, Croatia (9A), Denmark (OZ) and Slovenia (S5) that are within easy reach of the UK. Very soon though there should be some



The 144MHz e.m.e. station of RN6BN

more countries within E-layer range as the Portuguese telecom authorities have agreed to issue special 70MHz permits. It's expected that the initial permits will allow 10W output into a horizontally polarised antenna, using c.w., s.s.b. or f.s.k. on a frequency band centred around 70.110MHz. The permits will cover not only CT (Portugal) but also CU (Azores) and CT3 (Madeira) so, that's three new DXCC countries, which should be available in 2006. Incidentally the Dutch authorities now appear to be willing to allow access to the 70MHz band as soon as their national Channel 4 television transmitter is closed down in 2006. No details are available yet but keep your fingers crossed!

Meteor reflections on the 144MHz band were very good during November with many contacts made on and around 144.370MHz using the digital FSK441 mode. Countries worked from the UK included HA1FV (Hungary), I4YNO (Italy), LA8NK (Norway), LY2BUU (Lithuania), LZ2FO (Bulgaria), OE3DXA (Austria), OH6PA (Finland), OK2AF (Czech Republic), OM1WBC (Slovakia), RX1AS (Russia), S51AT (Slovenia), SM3JBO (Sweden), SP2MKO (Poland), YO5KUW/P (Romania) and YZ7MON (Yugoslavia). The pick of the bunch though was R1MWV, a DXpedition to the rare DXCC country Malyj Vysotskij Island (MVI) located in the Baltic Sea between Russia and Finland. Their v.h.f. station used a Kenwood TS-2000 transceiver and GU-34B amplifier into two 9-element Yagis.

EARTH-MOON-EARTH CONTEST

The second leg of the American Radio Relay League (ARRL) e.m.e. contest took place over the weekend of November 12-13. This created a reasonable amount of activity on the v.h.f., u.h.f. and microwave bands and also enabled stations with very small antennas to make their first contacts via the Moon.

Gerald Znoyek DL4KG uses a Kenwood TS-2000X transceiver running 100W output into a 10-element DJ9BV Yagi and an SSB Electronics mast-head pre-amplifier. It's a normal 144MHz tropo station, the only difference with conventional stations is that the antenna can be elevated with a rotator. Using JT65 he worked the stations of DF2ZC (Germany), EA6VQ (Balearic Islands), RN6BN (Russia) and S52LM (Slovenia). Gerald also decoded the 144MHz stations of DK3EE, DL9MS, EB5EEO (Spain), ES6RQ (Estonia), F1FLA (France), HB9Q (Switzerland), K5GW (USA), RA3AQ and YO4FRJ (Romania) but couldn't get through the bigger signals that were calling. He mentions that outside of a contest he should be able to contact some of these stations with his marginal setup.

A week before the e.m.e. contest **Christoph Petermann DF9CY** mounted his 144MHz 9-element DK7ZB Yagi on a vertical rotator that provided full elevation control. It made a spectacular difference and when elevated high enough the background noise decreased considerably. The e.m.e. contest weekend was a good test with the c.w. stations of IK3MAC, RN6BN, SP7DCS, W5UN, KB8RQ being copied very easily. Monitoring with JT65 DF9CY also decoded the e.m.e. stations of EB1DNK, IK7MAC and RK3FG.

Even smaller antennas can be used to work some of the larger e.m.e. stations situated around the world. **Juergen Bach DJ7AL** uses an Icom IC-910 transceiver driving a VLA200 amplifier giving 180W output into a very small 4-element F9FT Yagi. Using JT65 he contacted the very large e.m.e. stations of RN6BN, KB8RQ and W5UN.

Angus 2E0BAT mentioned on Moon-Net (an Internet bulletin board) that his very first e.m.e. contact was made with the station of W5UN. His station consisted of a Yaesu FT-817 transceiver, a linear amplifier running 50W output and two home-made 5-element Yagis. The antennas were attached to a fishing pole that was simply bent backwards and tied off at the correct angle. Extremely simple but it worked!

Just in case you're wondering what's it's like to operate a large 144MHz e.m.e. station take a look at the photograph, **above**. It's the station of **Sam RN6BN a**nd consists of 64 Yagis, each with 15-elements in both the horizontal and vertical plane. That's a total of 1920 elements! Running 1kW output from a GS35B amplifier Sam made 234 QSOs in the recent e.m.e. contest with stations in 44 countries, 6 continents and 26 American states.

DEADLINES

That's it again for another month. Thank you for your reports and please keep sending them in to the address and by the date given at the top of the column. Happy New Year!

73 David G4ASR

DAVID BUTLER G4ASR
YEW TREE COTTAGE
LOWER MAESCOED
HEREFORDSHIRE HR2 0HP
TEL: (01873) 860679
E-MAIL: g4asr@btinternet.com

Trader's Table

The equipment for sale on this page is secondhand or ex-demonstration

Disclaimer

Advertisements from traders for equipment that is illegal to possess, use or which cannot be licensed in the U.K, will not be accepted. While the publishers will give whatever assistance they can to readers or buyers having complaints, under no circumstance will the magazine accept liability for non-receipt of goods ordered, late delivery or faults in manufacture.

THE SHORTWAVE SHOP

01202 490099

TRANSCEIVERS

ICOM IC 703 HF+50Mhz QRP TCVR £350
ICOM IC 7400 HF/VHF TRANSCEIVER £895
ICOM IC 718 HF/DSP TRANSCEIVER £395
ICOM IC2725 VHF/UHF MOBILR TCVR £199
ICOM IC746 HF/VHF TRANSCEIVER £495
YAESU FT8900 4 BAND TRANSCEIVER £255
YAESU FT857 HF/VHF/UHF TCVR £395
KENWOOD TS130 HF TRANSCEIVER £195
KENWOOD TS450S HF TRANSCEIVER £450
KENWOOD TS140S HF TRANSCEIVER £275
KENWOOD TH G71E VHF/UHF H/H TCVR £135
TRIO TR7500 VHF TCVR WITH PS6 PSU £95
TRIO TS811 UHF BASE TRANSCEIVER £325
ALINCO DX70TH HF/50MHZ TCVR £325
KENWOOD TM 707E VHF/UHF TCVR £165
PALSTAR KH-6 50Mhz HANDIE £65
STANDARD C5800 VHF ALL MODE TCVR £135
YEASU FT290R1 VHF PORTABLE TCVR £95
ALINCO DJS41 UHF TRANSCEIVER £50
YEASU VX5 50/VHF/UHF HANDIE TCVR £125
KENWOOD TH F7E VHF/UHF TCVR £179
ALINCO DJ-C7 VHF/UHF TRANSCEIVER £85
ICOM M15 MARINE TRANSCEIVER £90

RECEIVERS

SANYO WS1000 WORLDSPACE RCVR £85
YUPITERU MVT7100 WIDE BAND RX £165
FAIRHAVEN RD500 RECEIVER £495
HITACHI KH WS1 WORLDSPACE/SW RX £85
AOR8200 WIDE BAND RECEIVER £250
SANGEAN AT818 PORTABLE HF RCVR £75
ROBERTS 9914 PORTABLE HF RECEIVER £55
KENWOOD R600 HF RECEIVER £95
GRE PSR225 BASE SCANNER £135
LAFAYETTE HA 600A HF RECEIVER £95
AOR AR7030 HF HI SPEC RECEIVER £475
AOR AR7030 PLUS HF RECEIVER £550
ICOM IC R75 HF RECEIVER £450
ICOM IC R10 HF/VHF/UHF H/H RECEIVER £165
YAESU FRG7700 HF RECEIVER £125
YAESU VR5000 WIDE BAND RECEIVER £325
YAESU FRG100 HF RECEIVER 125 ..... £275

ACCESSORIES

ICOM SM 6 BASE MICROPHONE £50
YEASU FP707 20AMP PSU-SPEAKER £65
MFJ 259B ANTENNA ANALYSER £155
DATONG D70 MORSE TUTOR £45
WATSON HUNTER FREQUENCY COUNTER £39
WONDERWAND ANTENNA £45
WELTZ SP220 HF/VHF SWR-PWR METER £39
ICOM SP21 SPEAKER £45
KENWOOD RM-1 REMOTE FOR TS850 ..... £25
MICROWAVE MODULE 50Mhz 30W AMP £65
MICROSET R25 VHF AMPLIFIER £65
NRD 525 RTTY BOARD £85
AOR AS5000 AUTO ANTENNA SWITCH £65
DATONG FL2/3 FILTER £55
WATSON W30 DUAL BAND RF AMP £45
MFJ 462B MULTIREADER £89
DIAWA SW110 SWR/PWR METER £39

