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Yaesu FT-8800E

an all round mobile reviewed

plus

- **Aladdin's Cave** Bargain Hunting on e-bay
- **Build** A 5-Band Inverted L Antenna
- **Classic Project** Direct Conversion RX for 3.5MHz

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The Brand new 2004 W&S Radio Communications Equipment Guide

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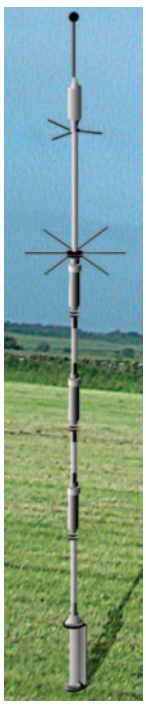
HUSTLER ZERO SPACE DX ANTENNAS



Run full legal power - 80m to 10m - with no masts or guys to worry about. 50 Ohm feed.

Small garden, planning problems or similar restrictions? Then the Hustler range is the answer. These HF verticals will take 1kW of power, work at ground level, and are self-supporting. A single earth rod will get you going. Add buried radials for even better results. Many hams have got on the HF bands with just this simple system. So why not join in the fun. These are rugged, well-built antennas that American hams have been using for years. Now they are available in the UK from our three stores.

4BTV
40-20-15-10m. 6.52m high. Full band coverage.
£159.95 C

5BTV
80-40-20-15-10m. 7.64m high. Full band coverage (100kHz on 80m).
£199.95 C

6BTV
80-40-30-20-15-10m. 7.3m high. Full band coverage (100KHz on 80m).
£219.95 C

GARMIN STREETPILOT III DELUXE

~~was £859 B~~
now £689.95 B

The Streetpilot III Deluxe is the latest in affordable portable satellite navigation for your vehicle. It acts like an over-the-road co-pilot creating a route to get you to your destination and providing clear, accurate, voice prompted turn-by-turn directions. The MapSource European City Navigator CD is supplied with one unlocked region. The Full colour LCD shows map details such as petrol stations, ATM's, restaurants and many other useful details.

**Built-in routable base map*
**Up to 50 routes stored*
**Navigation instructions and warnings given by voice*
**Display: 86x45mm, 305x160 pixels, high contast 16-colour LCD with backlighting*
**12 Parallel channel GPS receiver*
**Detachable BNC-type antenna*
**Power: 6xAA batts or 12V DC (external)*
**Battery life 2-20 hours depending on backlight setting*
**Size: 80x173x65mm*
**Weight: 635g*

To unlock the full potential of the streetpilot III City navigator CD-ROM a full unlock code & licence are available **£199.95** B

ICOM IC-756 PRO II SPECIAL OFFER £1899 C

Flagship of the Icom range of HF transceivers. HF & 50MHz, features large colour LCD with spectrum scope, auto ATU and 32-bit floating point DSP unit. **With *FREE* Watson HP-100 or HP-200 Headphones, state preference when ordering.**

3 Year Warranty
on orders before 14th Feb.

ICOM IC-7400 SPECIAL OFFER £1299 C

HF/VHF 100W transceiver. Features large LCD with spectrum scope, auto ATU and same DSP system as IC-756PRO II. **Comes with *FREE* SP-21 Speaker & SM-20 Desk mic.**

3 Year Warranty
on orders before 14th Feb.

ICOM IC-706 IIG DSP £789 C

HF/VHF/UHF mobile DSP transceiver. Its relative small size not only makes it a great mobile rig but also for fixed station use as well. HF general coverage Rx and VHF & UHF.

3 Year Warranty
on orders before 14th Feb.

ICOM IC-703 NEW £599 C

HF/50MHz Transceiver 0.1-10W Portable, Mobile, Base Station. (9-15.87V DC) Designed especially for the Foundation Licence/QRP. Built-in features auto ATU, DSP memory keyer. (5W when using 9.6V batts)

3 Year Warranty
on orders before 14th Feb.

ICOM IC-718 £499 C

HF 100W transceiver. Covers all HF bands plus wideband receive. C/w auto notch, dual VFO, SWR meter etc. Options include extnl ATU DSP & filters.

3 Year Warranty
on orders before 14th Feb.

ICOM IC-910X with 23cm £1249 C

Icom's all mode VHF/UHF transceiver with 23cm. Large clear LCD with lots of facilities. 100W on VHF and 75W on UHF, 10W on 23cm. IC-910H version £1149

3 Year Warranty
on orders before 14th Feb.

KENWOOD TS-2000 £1599 C

Top-of-the-range 100W Kenwood transceiver. HF/VHF/UHF or up to 23cm with the optional module. Built-in auto ATU, DSP and its unique TNC.

3 Year Warranty
on orders before 14th Feb.

KENWOOD TS-870S DSP £1399 C

HF DSP 100W base station. Excellent all round rig great for DX working with its ability to winkle out weak stations using its true IF DSP. No filters to buy.

3 Year Warranty
on orders before 14th Feb.

KENWOOD TS-570DGE £849 C

HF100W base station with built-in auto ATU. Very popular rig, excellent performance on SSB and CW. Two fitted antenna sockets - very handy.

3 Year Warranty
on orders before 14th Feb.

YAESU FT-1000 MKV £2349 C

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.

3 Year Warranty
on orders before 14th Feb.

YAESU FT-1000 FIELD £1749 C

100W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC / 13.8V DC - Building on the success of the FT-1000MkV, the Field has become a respected leader in its class.

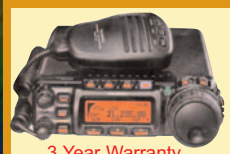
3 Year Warranty
on orders before 14th Feb.

YAESU FT-897 NEW £989 C

100W HF rig plus 2m and 70cms (50W/20W) 13.8V external supply / internal optional FP-30V AC power supply / self powered portable using optional Ni-MH pack at 20W output. Compatible with FC-30 auto ATU and ATAS 120/100 antennas. The "must have" radio for 2003.

3 Year Warranty
on orders before 14th Feb.

YAESU FT-857 NEW £799 C



HF/50/144/430MHz Mobile Transceiver HF/6m 100W, 2m 50W, 70cm 20W. (13.8V DC) Developed on the FT-897 and FT-817 transceivers. Built-in features 32 colour display, spectrum scope, AM airband receive, built-in memory keyer, detachable front panel, DSP unit supplied.

3 Year Warranty
on orders before 14th Feb.

YAESU FT-847 £1199 C

1.8 to 440MHz, this all-in-one transceiver offers unbeatable value. 100W on HF plus 6m, and 50W on 2m and 70cm. You get genuine RF clipping on SSB for up to 6dB gain and there are 4 separate antenna sockets.

3 Year Warranty
on orders before 14th Feb.

YAESU FT-817 £539 C

bhi DSP Module now available!

160m - 70cms. Up to 5W output all modes. ***Ours includes*** **battery and charger.** **Add £110 for DSP ready fitted.**

NEW DSP Module
There is NO new FT-817 DSP! The fact is that the UK manufacturers. **bhi**, (of whom we are their largest distributor), have produced a lovely 4-stage DSP module that can be fitted inside the FT-817. The module costs £89 plus a fitting charge of £25 for retro-fitting to existing models. This includes installing a mini switch and LED on top cover.

NEW FT-817 Clip on metal front support stand. In stock now £19.95 +£1 P&P

LINEAR AMP UK RANGER 811H £895 C

HF linear amp 160-10m including WARC bands. Drive 10-100W, output 800W (max) CW. Soft start on switch-on. Compatible with all modern 100W HF rigs. Silent running Papst fan.

AMERITRON AL-811 XCE £799 C

Ideal 600W HF Linear more than enough for the full UK limit. 160-10m including WARC bands. Uses 3x 811A low-cost valves. Matches all modern 100W solid state HF rigs. Silent running cooling fan.

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carriage charges: A=£2.75, B=£6, C=£10

ICOM IC-2725E £269 C

NEW LOWER PRICE!

The Icom IC-2725E dual band FM transceiver is proving very popular. Easy to install, the controller is separated from the main unit - great where space is limited.

ICOM IC-2100H £229 C

2m 55W FM mobile. Commercial grade, rugged construction. One piece die-cast aluminium chassis. Selectable green or amber display.

YAESU FT-8800E NEW £299 C

2m/70cm Mobile **144-146MHz,430-440MHz Tx *108-520MHz, 700-999MHz Rx * 512 memories per band * 6 Hyper memories* tuning steps: 5/10/12.5/15/20/25/50kHz * Audio: 2W output * Supply: 13.8V DC *Size: 140x41.5x168mm Weight:1kg*

YAESU FT-8900R NEW £349 C

Want the best of all worlds then the FT-8900R is just the ticket! A rig with four of the most popular mobile bands - 10m/6m/2m & 70cm. Detachable head. Airband Receive.

YAESU FT-2800M £159 C

The FT-2800M 2m FM 65W High Power mobile transceiver. Rugged construction, excellent receiver performance and direct keypad entry.

YAESU FT-1500M £159 B

Remarkably small and compact, yet built like a Battleship!
Should last for years.

NEW LOWER PRICE!

KENWOOD TMD-700E £449 C

Certainly the best dual band mobile transceiver with APRS. Does not need extra high cost boards to function. The only extra if required is a compatible GPS receiver.

KENWOOD TM-V7E £359 C

A lovely cool blue display, easy with 50/35W output. 50W/35W plus 280 memos and five storable operating profiles.

KENWOOD TM-G707E £289 C

If you are looking for simplicity and low cost, here's the answer. 2m & 70cms with detachable front panel and "Easy operation mode." GREAT!

IC-E208 NEW £319 B

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 *512 memories *FM narrow capability *104x2 DTCS, 50 CTCSS tone squelch *16 DTMF channels *HM-133 remote control mic *Packet ready for 9600/1200bps-mini DIN or 1200bps-mic socket *Supply 13.8V*

YAESU VX-7R £299 B

6m/2m/70cm handie. The case, keypad, speaker and connectors are all sealed against water damage. Wide Frequency coverage from 500kHz to 900MHz. Easy-to-read 132x64 dot matrix display + plus pictorial graphics.

Available in Silver or Black

YAESU VX-2E NEW £169 B

Dual Band Ultra Compact FM Handie. The VX-2E is unbelievably small yet provides 1.5W on 144MHz and 1W on 430MHz (3/2W with external supply). General coverage receiver 0.5-999MHz, which includes AM mediumwave & FM broadcast bands plus AM aircraft & UHF TV bands.

YAESU VX-110 £109 B

Combining the ruggedness of the VX-150 with the simplicity of 8-Key operation, the VX-110 is a fully featured 2m handheld ideal for the most demanding of applications. It has a die-cast csae, large speaker and illuminated keypad.

ICOM IC-E90 £269 B

The new E-90 offers triple band coverage of 6m, 2m and 70cms. Up to 5W output and rx coverage from 495kHz - 999MHz makes this a very attractive rig.

ICOM IC-T3H £129 B

The IC-T3H 2m handheld features tough quality but with slim looks. Its striking green polycarbonate case has been ergonomically designed. The rig is capable of providing a powerful 5.5W output with either Ni-Cad or Ni-MH battery packs. Supplied with charger and rechargeable battery.

KENWOOD TH-D7E £319 B

DATA COMMUNICATOR

One of the most successful handhelds over the past few years. It has a built-in TNC for Packet use. You can also use it for APRS operation in conjunction with an external GPS unit. Plus NMEA, 200 memos, and up to 5W output.

KENWOOD TH-F7E £259 B

WITH EXTRA WIDE RX COVERAGE

- 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.

KENWOOD TH-G71E £199 B

If you want an excellent 2m/70cm dual-bander then you can't go wrong with the TH-G71. Fully functional with three power levels, 200 memories, CTCSS tone encoder/decoder, illuminated keypad and backlit LED.

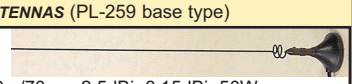
MOTOROLA T-5512 £69.99 B

Motorola Dual Pack PMR-446 Recreational 2-Way radio
·No Licence Fee or Airtime Charges
·8 Channels and 38 Codes
·3km Range
·Lightweight
·Water Resistant
·Handsfree use (VOX)
(with optional accessory)
·Supplied with 2 belt clips

MOBILE ANTENNAS

WATSON ANTENNAS (PL-259 base type)

Comes with coax & BNC



WSM-270. 2m/70cm, 2.5dBi, 6.15dBi, 50W max, micro-magnetic 29mm base, length 0.46m. **£19.95** A

W-2LE	2m quarter wave 2.1dBi 0.45m	**£9.95**	A
W-285S	2m 3.4dB 0.48m (fold over base)	**£14.95**	B
W-77LS	2m/70cm 0/2.5dB 0.42m	**£14.95**	B
W-770HB	2m/70cm 3/5.5dB 1.1m	**£24.95**	B
W-7900	2m/70cm 5.6/7.6dB	**£32.95**	B
W-627	6m/2m/70cm 2.15/4.8/7.2dB 1.6m	**£34.95**	B
WGM-270 NEW	2m/70cm On glass 3.7m coax 50W	**£29.95**	B

MOBILE BASES

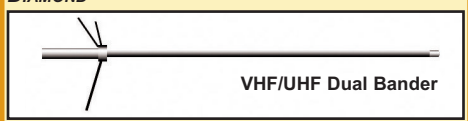
WATSON

WM-14B.
Large diameter 14cm magnetic mount SO-239, c/w 5m RG-58 & PL-259

W-3HM	Adjustable hatch mount	**£14.95**	A
WM-08B	8cm mag mount, 5m cable PL-259	**£9.95**	A
WM-14B	14cm hvy duty mag mount+cable	**£12.95**	A
WSM-88V	BNC mag mount plus 3m cable	**£14.95**	A
W-3CK	5m 5D-FB cable assembly+pigtail	**£18.95**	A
W-ECH	5m standard cable kit assembly	**£12.95**	A

BASE STATION ANTENNAS

DIAMOND

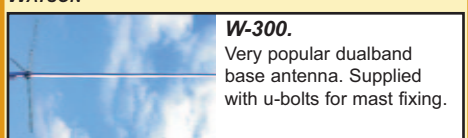


VHF/UHF Dual Bander

X-50	2m/70cm colinear 6/8dB 2.5m	**£54.95**	C
X-50N	2m/70cm colinear 6.5/9dB 3.1m	**£59.95**	C
V-2000	6m/2m/70cm 2.15/6.2/8.4dB 2.5m	**£89.95**	C

CHECK OUR WEBSITE FOR FULL DIAMOND RANGE

WATSON



W-300.
Very popular dualband base antenna. Supplied with u-bolts for mast fixing.

W-30	2m/70cm colinear 3/6dB 1.15m long	**£39.95**	C
W-50	2m/70cm colinear 4.5/7.2dB 1.8m long	**£49.95**	C
W-300	2m/70cm colinear 6.5/9dB 3.1m long	**£64.95**	C
W-2000	6m/2m/70cm 2.15/6.2/8.4dBi 2.5m	**£69.95**	C

WATSON W-25SM PSU £79.95 B

Very popular budget switch mode power supply. **Output voltage 13.8V DC *Output current of 22A (25A peak) *Front panel output terminals *Over current & voltage protection *Quiet operation*

WATSON W-25AM PSU £89.95 C

DC power supply for the shack & esp. for use with 100W transceivers. Separate voltage and current meters. **Output voltage 0-15V DC *Output current of 25A (30A peak). *3 sets of output terminals *10A cigar socket. *Over current protection*

CHECK OUR WEBSITE WWW.WSPLC.COM FOR MORE DETAILS OF THESE PRODUCTS

WATERS & STANTON

1973 WATERS & STANTON PLC 30th ANNIVERSARY 2003

PRICE MATCH

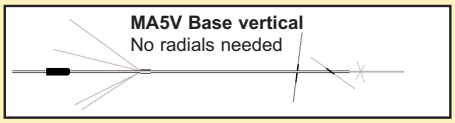
VERTICAL ANTENNAS

Hustler Mobiles

Get top performance when on the move. Purchase the **MO-3 base** (137cm) for **£26.95** or the **MO-4 base** (68cm) for **£22.95**. Then add the resonator of your choice. **RM-10, RM-12, RM-15**, all **£19.95** ea. **RM-17, RM-20 £24.95** ea. **RM-40 £26.95, RM-80 £29.95**

CUSHCRAFT BASE ANTENNAS

MA6V NEW	20-17-15-12-10-6m 250W PEP	**£289.95**	C
MA5V	20-17-14-12-10m 250W PEP	**£229.95**	C



R8	40-30-20-17-15-12-10-6m 1.5kW	**£529.95**	C
R6000	20-17-15-12-10-6m 1.5kW PEP	**£349.95**	C

BUTTERNUT BASE ANTENNAS

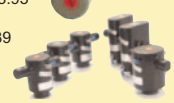
HF9V-X	80-6m 7.9m 1kW PEP	**£365.00**	C
HF6V-X	80-40-30-20-15-10m 7.9m 2kW	**£315.00**	C
HF2V	80-40m 9.75m (160m opt) 1kW	**£230.00**	C

HY-GAIN BASE ANTENNAS

AV-640	40-6m 1.5kW, 300W 6m (PEP)	**£399.95**	C
AV-620	20-6m 1.5kW, 500W 6m (PEP)	**£299.95**	C
AV-14AVQ	40-20-15-10m 1.5kW PEP	**£179.95**	C
AV-12AVQ	20-15-10m 1.5kW PEP	**£139.95**	C
DX-88	80-10m 1.5kW, 250W 30m	**£395.95**	C

High quality German traps. (Pairs)
200W 20m £44.95 40m £49.95 80m £53.95
1kW 20m £59.95 40m £64.95 80m £73.95

High quality German Baluns SO-239
200W 1:1, 4:1 or 6:1 £25.95 ea.
1kw 1:1 £34.95 4:1 or 6:1 £41.95 ea

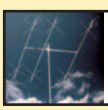


HORIZONTAL BEAMS & DIPOLES

CUSHCRAFT

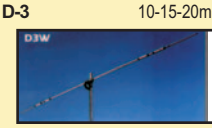
Premier HF beam used around the world by serious DX'ers.

X-7	20/15/10m 7 el. Yagi 2kW	**£699.95**	D



Not got the space for a full sized HF beam antenna, then the mini beam MA-5B should be considered.

MA-5B	10-12-15-17-20m 4 el. Yagi 2kW	**£389.95**	C
A4-S	10-15 & 20m 4 el. Yagi 2kW	**£599.95**	D
A3-WS	12 & 17m 3 el. Yagi 2kW	**£399.95**	D
D-3	10-15-20m dipole element 2kW	**£259.95**	C



Don't want a wire antenna but can't fit a Yagi, then consider a rotatable dipole.

D-3W	12-17-30m dipole element 2kW	**£259.95**	C
D-4	10-40m dipole element 2kW	**£349.95**	C
D-40	40m dipole element 2kW	**£319.95**	C
TEN-3	10m 3 el. Yagi 2kW	**£229.95**	C
ASL-2010	13.5-32MHz 8 el. log periodic	**£799.95**	C

RADIO WORKS

A choice of quality wire antennas available to fit almost any circumstances.

CW-160	160-10m 76.8m long	**£139.95**	C
CWS-160	160-10m 40.5m long	**£134.95**	C
CW-80	80-10m 40.5m long	**£99.95**	C
CWS-80	80-10m 20.1m long	**£119.95**	C
CW-40	40-10m 20.1m long	**£94.95**	C
CW-20	20-10m 10.36m long	**£84.95**	C
CW-620	20-6m 9.7m (32ft) long	**£94.95**	C
G5RV PLUS	80-10m with balun 31m (102ft) long	**£64.95**	B

MANSON EP-925 PSU £99.95 C

A general purpose 3-15V DC, 25A (30A peak) power supply able to provide the needs of the modern 100W HF transceiver.
**Dual analogue meters *Over current protection *Large power terminals for rigs *Quick snap connectors for ancillaries*

WATSON FC-130 Frequency Counter £59.95 B

SPECIAL PRICE
The FC-130 is an ideal frequency counter for the shack, mobile or portable use. Supplied complete with Ni-Cads, charger and telescopic whip.

MFJ-461 Morse Code Reader £84.95 B

**Stand alone unit*
**Built-in mic*
**32char high contrast LCD*
**Automatic speed tracking*
**Serial port*
**Built-in speaker*
**9V PP3 (not included)*
Simple PC program available (user supplies disk)

bhi NES10-2 & NES-5 DSP Speakers

NES10-2
£99.95 B

**Speaker with built-in DSP noise filters *Dip switches for 8 filter settings (NES10-2) *DSP settings preset, no user adjustment (NES-5) *Plugs directly into 3.5mm speaker socket *Handles up to 5 Watts input *Max 2.5 Watts output *Requires 12V at 0.4 Amps max*

NES-5
£79.95 B

bhi NEIM1031 £129.95 B

NOISE ELIMINATING IN-LINE MODULE
** Noise attn - 9-30dB (typical) * Noise Attn levels 8 * Audio output power 2.5W RMS max (8 Ohms) * Audio connections: Line level in/out (RCA Phono), Audio in/out 3.5mm mono jack * Line i/p impedance 10K * Line o/p impedance 100 Ohms * Line in sensitivity 300mV -2V RMS * Headphone socket 3.5mm mono jack * Power 12-24V DC 500mA*

bhi 1042 SWITCH BOX £29.95 B

Connect more than one piece of equipment to your bhi noise eliminating speaker with the 1042 Switch Box. Allows 6 pieces of equipment to be connected, 3 inputs loaded at 8 Ohms and 3 unloaded inputs (for low level signals). Two audio leads provided.

SGC ADSP² SPEAKER NEW £99.95 B

The ADSP² Speaker has three modes of operation - no noise reduction - original ADSP noise reduction - or the new ADSP² noise reduction mode which provides up to 26dB of noise reduction within the passband.

SGC ADSP² MODULES NEW £89.95 B

ADSP² is supplied in two versions. One for low level audio power ADSP-2 Board Low (70-11) and the ADSP-2 Board High (70-12) for high level audio power installation. Both versions contain full instructions and identify the relevant wire connections. They can be installed by the user or by a dealer. All SG-2020 upgrades will be done at the factory.

HEIL QUIET PHONES NEW £99.95 B

Active Noise Cancelling Headphones that use two small mics inside the headphones that listen to outside ambient noise and the in-line differential amplifier cancel it out! Everything below 400Hz drops away as you switch NR unit on. Amazing reduction! **Soft leatherette cushions *Fitted 3.5mm / 1/4" jacks. *In-line battery holder *Requires 1xAA battery (lasts 30hrs) .*

WEST MOUNTAIN RIGBLASTERS

RIGblaster pro	Data interface 8-pin/mod, Cd & cables	**£229.95**	B

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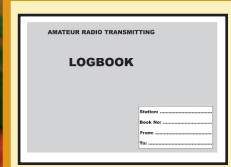

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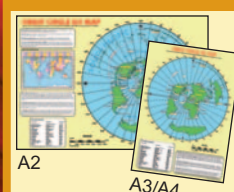

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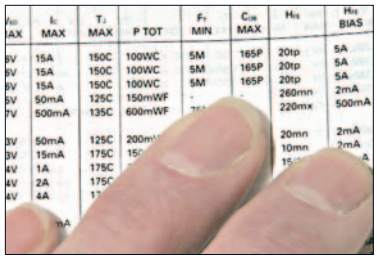
Cover subject

The radios just keep on coming! This month we have the Yaesu FT-8800E on test and from what **Neill Taylor G4HLX** it seems to fare very well as good all round dual-band mobile transceiver.

Design: Steve Hunt
Photograph: Courtesy of Yaesu UK Ltd.

February features



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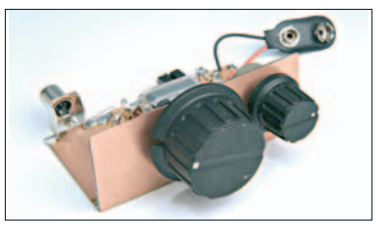

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22 Tex's Tips & Topics
Tex Swann G1TEX/M3NGS has something a little different this time in his 'bumper' column - he's looking at the susbstitution of transistors and f.e.t.s.

24 Radio Basics
In the second of his articles on headphones **Rob Mannion G3XFD** encourages you to make your own. Rob describes how you can modify modern headphones by winding your own diaphragm type inserts.

26 Yaesu FT-8800E Mobile Transceiver Review
Neil Taylor G4HLX found the latest mobile dual-band mobile transceiver to be a good all rounder and wasn't disappointed with its performance either!

30 *The Vectis Run*
Rupert Templeman continues the tale of travelling wireless technician-salesman, Alan Edwards. Set in 1939, in this instalment, without realising, Alan is slowly being drawn into a world of murder, technical espionage and political intrigue.

32 An Inverted L for Small Gardens
Looking for an antenna that will operate on five bands and fit in a small space? Then why not try **Len Paget GM0ONX**'s idea for an inverted L.

34 A Radio Amateur's Aladdin's Cave
Quentin Cruse GW3BV says if you are looking for Amateur Radio gear try the ebay Internet site.

36 A Direct Conversion Receiver
First published in the August 1971 *PW*, the Direct Conversion Receiver for 80 metres s.s.b./c.w. project by **R. F. Graham** will be welcomed by valve enthusiasts and intrigue newer readers!

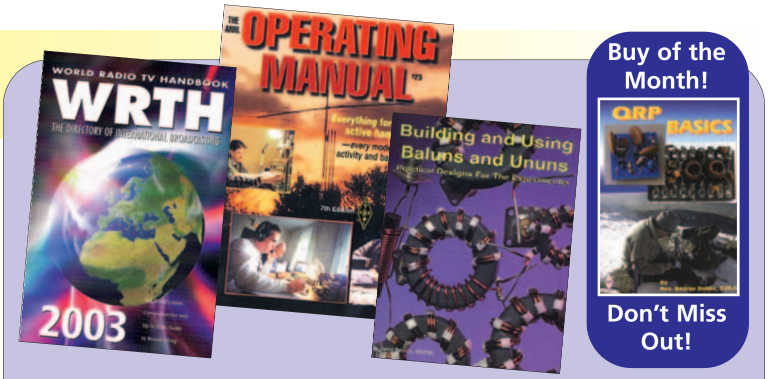
43 Antenna Tuning Units - Inside & Out!
Are you new to antenna projects? - Try this for size! **Graham Ridgeway M5AAV** takes a look at antenna tuning units - inside and out!

46 Valve & Vintage
In his first column of 2004 **Ben Nock G4BXD** looks at a different version of the historic HRO receiver.

48 Antenna Workshop
As he takes his turn in the 'Antenna Workshop' **Roger Cooke G3LDI** describes some simple antenna designs for the low h.f. bands.

50 Carrying on the Practical Way
George Dobbs G3RJV announces that he has 'another regenerative receiver' for you to enjoy.

February regulars



Page 70. The biggest and best selection of radio related books anywhere!

9 Rob Mannion's Keylines
Topical chat and comments from our Editor **Rob G3XFD**. This month he reports on misrepresentation of Amateur Radio and has some sad news to pass on regarding *PW* author Tom Walters.

10 Amateur Radio Waves
You have your say! There's a varied and interesting selection of letters this month as the postbag's bursting at the seams with readers' letters. Keep those letters coming in and making 'waves' with your comments, ideas and opinions.

12 Amateur Radio Rallies
A round-up of radio rallies taking place in the coming months.

12 Amateur Radio News & Clubs
Keep up-to-date with the latest news, views and product information from the world of Amateur Radio with our News pages. This month there's a variety of stories for you to enjoy. Also, find out what your local club is doing in our club column.

54 VHF DXer
David Butler G4ASR takes an in-depth look at Auroral openings on the v.h.f. and u.h.f. bands.

56 HF Highlights
There's lots of h.f. activity for **Carl Mason G0VSW** to report on this month.

58 Data Burst
Tex Swann G1TEX/M3NGS 'bursts' you with data all about how to find Amateur Radio related software on the Internet. Happy 'Surfing'!

60 In Vision
In his bi-monthly 'screening' of the ATV Scene **Graham Hankins G8EMX** reports on all the latest news.

61 Tune In
The broadcast bands have been very busy as the late (see Keylines) **Tom Walters'** column shows this month.

68 Bargain Basement
The bargains just keep on coming! Looking for a specific piece of kit? Check out our readers' ads, you never know what you may find!

70 Book Store
If you're looking for something to compliment your hobby, check out the biggest and best selection of radio related books anywhere in our bright and comprehensive Book Store.

76 Subscribe Here
Subscribe to *PW* and/or our stable-mates in one easy step. All the details are here on our easy-to-use order form.

77 Topical Talk
Rob G3XFD's 'epic weekend journey' to the Mayo Radio Experimenter's Network Rally is the topic under discussion this month.

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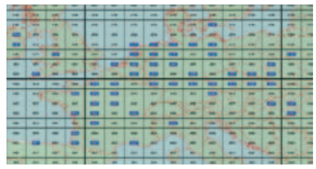
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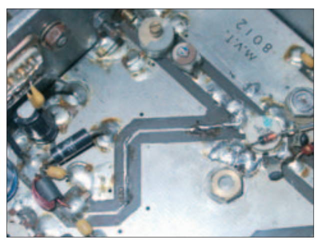
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ANOTHER PACKED ISSUE

rob mannion's keylines

Welcome to 'Keylines'! Each month Rob introduces topics of interest and comments on current news.

The recent State Visit to the United Kingdom by the American President Mr Bush wouldn't perhaps on the surface have any bearing on Amateur Radio. However, along with the amazing security precautions taken before the arrival of the President - a rather disturbing series of telephone calls arrived in the PW Publishing Ltd. offices.

Kevin Nice G7TZC, the Editor of *Short Wave Magazine* took the first call from a news reporter/researcher at BBC Television News Centre. He was urgently seeking to contact someone able to listen on the various p.m.r. channels involved with the State Visit.

Not satisfied with the fact that Kevin was unable to help him contact someone who would be monitoring the (probably highly secure!) p.m.r. channels, the reporter called again and ended up talking to me. The reporter's reaction was almost tangible. I could imagine his eyebrows lifting at the increasing possibility of finding someone (stupid enough) prepared to publicise the fact that they were prepared to break the law.

I carefully explained that Amateur Radio is a hobby, which requires a Licence to transmit and because of that we're all known to the Authorities and we value our privileges. I also emphasised that I wasn't at all happy that the media (particularly television news) seemed totally ignorant of Amateur Radio. This is despite the fact that many Radio Amateurs are involved in broadcasting - especially the BBC - in departments ranging from Engineering to Continuity Announcers and reporters.

Security Leak?

The reporter/researcher did not elaborate as to whether anyone contacted would feature in a possible 'Security Leak' story. Neither was I informed of any other angle for the story...but I decided that it was highly probable that the convenient - but misleading - 'Ham Radio' label would be attached to whatever appeared on the TV news.

Obviously desperate for something to work on the reporter/researcher asked if I could provide any leads whatsoever. I then - half humorously - suggested he contact the Radiocommunications Agency (now Ofcom) to see if it was possible for anyone who had been involved in a recent prosecution could help. Not taking the point - he then asked if there was anyone in London who might help.

Trying to end the conversation as quickly as possible I suggested that the reporter might consider 'hailing' an illegal 'plying for hire' mini-cab. I quickly explained that I'd discovered (from licensed Hackney Carriage - Black Cab drivers) that the illegally operating minicab drivers often use scanners for nefarious purposes...including avoiding the authorities and poaching passengers!

The BBC reporter then asked how I knew about the minicabs. I then had to explain that I'd once innocently asked a Black Cab driver for directions during one of my rare car journeys to London.

Looking at the v.h.f. antennas on my car roof, and following a stream of four lettered invective the driver emphasised that I should "Get the knowledge*. All you xxxxxxx (translation unavailable) minicab drivers are the same"!

However, once he knew I was a Radio Amateur the Cabby's attitude immediately changed as he'd met colleagues in the hobby. He then very kindly led me to the street required, apologised and suggested that whenever in London I display a tongue-in-cheek sign announcing ***"Amateur Radio's Fun - But I'm Not For Hire"***!

One problem solved perhaps...but how do we convince the media - particularly TV news - that we're much more than a tabloid type headline? And while promising to do my best to keep media professionals accurately informed on all aspects of Amateur Radio, I'd also like to hear of your suggestions.

**The 'Knowledge' is the foundation of Hackney Carriage driver's training for their licence. Without the comprehensive route planning knowledge, overseen and examined by the authorities, a taxi driver in the Metropolitan Police jurisdiction can't ply for hire.*

Tom Walters

Just as this issue of *PW* was closing for press we received the very sad news of the death of **Tom Walters**, our Tune In broadcast bands column author. Tom had been ill for some time but despite this, had not forgotten his readers and kept writing.

A full obituary will appear soon. In the meantime everyone at PW Publishing Ltd. sends their condolences to his family.

Rob G3XFD

practical wireless services

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

Subscriptions

Subscriptions are available at £32 per annum to UK addresses, £40 in Europe and £49 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both Practical Wireless and Short Wave Magazine are available at £61 (UK) £75 (Europe) and £92 (airmail).

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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.

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A complete review listing for *PW*/*SWM* is also available from the Editorial Offices for £2 inc. P&P.

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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

Make your own 'waves' by writing into *PW* with your comments, ideas, opinions and general 'feedback'.

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

Heys & His Hula!

● **Dear Sir**

The Slinky-Hula Antenna article by **John Heys G3BDQ** in the November Antenna Workshop in *PW* has started a veritable production-line here in Swindon. My father **Mike M3MTG** built one for **John G6IGN** who could not have an outside antenna. The antenna worked so well that he has been asked to build more, for **Jon M3DBD** and myself. After all this he has finally decided to build one for himself.

Thanks to John Heys and yourselves for such a useful and fun to build project! I have enclosed a photo of my father with a few of his slinky-hulas, for your amusement.

Andy Gittings M1EFY
Swindon
Wiltshire

Editor: Thanks Andy - John G3BDQ was intrigued and delighted with the feedback from so many readers who have enjoyed making 'Slinky Hulas'. Happy Hula makers also include readers in the Telemark region of Norway, led by Norleif LA9FG. They've had great fun too - and that's what the hobby is all about isn't it?

My M3 Woes

● **Dear Sir**

Never a week goes by without my being told as to what I can do as a M3 and what I can't. Being an Amateur has always been a dream and I wonder of the 6000 M3s, just how many wish to advance further. Don't get me wrong, privileges have to be earned, but it seems very petty that one has to earn them in such a roundabout way.

I read that M3s cannot join in any organised events, but we can make the tea and tidy up. In my case, it means I cannot report the positions of bicycle riders that might cross right in front of my living room window back to the main listening post either on 144 or 430MHz.

When I was active on CB radio, such events did take place, I even joined REACT - we helped the police find many a lost child and we were never a nuisance or hindrance. The CB hobby has now gone 'down the tubes'.

Please don't think that I'm writing as a disgruntled CBer, but comparisons have to be made as to the past and present. Another aspect of the hobby I can't take part in is Amateur Television on 23cm. I just wonder how many M3s have made enquiries regarding the "You can use 70cm, but not 23cm" ruling. What's the difference? Well, for a start there is no ATV activity on 432MHz! If I'm missing something, I'll be pleased when someone informs me. There is an ATV channel listed and kits are advertised but no one is interested, they've all gone to 1296MHz.

It was also interesting to read recently that an M3 took his h.f. rig on holiday to Ireland. Oh dear, not allowed! But a CB rig would have been as part of the CEPT agreement.

Perhaps if a full list of what M3s cannot do was published in *PW*, then the big dream for M3s at the very start would have been more truthful and realistic. Answers to the questions such as: No to my operating as an M3 with surplus p.m.r. rigs. So for a cheap 'big toe dip' into 430MHz at £35 isn't possible.

Yes, let's have it publicised - in large print - all the items an M3 cannot operate or own and a full explanation as to why not. Let's also have the explanations displayed on club noticeboards as part of the introduction to becoming an M3. Then see how many come forward to become an M3.

Just who are the brains behind all of this frequency management and restrictions? Please don't think I want something without trying, but I do think there's just a bit of logic required or at least a logical explanation for the decisions that have been taken.

Mike Evans M3EMB
Bungay
Suffolk

Thank You Everyone!

● **Dear Sir**

Just a short note to thank the Editor for his very thoughtful telephone call following an advertisement I placed in the 'Wanted' section of Bargain Basement. I found it quite extraordinary that he took the time, with the busy *PW* schedule in mind. Thank you, it is highly appreciated.

Following my advertisement for a Racal h.f. receiver for my disabled s.w.l. son, I received several telephone calls with units for sale at the price he could afford. We were however, overwhelmed by a call from another (like myself) local retired medical professional, **Dr Peter Nichols G7VEG/M0RCS** offering a Racal 1217, in full working order, as a donation to my son! We are very humbled by all these responses and especially Dr Nichols' most kind gesture. My faith in human nature and the spirit of Amateur Radio has never been higher. Thank you all.