For latest list please see www.shortwave.co.uk

NEVADA

023-9231 3090

Alinco DJC7 Handy Transceiver c/w Soft Case/Earphone/ERW4C Interface Lead £149
Alinco DJG5E Twinband Mobile with EMS47 Speaker Mic £199.95
Kenwood D7E 2/70cms Handy £169
Kenwood TM231E 45w 2m FM Mobile Transceiver £95
Kenwood TM531E 23cms FM Mobile Transceiver £225
Kenwood TR7730 2m FM 25w Transceiver £89
Trio TS700s 10w All mode 2m Base Tx with Ext VFO £299
Yaesu FT726R 2M/70CM All Mode 10W Base Transceiver £499
Alinco DJX10 Wideband Scanning Receiver £199
Alinco DJX2 1-1300Mhz AM/Fm/WFM Wideband Scanning Receiver £99.95
Alinco DJX3 Handheld Scanner c/w accessories & book £159
Commtel COM213 100 channel Handheld Scanner £75
Fairmate HP2000 All Mode Scanning Receiver £107
Icom R20 All Mode Wideband Scanning Receiver £225
Uniden UBC180XLT Handheld Scanning Receiver £99
Yaesu VR500 All Mode Handheld Scanner £149
Yupiteru MVT7100 All Mode Wideband Scanning Receiver £149.95
Yupiteru MVT7100 Wideband Scanning Receiver £149
Yupiteru MVT9000 MK I Wideband Scanning Receiver £229
Icom R71 Communications Receiver £225
Icom R75 General Coverage Receiver with 50Mhz £499
Sangean ATS303 Portable Receiver 13 SW bands & FM/MW £39
Alinco DX70Th HF & 6M Transceiver £399
Icom 718 10-100w (LSB,USB,CW,AM) HF Base/Portable £375
Icom 756Pro 100w HF & 6m Transceiver with ATU & DSP £859
Icom IC7400 HF/6m/2m Base Trasceiver £899
Icom Pro 756 II 100W HF & 6m Transceiver £1399
Kenwood T731e 2/70cms Twinband FM Mobile £199
Kenwood TS870SAT 100w DSP HF Transceiver with Auto Tuner £999
Realistic HTX-10 10m 25w All Mode Mobile £145
Yaesu FT1000 Mk V 200W HF Transceiver (IF mod & 2 cw filters fitted) £1699
Yaesu FT817D HF, VHF, UHF Portable Transceiver with Case & Battery £399
Kenwood VCH1 Visual Communicator & Leads £110
Perstel Bluenote Personal DAB Radio £59
Moonraker Minor 40 Channel CB Radio £39.95
Team ME4 80 Channel Mobile Transceiver £40
Zetagi M27 Antenna Matcher £20
Adonis AM-601 Desk Microphone (Wired 8 pin Yaesu) £39
Alinco EDX2 Automatic Antenna Tuner £225
Amdat ADC60 Frequency Standard Clock £99
AOR CT8200 CTCSS Card £55
BNOS LPM50 50-10-100 Amplifier £175
Dewsbury S/Tuner Super Tuner £25
Elmic Controls Noise Limitor £10
Heil Proset Plus Studio Headphones £119
Icom AT160 Coaxial Auto ATU £179
Icom RSR75 Remote Control Software for R75 ..... £25
Icom SCR20 Software & Lead £35
Jim NF96XI Filter £15
JPS ANC4 Noise Filter £115
Kenwood MB201 Mounting Bracket £10
Kenwood PS30m 20 amp Power Supply £110
MFJ 934 Antenna Tuner & Artificial Ground £129.95
MFJ 941E Versa Tuner II £84.95
MFJ 948 Antenna Tuner £99
MFJ 989C 3kw Antenna Tuner £215
Morse Key Brass Key £35
Pakratt 232 Data Terminal & Leads £99.95
Samlex 1223 20amp Switch Mode Power Supply £79.95
Trio TL922 HF Amplifier £895
Trio TL922 HF Linear Amplifier £795
Unioss Charger and Batteries £12
Watson WM2000 Base Microphone £80
Yaesu CD24 Charger for FT897/FNB78 ..... £75
Yaesu MH35A2B Speaker/Mic for older models £19
Yaesu SP8 Loudspeaker £89

Check our web site for latest Items available. E&OE Prices quoted are in pounds sterling and exclude carriage.

WATERS & STANTON

01702 206835

Alinco EDX-2 1 6-30MHz Automatic 200W ATU for DX-70, DX-77 ..... £199
Icom IC-82 H 2m, 70cm All Mode Base Transceiver 45/40W 12V £649
Icom IC-3230H 2m 70cm FM Mobile,45/35W Ful Duplex £249
AOR AR-3000 100kHz-2036MHz All Mode Receiver 400ch. 12V + psu £449
Kantronics KAM plus Multimode Dua Port Data Controller + Pactor £199
Icom IC R3 0 5-2450MHz AM,FM,WFM Receiver 450Ch + 2" TFT colour TV £269
SGC Power Clear DSP Audio Noise Filter + 5W amp, Band Pass Filter.. £179
Icom IC-M11 VHF Marine FM H/held Transceiver 6W + sp mic £149
Yaesu FT-1 R 2m FM H/Held T ansceiver + DTMF keypad £99
Yaesu FRV-7700 B 50-59, 118-130, 140-150MHz Converter for FRG-7700/8800 ..... £59
MFJ MFJ-784B Tunable DSP Audio Noise Filter £189
Alinco DJ-190T 2m FM H/held Transceiver + CTCSS £99
Icom IC R3 0 5-2450MHz AM,FM,WFM Receiver 450Ch + 2" TFT colour TV £269
MFJ MFJ-852 Power Line Noise Meter £69
ADI AT-400 70cm FM H/Held wi h Battery box 420-465MHz RX £89
BNOS TL50-144-25 6m 25W Linear T ansverter wi h 2m IF at 1W 12V DC (5A max) £89
Realistic Pro-39 68-960MHz (wi h gaps) H/held scanner AM,FM 200Ch. Hype scan £69
Icom IC R3 0 5-2450MHz AM,FM,WFM Receiver 450Ch + 2" TFT colour TV £269
Yaesu FRT-7700 150kHz-30MHz Receive ATU for FRG-7700/8800 ..... £69
Roberts R-827 Portable 0-30MHz w th FM Stereo & SSB via BFO £119
Icom IC R3 0 5-2450MHz AM,FM,WFM Receiver 450Ch + 2" TFT colour TV £269
Team EURO-8000 80ch 4w UK CB Base Station 12V or mains £99
Team EURO-8000 80ch 4w UK CB Base Station 12V or mains £99
Yupiteru MVT-9000 0 5-2039MHz All Mode Receiver 1000Ch £199
Kantronics KAM plus Multimode Dua Port Data Controller + Pactor £199
Yaesu VR-120D 100kHz-1300MHz AM,FM,WFM Hand Held Receiver 640Ch £109
GRE PSR-282 66-512MHz (wi h gaps) AM,FM Hand Held Receiver 200ch £69
Icom IC R75 30kHz-60MHz All Mode Receiver 12V wi h psu £399
Microwave Modules MMT-144-28 2m 10W Transverter 28MHz IF £69
Alinco DJ-C1 2m FM Micro Hand Held + CTCSS & Wide RX £69
Global AT-1000 0 5-30MHz SWL ATU £59
Alinco DJ-191 2m FM H/Held with DTMF keypad £119
Icom IC R3 0 5-2450MHz AM,FM,WFM Receiver 450Ch + 2" TFT colour TV £299
AKD AKD-7003 70cm FM Mobile Channelised 3W £89
MFJ MFJ-382 Amplified Speaker 1W (36 dB max) 9V batt or 12V DC £29
Kantronics KAM Multimode Data TNC £99
ADI AT-200 2m FM H/Held Transceiver with Nicad & Charger £89
Alinco DJ-480E 70cm FM H/Held Transceiver + Nicad & Charger £89
Ameritron ALS-600XCE 10-160m Solid State 600W Amplifier £849
Yaesu VR-120 100kHz-1300MHz AM,FM,WFM Receiver 640Ch £109
ADI AR-446 70cm FM Mobile 35W + CTCSS £129
Yaesu FT-290RII 2m All Mode Portable 2 5W £199
Yaesu FL-2025 2m clip-on 25W Linear (for FT-290R II) £99
Ameritron AL-80B 10-160m 1kW Linear Amplifier with 3-500 Tube £799
Icom IC R8500 100kHz-2GHz All Mode Receiver 1000ch. 12V + PSU £899
Palstar KH-6 6m FM H/Held w th CTCSS £75
MFJ MFJ-910 1 8-30MHz 200W Automatic Matcher £16
MFJ MFJ-9340K 1watt 40m QRP CW T anceiver Kit £139
Kenwood MC-55 Mobile "Gooseneck" Microphone wi h 8-pin mic plug £29
KENT KMPO Morse Code Practice Oscillator £29
Yaesu VR-500 100kHz-1300MHz All Mode Receiver 1000Ch Alpha £149
Yupiteru MVT-3300 66-1000MHz (wi h gaps) AM,FM 200Ch £95
Yaesu FT-8100 2m,70cm FM 50W,35W Ful Duplex + Remote Head £229
Yaesu FT-920AF HF,6m All Mode Base T ansceiver + Gen Cov. FM & Filter 100W 12V £899
MFJ MFJ-1786X 10-30MHz Super-Loop Antenna + Controller £249
Uniden UBC-9000XLT 25-550,760-1300MHz AM,FM,WFM 500Ch. 12V + psu £189
MFJ MFJ-934 1 8-30MHz 300W ATU wi h Artificial Ground £139
TGM Communications MQ-34SR Four Band Three Element Hybrid Quad Antenna £349
GRE PSR-282 66-512MHz (wi h gaps) AM,FM Hand Held Receiver 200ch £69
AOR AR-7030 0-32MHz All Mode Receiver 12V wi h PSU £449
Alinco DJ-C7 2m / 70cm Handheld Wi h CTCSS £89
Icom IC-706 HF,6m,2m All Mode Mobile/Base Transceiver w th Gen Cov. £449
Fai haven RD-500 10kHz-1750MHz All Mode Receiver wi h PC Control, CD ROM, 13000+ Ch. 12V + PSU £525
Icom IC R5 150kHz-1300MHz AM,FM & WFM Hand Held Receiver 1000Ch. + Nicads £105
Sony ICF-SW55E Portable Shortwave Receiver w th FM stereo and SSB £189
Yaesu FT-790R 70cm All Mode Portable T anceiver 1W Batt £149
Icom PS-55 12V 20A Matching PSU £149
Icom IC-756Pro I HF + 6m All Mode Base Transceiver + ATU, DSP & Gen Cov. 12V £1,199
Icom IC-R8500 100kHz-2GHz All Mode Receiver 1000ch. 12V + PSU £899
SML SWR-25 3 5-150MHz SWR / Power Meter 100W £29
MFJ MFJ-616 Speech Intelligibility Enhancer £119
Icom IC-706 MkII HF,6m,2m All Mode Mobile/Base T ansceiver w th Gen Cov. £499
Yaesu FT-290R MkII 2m All Mode Portable Transceiver 2 5W £199
Icom IC-703 HF& 6m All Mode QRP Mobile T ansceiver + Auto ATU, Gen Cov. 10W £449
Kenwood PS-53 13 8V 22 5A Matching PSU £129
Icom IC R3 0 5-2450MHz AM,FM,WFM Hand Held Receiver 450Ch + 2" TFT colour TV £249
Yaesu FT-100 HF,6m,2m,70cm All Mode w th Gen Cov RX 12V £399
JRC NRD-545 100kHz-30MHz All Mode Communications Receiver + DSP Audio Filter £899
JRC NVA-319 Matching Extension Speaker + Audio Filters & 2 inputs ... £99
JPS NIR-12 Noise & Interference Reduction Unit £199
Tokyo HL-50B 3 5-28MHz + 6m Linear Amplifier 5W in, 50W out £199
Icom IC-703 HF& 6m All Mode QRP Mobile T ansceiver + Auto ATU, Gen Cov. 10W £449
Kenwood TH-F7E 2m,70cm FM Palm Held T ansceiver + 0.1-1300MHz All Mode RX £179
Icom IC R8500 100kHz-2GHz All Mode Receiver 1000ch. 12V + PSU £899

Please check our website for latest list.
www.wsplc.com

HF Highlights

AS USUAL, INFORMATION, REPORTS AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

Well here we are at the start of another year and I wonder what 2006 has in store for us all? One thing is for certain, conditions on the h.f. bands have been very erratic over the last 12 months. Although, recently we have seen some signs of improvement especially on the higher bands.

It's funny, when a contest takes place where once there was a dead band it suddenly comes alive with the sound of Morse or voice. Are we all sitting in our shacks listening when we could be putting out a few calls and adding to our log books?

Several E-mails have arrived recently discussing the apparent drop in operating standards on the h.f. bands. I must admit I have been having the same thoughts while listening to 3.5MHz as I type the column. In particular you mention contests and DXpeditions. I am not sure how we can address this, if it's indeed a problem, but know doubt you have your own feelings on this one?

DX NEWS

Onto some DX news now and to Croatia, where members of **Mediterranean DX Club** will use a special callsign **9A0MDC** during the MDXC Trophy between the 3 and 5th February. The QSL Manager will be **Corrado Ruscica IT9DAA** and he'll send out all cards via bureau after he receives the log from expedition leader Emir Mahmutovic 9A6AA. Direct requests can be sent to **IT9DAA Via Cap. Salemi 41, 96019 Rosolini SR, Italy**.

In Antarctica **Jean-Paul Gendner F5BU** (ex-FT5WJ on Crozet Island) is in Adelie Land and will be staying at the French Antarctic 'Dumont d'Urville' station until the end of February. He hopes to be active during his free time on 14MHz s.s.b. and will use a callsign in the **FT5Y**** series. The QSL will be printed a few weeks after his return home and will be available via his home callsign via the bureau or direct to **182, Route de Mittelhausbergen, 67200 Strasbourg, France**. This French Antarctic station has been off the air for a long time so, it's worth listening out for this call, as it would make an interesting addition to your log books.

CARDS DELAYED FOR JW5YJ

Anyone who worked **JW5YJ** and sent their cards to **Hugo Ark LA5YJ** in Norway will have to wait a little while for their QSLs. Hugo had to leave on very short notice to Pakistan to help out with emergency communications there and said "I am really sorry but there is nothing I can do until I return home. It will also effect the cards for my operations as 9N7YJ in Nepal and XU7ACW I from Cambodia".

V73NS QRT

The Republic of the Marshall Islands (RMI) OC-028 is a nation of about 60,000 people living on 29 coral atolls and 5 low-lying islands in the central Pacific, midway between Hawaii and Australia. **Neil Schwananitz WD8CRT/V73NS** went QRT from these islands on the 21 November 2005 after three years and 22,400+ c.w. contacts.

The QSL cards will only be accepted via the bureau and you can expect at least a one year delay for the card to be processed. Neil is hoping to be active from Iraq again with c.w. and QRP beginning this month but no bands or times were available when the column was being put together!

MAURITANIA

The country of Mauritania lies in Northern Africa, bordering the North Atlantic Ocean, between Senegal and Western Sahara **Jean Lewuillon ON8RA** has been a resident there in Nouakchott since last January and has said that there are only three licensed Amateurs in the country. These operators are **Nicolas Sinieokoff 5T5SN** who operates c.w., s.s.b., EME and v.h.f., **Bernard 5T5BN** who operated s.s.b. only but has been inactive for sometime and Jean himself **5T0JL** who is 99% c.w. on all bands except 1.8MHz. This is because there is not enough room for a long antenna. Jean is planning to be active using PSK very soon and is hoping to organise an IOTA DXpedition to the Island of Banc d'Arguin AF-050. This is now a World Protected Wildlife Reserve so it's not so easy to get permission to operate there. Jean's good friend **Hugo De Clercq ON6ID** left Belgium driving a 4x4 vehicle and has now arrived in Mauritania and is currently signing as **5T0ID/M.** He is expected to be active on all h.f. bands but his current activity is mainly s.s.b. on 14/21MHz.

YOUR REPORTS

On to your reports now and the first is from all c.w. man **Ted Trowell G2HKU** on the Isle of Sheppy, Kent who seems to be one of only two reporters to use 1.8MHz. Around 2100 Ted worked HB9ACC (Switzerland), EA6/DL5DSM (Balearic Islands) EU-004, JW0HS (Svalbard) EU-026, LX/PA3DKC/P (Luxembourg) and OE50PWW (Austria) using his Ten-Tec Omni V and Butternut HF6 vertical. Ted mentions the latest CQ WW SSB Contest and the "Wall to wall s.s.b. and a total disregard of band plans" when he operated.

In Trelewis, Mid-Glamorgan **Leighton**

CARL GW0VSW HOPES THAT THE HF BANDS WILL KEEP BUZZING AS THE NEW YEAR DAWNS

Keith Winward 2E0JKD in his shack.

Smart GW0LBI used low power once again for his h.f. activities in the early evening. Using 1W c.w. and a 60m long wire antenna stations logged included S50X (Slovenia) 2020, DL2BHM (Germany) 2024, OK1FM (Czech Republic) 2110 and a little later YL2KO (Latvia) 2225. Changing mode to s.s.b. Leighton managed ON5WW (Belgium) 1900, OZ1HXQ (Denmark) 2150, 9A1P (Croatia) 2258 and EA1YM (Spain) 2310UTC. Good going with only 5W!

THE 3.5 & 7MHz BANDS

On 3.5MHz 1W of c.w. found HB9JND (Switzerland) at 1914UTC. Leighton said "This band has also been noisy with long periods where no signals were copied for hours at a time".

Also active here was **Martin Addison M3JUQ** in East Finchley, North London who used his Yaesu FT-840 and ran 10W s.s.b. into a folded half size G5RV and would like to thank PA0AGA (Netherlands) at 1754UTC for taking the time to work him with his 'poor' signal on this band.

Switching to 7MHz Martin had more success logging IO0BOB (Italy) a special call for the Torino 2006 Winter Olympics at 0636, DB3TH (Germany) 0656, F6AEW/P (France) Claude operating from Chateau Gondin at 0926, PI60NYM (Netherlands) 0937, ON4SK (Belgium) 0946, MU3SDE/P (Alderney) EU-114 at 1635, YU1XA (Serbia & Montenegro) 1922 and S51CK (Slovenia) at 2136UTC.

Moving to 7MHz **Chris Colclough G1VDP** in Nuneaton had voice contacts with V26B (Antigua) NA-100 at 2259, N2RS (USA) in Weaverville, North Carolina at 2307 and WP2Z (US Virgin Islands) NA-106 at 2317UTC using his half size G5RV and Yaesu FT-1000 MkV Field.

One contact 6Y2Z (Jamaica) NA-027 was added to the mobile log of **Mark Taylor G0LGJ** at 0627UTC using his Kenwood TS-480 and 100 watts output to a DK3 screwdriver antenna

THE 14MHz BAND

On 14MHz Mark found RN9SXX (Asiatic Russia) 0705, ZL4IR (New Zealand) 0825, PY8AZT (Brazil) 0842, T77EB (San Marino) 1340 and VP2MRJ (Montserrat) NA-103 at 1916UTC. Another s.s.b. operator on the band was **Martyn Medcalf M3VAM** in Chelmsford, Essex who used an Icom IC-746 and long wire antenna with SGC-237 auto tuner logging IT9UCS (Italy) 0815, OH6KN (Finland) 0825, UV8M (Ukraine) 0849, OE8CIQ (Austria) 0857, J43J (Greece) 1206, HA1ZN (Hungary) 1228, IS0/WH0Q (Sardinia) EU-024 at 1645, VY2LI (Canada) 2045 and K5EST (USA) in Crowley, Louisiana at 2105UTC.

In Newtonabbey, Northern Ireland **Peter Lowrie MI5JYK** was lucky enough to operate both days of the CQ WW SSB contest with a plan to operate on 3 bands 14, 21 and 28MHz as conditions on the latter bands had been reported as 'Quite good' by local Amateurs. Peter said "I had my FT-817 ready to go on 21 and 28MHz but I didn't get a sniff of the action there so I ended up sticking to 14MHz for the duration of the event. My MFJ-9420 and the Quarter Wave Wire Vertical mounted on a 9m roach pole worked well and by the end of the weekend 46 countries were worked on five continents and in 12 CQ Zones. Not bad going for a QRP station in an urban environment and with a very simple antenna".

Some of Peter's 5W DX log included CU2A (Azores) EU-003 at 0852, 3V5A (Tunisia) 0919, HB0/HB9AON (Liechtenstein) 0924, CT3YA (Madeira Islands) AF-014 at 0925, JA0JHA (Japan) a 0948, 8P9R (Barbados) NA-021 at 1013, TF3W (Iceland) EU-021 at 1105, RW2F (Kaliningrad) 1106, JW5E (Svalbard) 2147 and OH0JFP (Aland Island) EU-002 and WA1S (USA) in Milford, New Hampshire at 1657UTC.

The s.s.b. log of **Jim Pedley GM7TUD** in Dumfries lists 3G1M (Chile) 0906, TO5S (Guadeloupe) NA-114 at 1129, XU7TAS (Cambodia) 1403, 8Q7EA (Maldive Islands) AS-013 at 1415, 5X1VB (Uganda) 1527, J3/SP9BQJ (Grenada) NA-024 at 1618 and FR5HA (Reunion Island) AF-016 at 1644UTC using a Kenwood TS-450S and 100W into a full size G5RV.