Etienne Swanepoel
Bude
Cornwall

Editor's comment: Our pleasure to help Etienne! My telephone call was to ensure that the Swanepoel family knew of the work of the Radio Amateur Invalid and Blind Club's work. The latest update on Etienne's son (who had only fairly recently become seriously disabled) is that he's thoroughly enjoying his radio thanks to the generosity of Peter M0RCS.

Archives On CD?

● **Dear Sir**

Your teasing heading, 'Archives On CD'? (Topical Talk *PW* December 2003) raises the mouth-watering prospect of access to the entire collection of *Practical Wireless* to those of us who are too short in the tooth to have previously seen, especially the earlier issues.

While some Amateurs may very well throw out the previous issue the minute the next one drops through the letterbox, or appears on the shelves, I suspect that I'm one of the many who do not. No as one glances at the heavily burdened shelves in my shack will confirm, I don't throw mine out! Nor do I throw out the other magazines, books or QSL cards that I collect.

There's an irony in putting up more wooden shelves to hoard more paper. But thanks to the development and popularity of the CD-ROM, the storage procedure has been

streamlined considerably, much to the relief of the rain forests!

Any issue of any magazine/newspaper serves as a record of lifestyle and culture prevalent at that time, just as much as it serves its taskmasters of publicity and profitability. The latter are of course much more to the fore during the commercial lifespan of the particular issue.

However, as time moves on, these publications occupy a very significant role by providing an insight to the thinking and practices of their era. The possibility that the entire collection (or selected years) of *PW* might be available on CD ROM is to be welcomed enthusiastically.

Early weekly issues complete with all construction projects, commentary and of course advertisements (I presume there was little to review at the time!) would make very interesting reading and I for one would be delighted to have that opportunity. The RSGB offered archived CD-ROMs of *RadCom* a number of years ago now and these proved extremely interesting.

It should also be noted that RSGB experiment was conducted at a time when computers while popular, were not as commonplace as they are now. So come on then *PW*, let's have them!

While on the subject of the December issue of your magazine, I have to say that the closure of **AKD** under the heading 'Another British Loss' (p13) is most regrettable and is indeed a loss that extends beyond Britain. It is a loss for Amateur Radio everywhere. This coupled with the announced closure of G3TUX is further evidence of the commercial pressure on traders in what are extremely specialised markets.

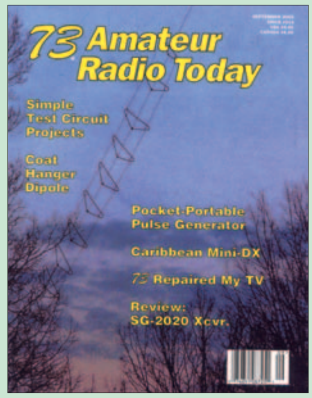
The hobby owes a great deal to manufacturers like AKD and traders like **G3TUX** and many others like them, who have offered an option to the large-scale heavy hitters. Perhaps long-established manufacturers/suppliers will benefit from the publicity their products and services will gain, second time round, on the archive CDs!

Finally, a Very Prosperous New Year to all at *PW* (as you remarkably enter your 72nd year) and to your many readers and to all the traders who serve the hobby so well.

John Corless EI7IQ
County Mayo
Republic of Ireland

Editor's comment: Nice to hear from you John! You can be assured that every single comment on the CD Archive topic is passed to our Publishers! Incidentally, on the loss of AKD, I'm sure readers will be pleased to have read in the news (see full news story, page 12 January 2004) that Garex Electronics, has acquired the manufacturing and design rights of the AKD range of filters. Additionally, I'm delighted to confirm that although Chris G3TUX is no longer active commercially - he's sponsoring the *PW* 144MHz QRP Contest Certificates. You can't keep a good man down!

Farewell *73* Magazine



● **Dear Sir**
As you kindly pointed out in the December issue of *PW* (news story '*73 Magazine* Retires'), we'll all miss it and with it, our monthly 'fix', well, at least those who subscribed to *73 Amateur Radio Today* will!

Can I just say that I'm a long-time personal friend and have also been a conscientious subscriber to **Wayne Green's** magazine for more years than I care to remember. Because of his sometimes controversial opinions (usually 99% right) which echoed the boundless enthusiasm for Amateur Radio in his monthly editorials, he tended rightly or wrongly, to be shunned by those within Amateur Radio who should know better. Be that as it may, let's not forget that Amateur Radio owes Wayne Green and his now defunct magazine, a huge debt of gratitude for many of the things we take for granted in Amateur Radio today - repeaters just being one.

Right from the off *73 Magazine* was, by my definition, a thinking Amateur's publication. It wasn't just another homogenised Amateur Radio magazine stuffed full with glitzy colour photo-spreads of the newest imports from the Far East, etc., all with one single object in mind, your cash, whether you really needed their respective products or not!

No, on the contrary, *73* bucked what's a continuing trend. In its day, Wayne Green employed the services of what was then the best minds in Amateur Radio to write for the magazine. One of which, was Jim Fisk, who went on to publish *Ham Radio*. And for most of the contributors *73* was the first conduit for their writing talents.

So, even though there will be no more *73*, I urge all your readers to seek them out and keep an open mind and be amazed. Unfortunately, a shinning light has been prematurely extinguished.

Ray Howes G4OWY
Weymouth
Dorset

Archives On CD

● **Dear Sir**
In the December's issue in Topical Talk you requested a reaction about the concept of CD archives of *Practical Wireless*. In answer I would say that such a project has my approval, although I have to admit that the thought of purchasing a full set could be a tad daunting.

The idea of volumes - of say five years - with the ability to scan the indices of the other volumes suggests itself as a possibility. However, I do accept that such a project will take a great deal of time and effort.

One of the difficulties I am experiencing at the moment, in referring to past numbers of both *PW* and (dare I say it!) *RadCom* is that over the last few years the available suppliers of kits, PCBs and other specialised components has declined and the 'Household Names' have for various reasons ceased operation (e.g. Cirkit, Howes & JAB?).

If along with your many other jobs you could arrange for a basic database of suppliers other than those who regularly advertise, I am sure it would be much appreciated. Thank you for a great monthly read and your continued efforts with Radio Basics.

Graham Gabbatiss G7UNY
Stockport
Cheshire

Editor's comments: Thank you for your comments and suggestions John! I'm, pleased that you also mentioned the RSGB's *RadCom* CD archives, especially as this respected journal's pioneering efforts have been mentioned to me by several other readers, especially at the recent Knock Rally in County Mayo (see Keylines).

Plumber's Delight Antenna

● **Dear Sir**
Having built the Plumbers Delight antenna from the Antennas 2003 supplement

page 26, Figs. 3 and 4, and failed to get better than 2.5 s.w.r. I discussed my problem with my club members.

The main outcome was advice to swap over the coaxial lead and braid so that the core lead went to the radiating leg and the braid went to the impedance leg. This was followed the next club meeting with a copy from **www.BUXcommco.com** with details of a similar antenna. I applied the lead switch and the 5in decoupling loops to the Fig. 4 system. After trimming, I managed to achieve a 1.2:1 s.w.r. Perhaps this may be of use to other constructors - I hope so!

Ken Sapsed M0KLS
Havant
Hampshire

Premier Memories

● **Dear Sir**

I read with great interest the article by **Jim Leigh** (Back to the Bench at Premier Radio, October 2003 *PW*) recalling his time at **Premier Radio**. I well remember buying from Premier Radio's shop in the Edgware Road a kit of parts to build a t.r.f. radio for my parents, this was much admired and several friends and relatives requested me to build one for them, altogether I must have built about a dozen!

After national service, I worked for **Webbs Radio** of Soho Square, at their Dean Street service department. I recall repairing radios made by Eddystone, Hallicrafters and Zenith, plus many others. However, travelling into London from my home in Middlesex, even in those days, was difficult, so I left to join **Kings Teleservice Company**.

Having spent most of my working life as a Radio and Television engineer - I say most because after being made redundant I became a vending machine engineer. Whilst not a Radio Amateur, I'm a keen s.w.l. and remain interested in all developments in radio and electronics.

Maurice Patten
Lincoln
Lincolnshire

Editor's comments: There's a great deal of interest in the period Maurice, and your own story must surely be worth sharing? I'm sure that our readers will enjoy your own memories, and to that end please expect a formal letter from *PW* inviting you to get busy remembering!

Twin Feeders

● **Dear Sir**

I read with interest the letter (Twin Feeders - What's The Point) from **Andy Foad G0FTD** in the December issue of *PW*. I look forward to his forthcoming article, which should be very interesting indeed.

Many Amateurs have neither the space nor the finances for an antenna farm or even a modest tower with an h.f. beam. In fact most Amateurs have to make do with a simple antennas (similar to those I use). Surely a doublet with an overall length between (say) 102ft and 132ft and fed with some form of balanced feed line will radiate quite efficiently on all bands from 1.8 to 28MHz?

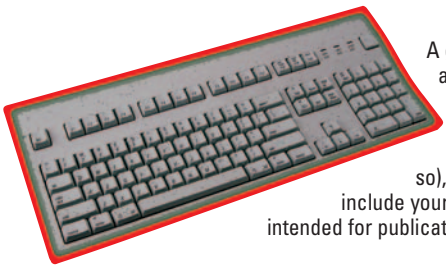
I have an inverted V doublet, total length 124ft, with the centre 43ft a.g.l. fed with 50ft of 300Ω feeder which comes into my basement shack via a plastic ventilated grill. I tune the antenna on 3.5 to 28MHz with an old KW (E-Zee) match and on 1.8MHz I use the same antenna as a top loaded vertical tuned against ground with another KW tuner - a 1.8MHz L-match tuner. On 1.8MHz I usually or often get 5S9 reports from the south of England and Western Europe.

I wonder if there's a simple coaxially fed antenna which radiates quite or very well on all nine h.f. bands from 1.8 to 28MHz? I seems to me that more and more Amateurs are now using twin/balanced feeders for doublet antennas which exhibit low loss and efficient radiation, or am I mistaken?

Arthur Tait GM4LBE
Lerwick
Shetland

Keep your letters coming to fill *PW*'s postbag

Letters Received Via 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.

February 8
The Harwell Rally
Contact: Ann G8NVI
Tel: (01235) 816379
Website: www.hamradio.harwell.com
This rally is to be held at the Didcot Leisure Centre, Mereland Road, Didcot, Oxon, signposted from the A34. Bring & Buy, trade stands, special interests, crafts, catering, licensed bar and talk-in on S22. Free car parking. Doors open 1030 (1015 for disabled visitors) and admission is just £1.50.

***February 15**
Stevenage Communication & Electronics Show
Contact: RadioSport Ltd.
Tel: (01923) 893929
Website: www.radiosport.co.uk
To be held at the Stevenage Arts & Leisure Centre, Lytton Way, Stevenage, Hertfordshire. Doors open 1000 till 1600 and admission is £3. PW Publishing will be in attendance at this show.

February 15
The Northern Cross Radio Rally
Contact: John G7JTH
Tel: (01924) 251822
Website: www.wdrs.org.uk
Held at Thornes Athletics Stadium, Wakefield, West Yorkshire. One large hall on ground floor - just out of town on the Horbury Road. There will be ample parking on-site, with easy access from M1 J39 & 40 - well signposted. All the usual attractions and doors open at 1030 (1015 for disabled visitors and Bring & Buy). Admission charge is £2.

February 22
Swansea Amateur Radio Society's Amateur Radio & Computer Show
Contact: Roger Williams
Tel: (01792) 404422
This show is to be held at the Afon Lido, Aberavon Seafront, Port Talbot. Please note that this is a new venue. Doors open at 1030 and admission is £1.50, children 50p. There will be trade stands, Bring & Buy, local radio interest and repeater groups, 2m talk-in and an operational h.f. station.

February 29
The Cambridge & District Amateur Radio Club Rally
Contact: Dr. M.D. Addlesse
Tel: (01223) 872258
E-mail: m0blp@amsat.org
Held at the Britten Arena, Wood Green Animal Shelter, King's Bush Farm, London Road, Godmanchester.

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.

At Rallies marked with a * look out for a representative from PW Publishing Ltd. at this Rally. Go along to the stand for great deals on subscriptions to *Practical Wireless*, *Radio Active* and *Short Wave Magazine*, clearance books and a selection of back issues.

amateur radio news

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

Broadcast DXing News

BDXC Macclesfield Meeting

The BDXC specialises in coverage of all aspects of broadcast DXing. Read on to find out more, as well as details of a forthcoming meeting.

The BDXC was founded in 1974 as the Twickenham DX Club. From its local roots came rapid expansion to become one of the major radio clubs in the UK. The title of British DX Club was adopted in 1979 and the club now has a large UK and substantial overseas membership.

The club cover all areas of broadcast DXing from searching out distant or difficult-to-hear radio stations to listening to the major international broadcasters on the short wave, medium wave and v.h.f./f.m. bands. They also look at new ways of listening to the radio including the WorldSpace system and over the world-wide web as well as keeping up with UK domestic radio developments.

The next North West BDXC meeting takes place on **Saturday 24 January** at the Wetherspoons Society Rooms in Park Green, Macclesfield. The proceedings will start at 1600 hours and continue until at least 1900 hours when everyone will have the opportunity to head off to a nearby restaurant.

Everyone with an interest in radio is welcome to go along and you don't have to be a BDXC member. The meeting will be an informal social event with plenty of opportunity to chat, share a drink and the latest loggings, etc.

If you are planning to attend the meeting on the 24th please E-mail **Tom Read M1EYP** at **tommyread@hotmail.com** so he can look out for you! If you are a regular he'd also appreciate knowing if you are coming or not! If you need directions you can call Tom on **(01625) 612916** or if you get lost on the night, call **Gavin** on **(07739) 858351**.

For more information about the British DX Club, any of the services they offer, or a sample copy of *Communication* (their newsletter) please E-mail: **secretary@bdxc.org.uk** or write (including return postage) to:

Colin Wright (Club Secretary),
British DX Club,
126 Bargery Road,
London SE6 2LR

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

Club Spotlight

Christchurch Amateur Radio Society

Over the 20 years since it first 'opened' its doors the Christchurch Amateur Radio Society continues to go from strength to strength. Offering a wealth of support, encouragement and fun for Radio Amateurs old and new.

The **Christchurch Amateur Radio Society** (CARS) was formed in the early 1980s as the Plessey Christchurch Radio Electronics and Computer Club and then subsequently became the Christchurch ARS. The society is affiliated to the Radio Society of Great Britain and holds the callsigns **G0MUD** and **G7MUD**.

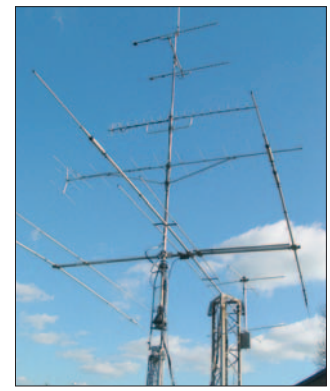
Current membership of the club is 35, with membership drawn from all age groups, occupations and professions. Many of the members have roots in the Electronics and Communications industries.

All aspects of Amateur Radio are catered for covering h.f., c.w., v.h.f./u.h.f., ATV, RTTY, PSK31, Packet and APRS operating. The club runs Foundation and Intermediate courses on Saturdays under the instruction of **John Goodall G0SKR**, with help from many other club members. Most of the instructors are members of RAYNET.

To date, over 150 students have passed the Intermediate Licence and over 79 students have attended and passed the Foundation Licence with many going on to Intermediate courses and the full RAE. All age groups are catered for, from those studying for their school NVQs to 'old timers' who want to revive a long lost hobby. There are several 'Elmers' who can help with specific areas of interest that students wish to cover.

The inside of the CARS shack has recently been refurbished, with new wiring, renewed lighting, white board and two operating positions, one for h.f. and one for v.h.f. including ATV, Packet and APRS operating. As home computers are now very much part of radio communications, three older, but serviceable for club purposes, PCs are also in use.

So, if you fancy joining in with the activities of the Christchurch Amateur Radio Society they meet on Thursday evenings from 1930 hours at **The Club Shack Grange Road, Christchurch,** (rear of British Aerospace Systems Sports and Social Club) and all new prospective members are welcome. For details of how to join or current courses that are running please contact **Steve Rann G1YNY/M3AFN** on **(01425) 276205** (evenings) or **The Shortwave Shop**, **18 Fairmile Road, Christchurch. Tel: (01202) 490099.**



Council of Europe Radio Amateur Club

Commemorative Competition

The Council of Europe Radio Amateur Club, TP2CE, has launched a competition, which is open to all Radio Amateurs.

The Council of Europe Radio Amateur Club TP2CE is running a competition in commemoration of its 18th Anniversary year. The club was formed in June 1986.

The challenge involves sending a list of all contacts made with the club station using its various special prefixes before 30 June 2004. All QSOs with the different prefixes used by the Radio Club will be valid but it will not be necessary to have received the QSL.

A summary of all the QSOs made on the h.f. bands, including WARC bands, mentioning the prefix used by the Radio Club, frequency, mode, date and time, should be sent to the Diploma Manager, **Mr Francis Kremer F6FQK** before 30 June 2004.

The full rules can be found at **http://www.coe.int/t/e/Tp2ce/Council_of_Europe_Radio_Club_Challenge/** below is a brief summary of how points will be awarded and the prefixes to listen out for:

Examples:
TP3CE - 40m - SSB - Date - Time - (1Point)
TP3CE - 20m - RTTY - Date - Time - (1 Point)
TP9CE - 15m - CW - Date - Time - (1 Point)
TP50CE - 10m - SSB - Date - Time - (2 Points)

Points:
There will be 1 point awarded for each QSO, 2 points for each QSO with the prefix TP50 (50th anniversary of the Council of Europe). The first three stations will receive a cup and a Council of Europe gift. The two other stations will receive a gift from Council of Europe.

List of prefixes:
TP0, TP1, TP2,TP3,TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP40, TP50 and TP2000.

All entries should be sent to:
Mr Francis KREMER F6FQK
31 Rue Louis Pasteur,
67490 DETTWILLER
France

New Bletchley Exhibit

Enigma & Friends

A new exhibition called Enigma and Friends has recently opened at Bletchley Park.

The exhibition is based on the private collection of **John Alexander G7GCK**, who has kindly loaned his magnificent collection of cypher machines to the Bletchley Park Trust. Enigma and Friends tells the story of European and American cypher machines that were contemporaries of Enigma and shows visitors what happened after Enigma's heyday.

The new exhibition is intended to complement Bletchley Park's existing exhibitions and will display machines from 1936 through to the 1970s. More information can be found on the Bletchley Park website at **www.bletchleypark.org.uk** as well as details of opening hours and admission prices.

Down Under

Morse Requirement Dropped

Australia has joined many other countries and announced that it is removing the requirement for Morse Code.

Following the recommendations of WRC 2003 with respect to the removal of formal testing requirements in Morse code for access to the h.f. spectrum. **Ernest Hocking VK1LK**, the Wireless Institute of Australia's Federal President, said that the Australian Communications Authority made its announcement on Monday the 17 November. The change came into force with effect from the 1 January 2004.

No More RAE!

Full & Advanced Examination

It's finally happened - the RAE as we know is no more, with effect from 1 December 2003 it's all change for getting your Radio Amateur's licence.

Following City & Guilds withdrawal from running the Radio Amateurs Examination (deeming it uneconomic), the 1st December saw the last exams being taken. The **Radio Society of Great Britain** are now adminstering a new exam known as the Full/Advanced (almost on demand) on behalf of RA/Ofcom, based on success of the Foundation and Intermediate schemes and therefore following a progressional sequence.

The progression to the Full/Advanced Licence is fully sequential (with no short-cuts), starting with the Foundation, consisting of (25 questions and a simple Morse assessment and Operating), then onto the Intermediate, which consists of 45 questions, practical assessment and project) and eventually to the Full/Advance Licence of 60-70 questions, theory only.

The original RAE syllabus has been revised to avoid duplication at lower levels with extra subjects reflecting trends e.g. synthesisers and DDS and more on EMC. High frequency, a.c. and transmitter and receiver theory is retained and now includes F1B Direct Frequency Shift Data modulation. The need to understand the measurement of station performance is retained. The BR68/Full, stays in force with Summer revisions due to Morse and MM wave bands.

The Syllabus scope follows the established pattern for the Foundation and Intermediate courses and includes the following: Licence conditions, AC theory, Semiconductors, p.s.u.s, receivers and transmitters including architecture, Oscillators, Mixers, Synthesisers, Mod/Demodulators., Poweramps, Feeders, Antennas including a.t.u.s, Matching and s.w.r.s, Return Loss, Propagation inc. Electromagnetic Waves, the Ionosphere. EMC, Operating Practice & Procedures and Safety and Measurements.

The RA/RSGB considers the term 'amateur' to undersell the hobby and want to raise the status of the hobby with the possibility of an NVQ in Radiocommunications Studies. The success of these plans will depend to a great extent on the skills of the tutors being educators rather than just trainers.

Radio Reading

Books For You

Rob Mannion G3XFD recommends a couple of books that you should consider for your shack bookshelf.

Instruments of Amplification
Written, illustrated & published by Peter Friedrichs AC7ZL
ISBN Number 0-9671905-1-7

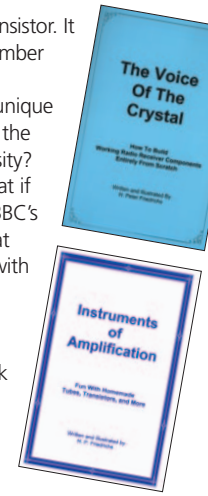
Peter Friedrichs AC7ZL is a Radio Amateur after my own heart and I'm sure his latest book will appeal to *PW* readers (I've also taken a second look at his original book *Voice of the Crystal* this month). However, please don't be put off by the somewhat formal title of the latest book! The front cover sub-title explains the contents of the book in a much more efficient way in my opinion by stating "Fun with homemade Tubes, Transistors and more".

The latest 300-page softback, book is an entirely 'one man' job. Peter not only writes and illustrates his work - he publishes them too! As he says in the letter which came with my copy "It's a labour of love Rob". In reply I can say it's a love which shows! If you want to really go back to basics and make your own valves, transistors and other devices, Peter's book is a must. It was three years in the making, including research, tinkering (as Peter calls it!), writing, drawing and composition. It includes 150 drawings, engravings and hand-drawn illustrations and has many references.

Chapters on offer include: Introduction, basics tools, safety first, What is an amplifier?, the microphonic relay, the balance beam amplifier (and if that doesn't intrigue you nothing will!). Next comes the needle box transformer,. the vacuum tube (the valve), vacuum basics (looking into the techniques and principles of the valve).

Peter also looks into experiments with 'glow tubes', which is fascinating! You may have come across these in the laboratory at school and the displays can be quite mesmerising and beautiful. Mind you, it's not just a pointless spectator sport - indeed no, instead the author leads and encourages the reader to have a go a making a valve capable of amplifying an incoming signal. It all seems great fun and I can confirm from practical experience, it really is entertaining and educational.

The book looks at semiconductor basics and then demonstrates how you can make your own 'Plumber's Special' point contact transistor. It really does use material which a plumber uses!



How can I possibly sum up this unique book in a way to adequately reflect the author's enthusiasm, zeal and curiosity? Well, in answering that I suggest that if any *PW* reader is invited on to the BBC's *Desert Island Discs* programme - that they ask for a copy to be included with their castaway supplies. The book is dedicated to "Childhood curiosity...may it live in us forever"....and armed with this book your own curiosity, together with a variety of commonplace household items will help you build a working radio receiver without recourse to the local electronics shop, if there is one on your Desert Island! **Very highly recommended - real radio reading.** There's a great challenge with an greater reward in pleasure waiting for anyone who builds radios from 'scratch' using this book.

Note: Peter's original book *Voice of the Crystal* is still available. I think it's particularly appropriate to mention it at this time because readers who are interested in building their own simple headphones, as featured in this month's Radio Basics column this month, will find that this book is literally crammed with ideas, projects and information. The author demonstrates how you can make a 'tin can' headphone together with a 'Gallows' type! (This book was reviewed in full on page 12 of the September 2001 isue of *PW)*.

Instruments of Amplification *costs* $US 19.95 and *Voice of the Crystal* $US 14.95. (Plus P&P).
Contact details:
Peter Friedrichs,
8410 North Burke Drive,
Tucson, Arizona AZ 85742
United States of America
E-mail:pfriedr@mindspring.com

Alternatively you can contact:
Camden Miniature Steam Services
Barrow Farm
Rode, Frome,
Somerset BA11 6PS
Tel: (01373) 830151
Website: http://www.camdenmin.co.uk/
who are able to supply the books. At the time of going to press prices were unavailable, so we suggest you contact them direct for details.

All Aboard

Visiting HMS *Belfast*

Take a second look - no you're not seeing double - this photograph shows Harald Joorman and his twin brother Uwe.

The photograph was taken when the Chairman of MF Runde, Harald Joorman DL5XI and his twin brother Uwe, a s.w.l visited HMS *Belfast* and met up with **Terry Barclay G0TBD**, the Chairman of the Royal Naval Amateur Radio Society London (GB2RN) Group. They are shown aboard the ship outside one of the forward gun turrets.

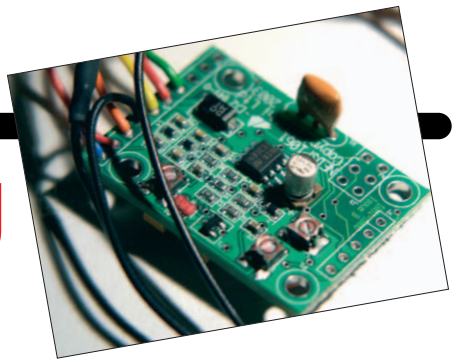
HMS *Belfast* is the last heavy Naval cruiser of the Second World War and is now owned by the Imperial War Museum and open to the public in the Upper Pool of London near Tower Bridge.

If you are interested in finding out about joining RNARS contact:

Phil Manning G1LKJ RNARS 2954,
Royal Naval Amateur Radio Society Secretary,
1 Waverley Gardens, Ash Vale, Surrey GU12 5JP
Tel: (01252) 334929
Mobile (07973) 298287
Email: rnars.sec@ntlworld.com

Product News from bhi

Noise Eliminating Module



If you need to eliminate noise in your operating experience then this could be the answer you've been looking for.

The NEDSP1061 noise eliminating p.c.b. module, offers an off-the-shelf solution to noise cancellation. Its small size and variety of connection options provides a solution to a wide range of applications.

Produced by bhi the NEDSP1061 eliminates noise and interference, as well as minimising distortion to the audio without producing musical tones. The p.c.b. module can be used in the design of new home-brew equipment or fitted into existing equipment.

Features include:

- Fully adaptive noise cancelling
- Minimum distortion to audio signal
- Noise cancellation 9-35dB
- Wide audio bandwidth for natural sound
- Input and output sensitivity control
- Input overload indication
- 5-15V d.c. operation
- Greatly improved signal to noise ratio
- Remote noise cancellation ON/OFF
- Preset or remotely set d.s.p. level
- Mount horizontally or vertically

The NEDSP1061 is manufactured by bhi who can be contacted at:

PO Box 136,
Bexhill-on-Sea
East Sussex
TN39 3WD
Tel: (08702) 407258
Fax: (08702)407259
E-mail: sales@bhi-ltd.co.uk
Website: www.bhi-ltd.co.uk

Can You Help?

A couple of *PW* readers need help in sourcing bits and pieces, can you help them?

Walter de Bruin from New Zealand has the following request: "While going through my 'very' old *PW* magazines I came accros the construction of a Dual Trace Unit for the 'PURBECK' oscilloscope in the February and March 1980 issues. As I made the PURBECK at the time I would very much like to make the Dual Trace Unit but I have encountered a problem of obtaining a few of the transistors and ICs".

"The transistors in question are 2 x E421; 4 x BSV81 and the IC's are 1 x CD4052; 1 x CA3018 and 2 x LM733. I suppose these are no longer available, but I wonder if someone or even the author (Ian Hickman) could tell me the comparable up to date types for them".

If you can help Walter in his quest please contact him direct at: **8 Dunn Street, Christchurch, New Zealand** or via E-mail at: **debruin@xtra.co.nz**

Mr S. Jackson G0UQL has written in asking for help with his attempt to replace the MOX, VOX, PTT 3-way switch in his Yaesu FT-101B transceiver. Unfortunately he has lost the connections but says there are five leads involved. Can anyone help?

Write to **Mr Jackson at 1b Colm Crescent, Colindale, London NW9 6EU. Tel: 0208-200 0982**.

Special Event Station

Youth Hostelling Radio Amateurs

Are you a member of the Youth Hostel Association and a Radio Amateur? If so read on...

The Croydon YHA Group (aka COPSE) is celebrating its 70th anniversary in 2004 and as in 1984 when they celebrated their 50th, the Group are looking to run a Special Event Station. Using the callsign **GB4YHA** and operating from the Wantage youth hostel, high up on the Ridgeway in Oxfordshire, the event is scheduled to run over a weekend in June.

Phil Manning G1LKJ is looking for any Radio Amateurs who are also members of the Youth Hostel Association to help run the GB4YHA station. So, if you'd like to get involved or want to know more contact Phil at **g1lkj@hotmail.com** via post (he's QTHR in the callbook).

Stop Press!

Oldham ARC Rally

Just as this issue of *PW* was going to press we received a late item of rally news from the Oldham Amateur Radio Club.

The Oldham Rally takes place on Sunday 18 January 2004 at the Oldham Sports Centre, Lord Street, Oldham. All the usual trade stands and Bring & Buy will be on display and refreshments will be available. Doors open at 1100 hours (1030 for disabled visitors).

If you are quick you can still book a stand by contacting **Hazel M5AEG** at **m5aeg@btinternet.com** or by calling **(01706) 848092**. More details on the location, how to get there and other information can be found at **www.oarc.zen**

SALES 01908 281705

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MOUNTING HARDWARE ALL GALVANISED

6" Stand Off Bracket *(complete with U Bolts)* **£6.00**
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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 H/DUTY (SWAGED)

Heavy Duty Aluminium (1.2mm wall)
1¼" single 5' ali pole **£7.00**
1¼" set of four (20' total approx) **£24.95**
1½" single 5' ali pole **£10.00**
1½" set of four (20' total approx) **£34.95**
1¾" single 5' ali pole **£12.00**
1¾" set of four (20' total approx) **£39.95**
2" single 5' ali pole **£15.00**
2" set of four (20' total approx) **£49.95**
(All swaged poles have a push fit to give a very strong mast set)

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 PL259/6 to conv to P1259/6) **£0.25**
PL259/6 plug (Small entry) **£0.75**
PL259/7 plug (For mini 8 cable) **£1.00**
BNC Screw type plug (Small entry) **£1.00**
BNC Solder type plug (Small entry) **£1.00**
BNC Solder type plug (Large entry) **£2.50**
N-Type plug (Small entry) **£2.50**
N-Type plug (Large entry) **£2.50**
SO239 Chassis socket (Round) **£1.00**
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N-Type Chassis scoket (Square) **£2.50**
SO239 Double female adapter **£1.00**
PL259 Double male adapter **£1.00**
N-Type Double female **£2.50**
SO239 to BNC adapter **£1.50**
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) **£2.50**
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BNC to N-Type adapter (Female to male) **£2.50**
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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

10/11 METRE ANTENNAS

G.A.P.12 1/2 wave alumimum (length 18' approx) **£24.95**
G.A.P.58 5/8 wave aluminium (length 21' approx) **£29.95**
S27-3 3-element yagi. Freq: 27-28MHz. Length: 2.5mtrs. Gain: 8.5dB **£59.95**
S27-4 4-element yagi. Freq: 27-28MHz. Length: 3.8mtrs. Gain: 10.5dB **£69.95**

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/DUPLEXER & ANTENNA 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 **£18.95**
CS201-N Same spec as CS201 but with N-type fittings **£28.95**
CS401 Same spec as CS201 but4-way **£49.95**

ANTENNA 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 Control Box **£449.95**
AR26 Alignment Bearing for the AR300XL **£18.95**
RC26 Alignment Bearing for RC5-1/3 ..... **£49.95**

MOBILE MOUNTS

Turbo mag mount 7" 4mtrs coax/PL259 3/8 or SO239 ..... **£14.95**
Tri-mag mount 3 x 5" 4mtrs coax/PL259 3/8 or SO239 ..... **£39.95**
Hatch Back Mount (stainless steel) 4 mts coax/PL259 3/8 or SO239 fully adjustable with turn knob **£29.95**
Gutter Mount (same as above) **£29.95**
Rail Mount (aluminium) 4mtrs coax/PL259 sutiable for up to 1inch roof bars or poles 3/8 fitting **£12.95**
SO259 fitting **£14.95**
Gutter Mount (cast aluminium) 4mtrs coax/PL259 3/8 fitting **£9.95**
SO259 fitting **£12.95**
Hatch Back Mount 3/8 4mtrs coax/PL259 ..... **£12.95**
Roof stud Mount 4mts coax/PL259 3/8 or SO239 fitting **£12.95**

ANTENNA WIRE & RIBBON

Enamelled copper wire 16 gauge (50mtrs) **£11.95**
Hard Drawn copper wire 16 gauge (50mtrs) **£12.95**
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)

HF BALCONY ANTENNA

BAHF-4 FREQ:10-15-20-40 Mtrs LENGTH: 1.70m HEIGHT: 1.20m POWER: 300 Watts **£129.95**

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 options)

TMA3 3" to 1¼" heavy duty aluminium telescopic mast set, approx 40ft when errect, 6ft collapsed **£199.95**
TMA2 2¼" to 1¼" heavy duty telescopic mast set, approx 40ft when errect, 9ft collapsed **£149.95**
TMA1 2" to 1¼" heavy duty aluminium telescopic mast set, approx 20ft when errect, 6ft collapsed **£99.95**
TMAF-1 2" to 1¼" heavy duty fibreglass telescopic mast set, approx 20ft when errect, 6ft collapsed **£99.95**
TMAF-2 2¼" to 1¼" heavy duty telescopic fibreglass mast set, approx 40ft when errect, 9ft collapsed **£189.95**

HF YAGI

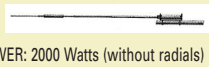
HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m LONGEST ELEMENT:13.00m POWER:1600 Watts **£329.95**

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 **£269.95**

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 **£499.95**
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 (with optional radials) **£89.95**
OPTIONAL 10-15-20mtr radial kit **£34.95**



VR5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 4.00m RADIAL LENGTH: 2.30m (included). POWER: 500 Watts **£169.95**

EVX4000 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs GAIN: 3.5dBi HEIGHT: 6.50m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials) **£99.95**
OPTIONAL 10-15-20mtr radial kit **£34.95**
OPTIONAL 40mtr radial kit **£12.95**

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 (with optional radials) **£139.95**
OPTIONAL 10-15-20mtr radial kit **£34.95**
OPTIONAL 40mtr radial kit **£12.95**
OPTIONAL 80mtr radial kit **£14.95**

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 **£249.95**

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 **£269.95**
80 MTR RADIAL KIT FOR ABOVE **£79.00**

(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)

UTD160 FREQ:160 Mtrs LENGTH:28m POWER:1000 Watts **£44.95**
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts **£39.95**
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts **£49.95**
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts **£89.95**
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 **£79.95**
(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)

ZL SPECIALS LIMITED OFFER

2 mtr 5 ele ~~£39.95~~ .....now just **£30.00**
2 mtr 7 ele ~~£49.95~~ .....now just **£40.00**
2 mtr 12 ele ~~£74.95~~ .....now just **£65.00**
70cm 7 ele ~~£34.95~~ .....now just **£30.00**
70cm 12 ele ~~£49.95~~ .....now just **£40.00**

Apologies to a Lady

Mannion's Mix-Up!

Rob Mannion G3XFD holds his hand up to admit a series of embarrassing 'lingual and foreign cultural clangers'! In doing so he confirms that when a journalist makes mistakes, there's no hiding from the truth! So, let's now hear the excuses from Rob and his attempts to apologise to a lady Radio Amateur....

"The 'Mannion's Mix-up' saga started when I received a letter for publication in *PW* from someone signing their name **Minaxi Joshi M1AXI/MJ0SHI**. It seemed a nice little story of how someone from abroad had received help to obtain their British Amateur Radio Licence, and I was pleased to publish it in the December 2003 issue of *PW*.

As Editor of *PW* I'm continually dealing with correspondence from people with foreign names. Unfortunately in this case the name Minaxi Joshi was very similar indeed to the name of a Japanese student who'd been staying with us at home in Bournemouth whilst he learned English. This is what led me to me to fall into the trap of thinking the foreign name was Japanese and the author a man. However, I couldn't have been more wrong, not only was the name not Japanese, it belonged to the lady in the photograph!

It was certainly a case of a 'Red face for Rob' when the letter arrived! Lesson learned, and it was something I should have been more aware of when dealing with foreign names and cultures, especially with the increasing number of people who are either guests in the UK or are even just visiting. In future I'll be even more careful and check to make sure who or what I'm dealing with to avoid classic clangers such as this one! I've had several narrow misses but Minaxi - known as Mina to her friends - caught me out and the following letter and accompanying photograph arrived at *PW* to prove how wrong I was!