THE 18 & 21MHz BANDS

On 18MHz Jim GM7TUD found 5B4AHY (Cyprus) AS-004 at 1147 while Ted worked W9RGB (USA) West Lafayette, Indiana at 1800UTC. Martyn M3VAM managed some mid-day activity and lists 3V5A (Tunisia) 1108, TF/N0HJZ (Iceland) 1258, 8P1A (Barbados) 1312, VE3EJ (Canada) 1325, RK4FD (European Russia) 1358, SV1UT (Greece) 1412 and UT5ID (Ukraine) at 1435UTC. In London Martin M3JUQ used a new wire 'sloper' antenna cut for the band, logging ZB2/ON6NP (Gibraltar) at 0908 followed by LZ1ND (Bulgaria) 0948, T77C (San Marino) 1021, LY2BHB (Lithuania) 1043 and W6KOK (U.S.A.) in Randolf Center, Vermont at 1355UTC.

Martin says "I've just added the sloping dipole for 18MHz and I have had a lot of fun with it. It clearly focuses well into southern Europe and should work well into the Middle East. It's a little bit long and I was going to trim it after initial testing, but I had a contact with it on 14MHz with a station in North Norway who couldn't hear me on the half-sized G5RV, so I think I'll leave it as it is". Now, I think that is always a sensible choice when a new antenna appears to be working well!

Moving on to the 21MHz band where Mark G0LGJ had mobile QSOs with 9K2HN (Kuwait) 1140, EX0M (Kyrgyzstan) 1141, FY5KE (French Guiana) 1548, VQ9DY (Chagos Islands) AF-006 at 1600, PS2T (Brazil) 1606 and J3/SP9PT (Grenada) NA-024 at 1618UTC. Meanwhile, the 5W s.s.b. QRP of Leighton GW0LBI reached EA8LS (Canary islands) AF-004 1147, 3V5A (Tunisia) at 1210, P49Y (Aruba) SA-036 at 1315, VE3KZ (Canada) in Milton, Ontario at 1435UTC. Conditions on this band were described as 'excellent' during the day.

A QSL card for W6KOK worked by Martin Addison M3JAQ.

Chris G1VDP also spent some time on the band and found VK6DXI (Australia) in Ocean Reef, Western Australia at 0958, S79RRC/A (Seychelles Islands) on Aldabra AF-025 at 1058, 5U7B (Niger) 1432, VQ9DY (Chagos Islands) on Diego Garcia AF-006 at 1604, XE1FSK (Mexico) 1616 and HK3JJH (Columbia) at 1628UTC.

THE 28MHz BAND

Finally, we come to the 28MHz band and we have not had many reports here for sometime. However, Chris G1VDP found conditions 'favourable' one morning working RZ9SWR (Asiatic Russia) 0841, V51WM (Namibia) 0920, 4Z4DX (Israel) 0941, S79EC/A again at 1038, EA8BWL (Canary Islands) on Tenerife at 1818, 5N45NDP (Nigeria) 1029, and EK0B (Armenia) at 1032UTC while Jim GM7TUD also managed a large number of contacts and these included TZ9A (Mali) 1128, PZ5RA (Suriname) 1249 and ZD7VC (Saint Helena) AF-022 at 1353UTC.

SIGNING OFF

Well, that's it, time to be signing off once again and it is good to see our reporters working all parts of the globe this month and I hope that this is a sign of better things to come on the h.f. bands this year. As usual my thanks go to all our reporters for their logs. If you want to join them send in your log listing the band, station worked, mode, time and any other information you think will be of interest to our readers. Photographs or copies of the QSL cards you have received are always welcome.

Thanks also to **Tedd Mirgliotta KB8NW** editor of the *OPDX Bulletin* and **Mauro Pregliasco I1JQJ/KB2TJM editor of the** *425 DX Newsletter* for the DX information. Until next time have a good DX filled month and may I wish you all a very Happy New Year.

73, Carl GW0VSW

CARL MASON GW0VSW
12 LLWYN-Y-BRYN
CRYMLYN PARC
SKEWEN, WEST GLAMORGAN SA10 6DZ
Tel: (01792) 817321
E-MAIL: carl@gw0vsw.freeserve.co.uk

Data Burst

ROBIN GW3ZCF LOOKS AT A MORSE PROGRAM YOU MAY LIKE TO TRY AND DISTRIBUTED COMPUTER PROJECTS AS HE BIDS FAREWELL TO THE DATA BURST COLUMN

I'd like to start this month with an apology. When giving the URL for downloading *LogPrint* in my last column in the October 2005 *PW*. I mistyped one figure. The correct address for the *Logger32* download site is **http://www.kc4elo.com** It's well worth a visit. As well as *LogPrint*, you can download the latest version of *Logger32* (which in my view is one of the most versatile free programs for PSK and RTTY, including a sophisticated logging program, rig and antenna rotator control, automatic look up in QRZ.com and other sources, propagation prediction, DX cluster information and much, much more!). If you have a more modest computer you can still download an earlier 16bit version of *Logger*, together with the latest version of *Zakanaka*, which works alongside.

MORSE RUNNER

I've found it difficult to start writing this month - I have been having so much fun with a Morse contest simulation program, which I have discovered. It's called *Morse Runner* and was written by **Alex Shovkoplyas VE3NEA.** It can be downloaded free from **http://www.dxatlas.com/MorseRunner** This is the most realistic QSO simulator I have ever seen.

The screen display, **Fig. 1**, resembles some of the commercially available contest logging software and as with the real thing, you need to type in the callsign and QSO serial number received from the other station, most other operations being performed using the function and arrow keys, Shift and Enter. Where this differs is that you don't need to connect it to a transceiver - all the incoming signals are simulated.

First you enter your own callsign, then you tick the QSK box if you wish to operate in full break-in mode. You can choose a c.w. speed (this is the speed at which your own transmission will be sent and to which most, but not all, of the incoming signals will adhere) and c.w. pitch and receiver bandwidth. Finally, you select the band conditions you want the simulator to produce - you can opt to have QRM, QRN, flutter, QSB, high or low band activity and even LIDs (incompetent or inconsiderate operators who call on top of you, fluff serial number exchanges and otherwise make life more difficult). To start with I opted for 10 minute bursts of operation, but as I became more used to the required button presses I continued to operate for longer periods of time. You start by selecting the required time and clicking Run.

You may hear signals straight away, but if not, press F1 to call CQ. If you have chosen a fairly high activity level you will be rewarded with an immediate pile-up. If you can pick out a signal from the resultant cacophony, type it in the Call window and then press F5 followed by F1 (that transmits his callsign, your report to him (599) and your serial number). If you got the callsign correct, he will come back and give you a report and serial number. A report of 599 can be entered by pressing the space bar, but any other report has to be typed in. Having entered the required fields, press Enter and, if you got everything correct, the contact will be logged, points calculated and TU transmitted. This then usually results in further stations calling you.

There are lots of other features that simulate a fully fledged computer-controlled contest setup - for example, pressing Alt + up or down arrows produces RIT, while Ctrl + up or down arrows controls the receiver bandwidth. Both of these are useful, when you have got used to them, for picking up particular stations in a pile-up.

You can find the other functions by trial and error (though there is a basic Help file available - I printed this out to study it off-line). The joy of the *Morse Runner* program is that if you mess up you are not really making a fool

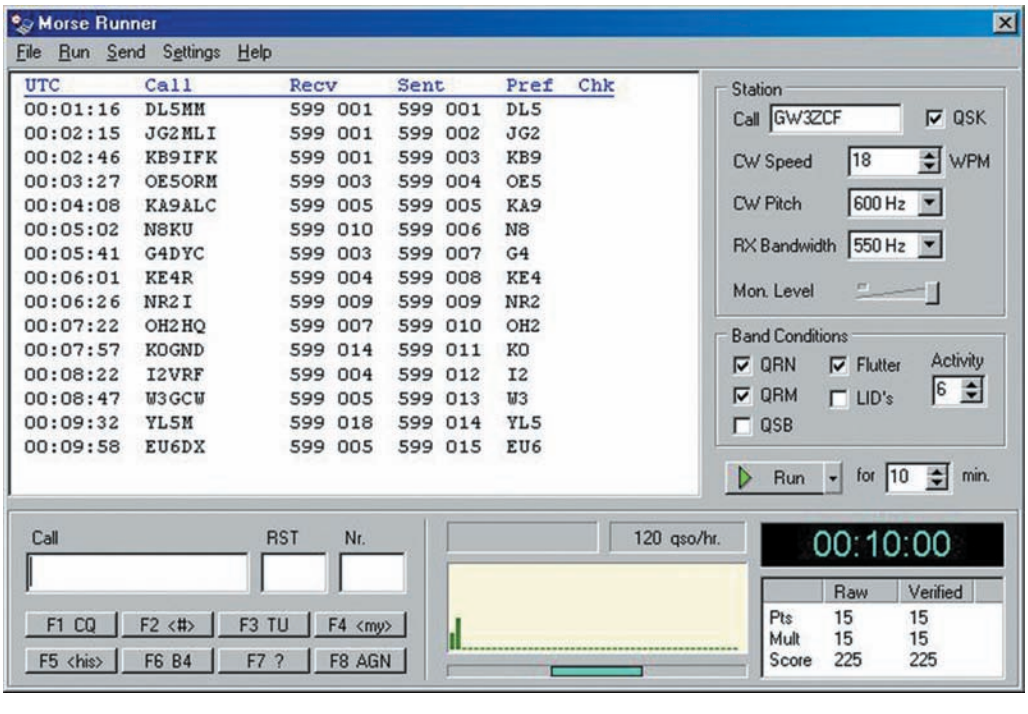


Fig. 1

of yourself on the air! I found it to be amazingly realistic, and after a few seconds it really felt as if I was operating a high powered station in a real contest. This is a wonderful free program that I recommend anyone with an interest in c.w. operation to try - it can't fail to excite you, and will certainly improve your skills at pulling signals out of noise and QRM.