Minaxi's letter said: *"Dear Mr Mannion, thank you for publishing my letter in PW under the heading 'Joshi From Japan...". However,* ***I'm not from Japan*** *but was born British in Zanzibar, East Africa, of Indian origin. I was certainly delighted to pass my Morse test and being able to use my callsign which is the same as my surname, whenever I visit Jersey. And, as promised I am sending you a picture of myself in the shack, taken by* ***Brian Godwin G8AOL/M5AOL****. It will certainly portray a positive image for women, especially those from an ethnic minority background taking up the Amateur Radio hobby".*

Rob says: "My apologies again and I'm pleased to correct my errors Minaxi! Good luck in the hobby and I promise to continue my steep learning curve with foreign names! In fact it's on-going as I've just received a letter from **Jurijus Krivkas LY3QN** who lives in Lithuania but here I had a head start because he sent some photos of himself and his shack. Helpful indeed, but I've still got much to learn!

Rob G3XFD

amateur radio clubs

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

ESSEX

Loughton & Epping Forest ARS

Contact: Marc Litchman G0TOC
Tel: 020-8502 1645/(07743) 456058
E-mail: secretary@lefars.org.uk
Website: www.lefars.org.uk

The Loughton & Epping Forest Amateur Radio Society meet every other Friday at: All Saints House, Romford Road, Chigwell Row, Essex IG7 4QD.

KENT

Dover Amateur Radio Club

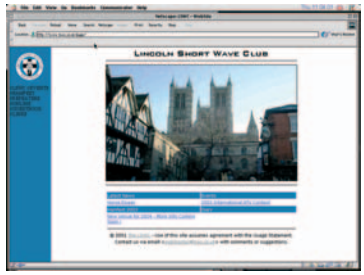
Contact: Brian Cuff G4SAU
Website: www.DARC.org.uk

Meetings of the Dover Amateur Radio Club are held every Wednesday at 1930 hours during term time in the Dover Boy's Grammar School. The club is a centre for the Foundation and Intermediate training courses as well as being the examination centre for the area. Forthcoming meetings include: **Jan 14:** RSGB video, **21st:** Operating and Natter Night and **28th:** 'Behind the Scenes of Broadcast Radio' by **Matt M1CMN**.

LINCOLN

Lincoln Shortwave Club

Contact: Pam Rose G4STO (Secretary) or Baz Matthews M3DMV (Activities Manager)
Tel: (01427) 788257 or 01636-612440
E-mail: m3dmv@btopenworld.com
Website: www.lswc.co.uk



The Lincoln Shortwave Club meet every Wednesday, 2000 hours at the Lincoln Railway Social Club, Ropewalk, Lincoln LN6 7DQ. They offer a varied club programme and welcome new members so why not go along and join in?

WEST SUSSEX

Horsham Amateur Radio Club

Contact: Alister Watt G3ZBU
Tel: (01403) 253432
Website: www.harc.org.uk

The Horsham Amateur Radio Club meets on the first Thursday of the month, The Guide Hall, Denne Road, Horsham, West Sussex. Forthcoming meetings include: **Jan 11:** Club Event 3.5MHz AFS c.w. & **18th:** Club Event 3.5MHz AFS s.s.b.

Keep those details coming in!

HAYDON Communications

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NEXT DAY DELIVERY TO MOST AREAS, £10.00.

MOBILE ANTENNAS

P&P £8.50

DB-770M	2m/70cm (3.5 - 5.8dB) 1m PL-259	£24.95
DB-7900	2m/70cm (5.5 - 7.2dB) 1.6m PL-259	£39.95
PL-62M	6m + 2m (1.4m) PL-259	£19.99
PLT-20	20m mobile whip (56" long)	£24.95
PLT-40	40m mobile whip (64" long)	£24.95
PLT-80	80m mobile whip (64" long)	£24.95
PLT-259	PL-259 converter for above	£5.95

MOBILE PENETRATOR

1.8-30MHz (200W PEP) mobile antenna – no ATU required. Length 102" (52" collapsed). Fits 3/8 mount (SO239 feed point)

OUR PRICE **£139.95** delivery £10.00

New improved 'Wire Penetrator' 1.8-60MHz end-fed wire antenna (45ft long) £159.95

Q-TEK PENETRATOR

"We've sold 100s all over Europe"

★ 1.8 - 60MHz HF vertical ★ 15 foot high ★ No ATU or ground radials required ★ (200W PEP).

ONLY **£179.95** delivery £10

SEND SAE FOR LEAFLET

Q-TEK COLINEARS (VHF/UHF)

P&P £10.00

X-30 GF	144/70, 3/6dB (1.1m) glassfibre	£39.95
X-50 GF	144/70, 4.5/7.2dB (1.7m) glassfibre	£54.95
X-300 GF	144/70,6.5/9dB (3m) glassfibre	£69.95
X-500 GF	144/70, 8.5/11dB (5.4m) glassfibre	£149.95
X-627 GF	50/144/70, 2.15/6.2/8.4dBi (2.4m)	£69.95

Q-TEK YAGIS

Delivery £10.00

2m	5ele (boom 63"/10.5dBd)	£49.95
2m	8ele (boom 125"/13dBd)	£64.95
2m	11ele (boom 156"/13.5dBd)	£94.95
2m	5ele crossed (boom 64"/10.5dBd)	£79.95
2m	8ele crossed (boom 126"/13dBd)	£99.95
4m	3ele (boom 45"/8.5dBd)	£56.95
4m	5ele (boom 128"/11.5dBd)	£69.95
6m	3ele (boom 72"/8.5dBd)	£59.95
6m	5ele (boom 142"/11.5dBd)	£79.95
70cm	13ele (boom 76"/14.9dBd)	£46.95
70cm	13ele crossed (boom 83"/14.9dBd)	£79.95

NEW 80-10M TRAP DIPOLE KIT

Covers 80-10m (1Kw PEP) 102ft long (34m).

Complete kit (requires feeder) £69.95 del £7.50

DELUXE G5RV

P&P on either full/half size £6.50

Multi-stranded heavy duty flexweave wire. All parts replaceable. Stainless steel and galvanised fittings.

Double size - 200ft (160-10m) £84.95

Full size - 102ft (80-10m) £42.95

Half size 51ft. (40-10m) £36.95

Choke Balun — Inline balun for G5RV £24.95 P&P £3

STANDARD G5RV

Full size	102ft (now includes heavy duty 300Ω ribbon)	£28.95 P&P £6
Half size	51ft (now includes heavy duty 300Ω ribbon)	£24.95 P&P £6

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end) £24.95 P&P £2.50 (a pair)

DIPOLE CENTRE PIECES

Open wire	£5.99
SO-239	£5.99

300Ω HEAVY DUTY FEEDER

5m length	£5.00 P&P £3.00
10m length	£10.00 P&P £3.00
300m roll "club special buy"	£135.00 P&P £10.00

BALUNS & TRAPS

1.1 Balun				£25.00 P&P £4
4.1 Balun				£25.00 P&P £4
6.1 Balun				£25.00 P&P £4
40 mtrs	Traps	1Kw Handling	(a pair)	£25.00 P&P £4
80 mtrs	Traps	1Kw Handling	(a pair)	£25.00 P&P £4
10 mtrs	Traps	1Kw Handling	(a pair)	£25.00 P&P £4
15 mtrs	Traps	1Kw Handling	(a pair)	£25.00 P&P £4
20 mtrs	Traps	1Kw Handling	(a pair)	£25.00 P&P £4
5.35MHz	Traps			£25.00 (a pair)

CUSHCRAFT BARGAINS

MA5V	New vertical 10, 12, 15, 17, 20m	SPECIAL ~~£229.95~~	£199.00
MA5B	Mini beam 10, 12, 15, 17, 20m	~~£349.00~~	£299.95
A3S	3 ele beam 10, 15, 20m	SPECIAL ~~£499.95~~	£349.00
A4S	4 ele beam (10-20m)	SPECIAL ~~£599.95~~	£429.00
R-6000	Vertical 6, 10, 12, 15, 17, 20m	~~£349.95~~	£315.95
R-8E	Vertical (40-10m) "special"	SPECIAL ~~£499.95~~	£349.99
X-7	7 ele 10, 15, 20m	SPECIAL ~~£699.00~~	£529.95

CAROLINA WINDOM

CW-160S	(160-10m) 40m long	£139.00 P&P £8.50
CW-160	(160-10m) 80m long	£134.95 P&P £8.50
CW-80	(80-10m) 40m long	£99.95 P&P £8.50
CW-80S	(80-10m) 20m long	£119.95 P&P £8.50
CW-40	(40-10m) 20m long	£94.95 P&P £8.50

NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/ Mains/PC/Phone etc. *Simply close shut over cables and notice the difference!* Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.

On thin cable simply wind cable round clamp 1-to-2 times. Simple yet effective!

OUR PRICE: **2 for £10** (p&p £2.50)

DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/OD35mm.

6 for £12.00 12 for £20.00

P&P £3.50

COAX BARGAINS

Genuine high quality coax

MILITARY SPEC

RG-213 Mil spec x 100m.

ONLY **£69.95** P&P £10

RG-58 Mil spec x 100m.

ONLY **£35.00** P&P £10.00

Coax stripping tool (for RG-58) £4.50

SP-350 STATIC PROTECTOR

Designed to reduce static build-up during electrical storms. (Gas discharge fuse is replaceable). DC-500MHz (SO-239 sockets). PWR up to 400W.

£24.95 P&P £2.50

LOW LOSS PATCH LEADS

£2.50 P&P

Connectors	Length	Price
PL-259 - PL-259	0.6m	£5.99
PL-259 - PL-259	4m	£9.99
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4-way guy ring		£4.95
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New all mode multibander: HF/50/144 /430 optional 1200MHz.

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Transceiver & scanner 2m/70cm Tx (5W). Rx:- 0.1-1300MHz, all mode (incl SSB). Incls:- Lithium ion battery & charger.

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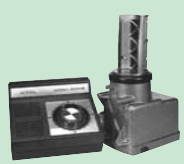

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(with up/down). Many amateurs using this mic (over 4000) have expressed extreme pleasure with it's performance. Includes 8-pin round Yaesu mic lead.

£49.95 P&P £6.00

Yaesu	8 pin round to modular adapter (FT-100, etc.)	£19.99
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K-08	8 pin "Kenwood" round	£9.95
I-08	8 pin "Icom" round	£9.95
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500kg brake winch.

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BNC 40cm flexible whip for the ultimate in gain. (Rx:- 25MHz-2GHz).

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- Temp/weather/ forecast/pressure barometric trend
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OUR PRICE £19.95 P&P £4.50

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State of the art, cable free thermometer. Supplied with one outdoor (waterproof) sensor. Will measure min/max indoor/outdoor temp. Up to three extra sensors can be used (available @ £19.99 each). RRP £49.99.

PRICE £24.95 P&P £5.00

TEX'S TIPS & TOPICS

Hello and welcome to the occasional column that, although it's called Tex's Tips and Topics, (TT&T) is really about your ideas, tips and any 'tricks' you may use in the hobby. This month, I'm going to look into the subject of semiconductor substitution, a topic that's cropped up several times in the last few weeks here in the office and deal exclusively with that.

As you may have noted, we are running some classic projects from earlier issues of *PW*. And one of the problems that we've encountered has been making sure that you can get hold of the various items in the shopping list. I've also had a couple of E-mails along similar lines, asking for help in finding suitable substitutes for both bipolar and field effect transistors (f.e.t.s).

Let's first deal with the task of finding a substitute for a bipolar transistor. Here we really need to know a little about bipolar transistors themselves. Of course, the name itself tells you the device's make-up because the transistor is made from two types (polarities) of semiconductor material. Transistors come in two main varieties, *pnp* and *npn*, showing how the two polarities are put together. So, when trying to find a substitute for a transistor, you must choose the right type to start with.

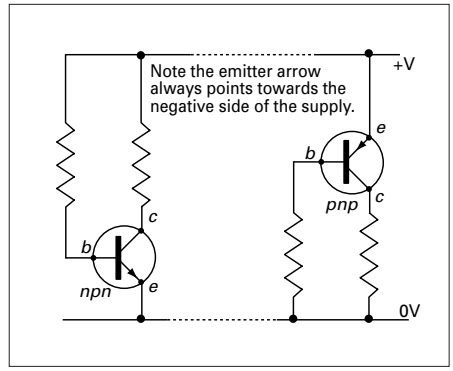


Fig. 1: Circuit snippets to show how *pnp* and *npn* transistors are biased in voltage polarity terms.

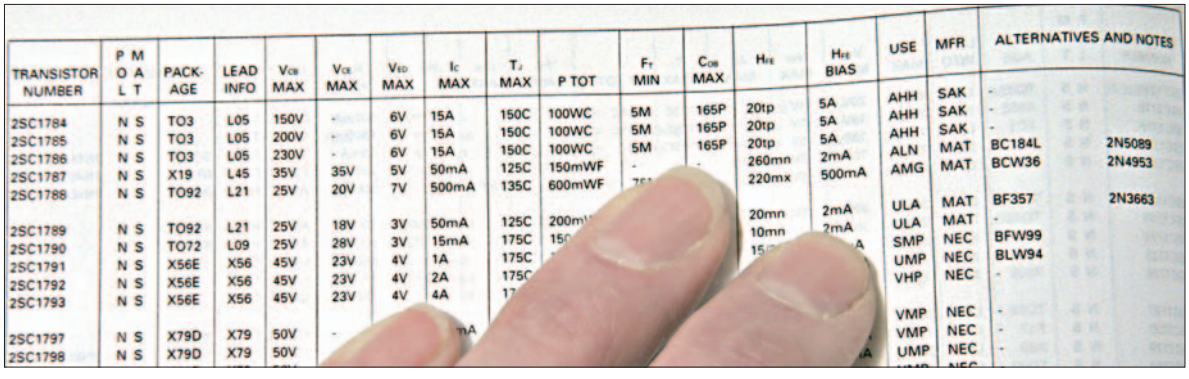
First Step

As I've mentioned the first step in the substitute, is to choose between, *npn* or *pnp* type. However, I'm going to ignore the fact that the transistor could be a Germanium device from an older radio or circuit. It's most likely that the device to be replaced is a silicon transistor with a recognisable device type number printed on it. In this case a quick look through a data reference book will give you (at least) an abbreviated specification.

Let's now suppose that you're unsure what type of transistor it is,

Transistor Number:	A simple manufacturer's type number for reference.
PM: **OA** **LT**	A strange column heading, but one that specifies the semiconductor material (Germanium or Silicon) type and device polarity - N for *npn* and P for *pnp*.
Package:	The industry standard shapes for individual devices.
Lead Info:	The actual orientation of the base, collector and emitter leads.
V_{CB}:	The absolute maximum voltage between the collector and the base with the emitter unconnected.
V_{CE}:	The absolute maximum collector to emitter voltage with the base connector unconnected.
V_{EB}:	The absolute maximum emitter to base connector with the collector unconnected.
I_{CMax}:	The absolute maximum collector current flowing under any condition.
I_{CMax}:	The absolute maximum collector current flowing under any condition.
T_{jMax}:	The maximum permissible junction temperature.
P_{tot}:	The absolute maximum permissible device dissipation.
F_{Tmin}:	The frequency at which the common emitter current gain has fallen to 1.
C_{OB}:	The maximum collector capacitance with the emitter open circuit (ie collector to base).
H_{FE}:	The low frequency current gain (actually the d.c. figure, but it usually holds good into the high audio range).
H_{FE}-Bias:	The current at which the current gain is measured (the gain can fall dramatically at lower or higher current levels).
Use:	An indication of the type of operation that the device was made for (ie audio, r.f. (signal or power) or current switching etc.).
Manufacturer:	Usually the original manufacturer, as often a type number becomes available from other sources, but be careful of the same type number transistor from other sources.
Alternatives:	Your first port of call in deciding which device will be a suitable alternative device.

Fig. 3: A simple explanation of the meaning of the data in each of the columns shown in Fig. 2.

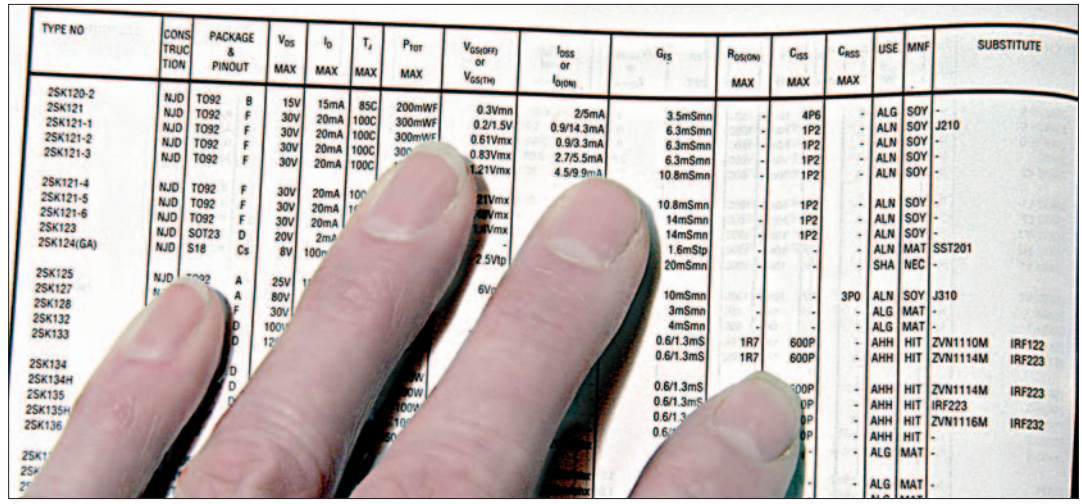


TRANSISTOR NUMBER	P M O A L T	PACK-AGE	LEAD INFO	V_{CB} MAX	V_{CE} MAX	V_{EB} MAX	I_C MAX	T_J MAX	P TOT	F_T MIN	C_{OB} MAX	H_{FE}	H_{FE} BIAS	USE	MFR	ALTERNATIVES AND NOTES	
2SC1784	N S	TO3	L05	150V	-	6V	15A	150C	100WC	5M	165P	20tp	5A	AHH	SAK	-	
2SC1785	N S	TO3	L05	200V	-	6V	15A	150C	100WC	5M	165P	20tp	5A	AHH	SAK	-	
2SC1786	N S	TO3	L05	230V	-	6V	15A	150C	100WC	5M	165P	20tp	5A	AHH	SAK	-	
2SC1787	N S	X19	L45	35V	35V	5V	50mA	125C	150mWF	-		260mn	2mA	ALN	MAT	BC184L	2N5089
2SC1788	N S	TO92	L21	25V	20V	7V	500mA	135C	600mWF			220mx	500mA	AMG	MAT	BCW36	2N4953
2SC1789	N S	TO92	L21	25V	18V	3V	50mA	125C	200m			20mn	2mA	ULA	MAT	BF357	2N3663
2SC1790	N S	TO72	L09	25V	28V	3V	15mA	175C	15			10mn	2mA	ULA	MAT	-	
2SC1791	N S	X56E	X56	45V	23V	4V	1A	175C					A	SMP	NEC	BFW99	
2SC1792	N S	X56E	X56	45V	23V	4V	2A	175C						UMP	NEC	BLW94	
2SC1793	N S	X56E	X56	45V	23V	4V	4A	17						VHP	NEC	-	
2SC1797	N S	X79D	X79	50V	-		mA							VMP	NEC	-	
2SC1798	N S	X79D	X79	50V										VMP	NEC	-	
													A	UMP	NEC	-	

Fig. 2: The columns shown in *Towers' International Transistor Selector* allow you to make a good guess, at a substitute transistor (see Fig. 2 for details of the columns). In fact there's often a substitute shown.

because you can't find any reference number on it. Obviously, if the device is 'dead' then you're at a disadvantage to start with, but all is not lost! Just check if the collector point is positive with respect to the emitter point. If it is, then the type you need is likely to be an *npn* type.

Conversely, if the collector point is negative with respect to the emitter point, then the transistor you will need is most probably a *pnp* type. The circuit fragment, **Fig. 1**, shows a the idea and is the first step in finding a replacement transistor.



Step Two

Now let's turn to other parameters and step two in the replacement, is to identify the circuits needs of the device in the circuit position. Is it an r.f. or audio stage? Is it a low-level signal or power output level stage? And finally, the voltage level that the stage works at. In most cases this will be limited to 12V circuitry, but you may come across, other supply voltage levels.

Step three is to look more closely at the published parameters of the device that needs replacing. Don't get too worried, you don't need to be a rocket scientist to work with these figures. I use *Towers International Transistor Selector* when initially looking for transistor substitutes. It's a book that I can highly recommend for the task, though it's not cheap. And I shall assume that you are using this (*Towers*) or a similar reference book from now on!

In *Towers*, you'll find columns of parameters for each transistor type listed. These columns are shown in the annotated photograph of **Fig. 2**. However, you may ask "how do you choose a replacement device from the often bewildering number of parameters"? The answer to that question is often far more simple than you might think!

To choose a suitable substitute, you have to judge firstly what the stage actually does. For example, if it's a small signal audio amplifier, it's not ideal to use an audio or r.f. output device as a replacement. Similarly if it's an output stage, then a suitable audio or r.f. device will be needed.

Amplifier Tasks

For many audio amplifier tasks, where the actual transistor parameters probably have less effect on the complete stage gain, then a simple substitution will probably do the trick. Many of the jobs will probably be able to be carried out by one of the BC182/3/4 transistors if an *npn* device is needed. (These devices have maximum voltage levels of some 30V at up to 200mA current levels, although the maximum device dissipation as only 300mW).

Should you have need to replace an audio or small signal *pnp* transistor, then one of the BC212/3/4 series will work electrically and are basically complimentary (opposite polarity) devices to the BC182/3/4/ series. However, if there are slightly greater current needs, then BC537/8 are 60V/1A *npn* devices, with BC527/8 as the *pnp* complimentary versions.

Although there's often no information available in *Towers* as to some transistor's maximum useable frequencies, it's quite probably that some 'audio' transistors would be useful in h.f. QRP rigs. Perhaps the BC537/8 could be operated as the r.f. output stage, and using a BC527/8 as the keying switch transistor. As a general rule, the '**USE**' column in *Towers* will give you the start point of your search, you can then narrow the choice down.

So, far I've only dealt with electrical replacement. If you're just replicating an older circuit with more modern devices, that's normally not a problem, but what if you're looking to replace a transistor? Will it just be a 'drop-in' replacement? Great care must be taken with replacement transistors, or f.e.t.s, in that the leads may be in a different orientation. This means that the base, collector or emitter leads could be in the wrong place.

I'll leave it up to you to try and work out the solutions to the lead orientation as the possibilities are rather more than I care to think about! Even a single transistor type may have differing pin-out variations - such as the BC182/3/4 devices already mentioned, because, each type here has three different pin-outs! In reality many of us, have a limited number of transistor types in stock, and we look to see which would be the most appropriate one to use in place of another.

As the frequency and output power level rises, then the need to be a little more careful with matching the parameters become rather more important. In this situation, then we must look more closely at the gain/frequency figures for the possible replacement device. Almost equally as important could be the actual package - this must be matched too, **especially at high power**. (I mention this ... although it's outside of this simple look at substitution).

Replacing FETs

Now let's move on to a quick look at f.e.t. replacement. This topic tends to be rather more difficult than transistor substitution. This is because when replacing an f.e.t. there are several topics that have to be considered as there are several different modes of operation, two differing polarities, and devices with one or two control gates to be considered.

Of the two f.e.t main modes of operation, the 'plain' junction f.e.t. is almost invariably a **depletion mode** type. This is where the gate must be held 'below' the source potential to control the flow of current through through the device. In this form the junction f.e.t. is almost analogous to a simple valve. As long as the gate (grid in a valve) is reverse biased with respect to the source (cathode of a valve), then no gate current flows.

Depletion mode f.e.t.s may be either N-channel (positive drain to source voltage) or P-channel with a negative supply for the drain with respect to the source. In some cases the drain and source may appear to be interchangeable. Devices such as the 2N3819, J310, MPF102, BF244, 245 and 246 fall into this type of depletion mode junction f.e.t.s.

Let's now turn to the enhancement mode f.e.t. devices. In practice these devices may have either one or two controlling gates (G_1 and G_2) which for some purposes may be interchangeable as demonstrated by **George Dobbs G3RJV** in some of his projects in Carrying On The Practical Way. This interchangeability of control gates isn't normally found in commercial equipment though.

In general terms with dual-gate enhancement mode f.e.t.s, the G_2 gate, is held a few volts higher than the source and G_1 gate which are normally held at around the 0V rail. The G_2 gate controls the quiescent current, and signal gate (G_1) is the usual input. When being used as a mixer device, the local oscillator signal (about 5V peak-to-peak) is added onto the control gate (G_2) level.

When trying a substitute for an f.e.t. it's worth trying another device of the same type, **if the pin-out is the same**. And for most of the dual-gate enhancement mode f.e.t.s, the pinout follows the same general layout, making it easy to 'drop' another type in to see if it works. As for the subject of power m.o.s.f.e.t.s, that I'll have to leave for another time. So, have a go! Happy substitution.

Tex

● Fig. 4: There are fewer parameter columns to be found in *Towers' International Mospower and Other FET Selector.* Although there's no frequency limit given, inter-electrode capacitances do affect the upper frequency usefulness.

Radio Basics

This month, in the second of his articles on headphones Rob Mannion G3XFD encourages you to make your own. He describes how you can modify modern headphones by winding your own diaphragm-type inserts.

I hope you enjoyed the Christmas festivities and the New Year. If you're a keen beginner in radio and were fortunate enough to get a new soldering iron as a gift, you'll be able to put it to work immediately!

Last month with the help of **Tex Swann G1TEX** (who prepared a suitable amplifier circuit) I described how you could use the modern moving coil - miniature loudspeaker - headphones to advantage. Using the rather insensitive headphones with the amplifier, a high impedance input (for simple receivers) and a low impedance output for the nominal 8Ω impedance moving coil units is provided.

As I explained, when using modern moving coil headphones unless you were extremely close to a powerful broadcast transmitter, any detected signals received from your simple receiver would not be strong enough to reproduce sound. It's very likely signals **will be present** but they'd be inaudible to the human ear.

Either of the amplifier circuits will help by providing a high impedance input, adding a little gain and then matching the output to the low impedance headphones. The output won't be very loud but it's the nearest you'll achieve by using modern miniature loudspeaker type headphones from simple crystal detector receivers.

Making Your Own

Making your own headphones can be fascinating and very rewarding. It's good to get back to basics - but it's worthwhile pointing out that even in Second World War prison camp radio receivers - the constructors (often desperately determined) achieved better results with headphones they had smuggled in.

Sensitive headphones can be difficult to make yourself. Despite this, we can take a few short cuts - especially on the presentation side.

As I mentioned last month, home-brewed headphones can look ugly. Nowadays though, much work is done for us and I strongly recommend that you buy a budget pair of modern moving coil unit headphones to modify, similar to those in **Fig. 1**. However, I strongly recommend you avoid trying to do anything with the tiny, flimsy types used with portable cassette players. Cheap they may be (at around £1 a pair) but they're extremely difficult to work with!

It's best to buy or find a reasonably priced pair which are comfortable to wear, and from which the moving coil miniature loudspeaker units can be removed easily. Don't worry about the fact you're possibly damaging them - you won't if you're careful - and the small loudspeakers can be used elsewhere later.

Fig. 1: Unless you are very skilled at lightweight engineering you will find it extremely difficult to construct reasonable (and comfortable) headphone units. In the article Rob G3XFD suggest that the home-constructor can take advantage of the ready-made low impedance (miniature loudspeaker type), turning them into traditional fixed coil magnet and diaphragm units. The reasonably priced (less than £10) model worn by Mr. Glasshead (above) are suitable for modification (see text).

Plastic Cap

Whereas 50 years ago I had to 'make do and mend' with hollowed out, carefully cut, shaped and sanded down wooden blocks to hold my headphones, nowadays we're spoilt for choice. One of the most useful items for our purposes is the ubiquitous plastic cap. The type of cap I favour comes from the top of 'Multivitamin' pill containers sold in most chemist's and health food shops.

Before you start make sure that the plastic top you've chosen will fit into the headphone casing you're planning to modify. With most of the types I've seen and tried there's more than enough space for the cap, plus the wiring and the diaphragm to be enclosed. But please check for yourself, nothing is more frustrating when you complete a job to find it won't fit into where you want it to go!

Incidentally, while on the subject and oddly enough, one of the major manufacturers of plastic containers for pillboxes, etc., **Seadair** (formerly **Dolphin Packaging**) is in Poole, just down the road from the *PW* offices. And it's just as likely you'll end up using one of their products. However, I can assure you I don't raid their rubbish pile - mine are recycled!

The plastic tops are just the right depth to contain the ceramic unit from a 'Fridge Magnet'. These are then cemented into place with rapid setting Cyanocrylic adhesive or scratching marks are scored into the plastic tops to provide

better adhesion for the magnet, **Fig. 2**.

When you hold the partly assembled unit up in front of your eyes, the magnet's top surface should be just short of being level with what is now the top of the upside-down cap. The clearance is important. The narrower you can make the clearance between the 'top' of the cap and where the metal diaphragm is to be placed the more efficient the eventual sound reproduction will be when the project is completed.

Field Coil

The next job, winding the field coil around the permanent magnet is not difficult...but it is fiddly! Getting this bit right is important and with care you'll end up with a transducer which can respond to very weak currents and reproduce sound very effectively.

Note: After many years of making and showing young school radio club members how to make the simple type of earphone insert described here, I recommend that the field coil is wound around the permanent magnet when it's in position, rather than winding it first and then fixing it in place. I've found that this is the best method because of the possibility of the end cheek pieces parting from the magnets.

Once attached with adhesive to the inside of the cap, you'll then be able to hold the assembly in your hand while winding the wire around the magnet. The 40s.w.g. enamelled copper wire (this size is best, but any other size up to 30s.w.g. will do) will be wound on by using an old ballpoint pen casing as a dispenser, as shown in Fig. 2. Initially, the wire is pulled down through the pen body and the start of the winding is anchored underneath the cap with a blob of wax. I suggest you leave around 50mm of wire for connection purposes.

Depending on how thick each magnet is, you may need two 'sandwiched' together using their own magnetism. You won't be able to get it wrong - if you place North-to-North, or South-to-South pole the magnets will repel each other. Once they're placed together as N-S they'll cling to each other immediately.

The next job is to ensure the magnets are fixed as securely as possible to the inside of the cap. Once you've done this, a very thin 'cheek piece' of plastic material (I use sections of polycarbonate cut from a mineral water bottle) is stuck over the top of the ceramic magnet. Make the cheek piece a larger diameter (by about 3 - 4mm) than the magnet so that you can eventually wind the copper wire around the magnet's edge and behind the cheek piece.

By placing a clear plastic cheek piece/holding disc on the exposed end of the magnet you'll be able to wind far more wire onto the assembly. This is the essential 'heart' of the project!

For those of you who have never been involved with this simple form of transducer before - perhaps a very simplified explanation will help! The permanent magnet's field (attracting the diaphragm we are to suspend above it) is 'modified'/altered by the weak currents flowing through the field coil we're to wind over it.

Again, looking at the unit in very simplified terms - the idea of the field coil is to ensure the extremely weak currents flowing through it (from a diode detector receiver for example) influence the permanent magnet's field as much as possible, and thus attracting and releasing the diaphragm and reproducing sound. Because of this it's essential to create as strong an electromagnetic field* (from the very small current flowing through the wire) as possible.

*See information panel.

Once you've wound as much wire around the magnet as possible (to the outside edge of the cheek piece) cut the wire, leaving a 'tail' the same length as the beginning of the winding. Next, check for d.c. continuity with your test meter set on the Ohms range. You should get a reasonably low ohm reading – depending on the wire you use and the amount wound on.

The earphone insert is now ready for testing with a temporary diaphragm. This can be easily done by using a small circular section of polycarbonate plastic (cut from an empty drinks bottle) shaped to sit on top of the cap, leaving as small a gap as possible between it and the magnet.

If you then place a thin magnetic (test to see if it's attracted by a magnet) washer on top of the diaphragm – distinct audible 'clicks' should be heard when you again carry out a continuity test. This will prove that the temporary diaphragm and the unit itself is working.

Next month I'll be suggesting refinements to the earphone units. We'll also be using it in conjunction with the amplifier circuit provided in January *PW*. Cheerio for now.

PW

Information Panel

Wire & Magnets

Enamelled copper wire is available from *PW* advertisers including Sycom and sources such as Maplin Electronics. Small ceramic magnets can be purchased from hardware shops and also removed from decorative 'Fridge' magnets. The recommended reading for this series is the excellent ARRL *Understanding Basic Electronics* (Available from the *PW Book Store* priced £15.50 plus P&P).

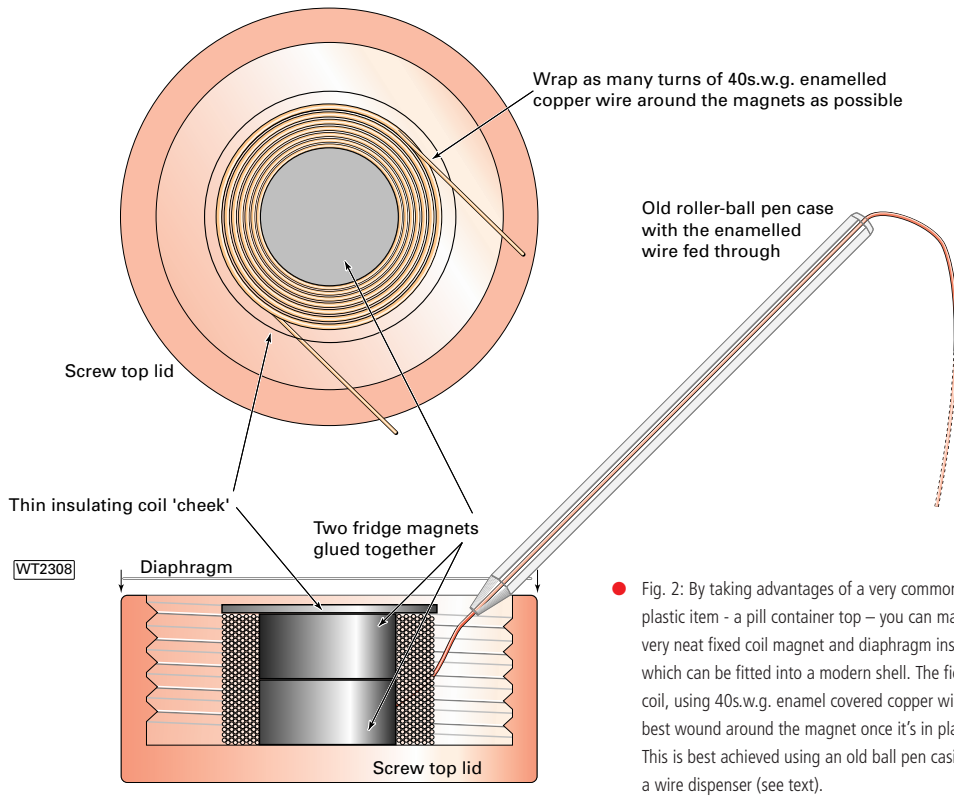


Fig. 2: By taking advantages of a very common plastic item - a pill container top – you can make a very neat fixed coil magnet and diaphragm insert - which can be fitted into a modern shell. The field coil, using 40s.w.g. enamel covered copper wire, is best wound around the magnet once it's in place. This is best achieved using an old ball pen casing as a wire dispenser (see text).

The Yaesu FT-8800E Dual-Ban

Neill Taylor G4HLX takes a look at the latest offering from Yaesu. He was expecting it to be packed with the latest features and he wasn't disappointed!

The Yaesu FT-8800E 144/430MHz dual-band f.m. mobile transceiver.

The latest dual-band 144/430MHz f.m. mobile transceiver from Yaesu, the FT-8800E, at first sight looks rather like other similar rigs of recent years. I was expecting, however, to find it to be packed with all the latest features and indeed this turned out to be the case.

Within its compact 140 × 180 × 40mm package, the FT-8800E has essentially separate transceivers providing up to 50W output on the 144MHz band and 35W on 430MHz and receive capability across the ranges 108–520MHz and 700MHz to 1GHz.

The two halves of the liquid crystal display (l.c.d.), heading photograph, left and right, show the frequencies on the two bands in use. Other information includes separate signal strength bars.

There are two independent sets of controls, left and right, for tuning, volume and squelch and four buttons controlling the main functions of each band. Pressing in the tuning control knob for either band designates that one the **Main** band, on which you will transmit when the microphone push-to-talk (p.t.t.) button is pressed.