DISTRIBUTED COMPUTING PROJECTS

I wonder if, like me, you leave your computers on all the time, regardless of whether you are actually using them. All that computing power going to waste most of the time and probably only a tiny fraction used when you are at the keyboard. That is the situation for most home computers, but a number of organisations have emerged to try to harness all that computing capacity, which would otherwise go to waste. They all work in a similar way - a huge computing task is divided into manageable slices, which are fed out over the Internet to an army of willing volunteers who are prepared to let the spare capacity of their computers be used to contribute to the project.

One such distributed computing project is called Search for Extra Terrestrial Intelligence (SETI), which uses the massive computing power from thousands of home users to analyse radio data from the University of California radio telescopes. They are searching for data buried under the noise of the radio signals reaching us from outer space to see if messages are being received from intelligent life forms out there. The thousands of home computers link together through the Internet to create a virtual supercomputer larger than anything that has yet been built. If you are interested in learning more about SETI, click **http://setiathome.berkeley.edu/sah_participate.php**

A project called Find-a-Drug caught my imagination about three years ago. It was started at Oxford University, using mathematical modelling to test the potential of various molecules to be used as drugs for the treatment of cancer and other serious diseases. A library of thousands of molecules is generated mathematically in three-dimensional space and tested to see if they interact with protein targets associated with particular diseases. Each molecule, which is predicted to interact with a target is called a 'hit' and has the potential to warrant further study to see if it could form the basis of a new drug for the treatment of the disease.

My computers have been working on the Find-a-Drug project for over three years and during that time have processed many millions of candidate molecules. One of the nice things about Find-a Drug is that you get feedback from the project and during that time I have had two successful results. When you score a success, you can download a certificate to mark it. **Fig. 2** shows an example of a certificate downloaded from the Internet. When Find-a-Drug first started it was specifically aimed at detecting possible drugs for the treatment of cancer. That is still a large part of the work of the project, but it has been broadened to include malaria, HIV, CJD, Multiple sclerosis and Respiratory diseases (you can opt in or out of specific areas of research at will). It is a not-for-profit organisation with members on all continents, and a number of potential drugs for the treatment of the above conditions have been identified for closer examination and clinical trials.

Fig. 2

Full details can be found **www.find-a-drug.org.uk** and if you decide to take it further, there is a very good description of how to install the software on **www.find-a-drug.org.uk/readme-win.html** You will find links on these pages to message boards where you can get help from more experienced members.

One word of warning though. Find-a-drug is written with low priority, which means that if you are operating any other program it steps aside and you barely notice any degradation in your computer speed. But if you are not using the computer for anything else it hogs all the CPU cycles and your computer works very hard. So long as your computer has good cooling and a well-rated power supply this is no problem, but if either of these is marginal it might overheat. It's probably a good idea to keep a fairly close watch on your computer in the early days of running Find-a-drug.

MORE ON EQSL

I wrote about *eQSL* a few editions ago in Data Burst. I always upload my logs to eQSL on a regular basis, but for the awards you are totally dependent on others doing the same. I have worked about 185 countries using PSK31, but it was only this month that the 100th country confirmed arrived into my box at eQSL.cc.

After verification I was able to download the certificate and now have the eDX100 award (the electronic equivalent of DXCC) on the wall of my shack. I still need Hawaii for the eWAS (Worked all States), but as the path is over the polar region, and polar flutter is notoriously unkind to PSK31 signals, I may never achieve that one!

AU REVOIR

I have been writing Data Burst on a quarterly basis for several years now and it's been a lot of fun. I seem to have covered a very wide range of topics, and have learnt a lot myself along the way. But I have found it increasingly difficult to find new things to write about, so have decided to step back from being a regular contributor.

However, as new topics come to mind I will still write copies of Data Burst on an occasional basis, so you may not have seen the last of me yet! Thanks for reading my column over the years, and for all the letters, E-mails and telephone calls, which were always appreciated.

73, Robin GW3ZCF

As Robin steps down from being a regular contributor we wish him all the best and look forward to the occasional article from him. In the meantime, ***Jack Weber*** *will continue with his Data Burst contributions on a bi-monthly basis.* Ed

ROBIN TREBILCOCK GW3ZCF
15 BROADMEAD CRESCENT
BISHOPSTON
SWANSEA SA3 3BA
TEL: (01792) 234836
EMAIL: robin@broadmead.eclipse.co.uk

In Vision

The BATC Treasurer Brian Sumnmers G8GQS, with camera, at the club's Open Day at RAF Cosford in 2003. But where will the next meeting be?

GRAHAM G8EMX LOOKS AT DATV, POSSIBLE PROBLEMS AND UPDATES US ON THE BUILDING OF HIS 24CM G8SUY KIT

One of the principal driving forces for exploring Digital Amateur Television (DATV) is bandwidth compression – the possibility of sending a good colour picture within maybe a 2MHz bandwidth. It might then be practical for ATV to return to the 432-440MHz (70cm) band, where of course fast-scan ATV first began and long-distance contacts were frequently achieved. The British Amateur TV Club (BATC) had purchased some DATV modules from Germany for its members to explore, so in the club's November issue of its magazine *CQ-TV*, **Ian Waters G3KKD** reported his efforts in Cambridge.

Ian had already shown that DATV with a 4MHz bandwidth (the BATC modules default setting) on 24cm (1.3GHz) was successful, with P5 pictures being received after an analogue transmission had only given a weak and distorted picture over an admittedly highly-obstructed path. With a bandwidth reduction to 2MHz not readily practicable, involving much more than changing links and no information available, Ian decided to retain the 4MHz signal when trying 70cm transmissions.

A constraint that Ian came across was that the lower edge of the modules' 70cm spectrum output was very close to the Cambridge 70cm voice repeater input! Local tests indicated no obvious problems so Ian built an up-converter to feed a satellite set-top box as receiver, then sent DATV on 70cm from an antenna at the end of his garden back to his main antenna. This almost could not fail to work, but to prove this was not just r.f. leakage, a 3km path was equally successful.

Ian's third test was to send DATV on 70cm over an 8km path to another Amateur station. But this time, nothing was seen! Path loss predictions suggested a good margin above the receiver's sensitivity, but even after trying several set-top boxes the result did not change and other commitments prevented Ian from continuing at that time.

No doubt Ian will continue with 70cm DATV again and either achieve success or determine the problem but, based on this, my view is that 70cm should probably be abandoned as an ATV band. With digital ATV transmitters still relatively expensive and giving such poor 70cm results, in what is now a crowded Amateur band already, why continue when 24cm has become the new 'home' of analogue ATV and can easily accomodate digital transmissions too? There, that might set a few pulses racing!

PROBLEMS FOR ATV

I think it now has to be admitted that there are more problems for ATV than difficult digital trials on 70cm. Basic ATV hardware is becoming scarce, particularly for the most popular ATV band, 24cm. Amateur Television Yagi antennas are no longer being advertised, analogue satellite receivers are not in evidence at rallies, there are no ATV receiver kits available and only one transmitter kit.

With the BATC's next edition of its magazine CQ-TV due for publication in March, in the run-up to its deadline of 31 December 2005 the club still had no venue and no organiser for its next General Meeting, due later this year. On the assumption that a General Meeting will take place, I suggest the following items for the Agenda.

Proposition 1
That the BATC arranges the supply of a purpose-designed Amateur television receiver for the 24cm band. The receiver to be available as 'plug and play' or in kit form with a sensitivity adequate for local contacts and repeater working.

Proposition 2
That the BATC arranges the design or supply of a purpose - designed ATV transmitter for the 24cm ATV band. The transmitter to have an r.f. output adequate for local simplex and repeater contacts. The transmitter to be available as 'plug and play' or as a kit option.

Proposition 3
The BATC to make available a basic 24cm Yagi antenna, again with just sufficient elements and hence performance for local and repeater working.

Proposition 4
That the BATC seeks the co-operation of the ATV Repeater groups towards producing an 'Introducing ATV' DVD.

Proposition 5
All the above proposition to be available via the BATC Members Services or from any BATC rally table that the club may provide.

I am prepared submit the ideas for inclusion on the formal Agenda, so if any BATC members wish to suggest amendments, or other items, please contact me at my E-mail address as a matter of urgency.

Wherever it is held, whenever it is held, with its specialist exhibitors and lecture stream, the BATC Convention and General Meeting needs tremendous organisation and personal time from whichever of the club's committee organises it. I therefore ask every BATC member, indeed everyone who has an interest in television as a technical and artistic medium, to support the meeting when it is eventually called.

KIT BUILDING PROGRESS

Now for an update on the building of the 24cm G8SUY transmitter kit that I featured in the December issue. The kit information clearly shows the position for each component but my technique for soldering is to first identify the two 'pads' that a part must go between, then apply a little solder to just one of those pads. Holding the component with tweezers, heat the solder and slide one end of your resistor onto the pad then remove the heat. Solder the other end to the other pad then with the component secure, resolder the first pad if necessary. (All this is done under a magnifier of course.)

After the 29 resistors the component count continues with 37 capacitors, 5 inductors and 14 semiconductors, including the power block, which is mounted off the board. The transistors are **really** small and there are 28 pins on the Phase Lock Loop (integrated circuit, so I will go into more detail of these in my April column.

Finally, for this time, apologies that the BATC table was not in evidence at the Kempton Rally. Normal service will probably resume this year.