The controls make basic operation of the two halves of the rig very straightforward. However, it also has a down-side: having all the controls on such a small front panel means that the knobs themselves are tiny. For example, I found it quite fiddly to turn the tuning and volume controls.

Transceiver Performance

The performance of the transceiver on the air appeared to be everything that I would expect for a mobile rig. The full 50W on 144MHz and 35W on 430MHz output is a good level for typical mobile use. Lower levels of 5, 10 or 25W can be easily selected on each band.

The receiver has adequate sensitivity, certainly good enough for mobile use. Transmitted audio, using the supplied microphone, had a nice crisp sound from the reports I received.

I found the receive audio was also clear, with plenty of power when cranking up the volume control. Even using the small internal speaker – enough audio was available for use in even the noisiest vehicle.

Repeater operation is well catered for. For example an automatic repeater shift gives the correct offset for the transmit frequency when the operator tunes to the repeater section of the 145 or 433MHz bands, in accordance with the UK Band Plans.

However, the transceiver doesn't know about the 'wide' split of 7.6MHz used by a few new repeaters operating on 430MHz. Despite this the offset can be programmed for any odd split that you like, if preferred.

Second Function

Most of the eight front-panel buttons have a second function if they're held for half a second instead of just tapped. The tuning and volume controls also double as buttons that can be pressed or held for various functions.

In addition to all the controls mentioned, are six buttons to recall the **Hyper** memories (see

Manufacturer's Specifications (Summary)

Note: This brief summary covers the specifications not included in the main text.

General

Operating temperature range:	-20° to +60°C
Freq. stability:	±5ppm @ -10° to +60°C
Current consumption:	Receive (squelched) 500mA.
Transmit 144MHz:	8.5A
Transmit 430MHz:	8A
Weight:	1kg (approx).

Transmitter

Modulation type:	Variable reactance
Maximum deviation:	±5kHz
Spurious radiation:	Better than -60dB
Microphone impedance:	2kΩ
Data input impedance:	10kΩ

Receiver

Circuitry design:	Double conversion superhet
Intermediate frequencies:	45.05MHz/450kHz (main band) 47.25MHz/450kHz (sub band)
Sensitivity:	Better than 0.2µV (for 12dB SINAD)
Squelch sensitivity:	Better than 0.2µV
Selectivity (-6dB/-60dB):	8kHz/30kHz
Max. a.f. output:	2W into 8Ω (5% THD)
Output impedance:	4 to 16Ω

d VHF/UHF Transceiver

below) and the all-important **Set** button that enters the menu system, with 47 items to allow the setting of every aspect of the transceiver's functions. I found these easy to use and with the aid of the clearly-written manual and provides just the right amount of explanation, in my opinion.

Microphone Buttons

The microphone, **Fig. 1**, has a further set of buttons, illuminated by a soft red glow if desired. As well as being equipped with **Up/Down** buttons, there's a keypad where an operating frequency can be entered directly and four additional buttons that can be programmed to perform a number of different functions. (This turned out to be important, as I found that I could set one to send a 1750Hz tone for repeater access, this is the only way of sending such a tone).

Of course the rig has full CTCSS tone encoder and decoder (as well as the alternative DCS tones). This is fine for accessing almost all repeaters these days, although there are a handful which still require 1750Hz.

Furthermore, when away from home in an unfamiliar area, I find it useful to put out calls with a 1750Hz tone on quiet repeater channels. This is to find out which ones are in range – and I sometimes ended up with a few surprises!

When listening to a repeater which uses an unknown CTCSS tone, the FT-8800E can be set to scan through all available sub-audible tones to find the one that the repeater is sending. It takes around 13 seconds to scan through all the tones, so in practice the repeater needs to be in use for a QSO while you do this.

Front Panel Detached

For installation in a vehicle, the front panel of the rig can be unclipped and detached, **Fig. 2**. Then, with the optional YSK-8900 separation kit, mounted remotely from the main unit (I didn't try this out).

The 'detachable' capability, common to most current mobile rigs, has become almost essential for dashboard mounting in modern cars. (The microphone plugs directly into the FT-8800 front panel unit).

Cooling for the main unit is provided by a heat sink underneath and a small fan that switches on automatically when it's transmitting, **Fig. 3**. In use the fan is very quiet and is almost unnoticeable, even when the transceiver is in use as a base station.

Left & Right Receivers

Either the left or right sections of the FT-8800E can be tuned across the entire frequency range including all the receive-only sections. The range is divided into five bands starting at 108, 200, 300, 400 and 700MHz.

A number of settings are stored separately for each of the five bands. These include features such as the tuning step, choosing one of seven values between 5 and 50kHz.

There's also an optional **Mute** function. This is so that when different signals are being received on the left and right bands simultaneously, the **Main** band can be heard while the other, **Sub** band is attenuated. Or you can set the sub band mute to only come into effect while you are transmitting on the main band.

The two bands share the single v.h.f./u.h.f. antenna connection, **Fig. 4**. This is provided by an N-type socket at the rear.

The audio is combined in the loudspeaker output, but the processing of signals in between is completely separate. Thus full duplex operation is possible using a single dual-band antenna.

I found that the duplex operating worked well, with no impact on the receiver performance on one band while transmitting on the other. Except, of course, the strong third harmonic of a 144MHz transmission somewhere in the 430MHz band and a handful of image responses noted in the manual, but in practice they fall on frequencies of no consequence when using the normal f.m. portions of the bands.

The two sets of controls can be set to receive different frequencies in the same band, if desired. But naturally, duplex operation is not possible in this case.

Mobile Operation

The duplex capability may not find much use in normal mobile operation. However, there are two types of operation that may be of interest to some users.

Firstly, the rig may be

Fig. 1: The microphone has become more than just an audio input device nowadays! The FT-8800E microphone has a further set of buttons, illuminated by a soft red glow if desired. As well as being equipped with Up/Down buttons, there's a keypad where an operating frequency can be entered directly and four additional buttons that can be programmed to perform a number of different functions (see text).

Product

Yaesu FT-8800E 144/430MHz f.m. mobile transceiver

Company

Yaesu UK Ltd.

Contact

Sales on (01962) 866667

Pros and Cons

Pros: The memory feature that I especially liked is the Hyper memory mode.....while memory scanning, there's also the option to skip some memories and also a useful facility to tag certain channels as Preferential, and scan only these. I liked this option!

Cons: Having all the controls on such a small front panel means that the knobs themselves are tiny. For example, I found it quite fiddly to turn the tuning and volume controls.

Price

£339

Summary

This transceiver is a sensible choice for an all-round mobile rig. It would also be fine for use as a base station for v.h.f./u.h.f. operating. My thanks go to Yaesu UK for the opportunity of evaluating it for PW.

Supplier

Yaesu UK Ltd., Unit 12, Sun Valley Business Park, Winnall Close, Winchester, Hampshire SO23 0LB. Tel: (01962) 866667, FAX: (01962) 856801. E-mail: sales@yaesu.co.uk

switched into a mode where it functions as a full cross-band repeater between frequencies in the 144 and 432MHz bands. Such operation **is not permitted** by the normal Amateur Radio Licence in the UK, but many Raynet Groups have special permits to operate such a facility (referred to as a "talk-through unit") as a manned repeater. The FT-8800 would be ideal for such a unit.

The other opportunity to use the full cross-band duplex capability, would be through an appropriate Amateur satellite. I say "would be" because the most successful and easy-to-use 144/432MHz f.m. satellite, *UoSAT/OSCAR-14*, sadly went out of service in August 2003, due to on-board battery failure.

However, future satellites are planned with a 144/432MHz f.m. mode and the FT-8800 is a good basis for experimenting with such operation. Yaesu seem to have anticipated this potential use by providing a "band linking" mode in which tuning one band automatically tunes the other in step.

Fig. 2

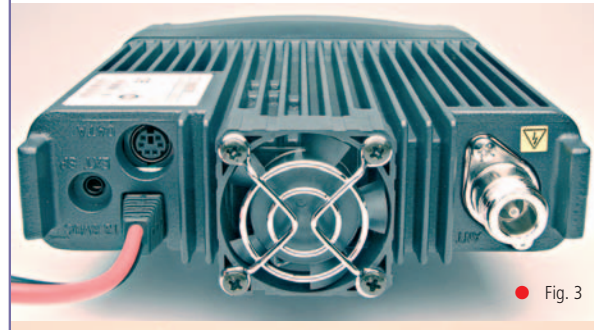


Fig. 3

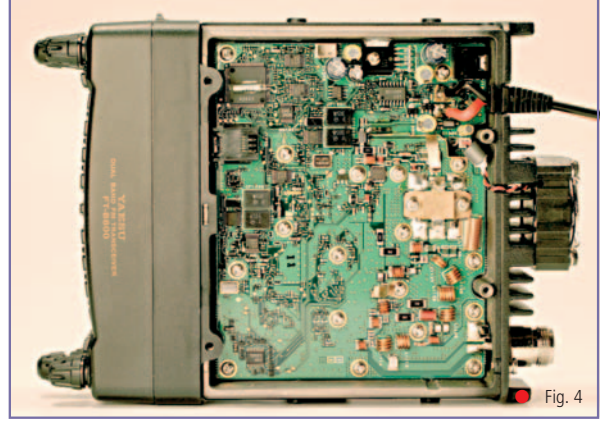


Fig. 4

- Fig. 2: For installation in a vehicle, the front panel of the rig can be unclipped and in conjunction with the optional YSK-8900 separation kit, it can then mounted remotely from the main unit.
- Fig. 3: Cooling for the main unit is provided by a heat sink underneath. There's also small fan that switches on automatically when it's transmitting (see text).
- Fig. 4: Inside (top) view of the FT-8800E transceiver, showing the main circuitry. The cooling fan is mounted centrally on the rear panel with the single v.h.f./u.h.f. antenna connection, provided by an N-type socket is to its right (see text).

Staggering 512 Memories!

Each 'half' of the FT-8800E, left and right, has a staggering 512 memories, each storing frequency, repeater offset (if any), CTCSS tone and output power level. This is far more than any normal user could possibly need!

For example, the last *PW* repeater datacard listed 90 v.h.f. and 169 u.h.f. repeaters in the UK. If you stored every one of these frequency/CTCSS tone sets into memory and used a further 50 memories for all f.m. simplex channels, you'd still have 715 memories left as spare!

To help organise all the memories, you can optionally group them into ten 'banks' and then make just one bank accessible at a time. I could imagine this being useful to create banks that are suitable for different geographic areas of operation, for example.

Each memory can be assigned an alpha-numeric identifier that can appear on the display when it is recalled. Up to six characters can be used, so repeater callsigns, channel designations, etc. can usefully be entered. These are fairly easy to enter, which is a good thing as, unlike some other transceivers, there's no option of connecting the rig to a PC to manage the memory contents via special software.

The memory feature that I especially liked is the **Hyper** memory mode. This provides six buttons on the front panel which store almost every operational setting of the transceiver.

The entire configuration can be stored in each of these simply by holding in the button for two seconds. Everything can then be instantly recalled by just pressing the button.

So you could have different set-ups memorised. These could include, for example, base station use, mobile operating, maybe for several different areas, packet radio working, satellite QSOs, and just recalling the complete setting for the desired operation with a single button press. As you've probably gathered, I really appreciated the operational simplicity of this feature!

Scanning Functions

The scanning functions on the FT-8800E also provide everything that I would expect. For example, in **VFO** mode you can scan all frequencies, or a range of 1, 2 or 5MHz above and below from the current frequency (or in one of ten programmable band limits that you can set up easily in special memory channels).

For memory scanning, there's also the option to skip some memories and also a useful facility to tag certain channels as **Preferential** and scan only these. I liked this option! It means I could load the memories with whatever I liked for various uses, but still retain a basic set of channels (all my local repeaters and the popular simplex channels) to be scanned for everyday use.

All scanning operations are carried out entirely separately on the left and right bands. So you can have two scans running at once it you like!

Many Other Features

There are many other features on the FT-8800E that I can only briefly mention. Some will appeal to some types of user, while others may appear irrelevant.

For packet radio use, there is a 6-pin mini-DIN socket at the rear for the connection to your TNC, with separate outputs for 1200 and 9600bps (I did not try this). There's also an **ARTS** facility, for use with other similarly equipped radios, which informs you if the other station is still in range. This works even when you're not actually speaking to each other, by sending a quick poll signal every 25 seconds with a specified DCS tone, and with your callsign sent in c.w. every ten minutes.

There's also an autodialler to send a sequence of DTMF tones, plus the most intriguing **Internet** mode, which is entered by pressing in the volume control on either band. I was disappointed to find that all this did was to send a DTMF tone at the start of each transmission. Apparently this is needed when using the **Internet Wires** system, Yaesu's own repeater internet-linking system that is used in the USA and Japan, but has not caught on in Europe, where the Echolink system prevails.

Well Featured

In conclusion, I think that the FT-8800E is a very well-featured dual-band transceiver. It contains many well thought-out operating options and although I would find only some of these useful, they include every facility that I could think of for a v.h.f./u.h.f. mobile rig. I may, however, find it hard to get used to those fiddly tuning controls.

With its effective on-air performance, in particular the good-sounding audio, this transceiver is a sensible choice for an all-round mobile rig. It would also be fine for use as a base station for v.h.f./u.h.f. operating. *PW*

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The Vectis Run Part 2

By Rupert Templeman

It's January 1939. Travelling Wireless Technician-Salesman Alan Edwards is on his monthly visit to the Isle of Wight; 'The Vectis Run'. Staying in Freshwater…he's about to find something unpleasant has happened overnight. Without realising it, he's slowly being drawn into the world of murder, technical espionage and political intrigue.

It was the postman's early knock which brought the news that Alan's van was damaged. Indeed, it was the postman himself who'd spotted both the offside tyres had been well and truly punctured. His urgent knock had woken Alan and his friends Arthur and Freda Cotton.

"The postman doesn't usually bang on the door like that at seven in the morning" Freda said – peering around Alan's door from beneath her customary overnight curlers.

Arthur, still in his pyjamas and dressing gown wheezed into the room…"Yes, he normally comes back again on his bike if it's something important needing to be signed for" said the Great War veteran. Recently as Chief Air Raid Protection Warden for Freshwater and the Totland Bay area, Arthur had been getting a great deal of post, but this time the postman's knock had seemed urgent and he'd seemed very concerned.

Alan's bedroom window was the only one overlooking the road and they were all soon staring down in to a damp dawn. It was only just getting light enough to see the postman, despite the nearby streetlamp.

"What's up George"…bellowed Arthur over Alan's shoulder. Alan, still half asleep and unprepared for his friend's shout literally jumped an inch off the floor and thought that being gassed in the trenches in 1917 hadn't reduced the power of his Royal Signals Sergeant's voice!

The postman, peering up from the road shouted back: "You'd better come down and see Arthur….both off-side tyres are flat. Alan will have some trouble changing them". The postman then detached his bicycle lamp and was soon intently checking over the van's other wheels.

Within moments Alan and his hosts joined the postman surveying the damage. It was then they all realised the tyres weren't just punctured, they'd been slashed repeatedly. It was certainly deliberate damage, perhaps even sabotage: "But who'd do such a thing"? Asked a shocked Freda.

Alan, his voice reflecting his concerns answered; "I don't know who did it…but I've got a big problem now folks. I've got to be in Ventnor by 10 o'clock this morning…and it looks as if I'm not going anywhere for a while. There's nothing else for it, I'll have to telephone Mr. Hayter my Boss and he won't be happy".

"No you don't Alan" came Freda's feisty voice…"at least not until you've had your breakfast. He'll be in the office in Bournemouth by the time we've finished"!

Together they all enjoyed the local eggs and bacon and several mugs of strong tea but Freda was surprised to find that the topic of conversation wasn't the van and its tyres. Indeed no, Alan and Arthur were discussing the strange interference on the Alexandra Palace television service from London. Unfortunately though there wouldn't be a chance to 'look in' on the pictures because the transmitter wouldn't be back on the air again until later that day.

Alan's telephone call to his Boss was much more difficult than he had imagined. John Hayter was fully aware that his best-qualified and otherwise most efficient salesman-technician wouldn't hurry when he was on the Island. He gave Alan a really rough time and inferred that the problems were all due to the young man's bad driving!

Slowly replacing the receiver onto its candlestick holder Alan smiled hesitantly. "Well at least he's arranging for a garage to come out. In the meantime I've got to sort out my stock in the van, telephone Ventnor Wireless to say I'll be late and look after your needs," he said, promptly selecting several new EF50s from his small trade sample case. Freda knew that once they got talking about this wonderful new valve…she'd never get a word in edgeways. In any case it was nearly time to open up the shop.

On The Road

Three hours later the old van was rattling along the 'Back of Wight' road heading towards Chale and eventually Ventnor. As he drove, with the window right down to avoid the exhaust haze, Alan was deep in thought. The news from the garage mechanic had worried him greatly; the tyres had been slashed with "some form of very heavy knife" the man had said.

"In fact, everything nowadays seemed to be becoming worrying", he thought to himself. "What with Air Raid Precautions and gas-mask drill…it seemed as if war was just round the corner".

"…..there never seemed to be many customers entering the dusty little shop".

Then, as he rounded a slight bend in the coast road he caught site of the Dutch Citroen parked overlooking the sea. It was empty, but he never gave it more than a moment's thought as he drove towards Ventnor.

There was a roar of high power engines as two low flying aircraft distracted him as they skimmed overhead. "Hurricanes" he mused as they flashed by, quickly disappearing over the forested downland above Brighstone. "Probably heading for Southampton, or Lee on The Solent both of which had aerodromes" he muttered. Alan wished he was with them – he'd volunteered for the Royal Air Force but had been rejected because of his eyesight. They wouldn't even consider him for wireless work! That confrontation with the recruiting officer had really upset him and more so when the RAF contacted his employer announcing he would be in a 'Reserved Occupation' when war did break out!

The increasing number of houses and people provided ample evidence he was approaching St. Lawrence. Of course, he'd looked to see if the little branch-line train from Merstone Junction was in the platform at Ventnor West. One day – he promised himself - he'd get a ride on the train through the short tunnel under St. Lawrence Down, and get to what Islanders joking called the 'Isle of Wight Clapham Junction' where the Ventnor West route met the 'main line' from Ryde to Newport and Cowes. He'd already ridden on the train from Freshwater to Ryde via Newport, when his van had broken down last summer. John Hayter had taken some convincing that the van had really broken down!

Very soon he was entering the outskirts of Ventnor, driving past the huge old 'open air' hospital for patients with tuberculosis. He shivered involuntarily – remembering that the patients would be in their beds in the open air even in January. But it worked because whenever he visited the hospital to check or repair their wired relay wireless system, he rarely saw the same patients twice.

The van arrived outside the slightly dingy looking shop displaying a peeling sign proclaiming "Ventnor Wireless – Everything For The Listener'. It was obvious - Karl Rheibach hadn't got round to sprucing up his shop front yet. It seemed that this mysterious gentleman who had literally appeared overnight from somewhere in Europe in 1933 – wasn't too worried about paint. But at least he seemed to care for his few customers and was in turn a good client of Southern Wireless.

In fact, Karl Rheibach was by far the best customer for the *Every Ready Winner* high-tension batteries, even though mains electricity was available in the town. Another thing that often puzzled Alan was that there never seemed to be many customers entering the dusty little shop.

Although Karl Rheibach, a short dark dumpy figure who never seemed to wear anything lese other than a scruffy old brown cardigan with a faded green check shirt, was friendly and spoke English very well, he never seemed to want to chat. Despite this, Alan was aware that this man knew a great deal about wireless. In fact, when Alan had received a telephone call from Arthur Cotton to say he'd left a case of valves behind during a visit last summer, Alan had seen a noticeable upward unguarded twitch in Karl Rheibach's eyebrows as he discussed television receiver valves. "One day" thought Alan; "I might get to know what his real speciality is"!

A Long Day

Alan soon became very busy talking to Karl Rheibach – although it was all strictly business and he spent several hours demonstrating a new valve tester to the shop owner. It had been a long day and they'd seemingly tested every valve in sight. However, at least half a dozen customers came into the shop - the largest number he'd seen at Ventnor Wireless!

Eventually it was time to go and Alan was pleased to have an order for a complete valve testing system with test cards for many different valves, including the new television types. An order for £70 was a feather in his cap and he knew it!

Driving along the narrow, very steep streets of Ventnor he passed the water cascade tumbling down through to the Winter Gardens. The water originated from St. Boniface Down which dominated the southern facing hillside-clinging town, although the water itself actually flowed from the Southern Railways Ventnor tunnel.

Alan was heading for Joe Primmer's house. Joe was another good friend. Alan had met him through his wife who ran a very small guesthouse next to Ventnor station, high above the town. It was close to Joe's work base as the Inspector at the Southern Railways' Ventnor Permanent Way Department. Their home was next door - indeed so close that many visitors thought it was the same establishment - to the *Railway Arms*…famous for its locally brewed beer-made with the 'St. Boniface Water'.

Mrs. Primmer was out when he arrived so Alan decided to wait in the van…catching up with his paperwork. In fact, he was deep in concentration when the van rocked slightly and the nearside door opened…and the ruddy face of Joe Primmer appeared. "How do ye' do Alan" he called; "Come on in I'll make you a brew of tea".

The Primmer's small parlour was warm and the room was still scented from the sleeper kindling which had recently lit the coal fire – a reminder a railwayman lived in the house. While enjoying the tea Alan learned why Joe was at home during the afternoon; "We're working nights at the moment Alan" – he said "and we're getting ready to work in the tunnel although the men aren't looking forward to it".

Alan's raised eyebrow encouraged Joe to continue his story. "Yes my friend…I've got a problem…the old ghost stories have started again". He went on to explain that the legend of the ghost of a Victorian navvy tunneller who'd been killed building the railway had frightened the permanent way gang.

"I've got a job to get them in there at times" said Joe, looking unusually grim-faced… "And this very afternoon one of my most experienced men was found dead at the Shanklin end of the tunnel not far from Wroxall station. He had head injuries but didn't appear to have been hit by the mid-afternoon train".

Joe continued, "Yes, Pat Dunne was a good man. He came through the Great War without a scratch, although he lost a brother. He could also speak fluent German, having been a prisoner of war camp guard".

Hearing his friend's words…a sudden chill passed through Alan's slight body. He'd overheard German being spoken and strange things had occurred. Was there a connection…or was he going mad? What **was going on?**

To be continued….

An Inverted L for small gardens

Len Paget GM0ONX describes his five-band inverted-L for small gardens. It may be just the job for your garden too!

Fig. 1: The overall layout of the Five-band inverted-L antenna, it's mounted in a far corner of GM0ONX's garden.

Very few of us these days have gardens that will allow the 'traditional' 40m long dipole (for the 3.5MHz band) to be erected. Fewer still have space for the doubled sized dipole for 'Top Band'. So, essentially, this means for many of us that 3.5MHz is totally out of the question. Or such a full-sized antenna has to be bent into various contortions to get it to fit in the available space.

The antenna I'm describing here was intended to allow operation on both 3.5 and 7MHz in less than half the space of a traditional dipole. However, it will, in most instances, give a performance equal to, or greater than, its full size cousin.

I'd describe myself as a lazy DXer, and by that I mean 'I'll take it if it's there'. With this antenna, I've had a lot of fun working stations in North and South America, North Africa and the Middle East on 3.5 and or 7MHz, something I could never achieve with a G5RV antenna contorted to fit into my garden.

Kilowatt Scrum

In general I find that if I can hear a station - I can work it, provided it's not part of a 'kilowatt scrum'. The antenna will also give good account of itself on 14, 21 and 28MHz being electrically similar to the W3DZZ trap dipole.

The standing wave ratio (s.w.r.) of the antenna system on the upper h.f. bands, is higher than the reading on either 3.5 or 7MHz, but it's no worse than the

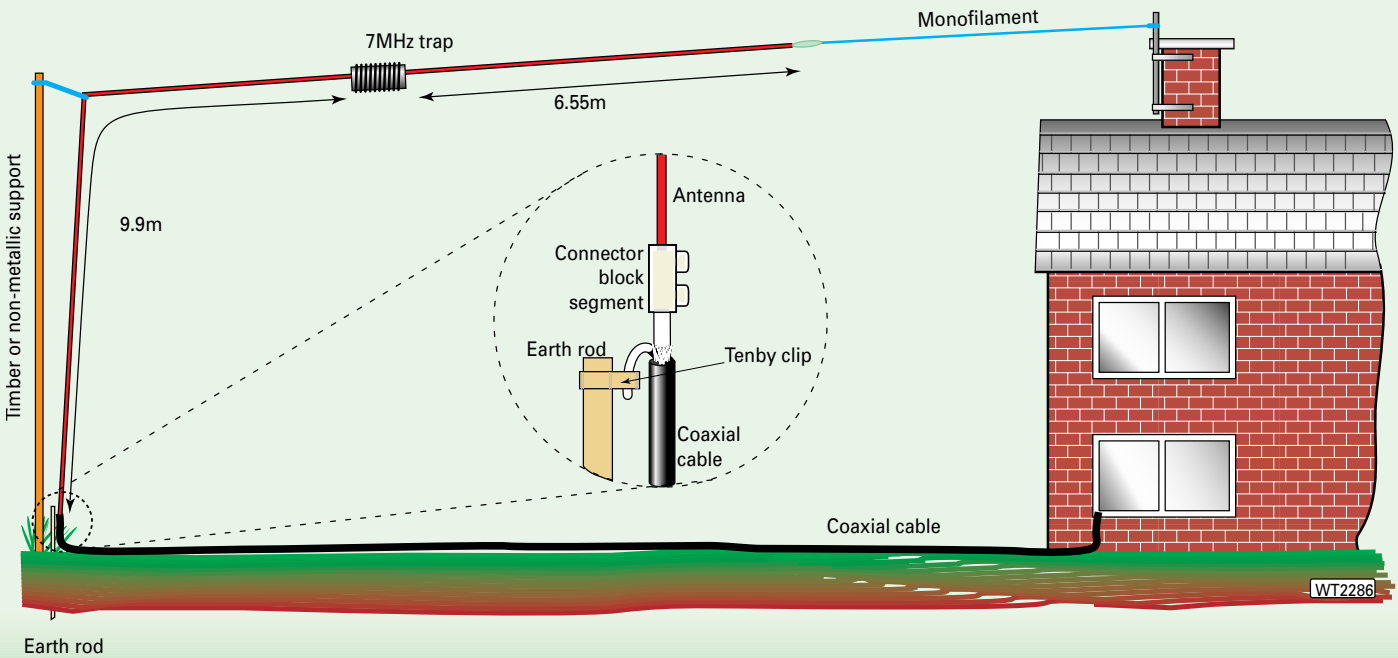
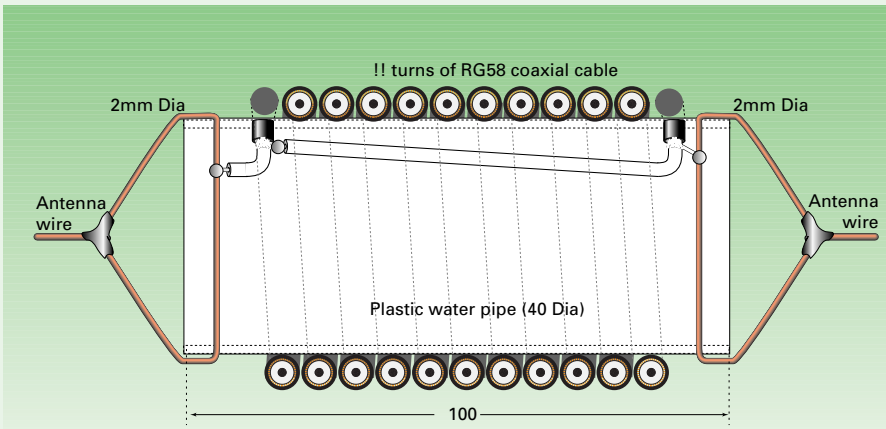


Fig. 2: After the trimming adjustments, the bottom of the antenna is covered in a thick covering to waterproof the join. The join itself and the 'Tenby' clip are seen in the inset photograph.



traditional W3DZZ trap dipole. The antenna system will almost certainly require some impedance matching to suit rigs with solid state power amplifiers - again, this is just like the W3DZZ antenna.

Antenna purists will often tell you that an antenna of this type requires radials, or a sophisticated earth system for optimum performance. But in practice the antenna works very well with a modest earth system, although this is dependent on soil conditions. Fortunately, for me in the south western area of Scotland we're 'blessed' with more than our fair share of rain, together with a very clay-rich soil, usually just below the surface.

Because of the rain and clay soil blessing, a good r.f. earth is assured with only a single one metre long earth rod. But should you have a rather more sandy soil in your area, you may require to install longer earth rods or an earth mat to achieve an acceptable r.f. earth. It's very much cases of 'suck it and see' - though not literally of course!

The prototype antenna was constructed from a heavy enamelled copper wire (2mm diameter or 14s.w.g.) obtained free as an end-of-roll gift from a local armature winder. There's a single 7MHz resonant trap to make it more efficient on that band.

General Layout

The general layout of the antenna and the theoretical lengths of the antenna are shown in the illustration **Fig. 1**. The antenna is fed with 50Ω coaxial cable, with the coaxial screen connected to the earth rod. This connection is secured using a 'Tenby' earth clamp intended for earthing water pipes and available from most d.i.y. centres.

The centre core of the coaxial cable is connected to the antenna wire via a single 15A 'chocolate block' connector. After double checking these connections and continuity, the whole area is covered with Denso tape, **Fig. 2**, to waterproof it. No balun or other matching network is needed for 3.5 and 7MHz as the antenna's feed-point impedance is close to 50Ω.

The 7MHz trap is constructed from 11 turns of RG58 coaxial cable wound on a 100mm piece of 40mm diameter plastic drainage piping as shown in the illustration **Fig. 3** and the photograph **Fig. 4**. In this type of trap the coaxial cable acts as both capacitor and inductor and is capable of working at power levels in excess of a kilowatt.

It's imperative that screen and centre cores of the coaxial cable are parted as close to the point the cable passes through the hole in the pipe as possible. This is to ensure the correct value of capacitance and inductance. The centre core of one end of the coaxial cable is soldered to the screen at the other end.

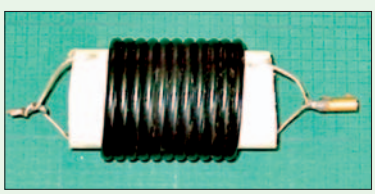


Fig. 4: A photograph of the finished trap, before sealing against moisture ingress (See text for more detail).

As with the antenna feed-point, the ends of the coaxial trap and other joints must be weather proofed. The capillary effects of coaxial cable are legendary and water ingress will totally ruin your trap. Any sealant must be of the non acetic acid type, (i.e. it doesn't smell like vinegar) to prevent cable corrosion.

The height at which the antenna folds over from vertical to horizontal is not critical but generally the higher it is the better. Extra height, not only aids the DX performance of the antenna but also significantly reduces the amount horizontal space required.

Tuning the antenna is quite simple but it is imperative that it is done in the correct order. Firstly cut both sections of the antenna about a half a metre longer than dimensions shown in Fig. 1.

Tuning Operation

To start the tuning operation, begin on 7MHz and trim the wire length at the end nearest the earth connection 50mm at a time until the lowest s.w.r. is achieved. I managed an indicated s.w.r. of less than 1.2:1 over the whole of 40m.

Then move to 3.5MHz and repeat the process, but this time **trimming the side of the antenna furthest away from the earth** i.e. the side nearest the house in Fig. 1. The s.w.r. on the 3.5MHz band should be less than 2 to 1 over the whole of the band falling to about 1.2 to 1 at the point of resonance. So. it's worth setting the lowest s.w.r. at the section of the band you normally use, if you have a preference.

The antenna can be made in a weekend with plenty of time left over to work that elusive DX. Having a very low visual impact most Local Authorities Planning Departments can be convinced that it is a 'minimalist' installation not requiring planning permission, **however this should be confirmed with your local planning office**.

I've had a lot of fun using the antenna and thoroughly recommend it to anybody not having enough garden room to erect a full size dipole in the optimum direction. So, why not chat up your local electrical motor rewinding company for the wire to make your next antennas?

pw

Fig. 3: A cross-section of the 7MHz trap made from a length of 40mm diameter, plastic pipe and some RG58 coaxial cable. (See text for more detail).

A RADIO AMATEUR'S ALADDIN'S CAVE

Never one to miss a bargain, Quentin Cruse GW3BV offers some advice on finding Amateur Radio gear on the Internet.

Where do you buy most of your Amateur Radio equipment? Like me, no doubt you are always on the look out for a bargain. Perhaps you look through the classifieds or Bargain Basement advertisements here in *PW*. Maybe you pick-up bargains at rallies or Silent Key sales. However, there is one place that you may have overlooked - the website **www.ebay.co.uk** an Internet auction site.

Everything imaginable is sold on the ebay auction site from cars, houses, jewellery, clothes, electrical appliances, Amateur Radio equipment and much more. During the first three months of 2003 over 5.6 million items were listed on eBay in the UK alone.

On any given day you can find over 1100 different Amateur Radio items for sale on the eBay site. Whether you want a classic Eddystone radio or the very latest hand-held from Yaesu, this is the place to look. Equipment for use on the l.f., h.f., v.h.f., u.h.f. and microwave bands, components, antennas, wartime radios, books, magazines and much more can all be found.

Getting Started

To have a look at items for sale go to **http://listings.ebay.co.uk/pool2/plistings/list/all/category1502/index.html?from=R0**. This will take you straight to the Amateur Radio section. Alternatively go to www.ebay.co.uk and browse around.

When you get to the Amateur Radio section you'll find a long list of items for sale. There will be a brief description of each item, the current price and how long is left until the auction finishes.

Let's say you find an item you like the look of, for example, a Yaesu FT-101ZD. Click on the item and you will be taken to the appropriate page. In most instances you will find a detailed description and a photo of the radio, you will also see the current price. Also on this page there will be a selection of links that enable you to ask the seller a question, find out more about the seller and if you are really interested in the item, place a bid.

The main concern most people have about buying an item from ebay is trust. How do they know that the person selling the radio is genuine? After all chances are you won't know the seller and he/she may live many miles away.

However, the 'trust' factor is where ebay comes into it's own. Everyone who sells or buys on Ebay has a 'Feedback Rating', which is basically a history of all the seller's transactions carried out on ebay.

● The Rascal PSK31/RTTY interface was a particularly good find for Quentin GW3BV.

The Feedback Rating works like this: After a transaction has been completed the buyer and seller leave a short comment about each other and how the transaction went. This comment is positive, negative or neutral. The feedback is then available for all to see who visit the site and view items for sale and is there to help **you** decide if an individual is trustworthy or not.

If an ebay user has negative feedback - be very cautious. Perhaps they have sold an item but it was never received or maybe when it arrived it wasn't working or was not as had been described. It's also possible that an 'ebayer' won an auction but never paid.

Occasionally misunderstandings do occur though and one negative comment does not make that seller a bad ebayer. But, more than one comment and then there may well be a problem, so exercise caution.

Preparing to Bid

If you have decided the seller is reputable then you may wish to place a bid. If you are at all unsure about the radio, ask questions such as: 'Has the item been modified in anyway?'; 'Is it a European version?'; 'Does it come with a manual?'; 'Has it got additional items that were standard when the item was new?', etc. This is especially important with radio equipment.

If the item is a lesser-known brand, converted p.m.r. or home-brew, it's certainly advisable to

ask questions as these items may not do everything you think they should. A genuine seller will be more than happy to answer your questions and put your mind at rest.

Before bidding you will have to register with ebay. You will need to enter a credit card number. This isn't used, but helps to confirm the age and identity of those who use ebay. Registration doesn't take long and will give you other advantages such as having a 'watch' list, which is a list you create of items you are interested in or are bidding on.

So, now it's time to place a bid. First and foremost you need to decide how much you are willing to pay and stick to it. Always take into account postage costs. Normally this will be listed but if not, find out. Some older radios are not exactly light and the postage can be a bit of a shock!

● Not only a keen Radio Amateur, Quentin is also a keen ebay bargain hunter - follow his advice and who knows what 'gems' you may find.

For example if the starting price on the FT-101 is £50 and you are prepared to pay up to £200. This is where ebay gets clever. If you type in your bid of £200 and you are now the highest bidder at £50. The ebay site will then automatically bid incrementally for you up to your limit of £200.

For example someone else puts in a bid of £100 on the rig. You are still the highest bidder, but the price is now £105.

If someone's bid is more than £200 then you are no longer winning and you will receive an E-mail to let you know. It is then up to you to try another bid, if you can afford it.

Some items will be listed with a 'Buy Now' price. Perhaps in the case of our example FT-101 this would be £300. If you bid that amount the auction ends immediately and you have won. Buy now prices are usually a little more expensive but it does guarantee that you win.

Know The Market

Make sure you are well aware of the market price for an item you wish to bid on. Occasionally people get over-excited and end up paying more for an item on eBay than new from a dealer!

For example a used 144MHz 5-element Maspro Yagi was sold for £24 plus £6 postage. New from Waters and Stanton the same Maspro Yagi was being sold for just £2 more including postage. So be careful and find out how much things are worth before you bid.

● Everything from components to complete stations can be found for sale.

So, you have won the Yaesu FT-101ZD. There are various ways to pay - cheque, cash, postal order, bank transfer or Paypal. Paypal is run by ebay and enables you to pay with your credit or debit card, very quickly and easily. A cheque is okay, but be prepared to wait for a couple of weeks before receiving the item.

After you have bought your item don't forget to leave your feedback. If you have had a positive experience, say so. If not, try to resolve the matter with the seller first.

Ninety-nine percent of the time there will be a good reason for any problem you've encountered. Hear the buyer out before taking action.

If you do have a genuine problem, notify eBay, as they'll be able to help. Then leave negative feedback to warn others who may deal with the individual.

● An Aladdin's Cave of Amateur Radio equipment can be found for sale on the Internet eBay auction site.

Time To Sell?

So, what about selling equipment on ebay? This is easy and can be profitable. I would however, recommend doing some buying first as this gets you used to ebay and will help you build up good feedback.

The process for setting up an auction is straightforward. Here are a few suggestions:

● I consider it essential to have a photograph of the item you are selling. Few people bid on items that they can't see! Any photo is better than no photo. Be very honest in the description, if you are not you may well get negative feedback and your life on ebay could be difficult. If the item is in excellent condition, but has a small scratch, say so.

● Try to view the item as if you were the buyer. What would you want to know? What would you pay for it and set your start price accordingly. If your start price is close to what you expect to get for it you may not get many bids. Buyers need to think they stand a chance of getting a bargain, even if they end up paying close to what you want anyway.

● You can set a reserve price. This means you could start the bidding on an item at £30 but have a reserve of £60. If the highest bid at the close of the auction is £55 you don't have to sell. I personally think these are a waste of time and they do tend to put people off. Once you are established on ebay you will be allowed to use 'Buy Now' prices for selling. If the item you are selling is popular, you may well get a very good Buy Now price for it.

● As with buying, you need to know how much the postage costs will be. If it is an expensive item take out insurance on it. It won't be expensive and could save a lot of trouble. Unless you know the buyer well, do not send the item until payment has cleared. You could end up losing the item and your money.

● Selling is also where ebay itself makes money. You will be charged a very small fee to list your item, ebay will also take a small percentage of the final sale price. Please don't let this put you off as it is a small amount and well worth it.

Final Warning

I've had many good experiences of buying and selling through ebay and some of the items I have bought are pictured in this article.

So, did I find any real bargains? Often, yes but more importantly it was a case of finding what I wanted when I wanted it. For example the Rascal PSK31/RTTY interface was for me a great find and I'm very happy with it.

The only problem with ebay and Amateur Radio is that it is addictive!.You may well find yourself checking the website every day to make sure you don't miss a good deal or that elusive valve or radio. There area a lot of interesting radio related items out there, all you have to do now is go and find them.

I hope to conduct a transaction with you soon, or perhaps work you using a radio bought on ebay. Have fun, happy surfing!

pw

A Direct Conversion Receiver For 80 metre SSB/CW

First published in the August 1971 *PW*, the Direct Conversion Receiver for 80 metre SSB/CW project by R. F. Graham will be welcomed by valve enthusiasts and intrigue newer readers! In fact, our Editor says "It could even be your first valved project".

Editorial Note: This project features the use of Denco coils. Please don't let this discourage you from trying it out for yourself. Although Denco coils aren't made anymore, I can assure you that winding the coils yourself (I did it myself back in the early 1970s) is extremely straightforward - especially if you have access to a dip-meter. Another factor which I hope will encourage readers to 'have a go' is that all the valves (if not in your junk box already) are still available. The circuit is very flexible and my own version used an EF91 for V1 and an ECL80 for V4. It's even possible to use the ECC83 a.f. double triode in place of the 12AT7. I hope you enjoy building this project as much as I did in the 1970s!
Rob Mannion.

Classic Project

Archive scanned photograph showing the author's original prototype receiver. The 'Muirhead' type dial is still often seen at club junk sales. The Editor's advice is...buy them!

This article describes the design and construction of a simple receiver using commonplace valves. As anyone who has become interested in the reception of single sideband and c.w. (Morse) signals knows, the usual type of receiver for a.m. (amplitude modulation) reception is not able to resolve these transmissions. An extra stage is required.

When a beat frequency oscillator (b.f.o.) is present in the receiver, s.s.b. and c.w. can be received and modern communications receivers have a b.f.o. Older communications receivers having a b.f.o. to allow reception of s.s.b., but this can cause some difficulty unless the operator is experienced.

To clarify requirements for s.s.b./c.w. reception, **Fig. 1A** shows the stages of a typical superhet. (**1**) is the r.f. amplifier, which amplifies signals at the received frequency. (**2**) is the mixer, with oscillator (**3**), which may be separate or combined in a single frequency changer. Output from this section is at a fixed intermediate frequency and passes through the i.f. amplifier (**4**) to the a.m. and product detector circuits (**5**).

With domestic type receivers, the detector stage is used for a.m. only. The signals are demodulated and passed through the audio amplifier (**6**) to the speaker (**7**).

Where the receiver is intended also for s.s.b./c.w. reception, (5) incorporates a product detector and a beat frequency oscillator - the extra stage mentioned - (**8**) is also provided.

When s.s.b. signals are received, the b.f.o. supplies an unmodulated r.f. input, which replaces the 'carrier' which is suppressed in s.s.b. transmissions. This 'local carrier' and the s.s.b. signal from the i.f. amplifier (4) are combined in such a way as to give an audio output, which passes to the audio amplifier and speaker.

For c.w. reception, the output of the b.f.o. (8) heterodynes with the c.w. coming through the i.f. amplifier (4) to give an audio tone. This is then amplified and fed to the speaker (7).

Direct Conversion

The circuit, **Fig. 1B,** shows a direct conversion receiver and its much greater simplicity is obvious; (**1**) is the r.f. amplifier, tuned to the required signal in the usual way and fed to a product detector (**2**) which also receives input from the variable frequency oscillator (v.f.o.) is shown in (**3**). The v.f.o. covers the band upon which reception is wanted.

The circuit is so designed that an audio output is obtained directly from the product detector (2) - hence the term 'Direct Conversion'. This is then amplified by stage (**4**) and routed to the speaker.

When receiving s.s.b. only those s.s.b. frequencies which combine with the v.f.o. frequency to give an audio output will be heard. Because of this factor the selectivity of the receiver does not depend upon the r.f. amplifier or product detector signal frequency circuits, but upon the selectivity of the audio stages.

The apparent selectivity is achieved because unwanted signals are combined with the v.f.o. in stage (2). This produces outputs which are not in the audio range of stage (4).

To receive c.w., the v.f.o. is

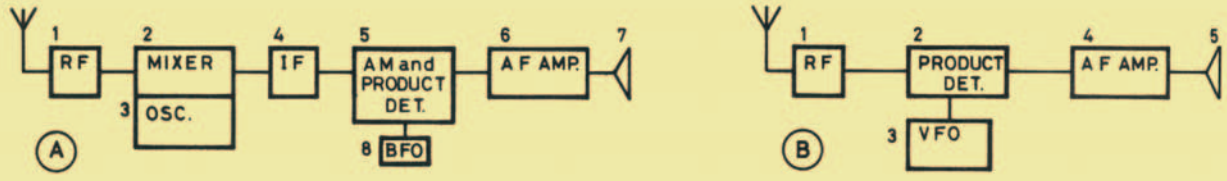


Fig. 1: Block diagram of a typical superhet receiver (a) and a Direct Conversion (DC) receiver (b). See text for further details.

tuned to one side of the c.w. carrier to give an audio output from the product detector. Incidentally, this particular circuit is not really suitable for the reception of a.m. signals which require the local carrier to be phase locked to the a.m. carrier.

Lively Performance

The receiver described here will be found to give a very lively performance. As it's assumed that anyone just becoming interested in the reception of Amateur s.s.b. and c.w. may not have much in the way of calibration or test equipment, the v.f.o. is designed to use three 1% tolerance capacitors and a coil with an adjustable core.

It's only necessary to set the core to give 3.5MHz band coverage. The radio frequency circuits are peaked for best reception*.

The complete circuit is shown in **Fig. 2**. The valve, V1 (6BA6) is the r.f. amplifier. It includes the gain control VR1, while the inductors L1 and L2 are tuned by VC1/2, which are parts of a small ganged capacitor for the r.f. tuning control.

Next we come to V2 (12AT7) which is the product detector. Here the wanted signal is presented at one control grid and injection from the v.f.o. at the other grid. Audio output from the second anode passes to the two stage audio amplifier, with the potentiometer VR2 acting as the volume control.

The valve V3 (EC90) is the v.f.o. covering 3.5-3.8MHz with a little to spare. The variable capacitor, VC3, is operated through an epicyclic slow-motion drive and although tuning is quite critical it's eased somewhat by the narrow band covered by VC3.

Coverage is determined by L3 and the three capacitors C14, C15 and C16, in parallel with VC3 so it is only necessary to adjust the core of L3. Because of the large value of these capacitors, changes in capacitance around V3 have little effect on its frequency.

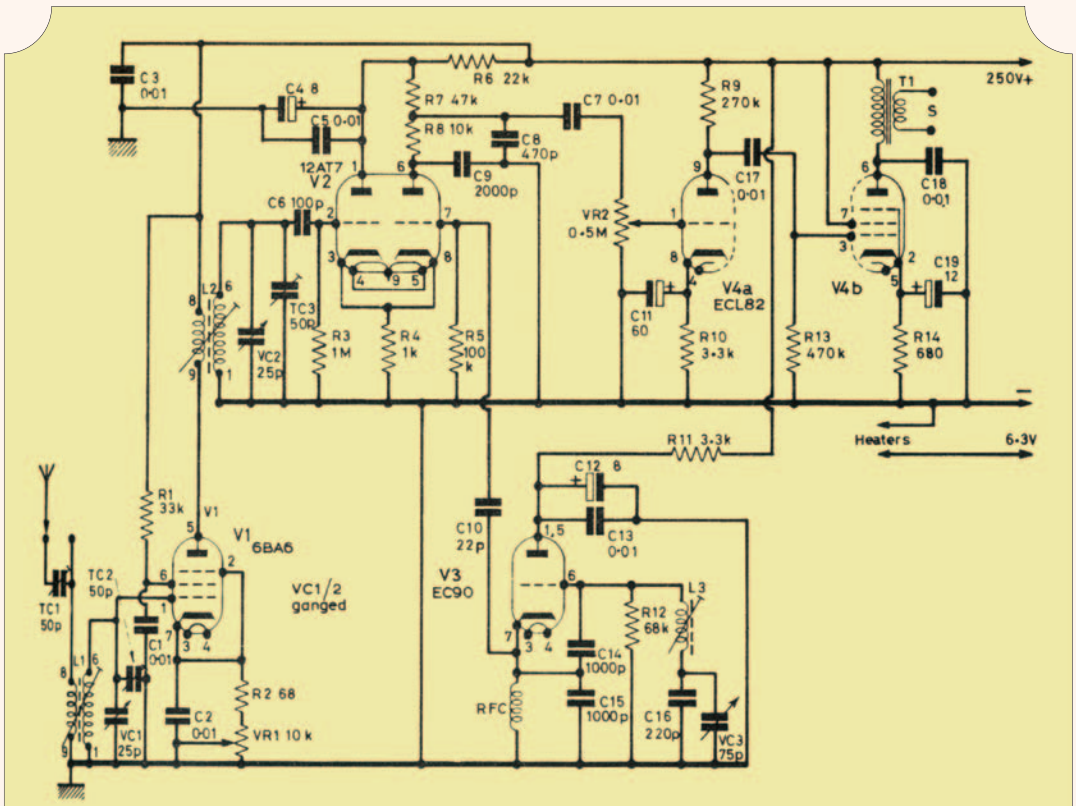


Fig. 2: Circuit diagram of the valved Direct Conversion (DC) receiver. See text for valve types and possible alternatives.

The capacitors C5 (V2) and C13(V3) are r.f. by-pass capacitors with C4 and C12 in parallel with them to avoid hum from h.t. supply and reduce audio feedback effects. The receiver is intended for use with a supply of about 220-250V at 40-50mA with the heaters drawings 1.53A at 6.3V.

**Note:* *Please read the heading note regarding the use of Denco coils.*

Aluminium Chassis

The chassis*, prototype shown in **Fig. 3**, was an 8 x 4in 'universal chassis' flanged member (**Fig. 4** shows the underside lay-out). This allows a complete case to be assembled by using two further 8 x 4in members, top and bottom, with two 6 x 4in members for the sides. The panel is 8 x 6in and the surface of the chassis is 2in above the bottom edge of the panel.

The variable capacitor VC1/2 is bolted to the panel, TC2 being soldered to a tag and VC1 as shown. If you are using Denco coils, the antenna coil L1 must be screened with the aluminium can supplied.

The can lid is secured to the chassis by the fixing bush of L1. Leads for TC1 and VC1 pass out near the chassis. On my prototype the lead from pin six passes through the chassis to tag 1 of V1. The trimmer, TC1, is mounted on a strip of insulating material. A1 and A2 are operational aerial connections.

The variable capacitor VC3 is fitted so that its spindle is able to couple with the epicyclic ball drive**. The slow-motion drive is then lined up so that it rotates freely and its lid is held with a long bolt with extra nuts. The lead MC3 from VC3 in Fig. runs to a tag bolted to the chassis near L3.

***Note:** The author's prototype used a Home Radio (remember them?) 'Universal Chassis' and is no longer available. However, this project can be successfully built using copper clad printed circuit board (p.c.b.) as the 'chassis'. Holes for the valve holders can be scribed out- or chassis punches used (My B9A metal chassis punches make an extremely neat*

Classic Project

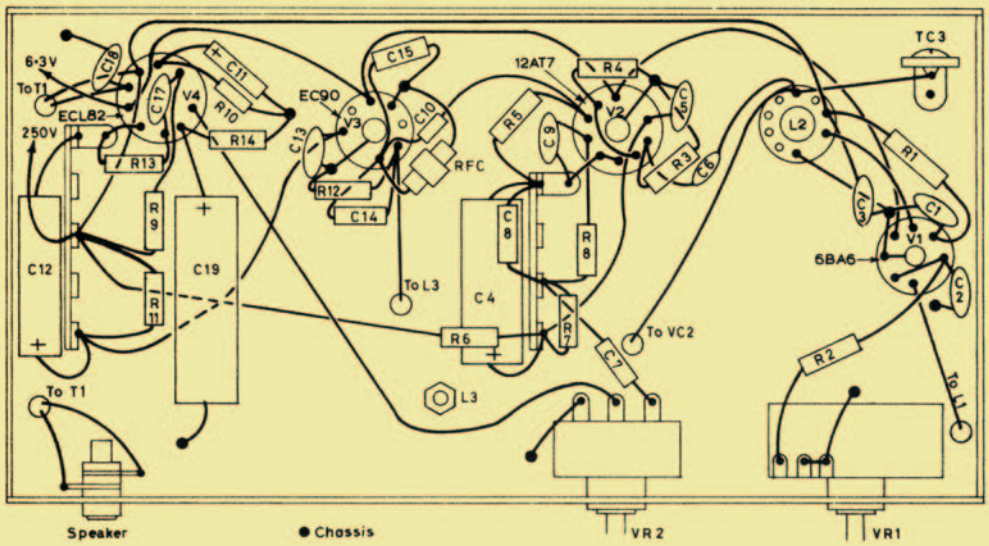


Fig. 3: Archive drawing of the author's original project using an aluminium chassis. Modern alternatives for the aluminium chassis are available (see text).

hole in p.c.b. material. Incidentally, p.c.b. type valve holders seem to be freely available on the surplus market and new. They're very easy to work with and can be soldered into place. **Editor**.

****Note:** *When I built the original project I used a simple front panel (A Formica floor tile suitably shaped) on 'stand off' bolts, to provide clearance for the epicyclic drive behind the panel, between it and the chassis. The same technique can be used if you adopt the p.c.b. 'chassis' approach.* **Editor**.

Audio Output

The primary (P) connections of the audio output transformer, T1, run through to pins 6 and 7 of V4. Secondary leads (S) go to a small panel jack, for speaker or headphones. An old loudspeaker removed from a valved receiver (usually around 3Ω) will be suitable.

Note: *Modern low impedance headphones (using miniature moving coil loudspeakers) of around 8Ω impedance will also work well in this project.* **Editor**.

Denco Coils

When using the Denco 'Range 3' coils listed, Blue for L1 and Yellow for L2, adjustment of the cores and TC2 and TC3 provides easy coverage of 3.5MHz and VC1/2 need not be exactly 25pF. (Don't forget - if you wind your own coils - to use formers with tuning cores).

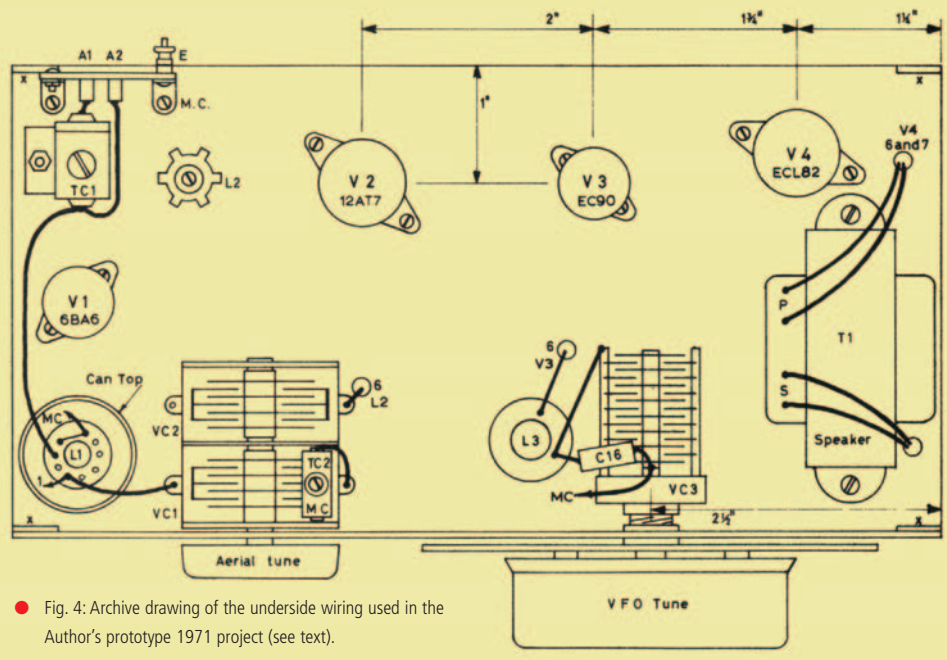


Fig. 4: Archive drawing of the underside wiring used in the Author's prototype 1971 project (see text).

The inductor L3 is 30 turns of 26s.w.g. enamelled wire, close wound on a 1/2in diameter former with adjustable core. The winding is located near that end of the former furthest from the chassis, with the windings sealed with a light dab of wax.

Wiring: Wiring will depend on the method of construction you choose. However, the heater, grid and anode leads are run close to the chassis. Trimmer TC3 has one tag bolted to the chassis, so that it can be adjusted from the rear.

All connections should be reasonably short and direct, run as shown. The v.f.o. wiring, especially to L3, C16 and VC3, is of stout wire, kept as short as possible.

In the prototype tag strips were

used to support various small components. You can use a 3-cored cable or coloured single flex twisted together for h.t. positive, 6.3V and common return connections - brown may be used for h.t. positive, blue for chassis and some other colour for the 6.3V heater supply.

A power supply capable of providing 250V d.c. at approximately 60mA should be perfectly adequate for this receiver. For best results ensure that the high tension (h.t.) 'smoothing' is as good as you can - the least 'ripple' there is on the h.t. rail the better, particularly when you listen on headphones.

The 6.3V a.c. supply for the valve heaters should be able to provide 1.5A. The current demands from the project are such that a recovered (from an old broadcast receiver perhaps) transformer will be suitable.

Receiver Alignment

To start the alignment process you should set TC2 and TC3 to approximately the half-closed position. Then with VC3 nearly fully open adjust TC2 and VC1/2 for the best volume.

Next (this is best done in the evenings, during darkness when 3.5MHz is busy!) find a signal with VC3 nearly fully closed and peak VC1/2 for best results before rotating the core of L1 for the maximum volume.

The core of L3 will need (particularly if a home-brewed coil is used) to be adjusted so that suitable 3.5MHz band coverage can be achieved. You can check just where the receiver is tuning to by connecting a short antenna and then placing it close to a receiver with known, accurate calibration. It should be easy to detect the presence of the DC receiver's carrier as it passes through 3.5MHz and causes a heterodyne. (If using an older receiver, don't forget to have the b.f.o. switched in).

In Use

In use the r.f. gain control, VR1, can be adjusted to suit the conditions. It's best to keep the gain of the r.f. stage as low as you can to help overloading (the receiver is very sensitive).

When used in conjunction with the tuning and 'peaking' controls - you should obtain some excellent results from what is in effect an extremely simple receiver. This type of receiver does very well with relatively simple antennas ranging from short lengths of wire right up to full size dipole for 3.5MHz.

pw

STOP PRESS
Isoplethics To The Rescue!

Just as we were passing for press on this issue **Tex Swann G1TEX** provided some really good news for intending 'classic project' constructors. Tex had reminded me of the specialist supplier Isoplethics, who have been suggested as a source of those difficult-to-find components in the past. Components they're able to supply include; Plug-in and chassis-mounting coil formers, valved equipment transformers, small valve output transformers, coupling and smoothing chokes, r.f. chokes, air wound coils and transformers and custom aluminium chassis and panels. Ready wound coils, slow motion drives and dials, iron dust cores. Full details of the extensive range offered, prices and P&P can be obtained direct from:

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E-mail: isoplethics@isoplethics.free-online.co.uk
Website: www.isoplethics.co.uk/

G3XFD

Shopping List (from original project)

Resistors:

R1	33kΩ 1W	R8	10kΩ
R2	68Ω	R9	270kΩ
R3	1MΩ	R10	3.3kΩ
R4	1kΩ	R11	3.3kΩ 1W
R5	100kΩ	R12	68kΩ
R6	22kΩ	R13	470kΩ
R7	47kΩ	R14	680Ω

All 0.5W 10% as indicated

VR1	10kΩ potentiometer, wire wound
VR2	500kΩ potentiometer, log

Capacitors:

C1	0.01µF 350V disc	C11	60µF 6V
C2	0.01µF 350V disc	C12	8µF 350V
C3	0.01µF 350V disc	C13	0.01µF 350V disc
C4	8µF 350V	C14	1000pF 1% SM
C5	0.01µF 350V disc	C15	1000pF 1% SM
C6	100pF SM	C16	220pF 1% SM
C7	0.01µF 350V	C17	0.01µF 350V
C8	470pF	C18	0.01µF 350V
C9	2000pF	C19	12µF 50V
C10	22pF SM		

VC1	2 x 25pF gang (Jackson type 02 suitable)
VC3	75pF variable (Jackson type C804 suitable)
TC1, 2, 3	50pF pre-set trimmers

Valves: (See Information panel for suggestions)

V1	6BA6 (EF93)	V3	EC90
V2	12AT7	V4	ECL82

Miscellaneous

Note: The information below is reproduced from the original article for guidance purposes only). L1 Denco 'Blue' Range 3 (valve type), L2 Denco 'Yellow' Range 3 (valve type), L3 see text. 'Epicyclic' Ball drive, (Jackson 4489/C) r.f.c., 2.5mH, 2 off B7G skirted valveholders and screens, 2 off B9A skirted valveholders and 1 screen. Knobs, tag strips, output jack socket. T1, output transformer about 60:1, to carry 40mA (240V to either 6 or 9V transformer suitable - not hi-fi but will work! **Editor**).

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HVU-8 Specifications

- Frequency: 80/40/20/15/10/6/2M/70cm bands
- Type: HF and 6M: wave.
- 2M: wave 2.15 dBi gain
- 70cm: Two 5/8 waves in phase 5.5 dBi gain
- Power: 200 watts SSB on HF and 150W FM on 6M to 70 CM
- SWR: 1.5:1 at fO frequency
- Connector: UHF (SO-239)
- Mast Diameter: 1.0 - 2.36 inches (25-60 mm)
- Height: 8.5 feet (2.62 m)
- Weight: 5 Lbs. 7 ounces. (2.4 kg)

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Maldol HMC-4

Type:	Amateur HF/VHF/UHF mobile antenna
Band(s):	10 m - 1/4-wave 6 m - 1/4 wave 2 m - 1/2-wave 70 cm - 2*5/8-wave
Gain:	10 - 0 dBi 6 m - 0 dBi 2 m - 2.15 dBi 70 cm - 5.5 dBi
Max power:	120 W (10/6 m: 80 W)
Impedance:	50 ohms, M-plug/PL-259
Length:	1.19m
Weight:	390gr
Manufactured:	Japan, 2003-200x
Other:	Suitable for Yaesu FT-8900R.

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The VK5jr is an antenna "Ground Plane" for vertical HF multiband with "traps", covering the amateur bands of 80, 40, 20, 15, 10 meters.

Characteristics

- Bands: 10, 15, 20, 40, 80 meters

Width of band:

- 10 meters: 1400KHz
- 15 meters: 300KHz
- 20 meters: 200KHz
- 40 meters: 80KHz
- 80 meters: 30KHz
- Height: 6.1 meters
- Diameter of the radial ones: 2 meters
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look! New Miracle Antenna MkII has arrived!

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MFJ-971

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Model Number	Power	Freq. Range	Display	Price Each
SX100	3KW	1.6 - 60 MHz	30W / 300W / 3KW	£109.95
SX200	200W	1.8 - 200 MHz	5W / 20W / 200W	£79.95
SX400	200W	140 - 525 MHz	5W / 20W / 200W	£89.95
SX600	200W	1.0 - 160 MHz + 140 - 525 MHz	5W / 20W / 200W	£139.95
SX1000	200W	1.8 - 160 MHz + 430 - 1300 MHz	5W / 20W / 200W	£189.95

SX20C

Diamond SX20C and SX40C Watt meters. The Diamond SX20C and SX40C are compact Watt meters featuring cross needle meter for measuring power and SWR simultaneously.

Model Number	Power Settings	Freq. Range	Size	Price Ea.
SX20C	30w & 300w	3.5 - 150 MHz 3.5-30 / 50-54 / 130-150 MHz	3 5/16" W x 3 5/16" H x 3 3/4" D	£74.95
SX40C	15w & 150w	144 - 470 MHz	3 5/16" W x 3 5/16" H x 3 3/4"	£69.95

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Antenna Tuning Units Inside and Out!

Graham Ridgeway M5AAV takes a look at a basic antenna tuning unit suitable for the novice constructor. First he looks at the 'whys and wherefores' before presenting a simple, practical project.

My article is aimed at helping the novice antenna or inexperienced constructor to understand some of the reasons for having and using an antenna tuning unit (a.t.u.). I'll also provide details of an a.t.u. that's simple to construct, won't drain your resources and more importantly - will work! It will also perhaps give you some ideas for future experimentation.

The reason for having an a.t.u., as most of us know, is to match the nominal 50Ω output impedance of the transmitter to whatever impedance the antenna shows. This is of course assuming that the design impedance of the antenna is something other than 50Ω.

The 'Other than 50Ω' category includes not only short and long wires, but also dipoles and G5RV designs, all of which need some form of a.t.u. to allow proper operation. With a single wire type of antenna, the impedance varies not only as a function of element length and frequency in use, there's something else which also needs to be taken into account. That 'something else' is the efficiency of the radio frequency (r.f.) 'earth'. This impedance can range from below 10Ω to well in excess of 2kΩ.

Ignoring The Hype

Ignoring all the 'hype', at the end of the day a.t.u.s fall into one of three categories namely; The Pi, or 'Collins' match, the 'L', or the 'T'. The names given are derived from their configuration (more on this later).

Any of the a.t.u.s I've just mentioned are quite easy to construct. The circuits, **Figs. 1, 2** and **3,** are shown in order for comparison.

The Pi Match, Fig. 1, is normally considered to be the 'standard' format for an a.t.u. It will usually match most random lengths of wire to 50Ω.

In use the Pi Match also has the advantage that it tends (when tuned correctly) to suppress any harmonics that may be present in the transmitter output. Indeed it's still found in many transmitter output circuits.

The L match, Fig. 2, is usually more suited to the shorter lengths of wire. It can be used in a fixed configuration at the base of (for example) a short vertical antenna for single band use.

The T match, Fig. 3, will again match most random wires. However, it seems to be happier when given a reasonable length to 'play' with.

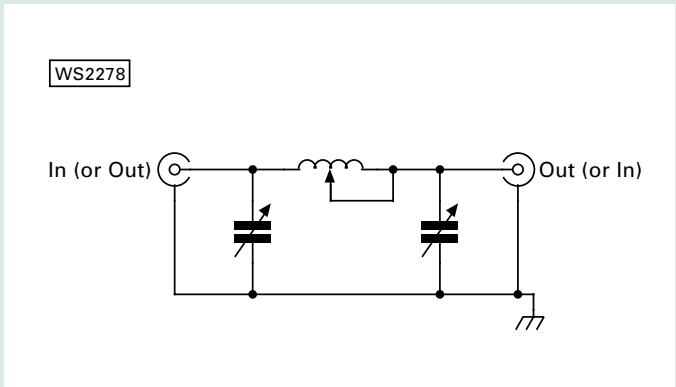


Fig. 1: The Pi Match is normally considered to be the 'standard' format for an a.t.u. It will usually match most random lengths of wire to 50Ω. In use the Pi Match also has the advantage that it tends (when tuned correctly) to suppress any harmonics that may be present in the transmitter output (see text).

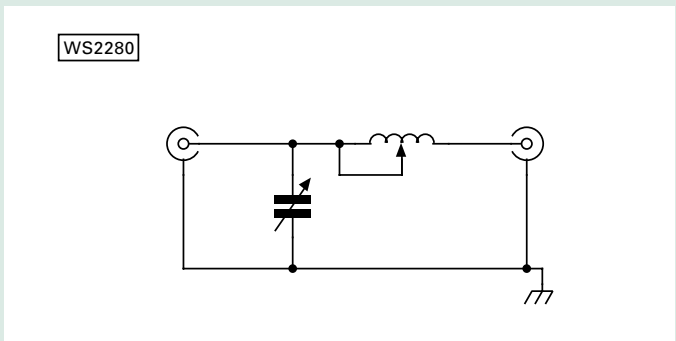


Fig. 2: The L match is usually more suited to the shorter lengths of wire. It can be used in a fixed configuration at the base of (for example) a short vertical antenna for single band use (see text).

So, now I've listed some basic ideas, the natural question you'll raise is "What type to use"? No doubt you'll be wondering, now that you're faced with three basic choices of a.t.u. and ask "which is the one for me?".

General Purposes

For general purposes, as I mentioned earlier, the Pi Match is probably the most versatile. Computer analysis has shown that with modern equipment needing to 'see' 50Ω at the input and anything from 10 to 2kΩ at the output, the coil only needs to be a maximum of some 25µH (micro henries), and neither capacitor needs to be more than 500pF at any frequency from 1.8 to 30MHz.

Although this is not the time to go into definitive figures or detailed calculations, the Pi match type of a.t.u. is the version that will be described

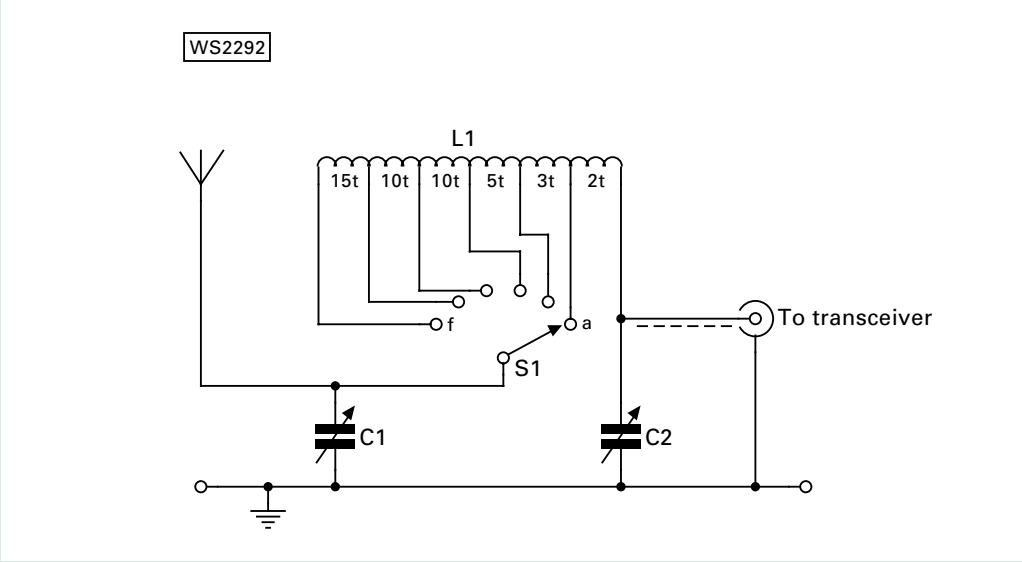


Fig. 3: The Pi match a.t.u. project circuit, the main subject of this article. In the text the author guides the intending constructor through the construction process also suggest how this circuit could form the basis of a more advanced a.t.u. making use of the three basic forms of matching circuits discussed. See the main text for details of the main coil and suitable materials which can be used as the former.

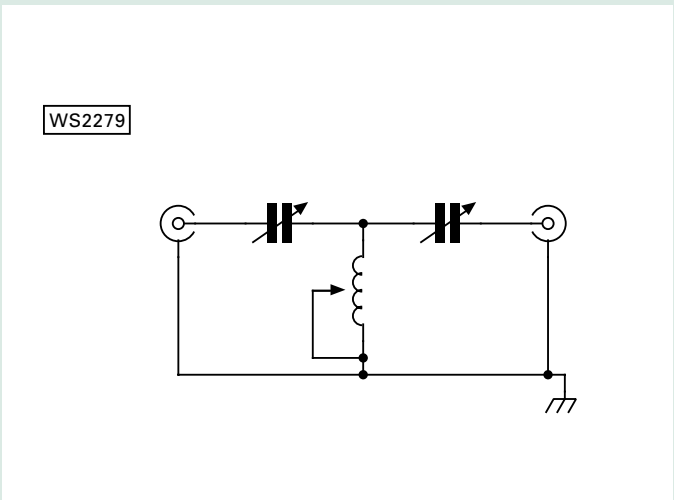


Fig. 4: The T match will match most random wires. However, it seems to be happier when working into a longer length of wire (see text).

here. After all - the idea is to present you with a buildable project to launch you into a.t.u. construction and the circuit we're to use is shown in **Fig. 4**.

For use in the circuit of Fig. 2 the two capacitors (particularly for QRP power levels) need not be wide spaced. In fact ex-broadcast receiver types of around 300 to 500pF will do quite adequately.

The coil consists of some 45 turns on a 50 to 75mm former. When wound the turns are spaced with one wire diameter between each winding. The coil requires to be tapped to allow a range of inductances to be selected.

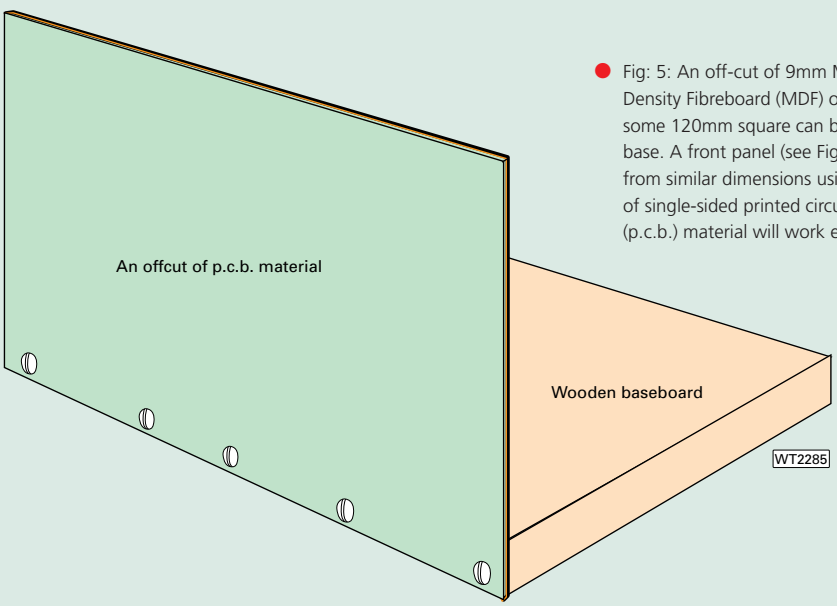


Fig: 5: An off-cut of 9mm Medium Density Fibreboard (MDF) or Plywood some 120mm square can be used as the base. A front panel (see Fig. 6) made up from similar dimensions using an off-cut of single-sided printed circuit board (p.c.b.) material will work equally well.