GRAHAM HANKINS G8EMX
17 COTTESBROOK ROAD
ACOCKS GREEN
BIRMINGHAM B27 6LE
E-MAIL: g8emx@tiscali.co.uk

Airband

	Pages	Price	Code
AIRBAND RADIO GUIDE (abc) 6th Edition	122	£8.99	ABRG6
AIRBAND RADIO HANDBOOK (Sutton) David Smith	190	£12.95	ABRHB
AIR TRAFFIC CONTROL (ABC) 9th Edition		£8.99	ATC9
AIRWAVES 2005 (Photavia)	144	£10.95	AIR25
AIRWAVES SELCAL - CIVIL & MILITARY DIRECTORY (Photavia)	176	£11.95	AIRSEL
CALLSIGN 2005 (Photavia)	2005	£10.95	CAL25
CIVIL AIRCRAFT MARKINGS 2005 (abc) Alan Wright	368	£7.99	CIVAIR
FLIGHT ROUTINGS 2005 Williams	180	£10.00	FR25
MILITARY AIRCRAFT MARKINGS 2005 (abc) March & Curtis	-	£7.99	MILAIR
BRITISH ISLES ATLANTIC TRANSITION CHART (AERAD)	1020x520mm	£10.50	UKH6
BRITISH ISLES LOW ALTITUDE CHART (AERAD)	1020x520mm	£10.50	UKL2
NORTH ATLANTIC ROUTE CHART (AERAD)	1020x520mm	£10.50	NATHL1

Scanning & Shortwave Frequency Guides

	Pages	Price	Code
BUYING A USED SHORT WAVE RECEIVER - 4th Edition. F. Osterman	78	£5.95	BUSWRX
FERRELLS CONFIDENTIAL FREQUENCY LIST 13th Ed.	540	£21.50	FERR13
KLINGENFUSS GUIDE TO UTILITY STATIONS 2005/6	552	£31.50	KFUTIL
KLINGENFUSS SHORTWAVE FREQUENCY GUIDE 2006	496	£24.50	KFSWFG
KLINGENFUSS SHORTWAVE FREQUENCIES CD 2006	-	£17.70	KFSWCD
PASSPORT TO WORLD BAND RADIO 2006 (IBS)	592	£17.50	PASS26
RADIO LISTENERS GUIDE 2006	160	£5.45	RLG26
SCANNERS 4 SCANNING INTO THE FUTURE. Bill Robertson	245	£9.95	SCAN4
THE ESSENTIAL GUIDE TO SCANNING. Martin Peters	108	£6.00	EGTS
UK SCANNING DIRECTORY - 9th Edition	544	£19.75	UKSD9
WORLD RADIO TV HANDBOOK 2006 (WRTH)	688	£22.50	WRTH26

Antennas/Transmission Lines/Propagation

	Pages	Price	Code
25 SIMPLE INDOOR & WINDOW AERIALS E.M. Noll (Babani)	50	£1.75	BP136
25 SIMPLE TROPICAL & MW BAND AERIALS E.M. Noll (Babani)	54	£1.75	BP145
AN INTRODUCTION TO RADIO WAVE PROPAGATION J.G. Lee (Babani)	116	£3.95	BP293
ANTENNA FILE (RSGB)	285	£18.99	ANTFIL
ANTENNA TOOLKIT (inc. CDROM). Joseph J. Carr	214	£25.00	ANTOOL
ARRL ANTENNA BOOK (inc. CDROM) 20th Edition	944	£32.00	RRAB20
BACKYARD ANTENNAS. Peter Dodd G3LDO (RSGB)	200	£18.95	BYANTS
BASIC RADIO PRINCIPLES & TECHNOLOGY. Ian Poole G3YWX	262	£15.99	BRPRIN
EXPERIMENTAL ANTENNA TOPICS. H.C. Wright.	70	£3.50	BP278
HF ANTENNA COLLECTION. Edited by Erwin David G4LQI (RSGB)	233	£19.95	HFANTC
INTERNATIONAL ANTENNA COLLECTION G. Brown M5ACN (RSGB)	250	£11.95	IANTC
INTERNATIONAL ANTENNA COLLECTION 2. G. Brown M5ACN (RSGB)	200	£11.95	IANTC2
MORE WIRE ANTENNA CLASSICS (ARRL)	200	£10.50	MWANTC
PHYSICAL DESIGN OF YAGI ANTENNAS (Hardback) David B. Leeson W6QHS (ARRL)	200	£15.50	PDYAGI
RADIO PROPAGATION PRINCIPLES & DESIGN. Ian Poole G3YWX	102	£14.95	PROPPR
RECEIVING ANTENNA HANDBOOK. Joe Carr (HighText)	189	£17.50	RXANHB
VHF UHF ANTENNAS. Ian Poole G3YWX (RSGB)	128	£13.99	VUANTS
WIRE ANTENNA CLASSICS (ARRL)	200	£10.50	WANTC

Beginners/Licence/Manuals

	Pages	Price	Code
ADVANCE! THE FULL LICENCE MANUAL. Alan Betts G0HIQ & Steve Hartley G0FUW (RSGB)	104	£11.99	ADCFLM
AMATEUR RADIO EXPLAINED. Ian Poole G3YWX (RSGB)	150	£9.90	AREXPL
AN INTRODUCTION TO AMATEUR RADIO. I.D. Poole (Babani)	150	£4.99	BP257
FOUNDATION LICENCE NOW! Alan Betts G0HIQ (RSGB)	32	£4.99	FLNOW
HF AMATEUR RADIO. Ian Poole G3YWX (RSGB)	120	£13.99	HFAR
INTERMEDIATE LICENCE - BUILDING ON THE FOUNDATION Steve Hartley G0FUW (RSGB)	76	£6.99	INTLIC
SECRET OF LEARNING MORSE CODE. Mark Francis (Spa)	84	£6.95	SOLMC

Design & Construction

	Pages	Price	Code
COIL DESIGN & CONSTRUCTION MANUAL (Babani)	106	£3.95	BP160
PRACTICAL PROJECTS. G. Brown M5ACN (RSGB)	208	£13.95	PRPROJ
PROJECTS FOR RADIO AMATEURS & SWL. R.A. Penfold (Babani)	92	£3.95	BP304
RADIO & ELECTRONICS COOKBOOK (RSGB-Newnes)	319	£16.99	RECOOK
RF COMPONENTS & CIRCUITS. Joe Carr (RSGB-Newnes)	398	£22.50	RFCOMP
TECHNICAL COMPENDIUM (RSGB)	288	£17.99	RSTECO
THE ART OF SOLDERING. R. Brewster (Babani)	84	£3.99	BP324
THE SUPERHET RADIO HANDBOOK. I.D. Poole (Babani)	104	£4.95	BP370
UNDERSTANDING BASIC ELECTRONICS (ARRL)	314	£15.50	UNDBEL

Shack Essentials

	Pages	Price	Code
AMATEUR RADIO MOBILE HB. P. Dodd. (RSGB)	114	£14.99	MOBHB
AMATEUR RADIO (VALUE) LOGBOOK (RSGB)	80	£4.95	TXLOG
ARRL HANDBOOK 2005 inc CD	1152	£32.00	RRHB25
ARRL OPERATING MANUAL 7th Edition (WSL)	420	£18.50	RROPM
CALLSEEKER GB AMATEUR CALLSIGN LISTING CD 2006		£14.95	CALLCD
DIGITAL MODES FOR ALL OCCASIONS. M. Greenman. (RSGB)	208	£16.95	DMFAO
GREAT CIRCLE MAP (PWP)	400 x 400mm	£1.50	GCMAP
LF TODAY - GUIDE TO SUCCESS 136kHz. M Dennison (RSGB)	128	£11.95	LFTOD
RADIO AMATEURS MAP OF THE WORLD	-	£8.00	ARMAPW
RADIO AMATEURS WORLD ATLAS (A4 size) (DARC)	20	£8.00	ARWAT
RSGB AMATEUR RADIO OPERATING MANUAL (RSGB)	224	£19.95	OPMAN
RSGB PREFIX GUIDE (RSGB)	34	£8.95	PFXGDE
RSGB YEARBOOK 2006 Edition (RSGB)	504	£18.95	RSYB26
RECEIVING (VALUE) STATION LOGBOOK (RSGB)	80	£4.95	RXLOG

THE QUICKEST AND MOST COMPREHENSIVE RADIO BOOK SERVICE IN THE UK!

UK Scanning Directory - 9th Edition

This book will not disappoint!

The UK Scanning Directory is Britain's largest and best selling VHF/UHF frequency directory and the undisputed leader in the field. No other book dares to list so many frequencies and in such great detail. More details on page 51 of this issue.

	Pages	Price	Code
Microwaves			
AN INTRODUCTION TO MICROWAVES. F.A. Wilson (Babani)	134	£3.95	BP312
INTERNATIONAL MICROWAVE HANDBOOK. A. Barter (RSGB-ARRL)	474	£24.95	IMWHB
QRP			
LOW POWER COMMUNICATIONS 2nd Edition (ARRL)	240	£13.95	LPCOM
LOW POWER SCRAPBOOK (RSGB)	320	£12.99	LPSCRA
QRP BASICS. George Dobbs G3RJV (RSGB)	204	£14.95	QRPBAS
VHF & Higher			
ALL ABOUT VHF AMATEUR RADIO. W. I. Orr W6SAI (ARRL)	163	£8.95	AAVHF
GUIDE TO VHF/UHF AMATEUR RADIO. Ian Poole G3YWX (RSGB)	180	£8.99	GTVUHF
VHF/UHF HANDBOOK. Dick Biddulph G8DPS (RSGB)	180	£22.00	VUHFHB
Crystal Sets			
CRYSTAL RECEIVING SETS & HOW TO MAKE THEM (Lindsay)	124	£7.95	XTHTM
CRYSTAL SET LOOPERS, A THREE TUBER & MORE Volume 8 Xtal Set Society Newsletter	128	£10.50	XTLOOP
CRYSTAL SET BONANZA Vol 9, 10 & 11 Xtal Set Society Newsletter	226	£15.00	XTBONZ
THE XTAL SET SOCIETY NEWSLETTER Volume 1 & 2 Combined. Phil Anderson WOXI	96	£14.00	XTNL12
THE XTAL SET SOCIETY NEWSLETTER Volume 4. Phil Anderson WOXI	88	£7.00	XTNL4
CRYSTAL SETS. The Xtal Set Society Newsletter, Volume 5. Phil Anderson WOXI	88	£7.00	XTNL5

	Pages	Price	Code
Historical			
100 RADIO HOOK UPS 2nd Edition (reprinted)	48	£3.35	100RHU
1934 OFFICIAL SHORT WAVE RADIO MANUAL. Edited by Hugo Gernsback (Lindsay Publications) (WSL)	260	£11.85	1934SW
AMATEUR RADIO - A BEGINNERS GUIDE (1940 REPRINT) (Lindsay Publications). Douglas Fortune W9UVC	156	£7.70	ARABG
COMMUNICATIONS RECEIVERS - THE VACUUM TUBE ERA. R.S. Moore	141	£17.95	COMRXV
MARCONI'S ATLANTIC LEAP (H/B). Gordon Bussey (Marconi)	96	£6.99	MALEAP
POP WENT THE PIRATES. Keith Skues	568	£14.99	POPPIR
SAGA OF MARCONI OSRAM VALVE (Paperback). B.Vyse & George Jessop	346	£25.00	SMOV
Valves			
HOW TO BUILD THE TWINPLEX REGENERATIVE RECEIVER. T.J. Lindsay	63	£6.75	HTBTRR
HOW TO BUILD YOUR FIRST VACUUM TUBE REGENERATIVE RECEIVER. T.J. Lindsay	127	£8.25	HTBFVA
HOW TO BUILD YOUR RADIO RECEIVER (A4) (Popular Radio Handbook No. 1)	100	£6.70	HTBYRR
HOW TO MAKE A NEUTRODYNE RECEIVER. Webb	63	£5.95	HTMNRX
SECRETS OF HOMEBUILT REGENERATIVE RECEIVERS C.F. Rockey	127	£8.75	SHBRRX
Electronics			
ELECTRONIC PROJECT BUILDING FOR BEGINNERS. R.A. Penfold (Babani)	110	£4.95	BP392
GETTING THE MOST FROM YOUR MULTIMETER. R.A. Penfold (Babani)	102	£4.99	BP239

Binders

Practical Wireless	£6.50	BINDPW
Short Wave Magazine	£6.50	BINDSW

to order, telephone: **0870 224 7830**

BY FAX - 0870 224 7850

the pwpublishing

RADIOBOOKSTORE

to order, telephone:

0870 224 7830

BY FAX -

0870 224 7850

THE QUICKEST AND MOST COMPREHENSIVE RADIO BOOK SERVICE IN THE UK!

how to order

By Post: Write to the Book Store, remembering to include your name, address, daytime telephone number and payment details (Sterling, cash not accepted), at: **Book Store, PW Publishing Ltd., Broadstone, Dorset BH18 8PW.**
By Telephone: Call the Book Store, Monday to Friday 9am to 4pm. Outside these hours your order will be recorded on an answerphone. **Call: 0870 224 7830**
By Fax: If you wish to FAX your order to us please mark it for the attention of the Book Store and send it to: **FAX: 0870 224 7850**
By E-mail: bookstore@pwpublishing.ltd.uk
Photocopies & Back Issues: To order a Back Issue please call the Order Line to check availability. We can photocopy articles from issues that are not available and we have a Review List going back years!
Back Issues (non-current): *SWM* @ £5.00 (£5.50), *PW* @ £4.75 (£5.25), *RA* @ £4.60 (£5.10).

Postal Charges: (UK) one item £1.75 / Two or more items £2.75.
EUR/RoW: One item £2.75 / two or more items add 75p for every item.
Review List: £2* (* includes P&P - add a further £1 for EUR/RoW)
Photocopies / Reprints: (Articles over 3 years old) £3.00, UK £4.00 overseas

E&OE

order form

Photocopies are acceptable

Please send me the following books:

.....Code ..... Price (£).....
.....Code ..... Price (£).....
.....Code ..... Price (£).....
.....Code ..... Price (£).....
.....Code ..... Price (£).....
.....Code ..... Price (£).....
.....Code ..... Price (£).....
.....Code ..... Price (£).....

Total cost of Books Ordered: .....Price (£).....

Postage Charges
Please remember to add postage to your order. (£).....

UK
£1.75 P&P for one item, £2.75 for two or more (UK)

Airmail
£2.75 P&P for one, £4.25 for two, 75p extra per item for three or more

Total cost of order including postage.....Price (£).....

Send this completed form to:

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

Payment Details. Please note: For security purposes, you must include your house number and postcode.

Name .....

Address.....

.....

.....

Postcode.....

Telephone (Daytime) .....

I enclose my Cheque/Postal Order for £.....

(Cheques MUST made payable to PW Publishing Ltd.)

MasterCard DELTA AMERICAN EXPRESS VISA

or please debit my Access/Visa/Amex

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry Date ..... Security No. ☐☐☐

or please debit my Maestro/Solo

Maestro

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐

Expiry Date ..... Security No. ☐☐☐

Start date ..... Issue No (if on card).....

Signature.....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at the time of going to press.
Please note: all payments must be made in Sterling, cash not accepted.

back issues
from PW Publishing Ltd

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

Short Wave Magazine and Radio Active have now combined to bring you the very best of both in radiouser - ON SALE NOW!

There are back issues of Short Wave Magazine and Radio Active available, plus current issues of RadioUser and not forgetting a huge selection of radio-related books, from our bookstore.

Practical Wireless Back issues are available too!

PW Publishing Ltd.

Quality, value for money hobby radio magazines.

Please call 0870 224 7830 for availability & prices.

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 publishe s 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.

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

Valves

VALVES AND ASSOCIATED COMPONENTS Available from stock as well as manuals and service information. Phone or SAE for your requirements. Chevet Book Supplies, 157 Dickson Road, Blackpool FY1 2EU.
Tel: (01253) 751858 or Fax: (01253) 302979.
E-mail: chevet@globalnet.co.uk

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.
Fax: 01484 655699.
E-mail: wilsonv@zoo.co.uk
Visa etc. Fast & personal service.

VALVES AND ELECTRONIC COMPONENTS Large stocks. Send for list to: Stuart Scott, 19 Portway, Steyning, W. Sussex BN44 3QF.
E-mail: triumph.76@btinternet.com

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.

1 Mayo Road, Croydon, Surrey CR0 2QP.

TEL: 0208-684 1166. FAX: 0208-684 3056.

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.

REPAIRS TO ALL AMATEUR EQUIPMENT call for details. G0PGY Electronics, 56 Bassenhally Road, Whittlesey, Cambs PE7 1RR. 01733 351538.

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.

Antennas

VARGARDA ANTENNAS ARE BACK! All antennas are pre-tuned. NO matching required. UK Distributor, Steve Burrows M5BXB. www.qsl.net/m5bxb
E-mail: steve.m5bxb@ntlworld.com
Tel: 01992 623335

Societies

ROYAL NAVAL AMATEUR RADIO SOCIETY seeks your support and membership. Qualify? Join today!
www.rnars.org.uk

For sale

Qtz x-tals 455.2kHz/£1.75 to 28.060MHz/£1.95. Mtchd 9MHz and 10MHz £12/8, 4MHz £2/8. 1.4MHz USB/LSB fltrs £14.00, 10.7MHz 10kHz fltrs £8.00, P&P £1.75 + VAT. IQ Electro 0208 391 0545. E-mail: vincent@jakomin.fsnet.co.uk

Wanted

WANTED: GRUNDIG YACHT BOY RADIO Must be model 210 from 1970–1974. Must be in absolutely mint condition. Tel: 0114 231 6321 between 9am & 10pm.

WANTED FOR CASH

COMMUNICATION RECEIVERS

Valve or solid state – working or not. Older or obsolete amateur radio equipment. Transceivers, station accessories, etc. Ex-Govt. wireless equipment. Radio books and magazines. We can collect anywhere in U.K. We also have a selection of the above items for sale in our shop. Open Tuesday, Thursday, Friday and Saturday 10am-6pm. Prior phone call before visiting appreciated.

Chevet Supplies, 157 Dickson Road, Blackpool FY1 2EU. Tel: 01253 751858. Fax: 01253 302979.

E-mail: chevet@globalnet.co.uk

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

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: 0870 224 7820, Fax: 0870 224 77850.

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: .....
.....
.....
.....
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.

YOUR ATTENTION PLEASE!

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 **0870 224 7820**.

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

20' MAST AND BASE PLATE, £35. Tel: 01606 597342 (Cheshire).

AR-88 R/X working order. Eddystone RX S640 1947 working. Mullard high speed valve tester ET-600 1954 with all manuals and lots of other items . Tape recorders, radios, etc. SAE details. Contact: D A Pine, 11 Lockeridge Road, Bere-Alston, Yeverton, Devon PL20 7AW.

COLLINS VFO UNIT with handbook and calibration, stability certificate. 2.4 to 3.45MHz. Control unit for CD-45 rotator. Microphones Yaesu YE-7A hand, YM-48 condenser and MH-1B8 dynamic. Tel: 01904 794680 (York).

DAIWA PS-304C 30A PSU, £55. SEM ATU, £50. Radio Works Y1-5K balun, £20. Lake, £20. TU-3 LF tuner, Realistic public address amp MPA-40, £20. All VGC plus postage. Tel: Mel 01274 817178 (West Yorkshire).

GOING QRT FOR SALE complete station TS-850S, Icom P/S, Drake MN-7, matching network. Kenwood MC-80 mic, low-pass filter, all handbooks. Prefer buyer inspects and collects. Tel; Joe 0141 779 2709 (Glasgow).

HEATHKIT SERVICE SCOPE model 05-1. Also valve meter model V-7AU. Full documentation for both. Test gear signal generator type CG/1. Offers please. Tel: M Bruce-Smith G8OBK 0161 439 2021 (Stockport).

ICOM IC-756 PRO Mk3 new from ML&S 24/8/05. Boxed with instructions, used twice. Ill health forces sale, £1600. Tel: Martin 2E0MJD QTHR 07973 793770 (Knebworth, Hertfordshire). E-mail: 2e0mjd@mjdesignprint.com

KENWOOD TS-570DGE brand new,. Donington 30 September 2005, unused (air tested only). Ten months manufacturers guarantee., £100 off cost. Delivery UK mainland included, £695. Tel: 01526 353696 (Lincolnshire).

***RADIO CONSTRUCTOR* VOLUME 20**, 1966-7, volume 21 1967-8. *Modern Radio and Television* volume 2 and volume 3. *The Manual of Radio* 1933. *The Book of Radio* 1934. *Outline of Radio* 1949. £offers or swop w.h.y? Tel: Bill 01432 279641 (Hereford).

REALISTIC DX-394 service manual in original condition. Will accept £20 or w.h.y?. Tel: 01604 767021 (Northampton).

RETIRING SALE Alinco DX-70, Trio TS-530SP, Trio TS-530SP tuner, Watson W-25 AM power supply, Trio AT-230 tuner, MFJ-989C tuner, Quad 3-band rotator and controller, coax cable, SWR meter, HP-500 and RS SP-200, Vibroplex key. Other items antenna analyzer and MFJ-259B. G10LCZ QRTH.