In practice the necessary tappings can be selected either by means of a rotary switch, or a crocodile clip on a flying lead. **Warning:** To avoid burns don't change coil tappings while r.f. is applied! (even when you're operating at QRP levels!).

Acceptable Former?

When an a.t.u. project is being considered a question often asked is; "What can be used as a former for the main coil". Fortunately, it can be answered quite simply. A quite acceptable former can be fabricated from a washing up liquid bottle. (The BBC's *Blue Peter* children's programme has a lot to answer for!).

So, after you've got the necessary bottle (wait for it to be emptied please!) carefully cut off the top. Leave the bottom in place, as a nut and bolt will secure this to the case or board.

A quick rub over with some emery cloth will give the bottle's surface a slight roughness and assist in holding the wire in place. A suitable alternative is a short length – say 100mm of 50mm plastic pipe, although an alternative method of fixing will have to be used.

Note: You may already be aware that there could be some concerns as to whether certain plastic materials used in items such as drainpipes, etc., are suitable for handling r.f. currents, albeit at low power. Fortunately, there's a fairly quick and easy test that can be done to remove any concerns.

Here's what you have to do; place a sample (use the cut off top' of the proposed 'former' into the microwave oven, along with a cup of water. If after a couple of minutes on high power, the sample has not got hot (be careful, just in case – and watch it the whole time) then it's quite suitable for our purposes.

Spaced Out Problems!

One problem that many constructors encounter when winding a coil that requires spacing onto a former, is how to

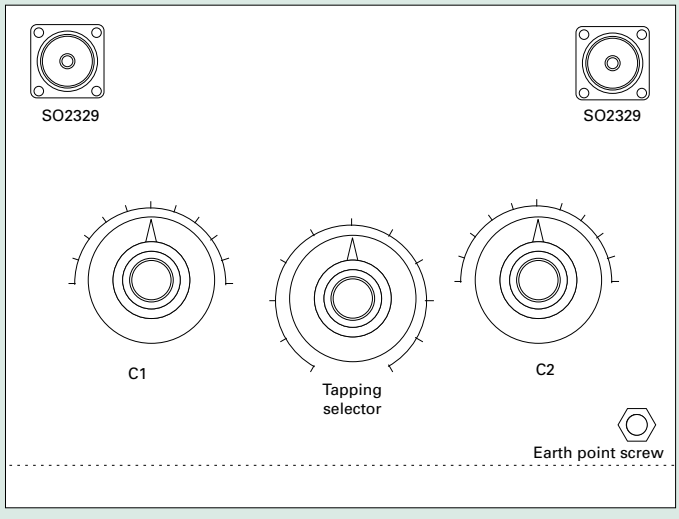


Fig. 6: The front panel will need to be drilled, as above - to mount the coil tapping switch (if used) along with an input and output socket (SO239s are quite acceptable). Also require are a six x 25mm screws and bolts for connection of the r.f. earth, as well as the two capacitors. The copper surface (the foil) faces inwards and then acts as the common 'ground' for the unit (see text).

get it spaced out correctly. To overcome this common difficulty I find that the best method is to fix one end, and wind the wire alongside a length of thin string.

At each tapping point, form a small loop in the wire before continuing. Don't worry - it's much easier to do than describe! Once both ends of the coil are completed to your satisfaction, (the ends can be fixed in place using hot melt adhesive or an epoxy resin type) remove the string and you're ready to go onto the next stage.

Better In A Box?

Home-brewed equipment does look better in a nice enclosed box and of course they don't trap dust. However, for a basic a.t.u. project of the type we're making here there's no real need to indulge in any serious 'metal bashing'.

You could use an off-cut of 9mm Medium Density Fibreboard (MDF) or Plywood some 120mm square as the base, **Fig. 5**. A front panel, **Fig. 6**, made up from similar dimensions using an off-cut of single sided printed circuit board (p.c.b.) material will work equally well.

The front panel will need to be drilled, see diagram - to mount the coil tapping switch (if used) along with an input and output socket (SO239s are quite acceptable). You'll also require six 25mm screws and bolts for connection of the r.f. earth, as well as the two capacitors. The copper surface (the foil) faces inwards and then acts as the common 'ground' for the unit.

The coil, as previously mentioned above can consist of some 45 turns of 16s.w.g. wire, with tappings at 2, 5, 10, 20, 30 and 45 turns from the 'input' end. If the washing-up bottle former is used after winding it can be screwed directly to the wooden base. **Note:** To ease construction, this need not be enamelled wire – instead try stripping the insulation from some 1mm 'earth lead' wire.

Straightforward Construction

The actual construction of the project is quite straightforward. After winding the coil and preparing the front panel, I suggest that you connect everything up as per the circuit diagram.

Screw the coil down to the baseboard in a suitable position. **Note:** The switch, if used, can then be soldered to the tapping points on the coil **before this is done**. (I've found wiring the switch in this way makes it much easier to handle on the bench, rather than doing it after mounting).

Tune In & Select

To use your basic a.t.u. on the air all you have to do is; tune in a signal and select the tapping point and capacitor settings which provide the greatest signal strength. You should, whenever possible, use the lowest amount of inductance (shortest section of coil selected either by the switch or croc clips) to obtain the best results.

On transmitting a short low power transmission (carried out while you're watching the s.w.r.) meter, and a final adjustment of the variable capacitors will see you tuned up. You'll be 'in business' and achieving the best match possible.

All Three Versions?

At the end of the day, Amateur Radio is all about experimentation, so why not build all three versions? You'll then find out which works best in your situation.

I can imagine readers saying - "Do what ... build all three"? In reply I suggest that you don't panic! Instead, look at the circuits for all three types and a clear similarity can be seen. The coil assembly can be the same for all three. For the Pi and T versions, you'll need two capacitors, and only one for the L match.

For all versions of the basic a.t.u. an input and output socket, which can be of the PL259 variety, or for real QRP the 'phono' sockets, are quite usable. Add in a few 4mm plugs and sockets and you'll have the basics of a really versatile a.t.u., which can be re-configured at will.

The only point which must be watched, is that for the T match, the capacitors are 'floating. i.e. **Not connected to earth** and if this version is constructed, one method is to use either a plain piece of p.c.b. substrate board or even a thin plywood panel. Good luck and I hope enjoy the experience of building your own basic a.t.u.!

PW

Further Reading

The subjects of antennas and antenna matching could keep you occupied in a library for a life time - it's such a fascinating subject! However, although it can be an extremely academic subject - we're fortunate enough to have some truly excellent books to help us make this branch of our science very enjoyable. One of the very best (although not a commonly seen publication in Europe, it's sometimes available from your local library/reference library) is the well known *Amateur Radio Handbook* by Orr & Cowan. The American produced book contains some of the easiest to understand articles and best presented chapters on antennas, coupling, feeder systems and antennas I've ever discovered in my work. Also to be highly recommended is the ARRL *Antenna Book* (available from the *PW* Book Store). Incidentally, if you're a newcomer to the Amateur radio hobby I thoroughly recommend you have a copy of the ARRL's *Understanding Basics Electronics*. Although not specifically dealing with antennas, this superbly written and presented book is the standard reference work I use and recommend in Radio Basics. It will provide the reader with a thorough grounding in the technical knowledge needed to understand feeders, antennas and the radiation of radio frequency transmissions. I can also recommend the *More Out of Thin Air* reprint (PW Publishing) as a good source of projects and ideas.

Rob Mannion G3XFD,
Editor

Valve & Vintage

Ben Nock G4BXD welcomes you to his first column of 2004. This time he's looking at a different version of the historic HRO receiver

Well, here we are again, a new year already and I certainly hope it's a good one for you and I. Hopefully you also had an enjoyable Christmas and Santa was kind when it came to delivering new 'toys' to play with?

It may be a new year - but here's an old story involving a venerable receiver, the HRO. Though a very common set it seems there are still areas of this receiver's history that need researching and definitive answers given.

The trouble today of course is that most of those who really knew what went on are no longer with us. So, getting to the real facts just gets more difficult every year.

The set causing all the consternation at the moment is a version of the HRO called the RBJ. These were basically HRO receivers used by the United States Navy and have slight differences from the more common models.

I acquired an HRO which had slight differences and enquiries were made as to its real model number. To this end I've had detailed contact with **Barry Williams KD5VC** and I share some of our correspondence here.

"Concerning the RBJ, determine if the centre valve along the rear is a 6B7 or something else (my set has a 6F8 in that position). If it's a 6B7, then the circuit with the exception of the headphone transformer is the same as the HRO-Jr. If it's a 6C8 or other dual triode, then the circuit will be the same as the RAS. They used the standard HRO manuals, so the owner would have to delete the crystal filter and add an i.f. transformer after the first mixer, then delete the meter circuit to see a Junior schematic.

The HRO used a 6B7 in that spot, a dual diode/pentode. The diodes were for detector and a.v.c. detector with a first audio amplifier. This would use the HRO type schematic. The 6F8 is a dual triode. They used one as an audio detector/amp and the other for the a.v.c. This is the same valve line-up as the RAS.

So, the RBJ looks like it is an RAS with the 456kHz intermediate frequency (i.f.). That's pretty interesting. Therefore the RAS circuit will look a lot like yours. As I mentioned the HRO Juniors that I've used the same valve line-up as the HRO. The primary difference in circuitry being the substitution of the i.f. transformer for the crystal filter, and the elimination of the S-Meter circuitry.

The RAS is like the Junior with the exception of the dual triode and the 175kHz i.f., they also had to add a swamping resistor to the i.f. transformer and tap it down to widen the response to audio bandwidth. With the 175kHz i.f., as you can imagine, the image response at 30MHz was down only about 6db.

It appears that they were primarily used down in the 400 - 500kHz range to guard emergency frequencies. Some were in use until the 1970s, just sitting there tuned to 500kHz. The Navy later adopted a noise limiter and these were fitted at depots, the manufacturer was not National. I had a second look at what I thought was an RAS, but in a table mount.

I have never seen an RAS other than rack mount. This may be the mysterious RAW. In the 1945 to 1946 era, there's an ad in QST that discusses the variations on the HRO. They listed the RAS, RAW and RBJ. I had heard of a rack mount 456kHz i.f. radio from a correspondent and figured that it might have been the RAW. It was probably a rack version of the RBJ in retrospect. That leaves the RAW as an unknown.

I have several military manuals, but they don't mention the RBJ and RAW. I do have several RBJ coils. They started with the 00, 0 and then 1 through 7. This is because the RBJ had 9 coils instead of the RAS which had only 7. I guess they wanted to try to keep the 1 through 7 coils similar to the ones on the RAS, which made them use 00 and 0 for the 8th and 9th coils.

One version that I mentioned was the HRO-W, I have a couple of these, and have never seen them in the UK, though they were built on contract for the English military. One of mine is mint, and the skirts on the dial have a gold tint from the fungicide. The other is very good, but someone has polished the fungicide off the knobs and there is some writing on the coil fronts. These came with silver fronted coils".

Thanks Barry! So, the good old HRO still throws up the oddity and there are still a lot of facts to learn yet. If anyone has any info on the RAS, RAW or RBJ versions I would very much like to hear from you.

Fig, 1: The HRO RBJ receiver, notice the absence of the S-meter and phasing controls. The coils are clearly marked RBJ-4 (see text).

Fig. 2: The Heathkit RG-1 general coverage receiver, nice large tuning dial and well laid out front panel. Still a good looker even in 2004.

Heathkit Magic

Now I'm going to deviate a little from the normal military theme by offering up the Heathkit RG-1 for consideration. The RG-1 is the general coverage version of the RA-1 which covered the Amateur bands only.

The RG-1, though a simple single conversion superhet design, has added features such as a crystal filter in the i.f., a noise limiter and an S-meter. The set uses eight valves including the rectifier and stabiliser and covers 600kHz to 30MHz in six bands.

On checking it over I found that the RG-1 benefits from a very clean layout inside. Incidentally, should you find a non-working set it's a design that's easy to service and repair. An ideal set to learn on, or for someone who may wish to increase their technical knowledge. I suggest this because all modern sets are far too complicated (and squashed inside!) to do anything with...but sets like the RG-1 offer a great test bed for experimentation.

When working as it should the RG-1 is a great little set. The crystal filter ensures a good degree of selectivity and the sensitivity is more than adequate for good reception of both Amateur stations and broadcasters

Old Japanese Set

Now I'm returning to the recently acquired Second World War Japanese set I told you about last time. I'm still looking for detailed information on this set, so there's not much I can tell you, save for a few basic facts.

The set is designated a Type 97 Easy-to-Use Wireless Telephone. It's dated June 1943 and was made by the Nichiden Radio Manufacturing Co. of Sendai Japan. It's a single valve transceiver operating between 24 and 30MHz transmitting an amplitude modulated (a.m.) signal.

A double triode valve is used as self-oscillating output and modulator on transmit, and as a regenerative detector and amplifier on receive. The set was battery powered, these being carried in an external bag connected by cable to the set.

An element of waterproofing had been built into the design. The window on top through which the antenna current meter can be seen, the tuning dial, and a window looking down on the valve, together with the push-to-talk (p.t.t.) button are all sealed with a water-tight gasket.

The two wing nuts on the side of the case must have held wire whip type antennas as the set was obviously designed to be operated on the move. I'm still researching the background of this set and have friends in Japan looking for information and I'll bring you further news as it arrives.

Well that's all for now. I'm looking forward to meeting one or two of you at rallies including **Harwell**, **Cambridge** and **Wythall**. But as always you can write to me at: **62 Cobden Street, Kidderminster, Worcestershire DY11 6RP** or via E-mail at **G4BXD@qsl.net** and have a look at my web pages at **www.qsl.net/g4bxd**

Cheerio for now! *pw*

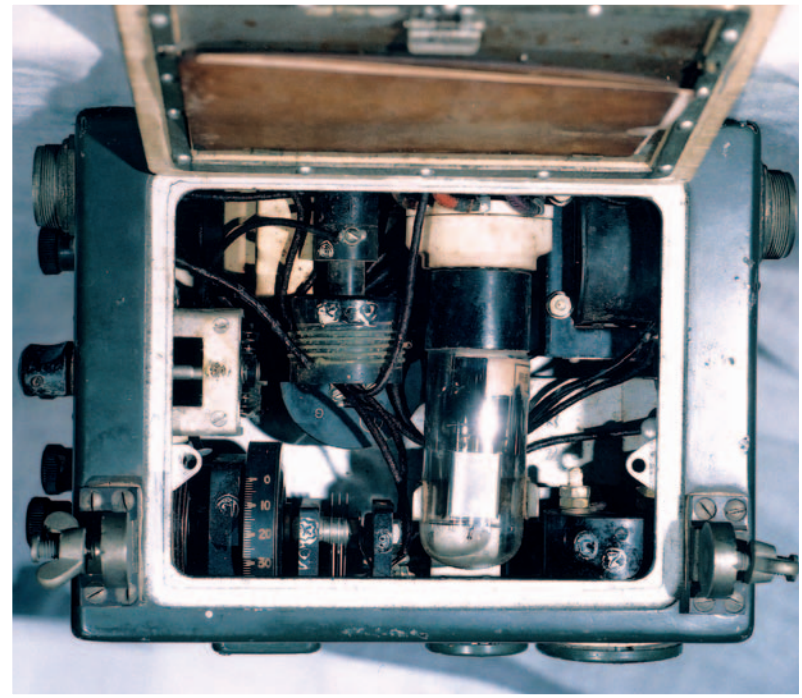


Fig. 5: Inside the Type 97, a single valve a.m. transceiver, with a very compact construction internally (see text).

Fig. 3: The Type 97 Japanese transceiver. Tuning window left, valve inspection window centre and p.t.t. button at the bottom right (see text).

Fig. 4: The Type 97 controls on the side of the case. The 4-pin socket is for the microphone-headset.

Antenna Workshop

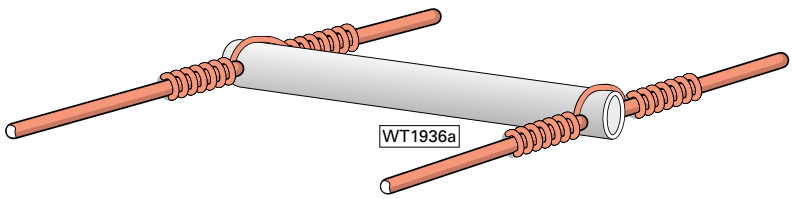
Simple Antennas for the HF bands

In this month's Antenna Workshop, Roger Cooke G3LDI describes some simple antennas for the lower h.f. bands.

I often wonder - why do people buy wire antennas? Surely there's no need to buy this type of antenna, or the tuning unit to match the antenna to the transmitter for that matter. So, to start if you have a long enough garden, try a 43.7m (135ft) long wire, as high as you can get it, fed at the end with tuned open wire feeder.

It's surprising what results can be achieved using wire antennas. The antenna can be almost any wire you have, but preferably hard drawn copper, but even insulated earth wire makes good antenna wire (and it can be bought quite cheaply from an electrical wholesalers). The tuned feeder can be made from multi-strand plastic covered wire, obtainable from the same source.

Don't just take the easy option and buy something just because it's advertised in a glossy advert! You can learn much more by doing it yourself gaining much more satisfaction too. The unit can provide a talking point when you get on the air, when buying everything, it's easy to end up with a limited amount of conversation after the weather and football have been discussed.



● Fig. 1: Open wire feeder is easy to make, a simple plastic spreader of around 125mm wide every 600-700mm along the run works well.

The spreaders for the feeder can be made from 10mm plastic tubing, which is quite cheap and easily obtained. Cut it into 120-150mm lengths, drill a hole in each end and feed the wire through. Space them every 600-700mm along the feeder, secured in place with a piece soft wire **Fig. 1**. Though it's a time-consuming job creating open wire feeder, its well worth it.

To make your own tuning unit, start by looking around at one of the rallies or shows and find some ceramic 2in formers and some wide spaced tuning capacitors (350-500pF). You can wind your own coils, and be able to alter the tuning unit at any time according to what type of antenna you wish to use.

Bedtime Reading

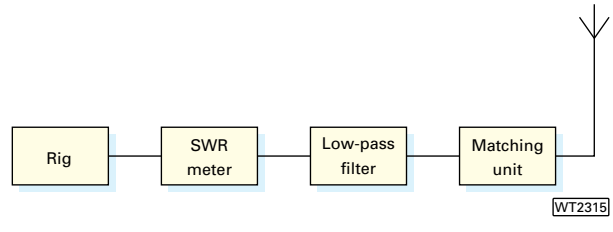
Some bedtime reading would be useful! A book such as the ARRL *Antenna Handbook* will provide you with a lot of very useful information. I personally use an SPC Transmatch that I made many years ago and is described in the book.

With a wire element 41.2m (135ft) long and high impedance (600Ω) feeder will allow the antenna to be used on several h.f. bands, with the help of an a.t.u. The actual layout will be determined by the physical location of the feed point relative to the shack.

Many commercial transceivers have an output designed to 'see' an unbalanced load of (50-70)Ω. For optimum transfer of power to the antenna, impedances throughout the system must be matched. If the antenna feed-point impedance is 50Ω, then a 50Ω feeder should be used to connect to the output of the transmitter. The output power from the transmitter is then transferred to the antenna, from which it is all radiated (barring losses).

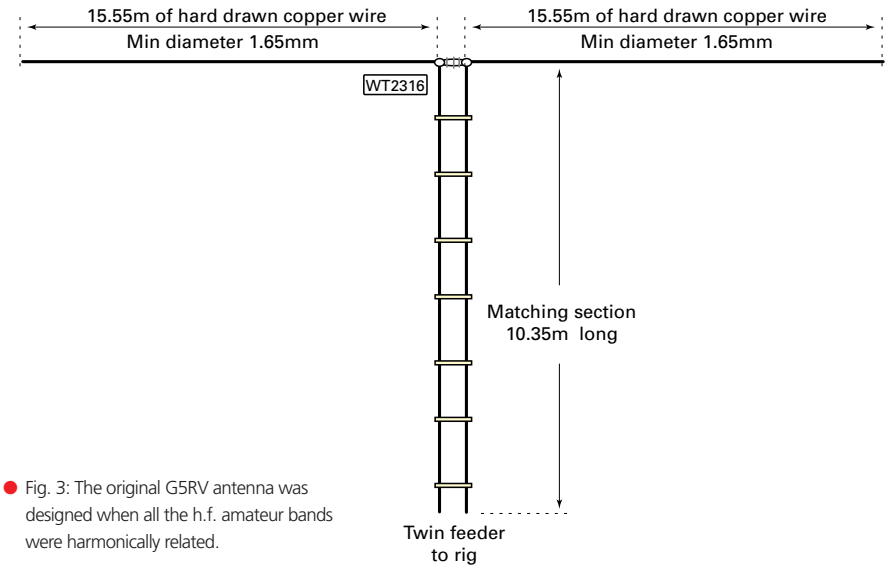
Obviously a multi-band antenna will exhibit varying degrees of match to 50Ω, not even remaining constant within one band, let alone from band to band. As the mismatch increases, the reflected (reverse) power rises and the s.w.r. increases. Thus s.w.r. is a measure of the loss or the effectiveness of the whole system.

Matching the feeder impedance to the antenna itself may not be a straightforward task, particularly in the case of multi-band antennas, which are themselves compromises. The solution to this problem, which has become virtually standard practice, is to match the transmitter to the feeder plus antenna as shown in **Fig. 2**.

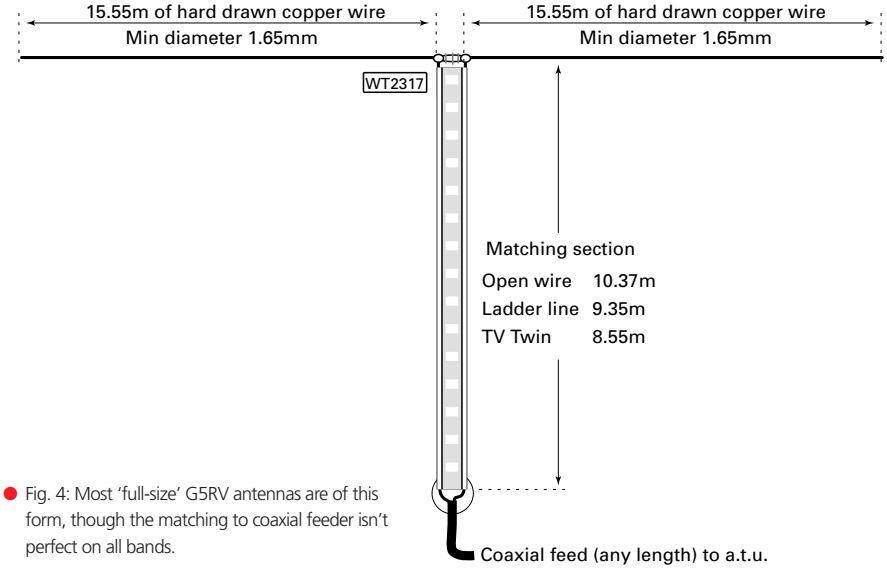


● Fig. 2: Preferred arrangement of transmitter-to-antenna link up.

Matching of the feeder to the rig is normally by means of the antenna-tuning unit (a.t.u.), though this doesn't tune the antenna. The a.t.u. matches the impedance at the bottom of the feeder to the transmitter output - it should really be called an antenna matching unit. But it's been 'a.t.u.' through many years common usage, though there are now other names in use,



● Fig. 3: The original G5RV antenna was designed when all the h.f. amateur bands were harmonically related.



● Fig. 4: Most 'full-size' G5RV antennas are of this form, though the matching to coaxial feeder isn't perfect on all bands.

such as antenna system tuning unit or matching network.

Perfectly Matched

A perfectly matched system will have an s.w.r. of 1:1 and many modern rigs may switch off or reduce power when the s.w.r. rises above 2.5:1. The question therefore arises: what's an acceptable maximum s.w.r.? There are many possible errors with s.w.r. measurement and a figure of 1:1 might be regarded with a certain amount of suspicion. Conversely, a system which appears to have an s.w.r. greater than 5:1 should certainly be investigated, although overall power lost is only just less than 3dB.

It's probably more important to reduce s.w.r. to safeguard solid-state transmitter output stages than for any other reason. In practice, the consequences of a high s.w.r. is greater loss in the feeder and with very high power and an excessive s.w.r. there may be breakdown of the feeder or such units as filters or switches.

The actual feeder losses depend on both feeder type and frequency. In general with twin feeder losses are inconsequential on h.f. (up to 30MHz). Breakdowns may be due to flashover (high voltage) or perhaps, conductors or dielectric melting due to high current points. **Note**: High s.w.r., in itself, does not cause a feeder to radiate, or produce TVI or other interference.

The G5RV

Let's now turn to a good general wire antenna, the G5RV, originated by the late **Louis Varney G5RV**. The original dimensions are shown in **Fig. 3**. The top should be horizontal and run in a straight line (if possible) and should be erected as high as possible above ground. It's better to erect the antenna at an average height of about 10.35m (34ft), which happens to be the optimum radiation efficiency on 1.8, 3.5 and 7MHz bands for any horizontal antenna. Few stations have the space, for the optimum height (λ/2) on the lower h.f. bands.

If, due to limited space available, or to the shape of the garden, it's not possible to accommodate the top in a straight line, then as much as 3m (10ft) at each end may be allowed to hang vertically. Or in practice, they may be bent in a horizontal plane, with little practical effect upon performance.

Incidentally, you may bend the ends of any resonant dipole antenna, as the most radiation takes place from the area where the current is greatest. Near each end of an antenna, the current is close to zero, so the effective radiation from these parts of the antenna is minimal.

The G5RV antenna may also be used in the form of an inverted-V. However, it should be borne in mind that, for such a configuration to radiate at maximum efficiency, the included angle at the apex of the V should not be less than about 120°.

There are at least three basic ways to make the matching section of the G5RV, by using an open wire, a ladder line (standard), or by using 300Ω TV twin lead, as shown in **Fig. 4**. The bottom end of the matching section, is connected to an ordinary coaxial cable linked to the transceiver. The full-size G5RV works on the 1.8MHz band too, where at the station end of the feeder (any form) the two sides are strapped and fed by a suitable antenna tuner using a good earth connection or a counterpoise wire.

Convenient Length

A particularly convenient length of open-wire feeder, for the G5RV, is 25.6m (84ft), because such a length permits parallel tuning of the antenna tuner circuit on all bands from 1.8-28MHz with conveniently located coil taps in the antenna tuner coils for each band. There are several designs to give the optimum loading condition for each band.

The feeder length of 25.6m is not a fixed requirement, as almost any length that's mechanically convenient may be used. As the feeder will always carry a standing wave, its characteristic impedance is less important. Relatively sharp bends may be used without detriment to its efficiency. Only when open wire feeder is correctly terminated by a resistive load equal to its characteristic impedance should such bends be avoided.

So, get out the wire-cutters, pliers and soldering iron. Go and buy some cheap wire and some plastic tubing and make a few antennas. Lots of fun can be had testing out a new antenna; Okay ... it might not match up to the latest *XYZ34* ten-element beam at 50m up, but so what, you made it yourself for little outlay and got results!

Self-education is all part of our hobby and should be encouraged. Following this path will give you more knowledge, experience, conversation, And turn you into a good operator. We could use any number of those!

PW

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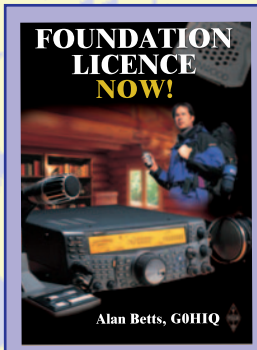

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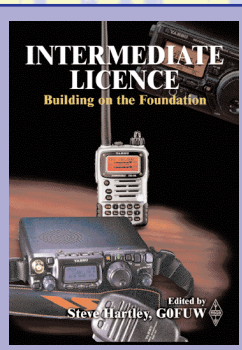

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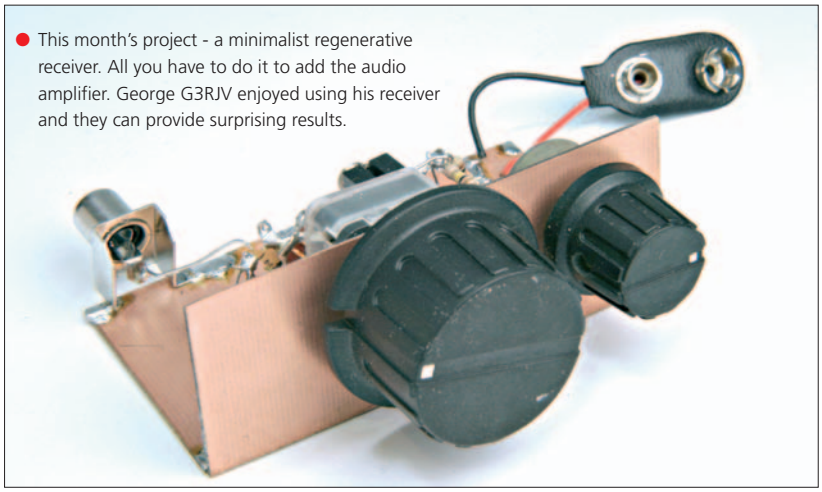


This month's project - a minimalist regenerative receiver. All you have to do it to add the audio amplifier. George G3RJV enjoyed using his receiver and they can provide surprising results.

This month the Rev. George Dobbs G3RJV announces he has "Another regenerative receiver" for us. No doubt it will be interesting... particularly if the quote is anything to go by!

Welcome to the February COTPW where I'm in a reminiscent mood! It may be a function of age, but I like to return to old ideas, especially when they work. I began making regenerative receivers in the 1950s and have built lots of them since then. It's one of those ideas that can give a good return for what's invested. A few components can produce surprising results and I never cease to be amazed at the number of stations that can be received on a modest regenerative receiver.

I think the regenerative receiver is a delightfully simple idea. It provides a high gain, frequency selective, receiver from few parts.

The principle allows controlled self-oscillation of the detector circuit to occur. With this principle some of the output signal from the detector stage is fed back to the input as a positive feedback loop. This results in high gain and high selectivity providing the two basic needs of a good receiver; to be able to hear weak stations and to be able to separate them.

A regeneration (feedback) control enables the detector stage to be set just short of the point of oscillation for a.m. (amplitude modulation) signals. The detector can also be used for Morse (c.w.) or single side-band (s.s.b.) by allowing oscillation to occur. As part of this process this also inserts the beat note required for those modes.

However, a simple circuit that provides good sensitivity and good selectivity with a choice of modes must have a down-side. The down-side here is that regenerative receivers can be tricky to use.

Smooth operation of the regeneration control is essential and interaction can occur between the regeneration and tuning controls. They need a little 'driving skill' but that's the fun of real radio!

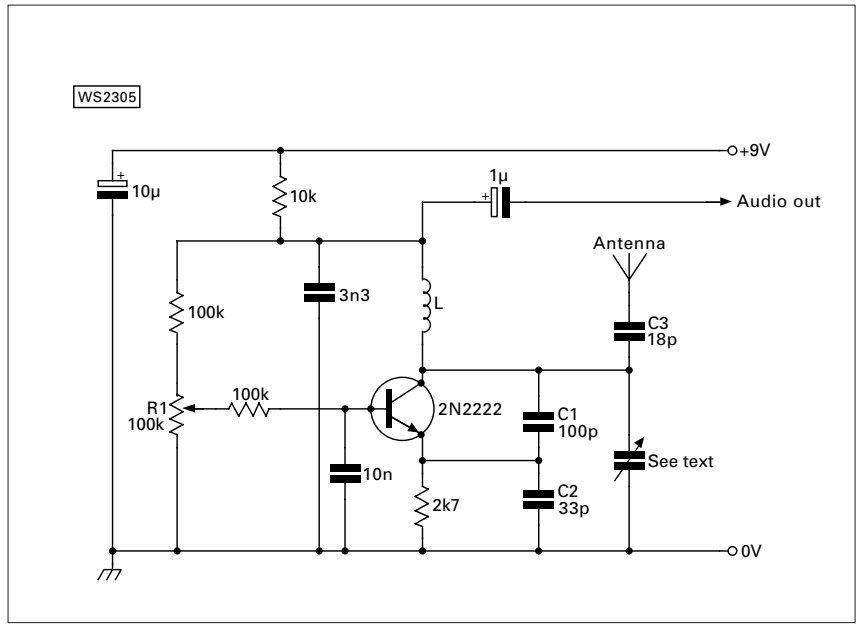


Fig. 1: The circuit of the simple regenerative detector. The intending constructor is left to add some form of audio amplification (see text).

Many Variants

There are many variants on the regenerative receiver theme. What I offer here is a basic version of a circuit described by **Charles Wenzel** on a webpage, which in turn, is based on the work of **Charles Kitchin N1TEV**.

The circuit is shown in **Fig. 1**. In essence the circuit is just the regenerative detector. The intending constructor is left to add some form of audio amplification.

Any radio frequency (r.f.) oscillator buff reading COTPW will recognise that a Colpitts oscillator circuit with series capacitors, C1 and C2, providing the feedback path. The frequency is tuned using the inductor (L) and a variable capacitor.

A potentiometer (R1) adjusts the biasing of the transistor to take it in and out of oscillation. The resistor, R1, should be a linear track potentiometer.

The antenna input is at the top of the variable capacitor and the audio output is extracted from the top of the inductor. Simplicity itself!

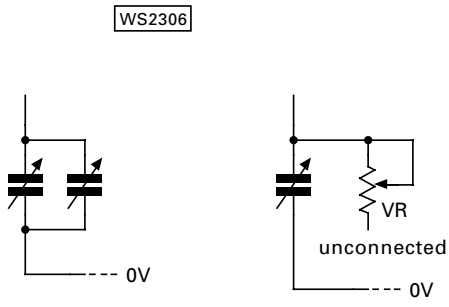
I used the common 2N2222 transistor. However, any similar generic *npn* type would do the job.

My variable capacitor was a cheap polyvaricon type with a maximum capacitance of around 160pF. The reader may choose whatever is to hand.

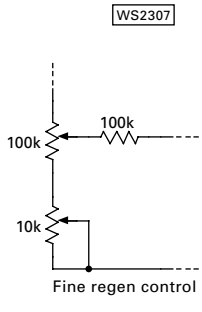
The inductor is made up from 25 turns of 24s.w.g. enamelled copper wire wound on a T68-2 core. I wanted to cover the 7MHz Amateur band and this arrangement tunes approximately 6.3 to 12.5MHz, giving that band plus some broadcast stations.

Readers may like to experiment with the tuned circuit. It would be simple to wind a suitable coil on a 35mm film canister or some other suitable former.

An easy way to check the coverage of the tuned circuit is to set the receiver into oscillation. All you



● Fig. 2: The receiver tuning range is such that the variable capacitor requires either a reduction drive or some form of additional band-spread tuning to select individual stations. Two methods of achieving fine tuning are shown here (see text).



● Fig. 3: Another useful addition can be a fine regeneration control. This may be achieved, as shown, by placing a smaller value variable resistance with a linear track between R1 and ground (see text).

have to do then is to listen for the radiated signal on a nearby short wave receiver!

Short Antennas

Regenerative receivers usually work best with short antennas. Often, a small piece of wire brings in a surprising number of stations. In fact, a large antenna may overload the detector and reduce the sensitivity of the circuit - an effect which is often referred to as 'blocking'.

The antenna is coupled to the detector via a small value capacitor (C3). The best value for C3 will depend upon the length of the antenna. Incidentally, C3 could be a small variable capacitor or a smaller trimmer capacitor adjusted according to the antenna in use. This is yet another variable control which makes the regenerative receiver fun to use!

When building this project don't forget that it is in effect an high frequency oscillator circuit. So, you should follow all the common rules associated with such circuits.

The variable capacitor along with C1 and C2 are in the tuned circuit. C1 and C2 should be capable of good temperature stability. Polystyrene capacitors or NPO (low temperature coefficient) capacitors would be ideal if they are available.

Despite my own advice, my prototype used cheap ceramic capacitors and a rather 'iffy' polyvaricon variable capacitor and it was still (oddly perhaps) stable. Don't forget also that in common with all oscillator circuits, this circuit will benefit from rigid construction techniques.

This month's heading photograph, shows the front panel of my prototype which is built using 'Ugly' point-to-point wiring techniques. A failing in this version was the small front panel. A larger panel would have prevented stray capacitance from my hand influencing the tuning. Bear this in mind when you build your version!

High Impedance Headphones

The minimalist constructor could try connecting a pair of high impedance headphones between the audio output point and ground for a very simple receiver. In reality however, the receiver does require audio amplification.

I obtained good results by connecting my small bench audio amplifier to the audio output. Regular readers should have one to hand...as in the past this column has been well blessed with suitable simple audio amplifier circuits, usually based on the LM386 or LM380 chips.