SCANNER 200 CHANNEL DESKTOP PRO-2045, CTSS, attenuator, hyperscan rotary tuner, auto store, search priority search, lockout, backlit display, aircraft, amateurs, shipping, 66 to 600MHz. 49,000 frequencies with manual, boxed. Only £95. Tel: Frank 01608 663745 (Warwickshire).

SLOW MOTION DRIVES 50mm dia. Nice silver dials marked 0 to 100, £6 each to include postage. Tel: George 01284 768084 (Suffolk).

SONY CRF-V21 VISUAL WORLD BAND RADIO
Complete with antenna paper plus instructions, VGC. All fair offers considered. View picture atwww.dxing.com/rx/crf330k.htm Tel: B Roberts 01442 246680 (Hemel Hempstead) E-mail: robertsbv@mac.com

SPEECH INTELLIGIBILTY ENHANCER MFJ-616, matching speakers, 4-band equaliser, L/R balance. 12V, 1.5A, very effective in heaing difficult signals. As new condition, half cost, £65. Tel: (G4DRF) 01526 353696 (Lincolnshire). E-mail: g4drf@lomstar.net

TELEQUIPMENT TRUE DOUBLE BEAM SCOPE
plus two Tektronics probes, £85. 500 gramme reels, Enthoven 60/40 resin cored solder, £9 plus £2 postage. Tel: George 01202 822841. 5 Hillside Road, Verwood, Dorset BH31 7HE.

UNIQUE SKETCH by *PW* cartoonist John Worthington for your QSL cards, £10 black and white, £20 colour. Tel: 01694 731661. G3COI, Bank Cottage, Kenly SY5 6NW

WIRELESS WORLD January 1934 to present day. In maroon/red binders until December 1986. Loose copies thereafter, £450. Buyer collects or possible to deliver at cost with in 50 miles of Farnham, Surrey. Tel: Brian Cox G4KWX 01252 712178 (Farnham). E-mail: g4kwx@hotmail.com

YAESU FT-2800M with a mobile antenna, £130. Tel: 0161 6889680 (Manchester).

WANTED

VARIOMETER PSU and head-set + mic for 19 set. Also, required TR-9 and 1196 TX/RXs any condition. Tel: Peter G8CKM 01939 290118. E-mail: peterparker2@lineone.net

BOOK ONE of *A Comprehensive Valve Guide* by B B Babani published by Bernards Radio Manuals No 100 or complet set of five. Also source of SL-1641 ICs at reasonable cost. Tel: Robin 01430 828346 (York).

EXCHANGE

TRIO TR-7010 SSB for swap TRX for SWR meter, 70cm and 2m type and low band M-290 for 6m. Swap please. Tel: Tom 01606 597342 (Cheshire).

bargain basement order form

Please insert this advertisement in the next available issue of *Practical Wireless*.

❑ **For Sale** ❑ **Wanted** ❑ **Exchange**

Please note: For security purposes, you must include your house number and postcode. Don't forget the corner flash!!

Name.....

Address .....

.....

..... **Post code**.....

Telephone Number.....

please write in block capitals

CARD NUMBER

Signature..... Security number

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. Feb '06

Subscribe

to Practical Wireless

- *Never miss an issue*
- *Have it delivered to your door*
- *Subscribers get their copies before they reach the shops*
- ***PW** is Britain's best selling Amateur Radio magazine*

On-line facilities are now available as well as the usual way to pay by cheque, postal order and credit card.

order a new subscription

Simply pay with a credit card on-line using our secure server.

check the status of a subscription

Existing subscribers can now log in to their own accounts and see how many issues they have left to run.

update your details

If you move or change your personal details, you can now update them on-line without having to write in to let us know.

renew an existing subscription

We've made renewing easier too. Everything you need to renew is now available on-line as well as by regular mail. (Subscribers still get a reminder in the post when it's time to renew).

To order a subscription please contact our new subscription agency:

Practical Wireless Subscriptions
PO Box 464
Berkhamsted
Hertfordshire HP4 2UR. UK

Credit Card Orders taken on:
(01442) 879097
between 9am - 5pm. Outside these hours your order will be recorded on an answering machine.

FAX Orders taken on
(01442) 872279

Internet Orders can be placed at:
www.webscribe.co.uk

or **via E-mail** to:
pw@webscribe.co.uk

Please note cheques should be made payable to PW PUBLISHING LTD and CASH is NOT accepted.

Subscription Rates

(Please tick appropriate box)

		PW	
1 YEAR	*UK*	*£33*	❑
	Europe Airmail	*£41*	❑
	ROW Airmail	*£50*	❑
3 YEARS	*UK*	*£89*	❑
	Europe Airmail	*£111*	❑
	ROW Aimail	*£143*	❑

I wish to order a one/three year subscription to Practical Wireless starting with the.....issue.*

Payment Details

I enclose my Cheque/Postal Order for £.....*
made payable to PW Publishing Ltd.
or please debit my Access/Visa/Amex* card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Security Number: ☐☐☐

MasterCard VISA AMERICAN EXPRESS *Expiry Date.....*

or please debit my Switch card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐

Security Number: ☐☐☐

SWITCH *Date.....Switch Issue Number (if on card) .....*

Switch Expiry Date.....

Signature .....

Name .....

Address .....

.....

.....

.....

.....

Please note: For security purposes, you must include your house number and postcode.

Postcode .....

Daytime Tel. No .....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at time of going to press.

Please note: All payments must be made in Sterling. Cash not accepted.
Cheques made payable to PW Publishing Ltd.

*(*Delete as necessary)* **Photocopies of this page are acceptable**

rob mannion's topical talk

This month Rob G3XFD discusses a topic - eBay - that raised a few hackles in 2005. You either love it or loathe it and many letters aired differing opinions! So, read on to discovered G3XFD's experiences on eBay!

During the last 18 months or so the on-line Internet auction service eBay has frequently been mentioned in *PW*. Some readers were very impressed by the services and some weren't. Despite the opposing opinions expressed in *PW*'s letters pages - I tried to present a balanced selection of opinions.

Eventually, after much hesitation, I jumped into the eBay pool myself and had a go! I'd been very reluctant to have a go and had been put off even further by a host of E-mails from eBay itself. This made me think that once I did dip my feet in, I'd be sucked into (what I thought) could be deep mud. However, I need not have worried as it turned out very much to my advantage!

Language Studies

My colleagues and friends know how much I'm interested in language study - particularly using the Linguaphone Institute's audio system and superb manuals. These courses are available as 45r.p.m. records (older types - more for the collector nowadays) cassette tapes and the modern courses on CDs and videocassettes. When I was fitter - car boot sales were a good source of language courses.

Even though I have few opportunities to speak foreign languages (it's frustrating to find your Dutch friends speaking perfect English why you struggle in their language!) in my work as a specialised journalist and writer, it's a great advantage to be able to read other languages.

It's long been my ambition to at least understand and read every European language - and that's where eBay has come into play. Some languages (I already had German, French, Italian, Dutch, Portuguese, Danish and Norwegian) are difficult to find. However, eBay came into play and I managed to get a Welsh Linguaphone course from a seller in Dublin! It arrived within a few days and the truly amusing story here is that I purchased an almost un-used Irish Gaelic course from an eBay seller in Bradford, Yorkshire!

Long Search Completed

During my schooldays I had the great fortune to be friends with children whose parents had escaped from Poland during the Second World War and they taught me the basics of the language. Since then I've found my limited Polish most useful during holidays exploring Poland's railways.

Always wanting to formalise my Polish language attempts via a Linguaphone course, I waited for a long time before one appeared on eBay. Bidding was fierce but it came my way and now I'm busy learning the language.

I've not had any problems and the people seeking further education all seem very civilised and I'm extremely pleased with my growing language library. I've made a number of friends and we can perhaps start a language club made up by Linguaphone enthusiasts.

My long and successful search for a Polish course didn't mean I stopped bidding! Indeed no - a very rare Finnish Linguaphone course appeared on eBay and I successfully bid for it! Now awaiting delivery - I'm looking forward (eventually) to start learning the language of the Suomi people. I'm told that Finnish and Hungarian (similar languages) are very difficult to learn. What a challenge! Does anyone from Magyar (Hungary) have a course to sell me? **PW**

YOUR SPECIALIST & LOCAL DEALERS

Index to Advertisers

TETRA
COMMUNICATIONS LTD
Linking PMR to Amateur

Tetra Communications are able to supply converted PMR radios for the 2mtr, 4mtr, 6mtr and the 70cms band, including repeater base stations .....

Models for 2m, 4m and 70cms

New microphones from £9.99 and
New speakers from £4.99

We hold over 7,000 used radios in stock at any one time.

We also hold 10,000 plus spares for all models, including PSU's and Controllers

All these models are available for 2 mtrs, 4 mtrs, and 70cms
Icom U200 & V200
Maxon PM150
Key KME & KM
Tait 2000
Philips FM1200
Motorola M110, GM340, GM350, GM360

Philips FM1200


Motorola GM350


Key KME


Maxon PM150


Tait 2000

Icom U200

Available for 6m only

The GE Rangr below is available to cover the whole of the 6 mtr band in FM.

Contact us

If you have any questions regarding the above then you are welcome to give me a ring on 01604 234333 or 07836 600700, Gary G6NYH
TETRA Communications Ltd,
Victoria Chambers,
1 Victoria Road, Northampton, NN1 5EB
Or by the written word to G6NYH@AOL.COM
www.tetra.tv

CASH / CHEQUE / DOLLARS / EURO's / VISA / MASTERCARD / AMEX

PERFECT PARTNERS

FC-40

Automatic Matching 100 Memory Antenna Tuner

Automatic Matching for FT-857/897

Compact Size 236 x 175 x 53mm

Rugged Waterproof Case

100W Power Handling

FT-857

Ultra Compact

Rugged, High Output

High Performance Receiver

High Resolution Display

Wide Frequency Coverage

Enhanced Performance (DSP)

Advanced Features - VHF/UHF

YAESU

Choice of the World's top DX'ers

www.yaesu.co.uk