The receiver's tuning range is such that the variable capacitor requires either a reduction drive or some form of addition band-spread tuning to select individual stations. Two methods of achieving fine tuning are shown in **Fig. 2**.

The classic approach is to place a much smaller value variable capacitor **in parallel** with the main tuning capacitor. The main tuning capacitor then becomes a 'band-set' control to locate the desired frequency range and the smaller capacitor acts as a band-spread control for finer tuning.

Older & Cheaper!

An older, and cheaper, dodge is to use a potentiometer as the band-spread tuning control. This is shown on the right-hand diagram.

The circuit may look incorrect because nothing is connected to the bottom end of the potentiometer! However, in practice the potentiometer is being used like a variable capacitor. To work effectively **this circuit requires a potentiometer with a metal casing that is connected to the ground of circuit.**

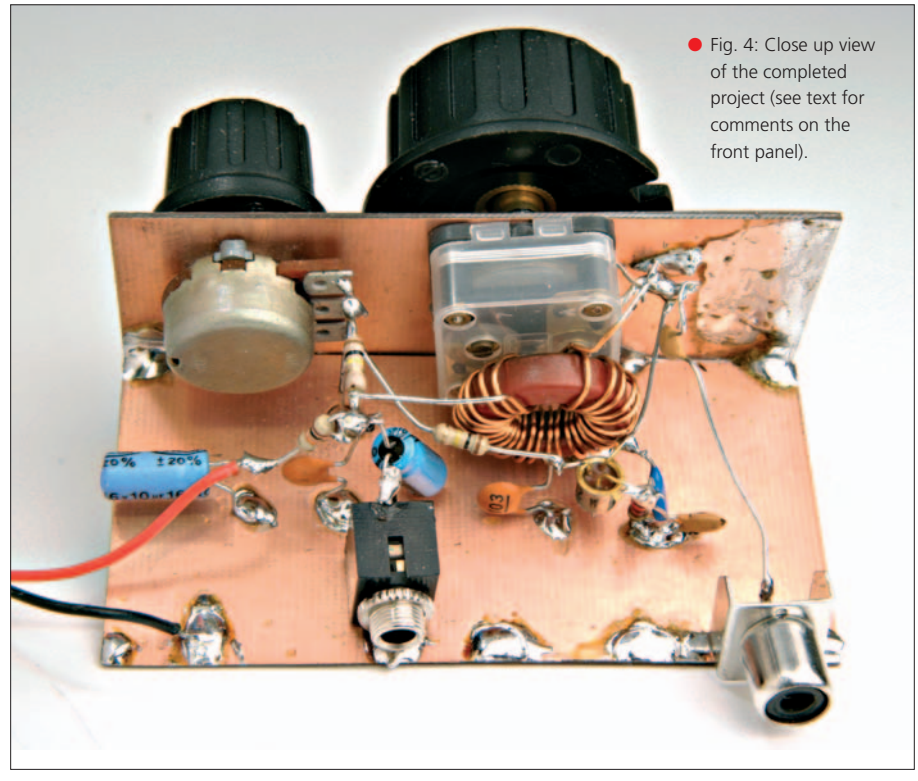
The slider and one side of the potentiometer track are connected to the top of the variable capacitor. In effect a capacitor is formed between the track and the case of the potentiometer, the capacitance of which varies as the slider moves around the track. A little crude perhaps, but it does work!

Another useful addition can be a fine regeneration control. This may be achieved, as shown in **Fig. 3**, by placing a smaller value variable resistance with a linear track between R1 and ground.

With the variable resistance set at half way, the receiver is moved to the point of oscillation. The fine adjustment control can then be used to control the oscillator.

As with all regenerative receivers, you should seek stations with the regeneration control set just at the point (the 'Threshold') of oscillation and back-off the regeneration if the station is using amplitude modulation. You should hear a gentle 'plop' and a low hissing sound as the circuit drops in and out of oscillation.

It takes practice but these receivers are great fun as well as being simple. Have a go yourself and help to regenerate your own interest in really simple receivers! *PW*



● Fig. 4: Close up view of the completed project (see text for comments on the front panel).

VHF DXER

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

DAVID G4ASR TAKES AN IN-DEPTH LOOK AT RECENT AURORAL OPENINGS ON THE VHF & UHF BANDS

Last month I reported that on October 28 one of the most powerful solar flares in years, a remarkable X17-category explosion, erupted from giant sunspot 486 and as a result a strong solar radiation storm commenced. One day later another coronal mass ejection (c.m.e.) was hurled towards Earth by an X11-class explosion again from giant sunspot 486. These two very fast-moving clouds of gas from the Sun swept past Earth, one on October 29 and one on October 30, sparking extreme geomagnetic storms and associated auroral back-scatter openings on all bands as high as 430MHz.

Propagation was widespread with contacts on the v.h.f. and u.h.f. bands being made with stations from Scandinavia in the north, through the ex-Russian Republics, down to Croatia and Italy and as far south as Bordeaux in southern France. However, as the event occurred right at the end of the month I only managed to get in a few reports so, here's some more.

Ian White G3SEK mentions that he plans to move to Scotland and for some time has been going to the same holiday cottage near Wigtown (Dumfries and Galloway) where they let him put up a G5RV antenna and operate on short wave frequencies. However, on the night of October 29 he got caught with all of h.f. wiped out by the aurora and no v.h.f. antennas for the Icom IC-746 transceiver.

Fortunately, Ian (operating as GM3SEK) discovered that the manual h.f. antenna tuning unit would just match the G5RV antenna onto the 50MHz band. Although the v.s.w.r. was quite high and the antenna pattern must have consisted of many lobes a total of 18 contacts were made on 50MHz including two Polish (SP) stations and one in the Czech Republic (OK).

John Lemay G4ZTR (Essex JO01) was active on the 144MHz band during the auroras on October 29-30. He uses a Yaesu FT-1000MP transceiver, an LT2S transverter and HLV-600 amplifier running 200W to a 16-element 16JXX2 Yagi. His top ten c.w. contacts based on personal interest, not distance include: F5VHX (JN04), HA5OV (JN97), HA0HO (KN07, furthest east), I1JTQ (JN35), IK1SPR (JN34, a long way south), I2FAK (JN45), IK2GSO (JN45), LA7XK (JP50), YU7BCL (KN05, furthest southeast) and 9A2VR (JN95).

Dave Edwards G7RAU (Isle of Wight IO90) was also active on the 144MHz band with a Yaesu FT-757GX2 transceiver, MuTek transverter and a 3CPX1500 amplifier running 400W to a 17-element F9FT Yagi. Over the three-day period October 29-31 he made a stupendous total of 222 c.w. contacts with stations in 25 countries (DL, EI, ES, F, G, GM, GW, HA, HB9, I, LX, LY, OE, OK, OM, ON, OZ, PA, SM, SP, S5, US, YO, YU, 9A) and 77 locator squares. Twenty contacts were made over 1500km and his best DX was with the station of ES5PC (Estonia) at 1978km.

Dave also heard the Russian station RA3LE peaking 42A at 2265km but had no chance against the 'pile-up' of German stations. Some of his c.w. contacts included the stations of HA0HO (1679km), HA6NQ (1556km), HA8V (1657km), LY2BJ (1824km), LY2BIL (1827km), LY3OD (1827km), SM0KAK (1552km), YO2IS (KN05), YU1LA (1750km), YU7EW (1713km) and US5WU (1799km),

In Scotland **Peter MM0CEZ** (IO75) made an excellent total of 84 QSOs on the 144MHz band during the event on October 29. His c.w. contacts were made with stations in 12 countries (DL, EI, F, G, GW, HB9, LA, OE, OK, OM, ON, PA) and included LA3IW (JO29), OE5XBL (JN68), OK1AR (JO60) and OK2MWR (JN99).

Ian GM0TGE (IO87) was QRV on the 144MHz band from 1330UTC on October 29 through to 0400UTC on October 30. Running an Icom IC-706 MkI transceiver with 100W to a 17-element F9FT Yagi a total of 146 c.w. contacts were made with stations in 18 countries (DL, EI, ES, F, G, GI, GW, HB9, LA, LX, LY, OK, ON, OZ, PA, RX, SM and SP). His longest distance contacts were all made between 0130-0220UTC on October 30 and included the stations of ES5PC (KO38) at 1709km, LY3OD (KO24OR) at 1726km, LY2BIL (KO24PQ) at 1732km and RX1AS (KO59) at 1905km.

John Quarmby G3XDY (Suffolk JO02) was active on both the 144 and 430MHz bands during the three-day auroral events. Highlights on the 144MHz band included the c.w. stations of ES5PC (1745km), ES6RQ (1693km), LY2BIL (1615km), LY3OD (1610km), S51MQ (1228km), S57TW (1171km), YO2IS (1618km), YU7EW (1582km), 9A2VR (1441km) and 9A6WW (1291km). Because of the higher frequency it's much more difficult to achieve auroral contacts on the 430MHz band.

On October 29 John contacted the station of DF5JJ (JO43) and on October 30 the stations of DL1SUN (JO53), DL8OBU (JO42), DL8QS (JO43), DF9QX (JO42) and DJ9RX (JO43). It's interesting to note that these contacts were made with stations only located in three adjacent locator squares in northern Germany.

The propagation was much more intense between 0000-0045UTC on October 31 with c.w. contacts being made on the 430MHz band with the stations of DM2DXG (JO51), DJ4TC (JO63), DK8VS (JN39), HB9BZA (JN36), OK1DFC (JN79) and OZ12CTZ (JO46). John mentions that although these were excellent auroras they were not in the same league as the 'mega-aurora' of March 1989.

NOVEMBER ACTIVITY

There were a number of auroral back-scatter openings during November 9, 10, 11, 12, 13, 14, 15, 20 and 22 most of which provided DX contacts on the v.h.f. bands. The very best of these was initiated during the early hours of November 20 when a c.m.e. swept past Earth sparking huge global auroral openings.

In the UK it commenced around 1200UTC when the interplanetary magnetic field (i.m.f.) near Earth tilted sharply south, a condition which promotes geomagnetic activity. This condition persisted for over 12 hours producing strong auroral openings on the 50, 70, 144 and 430MHz bands.

The ionisation was very intense pushing the auroral oval a long way to the south. When this situation occurs stations in southern Europe (Spain, Italy and Yugoslavia) are able to access the auroral zones with relative ease. However stations in northern Europe can often be at a disadvantage as they can actually be **behind** the reflecting auroral curtain. Another aspect of a southerly aurora is that beam-headings will often be considerably to the east (or west).

THE 50MHz BAND

This was the first time I have ever heard auroral signals on the 50MHz band reports **Matteo IW5DHN**. Located in northern Italy he

managed to work over 30 stations in the Czech Republic (OK), Eire (EI), England (G), France (F), Poland (SP) and Sweden (SM).

During large-scale openings such as this event it is possible to make a few contacts with a small antenna. **Hugh M0WYE** (JO01) using a λ/4 wave ground-plane vertical managed to make s.s.b. contacts on the 50MHz band with EI2JD (IO63) and G1ZJP (IO92) for his first ever contacts via aurora. He mentions that the 50MHz band was very busy with auroral signals and that he heard many UK stations, F6HRP (France) and SP2BD (Poland). He also listened on the 144MHz band again with a vertical antenna and heard many hissy c.w. contacts going on.

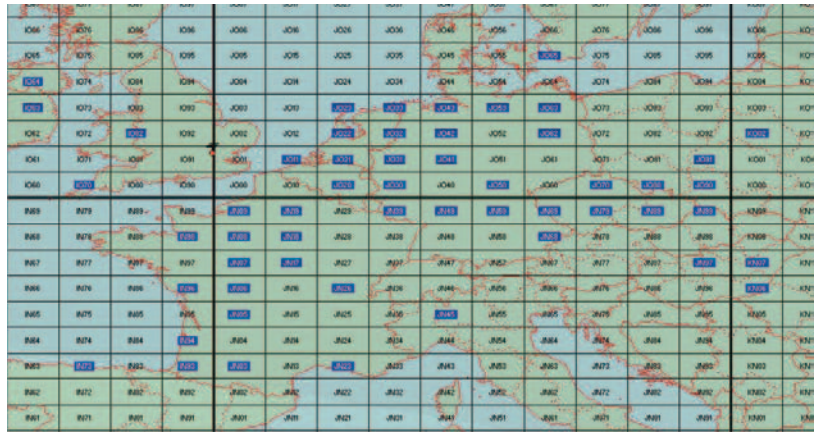

Fig. 1: Locator map showing the s.s.b. contacts made on the 144MHz band by Steve Burrows M5BXB during the auroral opening on November 20 (the small red dot is his QTH locator IO91).

Neil Carr G0JHC (Lancashire IO83) reckons that the event on November 20 was probably the best southerly aurora he has ever experienced on 50MHz. He was active between 1700-2200UTC working 230 stations in 24 countries. Over 40 Italian and 60 French stations, many down in the Mediterranean area around locator squares JN13, JN23 and JN33 were contacted.

Neil remarks that unlike other auroras he heard very few stations to the north of his QTH, only a couple of GM operators and no one from Scandinavia (LA, OZ, SM). Signals from southern France (F), northern Spain (EH2KU), most Italian call areas (I), Croatia (9A) and Slovenia (S5) were very strong on a beam heading of 80 degrees. Neil mentions that most Italian stations in call areas I4, I5, I6 were peaking 59A and were very distorted.

THE 144MHz BAND

Paul G4RRA (Devon IO80) reports that although his amplifier blew up during the event he still managed to work many c.w. stations throughout Eastern Europe. Amongst the DX worked on the 144MHz band were the stations of HA8V (KN06) at 1838km, HA8BR (KN06) 1851km, HA0HO (KN07) 1861km, LY2IC (KO14) 1906km, YO2IS (KN05) 1932km, LY2BJ (KO25) 1943km, EU3AI (KO22) 1944km and OH1FA (KP10) at 1996km. Paul also heard the station of EW6FS (Belarus) at 2102km but despite calling for a long time no contact could be established.

Thanks to a call from Paul G4RRA the station of **Mike Ray G4XBF** (JO01) was active on the 144MHz band from 1400UTC. In total he made 118 QSOs with stations in 57 locator squares, the highlights being c.w. contacts HA6NA (JN98) at 1503km, YU7EW (KN05) 1676km, LY2IC (KO14) 1681km, EU3AI (KO22) 1708km, LY2BJ (KO25) at 1721km, US5WU (KO20) 1746km and best DX of the opening ES6RQ (KO28) at 1855km.

Most of the auroral opening was missed at my QTH as I had been out shopping until 1915UTC! On getting home I turned on my Kenwood TS-790E transceiver and noticed that the 144MHz band was totally full of auroral signals. It was amazing.

Although I managed to make 34 c.w. contacts with stations in 12 countries I still wonder how many contacts could have been achieved if I had been QRV earlier. Some of my contacts included the stations of HB9BZA, IK4DRY, OK1TEH, SP6IWQ and S51MQ. The longest distance c.w. QSOs were with OK2SBL 1531km, HA5CW 1611km, OM3TZZ 1615km, HA5OV 1661km and HA8V at 1792km.

All beam-headings ranged between 80 to 90 degrees even when making contacts with stations in southern France. The only exception to this was a solitary contact into Scandinavia when the station of SK6DK was worked on a beam heading of 20 degrees. As I've mentioned many times before, DX stations are **never** worked when beaming due north from the UK.

Reg Woolley G8VHI (Northamptonshire IO92) was unable to be active until 1900UTC due to work commitments. Between 1900-2000UTC he made s.s.b. QSOs with DB0ITR, DF7AQ, DK7LZ, DB8KJ, F4DAT, IW4BET, ON4ALO, PA0FXO and S51MQ.

Using a Kenwood TS-2000 running 50W into a pair of 14-element Cushcraft Yagis. **Jamie Ashford GW7SMV** (Monmouthshire IO81) was active in the Aurora on November 20 between 1950-2130UTC making a total of 18 s.s.b. contacts with stations in DL, G, ON and PA. At 2120UTC he worked SP9APC (JN99) for his best DX at 1583km.

Steve Burrows M5BXB (Hertfordshire IO91) was operating on the 7MHz band when the c.m.e. hit the Earth. Signals on h.f. became very distorted so he immediately moved up to the 50MHz band, which he observed to be full of very strong auroral signals. Moving up to the 144MHz band he called CQ on s.s.b. and was answered by a Dutch station exchanging 59A reports. Running an FT-847 transceiver, a 400W amplifier and a 9-element Vargarda antenna Steve went on to work 100 stations in 14 countries and 54 locator squares, see **Fig. 1**.

Anto IK4PMB (Italy JN54) was active between 1700-2315UTC making 27 c.w. contacts on the 144MHz band. Using a Yaesu FT-225RD transceiver with a replacement MuTek front-end (designed by **Chris G4DGU**), an 8877 amplifier running 400W and an 11-element F9FT Yagi he made UK contacts with the stations of G3JHM (IO91), G4ASR (IO81), G4DEZ (JO03), G4HGI (IO83), G4KWQ (IO92), G4MKF (IO91), G4RRA (IO80) and G4XBF (JO01).

THE 430MHz BAND

John G3XDY mentions that although it was an excellent aurora the results on the 430MHz still didn't match the huge aurora of 1989. Nevertheless on 430MHz he managed to work DF6NA (JN49) at 663km, DK6AS (JO52) 653km, DL6NAA (JO50) 765km, F5VHX (JNØ4) his most southerly contact at 808km, F6CRP (IN96) 675km, HB9DKM (JN37) 682km, OE3JPC (JN87) 1174km, OK2MWR (JN99) 1247km, S51ZO (JN86) 1239km and 9A2SB (JN95) for his best DX of the evening at 1458km. John also heard the station of HA2RD (Hungary) but didn't complete a contact. On the 144MHz band he worked HA8V, I2FAK and S51ZO and heard UR5SKB (Ukraine) calling a German station.

Chris Bartrum GW4DGU (IO71) reports "This was one of the best auroras I've experienced since coming back on after a few years of being QRT". Active on the 430MHz band with only 10W to a 17.3dBi home-made Yagi he made c.w. contacts with EI5FK (IO51), F6CRP (IN96) and S51ZO (JN86) at 1603km. At 1907UTC Chris worked the station of 9A2SB (JN95) at 1821km which according to Zlatko 9A2SB is a new Croatian DX record. It may also be a 'first' GW to 9A contact via aurora as may the QSO with S51ZO (Slovenia). Does anyone know any better?

Chris also operated on the 144MHz band making 37 c.w. contacts with his longest distance QSO being with LY2IC (Lithuania) at 1809km. He also heard EW6FS (KO35) over a path of 1890km but couldn't make it through the German pile-up.

Zlatko 9A2SB reports that it was a fantastic opening with two new countries worked on the 430MHz band. Running an HM transverter, 50W and a 23-element DJ9BV Yagi a total of 11 c.w. contacts were made with the stations of G3LQR (JO02), G3XDY (JO02), G4BRK (IO91), G4RGK (IO91), GW4DGU (IO71), DL1SUN, DK3WG, DL8OBU, PA0EZ, PA3DZL and PA5DD.

DEADLINES

That's it for this month Thank you very much for your reports, please keep sending them in. Have a Happy New Year and good luck with the v.h.f. DX!

David G4ASR

HF HIGHLIGHTS

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REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

CARL GW0VSW HAS LOTS OF NEWS TO REPORT THIS MONTH - READ ON!

I begin this month with news from the **Five Star DXers Association** (FSDXA) which has announced **Project Star Reach**, a large-scale DXpedition to Rodrigues Island (3B9). The FSDXA is closely linked to the Chiltern DX Club (CDXC), which is the UK DX Foundation. It's also the group that brought you the very successful 9M0C DXpedition to the Spratly Islands in February 1998 and the record-breaking D68C DXpedition to the Comoros in February 2001.

Yaesu will be the Principal Sponsor and are going to provide ten complete state-of-art stations consisting of FT-1000MP MkV Field transceivers and Quadra VL-1000 linears. The callsign 3B9C has already been assigned and the plan is to be active for three weeks including four weekends so there should be more than enough time for you to work them on at least one band.

The first members of the team will arrive in 3B9 on Tuesday 16 March and will spend the first two to three days installing antennas and equipment. Operations will begin shortly after this and run through until Monday 12 April. One of the main objectives of the DXpedition is to provide the chance for every Amateur Radio station in the world, including those running QRP or using a very simple antenna, to make at least one contact with 3B9C.

The last major activity from Rodrigues Island was the 3B9R DXpedition of 1999 where some 47,000 QSOs were made. The Island currently stands at number 81 in the 2002 world-wide listing of 'Most-Wanted' DXCC entities published by the *DX Magazine*, although this is much higher in Europe for s.s.b. where it ranks number 27. For more information and regular updates visit **www.fsdxa.com/3b9c**

THE CHELMSFORD AWARD

Members of **Chelmsford Amateur Radio Society** (CARS) have set-up an award in aid of the **Essex Air Ambulance**. This is an emergency helicopter completely funded by sponsorship and fund-raising events. The award is open to all licensed amateurs and s.w.l.s and is issued to commemorate the Centenary of Marconi's first Trans-Atlantic radio transmission on the 12 December 1901.

To obtain the award use any one letter from the suffix of a callsign you have worked or heard to spell out CHELMSFORD THE BIRTHPLACE OF RADIO. Only one callsign can be used per letter and a total of 30 callsigns are required. One of these should be with a station located in the Chelmsford (CM) Postal District and includes Chelmsford (CM1, 2 & 3), Ingatestone (CM4), Great Dunmow (CM6), Braintree (CM7), Witham (CM8), Maldon (CM9), Southminster (CM0) and Harlow (CM20).

All bands and modes are eligible and all contacts should have been made on or after 12 December 2001. The award costs £6, cheques made payable to The Chelmsford Amateur Radio Society or 10 IRCs or US$10. For every award issued a donation will be made to the Essex Air Ambulance and applications should go to **Martyn Medcalf M3VAM, 47 Paddock Drive, Chelmsford CM16UX**. Several of these awards have already gone to DX stations including **Helio Carlota PY2DBU** in Brazil.

YOUR REPORTS

Onto your reports now and the log of all c.w. man **Ted Trowell G2HKU** on the Isle of Sheppey in Kent who

Martyn Medcalf M3VAM with his 'Buddipole' antenna.

used his Ten-Tec Omni V with 70W and G5RV antenna on the 7MHz band working 7X4AN (Algeria) and ZA/Z35M (Albania) around 2200UTC. A change to 10MHz and slightly better conditions found HV5PUL (Vatican), 9M2TO (West Malaysia), OY3QN (Faroe Islands) EU-018 and a 5W QRP contact with 9K2MU between 1600 and 2000UTC.

THE 14 & 18MHz BANDS

Onto 14MHz now and the log of **Owen Williams G0PHY** in Biggleswade (Bedfordshire) who used a Yaesu FT-747 and dipole antenna to contact C5Z (Gambia) 0712, DP1POL (Antarctica) 1925 and V26DX (Antigua) NA-100 at 2050UTC using s.s.b. and 100W.

Enjoying a few days in the sun was **Graeme Coultas** who left his home in Kidderminster for the warmer climate of Corfu EU-052 to operate as **SV8/G0TNU/P**. His equipment included an SGC-2020 transceiver and MFJ-949E a.t.u. to a wave wire antenna and counterpoise for the band which was only 3m (10 feet) high strung up in a convenient lemon tree!

Over 140 QSOs were made 'on the key' with countries like SP8BAB (Poland) 0612, UX5VK (Ukraine) 0625, OE6WTD (Austria) 0819, HB9DNO (Switzerland) 0925, RA4ACX (European Russia) 1314 and 4Z9DBI (Israel) 1422UTC. Graeme says "Please give a mention to **Glenn Arnold G1IDQ** who works as ground staff at Birmingham airport. He was very helpful, arranging for all my equipment to get on the Monarch aircraft safely with out any problems".

Thanks Graeme! There's no doubt that holiday operations can be a lot of fun and make a nice change, especially when you are the DX. So, if you are planning a holiday this year, why not take your rig along and let us all know how you get on!

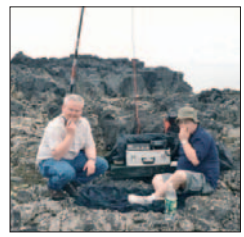
Meanwhile, in Grays, Essex **Len Stockwell M1DPE** had several QRP contacts using an Yaesu FT-817 and Windom antenna running just 5W s.s.b. Making his logbook were 9H1DE (Malta) EU-023 1234, 4O8AA (Yugoslavia) 1330, ER4DZ (Maldova) 1321, CU3GD (Azores) EU-003 1336 and KB1H (USA) in East Killingly, Connecticut at 1415UTC.

The new Regional Manager for the RSGB in Northern Ireland is **Peter Lowrie MI5JYK,** Newtonabbey, County Antrim. Despite a heavy workload in his new role Peter managed to hook-up his 'old faithful' an MFJ-9420 transceiver to a small ground mounted vertical with three radial wires. All equipment seems to have worked well as over 200 QSOs made the log.

Low power 5W s.s.b. contacts this month include F6FYD (France) 1015, EA3GHZ (Spain) 1016, VO2WL (Canada) 1044, K1ZR (USA) in Londonderry, New Hampshire at 1130, OZ5EW (Denmark) 1405, LY7A (Lithuania) 1419, IK3UMT (Italy) 1424, ES5TV (Estonia) 1515, UW8SM (Ukraine) 1516, 9A5E (Croatia) 1548, HB9AUS (Switzerland) 1609, SV1GE (Greece) 1743 and RW2F (Kaliningradsk) at 1747UTC. Not bad going for just a few hours work!

The Chelmsford Amateur Radio Society's Award.

Mark Hampton M5MDH using his new rig - a Yaesu FT-857.



Peter with good friend Dave MI5KAW at WAB-C84, John MI0AAZ was hiding behind the camera!

Last year Peter and good friends **Dave MI5KAW** and **John MI0AAZ** did a spot of portable working in July for WAB/WAI purposes and went to C84 in County Londonderry. This is a very small area, which is uncomfortable to sit on, and only accessible if the tide is right! The area is very hard to locate and as you can see from the photograph, with the Atlantic was only feet away. "This may have been the first time ever that this rare square had been activated by any 'known' raving lunatics" said Peter. "Conditions weren't at their best but we did manage to work a lot of stations on 7MHz using an Icom 706, portable battery pack and inverted V dipole strung from a fibreglass fishing pole".

THE 21 & 24MHz BANDS

On to **Mark Hampton M5MDH** now who made several 100W s.s.b. contacts on 21MHz using his new rig, a Yaesu FT-857. Stations worked /Mobile near his home in Eastleigh, Hampshire included VP5B (Turks & Caicos) NA-002 1528, Z36W (Macedonia) 1529, IS0A (Sardinia) EU-024 at 1534, YB0ZDA (Indonesia) who called Mark at 1540, V26DX (Antigua) 1616 for a new country and A61AJ (United Arab Emirates) at 1617UTC.

Also operating on the band was **Owen G0PHY** who had voice contacts with PJ4T (Netherlands Antilles) SA-006 at 1734 followed by V55V (Namibia) at 1737UTC.

Using a Kenwood TS-940 and new CP 5-band vertical antenna was **Steve Gillespie MI3ATK** in Londonderry, Northern Ireland. Mixed conditions found YL85UZ (Latvia) 0920, HV5PUL (Vatican) 1225, LZ2PB (Bulgaria) 1334, 9A4KF (Croatia) 1441 and finally ZS/KI4ARA (South Africa) 1618UTC.

A 'Buddipole'* was the preferred choice of antenna for **Martyn Medcalf M3VAM** in Chelmsford, Essex this month. Martyn says, "The antenna is very well made, small and light in weight so fits in my garden well. It packs down into a very compact package making it very easy to transport. I used my MFJ-269 analyser to set it up and typical s.w.r. readings are under 1.7-1 from 7MHz up".
**** Editorial Note: This antenna is to be reviewed in PW soon***.

Using his Yaesu FT-897 Martyn logged ZA1A (Albania) 1524, HA3NU (Hungary) 1212, VY2ZM (Canada) 1218, SP9MRO (Poland) 1251, EW1CQ (Belarus) 1342, and VP5DX (Turks & Caicos) at 1439UTC. The antenna is made in the USA by **Bill Drummond W3FF** who has information available at **www.budipole.com**

Only two reports this month for the 24MHz band. **Jim Pedley GM7TUD** from Dumfries found A61AJ (United Arab Emirates) calling "CQ" at 1211 on s.s.b. using a G5RV antenna. Meanwhile, Ted G2HKU switched to his Butternut HF6 vertical and despite some "Rapid QSB" worked V51AS (Namibia) and 9Y4/DL8DYL (Trinidad & Tabago) SA-011 using c.w. a little later at 1600UTC.

THE 28MHz BAND

Jim GM7TUD put up a 4-element mono band Yagi to concentrate on 28MHz and it did very well judging by his large logbook. Well over 100 countries made it into his log and DX included countries like BV6DF (Taiwan) 0820, HL0ECL (South Korea) 0907, JR4ABB (Japan) 0914, XZ7A (Myanmar) 0934, ER4ER (Iran) 0945, VK8DP (Australia) OC-001 0955, VU2WAP (India) 1245, T77M (San Marino) 1250, HP1/DL2OE (Panama) 1311, TU2CI (Ivory Coast) 1342, TG9NX (Guatemala) 1347, HR1RMG (Honduras) 1608 and HC8N Galapagos Island) SA-004 at 1628UTC.

SIGNING OFF

I have been plagued with computer problems once again as the motherboard and hard drive on my main machine decided to play up just as I was backing up all my files. Therefore I'm sorry if I have missed anyone out this month or have not replied to your E-mail. Hopefully this situation will be resolved by the time the next column is put together.

Conditions have generally been fairly poor these past few months although some good long range DX has been worked across most of the h.f. bands. I am sure things will improve and many thanks go to all our reporters who have worked hard to dig out the DX and send in their logbooks. Until next time may I wish you all a very Happy New Year.

73, Carl GW0VSW

DATA BURST

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TEX SWANN G1TEX/M3NGS TAKES A LOOK AT GETTING HOLD OF AMATEUR RADIO RELATED SOFTWARE ON THE INTERNET

Hello and welcome to Data Burst for February 2004, it hardly seems like any time has passed since I was last here. In my last column, I said that I would be looking at getting hold of Linux software suitable for Amateur Radio use. Well, after talking with several friends and colleagues who have taken up computing, I think I'll broaden the outlook to how to find suitable software over the Internet.

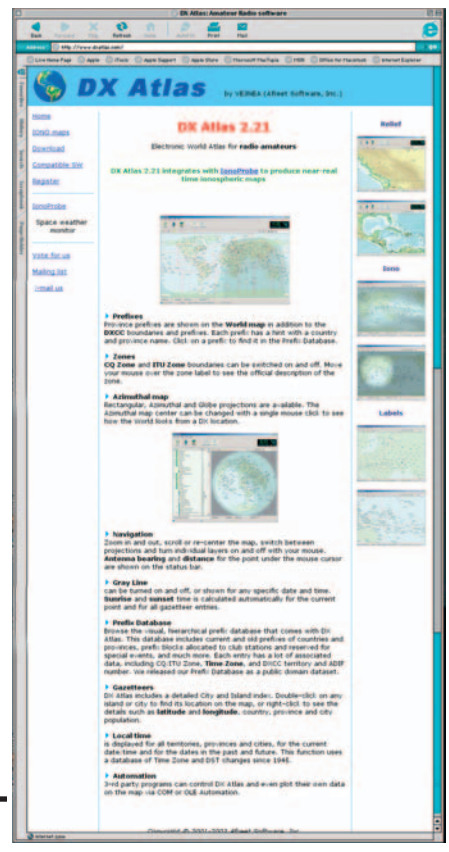
The Internet is a wonderful way of finding out information about almost any subject under the sun. There is however, a problem with the Internet, and that's how do you sort out the dross and drivel from the stuff that you really want? The answer to that one, is to learn how to use one, or more of the Internet 'search engines'.

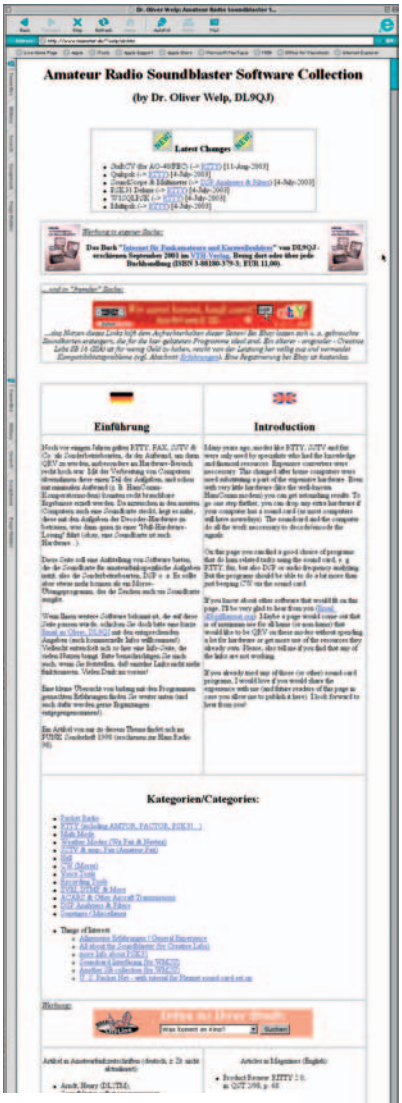
My search engine of choice, is the brilliant one that is Google! I've been using this site for several years. When I started they declared the number of web pages that the 'engine' had catalogued to be only a few hundred million. But that figure seemed to go up in leaps and bounds almost every time I logged on to search for something!

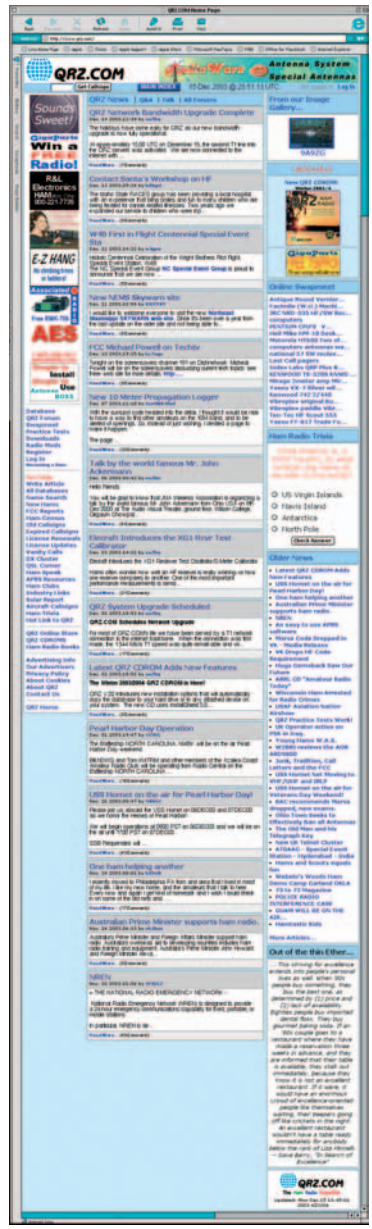
PAGES INDEXED

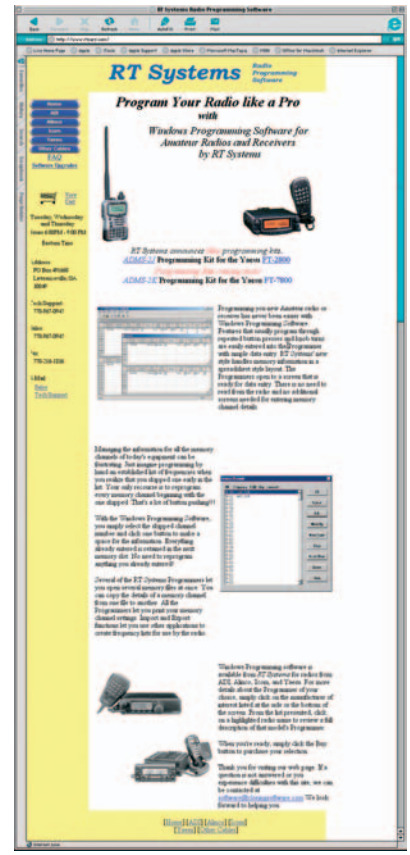
Google no longer declare the number of pages indexed, but it must now run into many thousands of millions. And yet a search takes under a second! So, how do you use it the site? But before I start, are you sitting comfortably at your computer and logged onto the Internet? Once you start searching, you'll find it fascinating so, make sure it's cheap rate on the phone!

Using your web browser of choice - let's begin. Start by accessing the Google website itself at **www.google.com** or **www.google.co.uk** and wait a second or two until the query screen comes up. It's very simple and hides the wealth of details that can be yours for the asking.









As we're going to look for Amateur Radio software we could type this into the 'search for' line and let google loose to search. And in fact when I did that I had a response of 916000 pages found, each one of which had one or more of my key words in them. And the key phrase here is 'one or more of the key words'. The reason is that Google found almost a million pages with combinations of those words. Pages, just containing 'software', pages with just 'radio' and others with 'amateur'. But as I'm not interested in amateur dramatics, or other amateur pastimes - how do I get rid of those pages?

WINNOWING OUT

The answer to the problem of winnowing out the thousands of non-Amateur Radio software pages is actually quite easy. You have to make Google deal with your key words as a key phrase where all the words must be in the page as you typed them. To turn the words into a phrase, just enclose them within the double inverted commas (").

On typing in the 'search for' line as "amateur radio software" then google came back with only 5560 pages, which although still enormous, is rather more manageable than almost a million. The web pages shown around this column are taken from the first few pages offered by Google as being pertinent to my search criteria.

I suggest you have a look at the web page from **Rodney R. Dinkins AC6V**. I say page, but it covers many screens with a claim of more than 6000 links. (If that's true it actually contains more genuine assorted offerings than Google could find). I scrolled down the page and took several screen grabs to illustrate the breadth of topics and links available from the site. It's not the complete page, but that's because we ran out of paper before Rodney ran out of links!

It's time for me to step back now and just list some of the links that I've found in my looking into getting Amateur Radio software on the Internet, it's not definitive, just a few of the links that I found in my searches. Go on ... have a a look - I think you'll be fascinated!

Happy searching, cheerio until next time.

Tex G1TEX/M3NGS

A search engine	**www.google.com**
A massively linked site	**www.a6v.com**
QRZ.COM	**www.qrz.com**
TAPR club	**www.tapr.org**
The Packet Radio	**www.tapr.org/tapr/html/pkthome.html**
Linux radio application and utilities	**radio.linux.org.au**
DX Atlas: Amateur Radio software	**www.dxatlas.com**
Amateur Radio Soundblaster Collection	**http://www.muenster.de/~welp/sb.htm**
Free Radio Computer Programs	**www.btinternet.com/~g4fgq.regp**
HAM radio software	**www.dxsoft.com**
Downloadable Software	**www.amsat.org/amsat/ftpsoft.html**
SkySweeper - multimode radio	**www.skysweep.com**
The G0OAN Mac. Software Archive	**www.g0oanint.demon.co.uk**
EI5DI - SD, the Contest Logger	**ww.ei5di.com**
The Digital Radio Operator's Page	**www.packetradio.com**
DXbase Logging Software	**www.dxbase.com**
AMSAT-NA	**www.amsat.org/amsat/AmsatHome.html**
Kangaroo Tabor Software	**www.taborsoft.com**
APRS Reporting System	**www.cave.org/aprs**
XMLog - Amateur Radio Logbook	**www.xmlog.com**
Almost All Digital Electronics	**www.aade.com**
Amateur Radio Software	**www.n3fjp.com**
The Salopian Web	**www.r-clarke.org.uk/hamsoft.htm**

IN VISION

GRAHAM HANKINS G8EMX
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BIRMINGHAM
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GRAHAM HANKINS G8EMX HAS THE LATEST NEWS FROM THE ATV SCENE

In the latest edition of the British Amateur Television Club's (BATC) magazine, *CQ-TV*, the Chairman **Trevor Brown G8CJS** confirms that the club **will** be holding its Biennial General Meeting (BGM) this year. Trevor writes: "We are about to enter the planning stage. Bletchley, although very popular, is not possible after its wartime codebreaking activities found fame on film. Shuttleworth has been the home of late – it does have an excellent lecture room and grounds". So, at the moment Trevor is asking for suggestions from BATC members: "You may have your own ideas – and why not, it is your club!".

Of course, the BGM is usually combined with an ATV rally or convention, so everyone interested in ATV can come along. Latest E-mails on this are that the organiser of the Telford Rally at RAF Cosford has again offered a conference room, but opinions within the BATC committee are divided on this; there are views that the BGM should be part of a 'stand-alone' ATV day. Further details will be published here as they become finalised and on the BATC website at **http://www.batc.org.uk**

TRANSMITTER & RECEIVER FUN

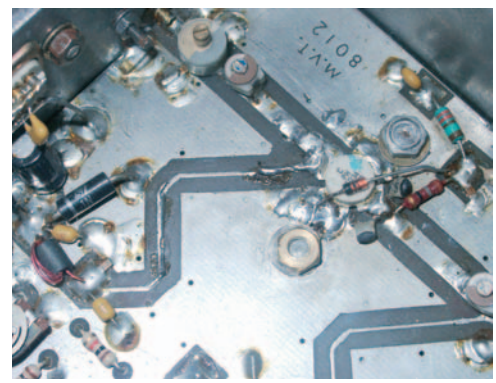
An ATV transmitter and receiver have been sent to the Radio Society of Great Britain (RSGB) for installation in the RSGB Demonstration vehicle GB4FUN. Anyone who has been inside the GB4FUN van knows what a splendid idea this is for introducing the science and technology of radio communication to a wider audience and co-ordinator **Carlos Eavis G0AKI** takes the exhibition to many venues, for example schools, colleges and leisure centres around the country.

Carlos was keen to provide as many modes as space would allow and made a request to the BATC for help with adding ATV. Although this has taken rather longer than originally thought, I have sent a 1W 24cm (1270MHz) transmitter and a modular receiver with tuning module for installation in the unit.

REPEATER SITES

What links a farm outbuilding, loft space above a sports centre and a disused wartime underground Observation bunker? These are some of the places where local Amateur Television (ATV) enthusiasts have installed their ATV repeaters and it is the latter, buried somewhere beneath the Leicestershire countryside, that houses what was the first 24cm (1.3GHz) ATV repeater in the UK, **GB3GV**. Recently only in beacon mode with transmitter problems, GB3GV may soon be fully functioning again after some investigation by the Leicester Repeater Group (LRG).

With no new repeaters being cleared, or even site changes to existing licences being approved, it's vital that established repeaters are continued in service if possible. As GB3GV is one of the two ATV repeaters that I can receive from a vantage point in Birmingham and noticing a much weaker signal than usual, I asked the Group what the situation was. So, when the LRG arranged a 'bunker working party' at the end of October, I travelled up to the repeater site to meet LRG chairman **John Senior G7RXS** and discuss the ATV problems with **Dave Payne G8OBP**.



Final PA stage of Worthing transmitter for GB3GV, showing the replaced transistor and repaired track.

The original GB3GV transmitter had been a 'Worthing/Solent' circuit feeding a power amplifier, but when the output transistor in the Worthing unit failed a smaller transmitter unit – let's call this one 'Tx2' - was installed. But after this change there appeared to be colour problems, so the LRG decided to keep the repeater on air in beacon mode and only in monochrome, pending investigation into the problem.

Both of the GB3GV transmitter units are extremely well engineered and constructed. Opening the Worthing drive unit it was obvious that the final transistor had been replaced and there was re-wiring along a 'burned up' p.c.b. track. A hefty p.s.u. and heatsink completed this transmitter and as everything seemed to be in order, the mains was applied and the transmitter switched on!

Smoke billowed everywhere! No, only kidding Hi! The s.w.r. meter indicated a healthy 15W into the dummy load, a counter showed 1318.5MHz. Spot on!

A colour video signal was applied and was duly received on a monitor a short distance away, showing that the original GB3GV transmitter was working fine. The Tx2 was then powered up now the s.w.r. meter only indicated 9W but otherwise the receive monitor gave a similar display.

During the following few days a variety of test signals were passed through both transmitters, the results viewed with nothing more sophisticated than the monitor and an oscilloscope. There was not much apparent difference between the two transmitters, the monitor screen displaying similar colour pictures and surprisingly the oscilloscope showed a very low level of colour burst output – this is the eleven cycles of 4.433MHz inserted between the 'back porch' of each line sync pulse and the start of the picture video.

On a standard 1V composite video waveform, the 'burst' should have an amplitude of 0.3V. This was difficult to see at all on the received signal from Tx2 and at a very low level after the test had passed through the Worthing unit but this may have be the response of the receiver?

Each was producing an acceptable colour picture on the monitor, at least over the very short distance that the modulated 1.3GHz transmission could travel with screening and a dummy load. As a repeater GB3GV was giving good service with the original Worthing transmitter this could be put back into use, with Tx2 retained as back-up in case of any future failure.

NEW WEBSITE

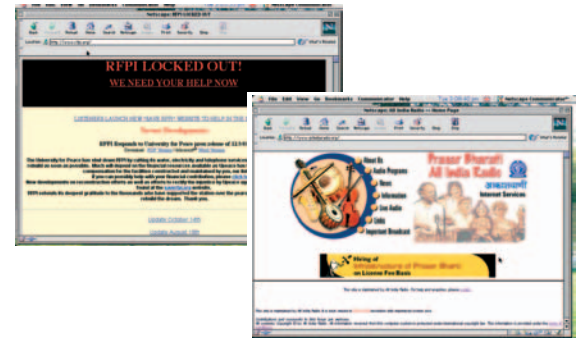
Finally, for this time, **Viv Green G1IXE**, chair of the Severnside Television Group (GB3ZZ, GB3XG) E-mails: "Hi Graham, just to let you know that the Group has got a new website, point your browsers at **www.stvg.co.uk** We are also planning an exciting new venture, the West of England radio rally, which will be held at Frome, Somerset on **Sunday the 27 June** see **www.westrally.org.uk** for more details". Thanks for the update Viv.

That's all for this month so, until next time keep 'In Vision'.

Graham G8EMX

TUNE-IN

TOM WALTERS
P.O. BOX 4440
WALTON
ESSEX
CO14 8BX
E-mail: tom.walters@aib.org.uk



The fracas at **Radio for Peace International (RFPI)** is getting worse! The station is located on the campus of the University for Peace, but peace seems to be the last thing on people's minds at the moment. The station was built with the full permission of the University years ago, but the latest University management has demanded that Radio for Peace get off their land. The first move by the University was to chain up the station's gates and to post armed guards. Now it's got much worse, with the University cutting off water, electricity and telephones, making it impossible to broadcast.

Talks are still in progress, but apparently getting nowhere. The station was built with and is run by listeners' money, but so far the University has offered not 'a dime of compensation'. A new location is being sought, but funding will have to be found.

Frequencies for RFPI are/were: 24 hours on 7.445 and 15.040MHz. The website, on which you can find a petition and a means of donating funds, plus some audio material is **www.rfpi.org** A sad story.

At **Radio Netherlands** they must be getting very 'hot under the collar' about meddling from outside organisations and not for the first time. This time the advisory Dutch Council for Cultural Affairs has called for a review of Radio Netherlands' operations.

The Council says that RNW's Dutch language service should all come from domestic broadcasters. It also suggests that overseas transmissions, including those in English, should be limited to countries where the programmes have a measurable impact. This is not the way international broadcasters gain audiences. Programmes need to be specially designed and there should be a striving for new audiences, not a limitation. A reminder of Radio Netherlands' (extensive) English frequencies - note the inclusion of **DRM** transmissions (RNW have been great proponents of this system): 0000-0057 on 9.845; 0100-0157 on 6.165; 0400-0457 on 6.165 and 9.590; 0500-0557 Sat & Sun on 15.255 (DRM); 1000-0602 on 13.820; 1000-1200 on 9.850 (DRM); 1000-1057 on 7.260, 9.785 and 12.065; 1100-1300 on 21.780 (DRM); 1200-1257 on 5.965; 1400-1557 on 12.070, 12.080 and 15.595; 1430-1500 on 9.815 (DRM); 1800-1957 on 9.895 and 11.655; 1800-1857 on 6.020; 1900-2157 on 17.810; 1900-2057 on 7.120; 1900-2157 Sat & Sun on 15.315; 1900-2057 Sat & Sun on 17.725 and 17.875; 2000-2057 on 9.895 and 11.655; 2100-2157 on 11.730 (DRM); 2130-2200 on 9.800 (DRM) and at 2200-2257 on 1.512 and 15.530MHz (DRM). Visit **www.rnw.nl** for more details.

LOTS OF BROADCAST STATION ACTIVITY THIS MONTH

BROADCASTS JAMMED

There was a report that **Radio Sweden's** broadcasts to Asia were being jammed by Vietnam. So, was it a plot or not? Apparently not, as the Vietnamese were jamming another station altogether, but left the jammer on after the offending broadcast was finished.

Radio Sweden's programme at the time in question was pretty harmless, being for Swedes living abroad. A protest of 'unacceptable' was lodged with the Vietnamese and jamming should by now have ceased, especially as Swedish Radio trains Vietnamese journalists and other radio staff.

There's an opportunity to check current Radio Sweden International frequencies (note again the inclusion of DRM). Listen at: 0130-0200 on 9.435 and 9.495; 0230-0300 on 9.495; 0330-0400 on 9.495; 1330-1400 on 9.430, 9.815 (DRM), 17.505 and 18.960; 1430-1500 on 17.505 and 18.960; 1830-1900 Mon-Sat on 1.179 and 6.065; 2030-2100 on 1.179, 6.065 and 9.445; 2230-2300 on 1.179 and 6.065 and at 2330-0000 on 9.800MHz (DRM). Visit their website at **www.sr.se/rs**

SYSTEM RESTORED

We don't hear too much from Afghanistan - America's first target in the 'war against terrorism' now that all the initial excitement has died down. But gradually, Afganistan's broadcasting system has been restored and several countries have set up their own transmitters. The **BBC World Service** is now broadcasting to Afghanistan 24 hours a day and has just installed three more f.m. transmitters.

If you fancy a really obscure challenge, the BBC has also begun a daily 30-minute programme in the Pashto language, spoken not only in Afghanistan itself but also in Pakistan's North West Frontier province, Baluchistan and Karachi.

The programme is at 2.130 Pakistan time (**1630GMT**). The short wave frequencies are 3.605 and 9.795MHz. There's nothing in English, as far as I know, coming out of Afghanistan yet, although I think they're working on it.

Pakistan is not only in difficulties with Afghanistan, Osama bin Laden, etc., but also with India. Pakistan is turning very religiously against what it considers to be blasphemous Indian broadcasts on its cable system and has banned them. India has hit back by excluding Pakistan from its list of approved broadcasters.

Never mind, **Radio Pakistan** continues on short wave, with a rather skimpy short wave schedule, listen at: 0045-0115 on 9.340 and 11.565; 0800-0804 on 17.835 and 21.465; 1100-1104 on 17.835 and 21.465; 1600-1615 on 9.320 11.570 11.640 and 15.725MHz. Some audio can in theory be found on **http://pakinfonet.tripod.com/news/radio_pakistan.htm** although I could not get any English audio recently.

STATION NEWS

All India Radio's schedule is much more extensive and can be heard at: 1000-1100 on 17.800 and 17.895; 1000-1100 on 1.053, 7.270, 13.710, 15.020, 15.235, 15.260 and 17.510; 1330-1500 on 9.690, 11.620 and 13.710; 1745-1945 on 5.155 and 1.7670; 1745-1945 on 7.410, 9.445, 9.950, 11.620, 11.935, 13.605 and 15.075; 2045-2230 on 7.410, 9.445, 9.575, 9.910, 9.950, 11.620 and 11.715 and at 2245-0045 on 9.705, 9.950, 11.62,0 11.645 and 13.605MHz. Visit **www.allindiaradio.org** - it's quite a nice looking site, but again not much seemed to be working when I visited it.

The winter 2002-2003 short wave schedule is about to come to an end, with frequencies changing at the end of March. Various printed guides are available, but give a thought to the **Association for International Broadcasting's *Global Broadcasting Guide***, available in April. Just £7.50 in the UK, or £9.00 elsewhere brings you two six-monthly editions or two years for £14.50/£17.50. Excellent value, especially as you get a whole lot of extra information about international radio and TV as well. Also available from the *PW* Book Store. Postal enquiries to AIB, PO Box 990, London SE3 9XL or order online at **www.aib.org.uk**

Stop Press: It is with great regret that we have to inform readers of this column that Tom Walters became a 'Silent Key' in December. Please see Keylines on page 9.

RADIOWORLD SECOND HAND LIST

MAKE	MODEL	DESCRIPTION	PRICE
Adonis	AM-805G	Desk Microphone, with Built In Compressor, and VU Meter	£70.00
AEA	PK-232MBX	TNC	£125.00
AEA	PK-900	TNC	£200.00
AEA	PK-96	TNC	£90.00
AKD	6001	6m FM Transceiver	£135.00
ALAN	HQ-2000	2kW 26 - 30MHz SWR / Watt Meter	£25.00
Alinco	DJ-G5EY	Dual Band Handheld	£199.00
Alinco	DJ-X10	Wide Band Receiver	£200.00
Alinco	DJ-X3	Handheld Scanner	£99.00
Alinco	DR-150	2m Transceiver with Air-and Receive	£150.00
Alinco	DX-70	HF & 6m Transceiver	£399.00
Alinco	DX-70TH	HF & 6m Transceiver (100W Output)	£475.00
Alinco	DX-77E	HF Base Station	£399.00
Ameritron	QSK-5	Amplifier Switch / Pre Heat	£200.00
Ameritron	RCS-4X	4 Way Switch	£99.00
AOR	AR-3000A	Wide Band Receiver	£450.00
AOR	AR-3030	HF Receiver, Including PSU	£350.00
AOR	AR-7030	Top Receiver	£550.00
AOR	AR-7030+	HF Receiver	£625.00
AOR	AR-8600	Base Scanner / Receiver	£425.00
AOR	AR-8600mkII	Base Scanner / Receiver	£499.00
AOR	AR-950	Communications Receiver	£89.00
AOR	ARD-2	Decoder	£200.00
AsCom	4 Metre	4 Metre, FM Transceiver, Including PSU. Base Station	£99.00
Comet	CD-270D	SWR Power Meter	£49.00
Cubic	CDR-3550	State of the Art 20 - 1300 MHz Digital Receiver	£4,999.00
Daiwa	CL-22		£20.00
Daiwa	CN-1001	Auto ATU	£99.00
Daiwa	CN-103L	2m / 70cms Cross Needle SWR Meter	£40.00
Daiwa	CN-540		£20.00
Daiwa	DK-210	Electronic Keyer	£60.00
Daiwa	LA-20		£99.00
Datong	ASP	Automatic Speech Processor for FT-817, FT-77 etc.	£70.00
Datong	FL-2	Filter	£60.00
Datong	FL-3	Filter	£75.00
Datong	RFA	Broad Band Amplifier	£20.00
Diamond	SX-100	SWR & Power Meter - 1.6 - 60MHz	£65.00
Drake	SW-8	World Band HF Receiver	£375.00
Fairhaven	RD-500VX	Wide Band Receiver	£525.00
Global	AT-1000	Manual Short Wave Tuner	£50.00
Hunter	750	Linear Amplifier	£599.00
Icom	AT-150	Auto ATU - IC-735 etc.	£175.00
Icom	BC-30	Battery Charger	£25.00
Icom	CM-35	Mains Battery Charger	£20.00
Icom	IC-2100H	2m FM Mobile Transceiver	£150.00
Icom	IC-2710H	Dual Band Mobile	£225.00
Icom	IC-271E	2m Multimode Transceiver - 25W	£299.00
Icom	IC-32E	2m / 70cms Handheld Transceiver	£99.00
Icom	IC-451E	70 cms Base AC	£299.00
Icom	IC-471E	70cms Multimode Transceiver	£299.00
Icom	IC-490E	70cms Mobile Transceiver	£250.00
Icom	IC-505	50 MHz Multimode Transceiver	£275.00
Icom	IC-575A	50 MHz Multimode Transceiver	£450.00
Icom	IC-7100	25 - 2000 RECEIVER	£575.00
Icom	IC-720A	HF & FM Transceiver	£400.00
Icom	IC-735	Base Or Mobile Transceiver	£399.00
Icom	IC-740	HF Base Transceiver	£350.00
Icom	IC-7400	HF / 6m / 2m Built In ATU	£999.00
Icom	IC-746	HF / 6m / 2m Built In ATU	£875.00
Icom	IC-746pro	HF / 6m / 2m Built In ATU Latest DSP Radio	£999.00
Icom	IC-756	HF / 6M All Band Transceiver	£950.00
Icom	IC-756pro	High Class Transceiver	£1,400.00
Icom	IC-821H	Dual Band Base - All Mode	£599.00
Icom	IC-910	2m / 70cms Base Transceiver	£999.00
Icom	IC-E90	Tri-Band Handheld	£220.00
Icom	IC-R2	Handheld Scanner	£99.00
Icom	IC-R5	Handheld Scanner	£125.00
Icom	IC-R10	Handheld Scanner	£229.00
Icom	IC-R70	HF Receiver	£299.00
Icom	IC-R7000	MINT CONDITION!!! Receiver	£550.00
Icom	IC-R71E	Receiver	£325.00
Icom	IC-R72	Receiver	£350.00
Icom	IC-R75	Receiver (With DSP Unit)	£499.00
Icom	IC-T21E	2m Handheld Transceiver	£60.00
Icom	IC-W2E	2m / 70cms Handheld Transceiver	£140.00
Icom	PS-55	Power Supply Matching IC-735	£100.00
Icom	RC-7000	Remote Control	£40.00
Icom	SP-20	External Speaker	£99.00
JPS	NIR-10	Noise / Interference Reduction Unit	£99.00
JRC	JST-245	HF 50MHz 1500w AC Base Transceiver	£1,295.00
JRC	NRD-525	HF Receiver	£375.00
JRC	NRD-545	DSP Receiver	£899.00
JRC	NRD-L2000	1kW Linear Amplifier Solid State (VERY RARE!!!)	£1,600.00
Kamtronics	KAM	Multimode TNC	£140.00
Kent	RA	Morse Paddle Key	£40.00
Kenwood	23cms	23cms Module for Kenwood TS-790E	£299.00
Kenwood	AT-230	ATU for TS-830S etc	£130.00
Kenwood	BC-15	Rapid Charger	£35.00
Kenwood	HS-5	Headphones	£25.00
Kenwood	MC-80	Desk Microphone	£40.00
Kenwood	PS-10	Power Supply for TR-9130 etc.	£40.00
Kenwood	PS-31	Power Supply (TS-870, TS-850, etc)	£135.00
Kenwood	PS-430	Power Supply	£100.00
Kenwood	PS-50	Power Supply	£145.00
Kenwood	R-2000	Receiver Including Converter	£275.00
Kenwood	R-5000	Receiver	£499.00
Kenwood	R-5000	Receiver With VHF Converter	£600.00
Kenwood	R-600	Receiver	£175.00
Kenwood	SP-430	Speaker	£45.00
Kenwood	SP-930	Speaker with Built In Filters	£65.00
Kenwood	SW-100E	SWR Meter	£25.00
Kenwood	TH-215E	2m Handheld Transceiver	£99.00
Kenwood	TH-235	2m Handheld Transceiver	£85.00
Kenwood	TH-47E	70cms Handheld Transceiver	£80.00
Kenwood	TH-79E	2m / 70cms Handheld Transceiver	£175.00
Kenwood	TH-F7E	Dual Band Handheld	£199.00
Kenwood	TL-120	Low Drive Linear Amplifier 100W HF	£150.00
Kenwood	TM-241E	2M Mobile Transceiver	£120.00
Kenwood	TM-251E	Mobile Transceiver	£140.00
Kenwood	TM-255E	2m Multimode Transceiver (Fair Condtion)	£299.00
Kenwood	TM-255E	2m Multimode Transceiver (MINT)	£395.00
Kenwood	TM-451E	70cms Mobile Transceiver - Data Ready	£175.00
Kenwood	TM-V7E	Dualband Mobile	£299.00
Kenwood	TR-2400	2m Handheld Transceiver	£50.00
Kenwood	TR-751E	2m Multimode Transceiver	£250.00
Kenwood	TS-450S	HF Base / Mobile	£499.00
Kenwood	TS-50S	HF Mobile / Base Variable Power	£425.00
Kenwood	TS-570DGE	Mobile / Base HF Transceiver	£675.00
Kenwood	TS-790E	Dual Band Base - All Mode	£750.00
Kenwood	TS-850SAT	HF Base Station with Built In ATU	£699.00
Kenwood	TS-950SD	HF 150W DSP Base Station	£1,200.00
Kenwood	TS-950SDX	Kenwood's Flag Ship	£1,650.00
Kenwood	VC-10	VHF Converter	£99.00
Kenwood	YG-455CN-1	270Hz CW Crystal Filer	£100.00
Kenwood	YK-88C-1	500Hz CW Narrow Filter	£40.00
Kenwood	YK-88CN1	270Hz CW Filter 8.83MHz	£40.00
Kenwood	YK-88S-1	2.4KHz SSB Narrow Filer 8.83MHz	£40.00
Kenwood	YK-88SN	1.8K SSB Filter	£40.00
Kenwood	YK-88SN-1	1.8KHz SSB Narrow Filter 8.83MHz	£40.00
Lowe	HF-225	HF Receiver	£175.00
Lowe	HF-350	HF Receiver	£295.00
MFJ	MFJ-1272B	TNC / Mic Switch	£20.00
MFJ	MFJ-1278	TNC All Mode	£175.00
MFJ	MFJ-207	HF SWR Analyser	£50.00
MFJ	MFJ-722	CW / SSB Filter with 5 Watts Amp	£59.00
MFJ	MFJ-784DSP	DSP Tunable Filter	£140.00
MFJ	MFJ-921	VHF 200 Watt ATU	£50.00
MFJ	MFJ-941E	Versa Tuner	£89.00
Microwave	28/144	28 / 144 MHz Transverter	£125.00
Microwave	MOD-144/30	30 Watt Amplifier	£79.00
Microwave	MML-144/100-S	100W 2m Amplifier	£99.00
Microwave	MML-432/50	50 Watt 70 cms Amp, with Built-In-PreAmp	£85.00
Microwave	Pre-Amp	Low Noise RF Switched Pre-Amp	£25.00
Midland	PowerPack	CB Power Pack (BOXED)	£50.00
Nissei	TM-3000	1.6 - 60MHz, 10W / 3kW, SWR Meter	£49.00
OptoElectronics	MiniScout	Frequency Counter	£129.00
PacCom	TNC-320	TNC	£90.00
Pres. Lincoln	10 METRE	10 Metre Multimode	£175.00
RadioShack	Pro-60	200 Channel Handheld Scanner (30MHz - 999MHz, WITH GAPS)	£99.00
RevCo	RS-2000	60 - 519 MHz Home Base Scanner	£79.00
Revex	V-540	SWR Meter	£25.00
Sangean	ATS-909	World Band Receiver	£130.00
SGC	SG-2020	HF Transceiver	£450.00
Sommerkamp	FT-290R	2m Multimode Transceiver	£150.00
Sony	SW-100E	FM/SW/MW/LW Portable Receiver	£90.00
Spectrum	RP-6S		£20.00
Standard	C-156E	2m Handheld Transceiver	£125.00
Standard	C-500	Dual Band Handheld	£99.00
Standard	C-510	2m / 70cms Handheld Transceiver	£125.00
Standard	C-510E	Dual Band Handheld	£99.00
TenTec	RX-350	HF Receiver	£999.00
Tokyo	HL-30V	2m - 25W Amplifier	£75.00
Tokyo	HL-35V	2m Power Amplifier with Pre-Amp	£89.00
Tokyo	HL-37V	Linear Amplifier	£60.00
Tono	T-777	Communications Terminal	£120.00
Transverter	QM-70	28/144 Transverter	£100.00
Trident	TRX-200	Latest Scanner	£175.00
Trio	TR-9000	2m Multimode	£199.00
Trio	TR-9130	2m All Mode Transceiver	£250.00
Uniden	UBC-860XLT	Base Scanner / Receiver	£99.00
Uniden	UBC-9000XLT	Base Scanner	£199.00
Welz	AC-38M	200W Mobile Matching Network	£50.00
Welz	CH-20A	Antenna Switch	£15.00
Welz	CH-20N	Antenna Switch	£15.00
Welz	CT-150	Dummy Load	£50.00
Welz	SP-15M	SWR Meter	£35.00
Welz	SP-380	SWR & Power Meter 1.8 - 500MHz	£30.00
WinRadio	WR-1550E	Trunking Software	£450.00
Yaesu	ATAS-100	Yaesu Active Tuning Antenna System	£175.00
Yaesu	FL-2025	Amplifier	£90.00
Yaesu	FP-30	Power Supply - FT-897, FT-857	£189.00
Yaesu	FP-700	Power Supply	£100.00
Yaesu	FP-707	Power Supply Unit	£80.00
Yaesu	FP-757GX	Power Unit for FT-757	£300.00
Yaesu	FR-101	HF, 2m, 6m Base Transceiver	£399.00
Yaesu	FRG-8800	Receiver Including Converter	£399.00
Yaesu	FRT-7700	Antenna Tuner for FRG-7700	£60.00
Yaesu	FRV-7700	Converter for FRG-7700	£60.00
Yaesu	FT-100	HF / 6m / 2m / 70cms Mobile Transceiver	£499.00
Yaesu	FT-1000MP	HF Base Station with Built In ATU with DSP	£1,199.00
Yaesu	FT-1000MPmkV	200W DSP HF Transceiver	£1,800.00
Yaesu	FT-1000MPmkV-Field	Top HF Radio - AC	£1,500.00
Yaesu	FT-101ZD	HF Base Transceiver	£275.00
Yaesu	FT-1500M	2m 50W Mobile Transceiver with DTMF Microphone	£129.00
Yaesu	FT-221R	2m Multimode Base Station	£200.00
Yaesu	FT-2600M	Mobile VHF / FM Transceiver	£120.00
Yaesu	FT-290RmkII	2m Multimode Mobile Transceiver	£225.00
Yaesu	FT-41R	Handheld Transceiver	£120.00
Yaesu	FT-50R	Dual Band Handheld	£150.00
Yaesu	FT-5100	Dual Band Transceiver	£199.00
Yaesu	FT-51R	2m / 70cms Handheld Transceiver	£199.00
Yaesu	FT-690R	6m Multimode Mobile Transceiver	£199.00
Yaesu	FT-707	HF 100W Transceiver	£275.00
Yaesu	FT-7100M	2m / 70cms Mobile Transceiver	£220.00
Yaesu	FT-726R	6m / 2m / 70cms / HF Transceiver	£575.00
Yaesu	FT-726R	2m / 70cms / HF Transceiver	£425.00
Yaesu	FT-730R	70cms Mobile Transceiver	£120.00
Yaesu	FT-736R	2m / 70 cms Base Transceiver	£575.00
Yaesu	FT-736R	6m / 2m / 70cms Transceiver	£650.00
Yaesu	FT-76R	70 cms Handheld Transceiver	£99.00
Yaesu	FT-790R	70cms Multimode Transceiver	£175.00
Yaesu	FT-790RmkII	70cms Multimode Transceiver	£250.00
Yaesu	FT-8100R	2m / 70cms Mobile Transceiver	£220.00
Yaesu	FT-817	Mobile HF, VHF, UHF Transceiver	£450.00
Yaesu	FT-840	HF Base / Mobile Transceiver	£399.00
Yaesu	FT-920AF	HF / 6M Base Transceiver	£899.00
Yaesu	FTV-1000	200 W Transverter	£475.00
Yaesu	FTV-430MHZ	Module for Transverter	£99.00
Yaesu	FTV-707	2m Multimode Transverter Including Module	£125.00
Yaesu	FTV-901	Transverter including 2m Module	£165.00
Yaesu	FTV-902DM	Transverter	£225.00
Yaesu	KP-100	FRG-100 Key Pad	£25.00
Yaesu	MH-35	Speaker Microphone	£10.00
Yaesu	MMB-16	Mounting Bracket	£20.00
Yaesu	MW-1	Remote Control Microphone & Infra-Red	£60.00
Yaesu	NC-29	Battery Charger	£30.00
Yaesu	NT-29	Charger	£30.00
Yaesu	SP-55	Mobile Speaker	£15.00
Yaesu	SP-980	Speaker	£60.00
Yaesu	System 600	HF Commercial Radio	£600.00
Yaesu	VR-120	FM / WFM / AM Receiver	£99.00
Yaesu	VR-500	Yaesu Handheld Scanner	£149.00
Yaesu	VR-5000	Top Class Base Scanner	£450.00
Yaesu	VX-1R	Handheld Transceiver	£120.00
Yaesu	VX-5R	Triband Handheld	£220.00
Yaesu	VX-7R	Triband Handheld	£240.00
Yaesu	XF-114SN	2KHz SSB Filter	£60.00
Yupiteru	MVT-3300	Handheld Scanner	£99.00
Yupiteru	MVT-7100	Handheld Scanner	£129.00
Yupiteru	MVT-7300	Multiband Handheld Scanner	£199.00
Yupiteru	MVT-8000	Base / Mobile Scanner	£199.00

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THE SHORTWAVE SHOP
01202 490099

TRANSCEIVERS
ICOM IC746 HF/6M/2M TRANSCEIVER....£749
ICOM IC735 HF TRANSCEIVER....£395
ICOM IC 1271 1296 MHZ TRCVR....£495
NRD JRC 135 HF TRANSCEIVER....£295
YAESU FT1500M VHF TRANSCEIVER....£125
YAESU FT726 HF/VHF/UHF TCVR....£450
YAESU FT736 HF/VHF/UHF TCVR....£575
YEASU FT1000MP Mk5 TRANSCEIVER....£1395
KENWOOD TS680 HF+6MTR TCVR....£425
KENWOOD TS50 HF TRANSCEICER....£395
KENWOOD TS850S HF TCVR....£695
KENWOOD TS450S HF TRANSCEIVER....£450
KENWOOD TS140 HF TRANSCEIVER....£325
KENWOOD 9130 VHF MULTIMODE....£195
KENWOOD TM251E VHF MOBILE....£99
KENWOOD TS780 VHF/UHF TCVR....£325
KENWOOD TH 215E VHF HANDHELD....£125
ALINCO DR 140 VHF MOBILE TCVR....£95

RECEIVERS
ICOM ICR 75 HF RECEIVER....£495
ICOM ICR 5 HF/ VHF/UHF RECEIVER....£129
JRC NRD 545DSP HF RECEIVER....£725
JRC NRD 545DSP HF RCVR+VHF/UHF....£825
JRC NRD 515 HF RECEIVER....£599
KENWOOD R5000 HF RECEIVER....£395
KENWOOD R600 HF RECEIVER....£175
LOWE HF225 HF RECEIVER....£245
AKD HF3 HF RECEIVER....£95
AOR AR3000A+ HF VHF UHF RCVR....£395
AOR AR8200 WIDE BAND H/H RCVR....£325
AOR AR8000 H/H RECEIVER....£185
YUPITERU MVT7300 H/H RCVR....£185
YUPITERU MVT7100 H/H RECEIVER....£145
YAESU FRG100 RECEIVER inc PSU....£295
YAESU VR5000 WIDE BAND RCVR....£399
YAESU FRG 7700 HF RECEIVER....£125
YAESU FRG 7 HF RECEIVER....£95
REALISTIC DX394 HF RECEIVER....£85
BEARCAT 9000XLT BASE SCANNER....£185
BEARCAT UBC120XLT. H/H SCANNER....£95

ACCESSORIES
KENWOOD BC15A CHARGER/TH28/78....£39
KENWOOD MC80 BASE MICROPHONE....£60
KENWOOD MC60 BASE MICROPHONE....£60
KENWOOD HD5 HEADPHONES....£35
MFJ948 ANTENNA TUNER....£85
TOKYO HC150 HF ANTENNA TUNER....£55
LGD RT11 AUTO ANTENNA TUNER....£195
AEA AUTO MAG LOOP ANTENNA....£225
MFJ 9593 ACTIVE ANTENNA UNIT....£85
TIMEWAVE DSP599DX DSP UNIT....£145
CANTRONICS KPC4 TNC....£95
KENWOOD PS30 PWR SUPPLY UNIT....£85
KENWOOD PS5 PWR SUPPLY UNIT....£35
WATSON W25AM PWR SUPPLY....£60
NRD RTTY BOARD FOR NRD 525/535....£95
NRD RTTY TUNING INDICATOR UNIT....£35
KENWOOD AT50 AUTO ATU....£135

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NEVADA
023-9231 3090

VHF/UHF EQUIPMENT
ADI AR-146 2M VHF MOBILE....£90
ALINCO DJ-SR1 PMR 446 TRANSCEIVER....£50
ALINCO DJ-SR1 PMR 446 TRANSCEIVER....£50
ALINCO DRM06 6M FM TRANSCEIVER....£129
ICOM IC-2725E 2M/70CM MOBILE TRANSCEIVER....£259
ICOM IC-T8E 6M/2M/70CM HANDI....£199
YAESU FT-1500M 2M MOBILE TRANSCEIVER....£129
YAESU FT-8100R 2M/70CM MOBILE TRANSCEIVER....£249
YAESU FTL2014 VHF PMR TRANSCEIVER....£50
YAESU VX-5R+ACC 6M-70CM HANDI + VC25 CASE MIC£249

RECEIVERS & SCANNERS
ALINCO DJX-10E HANDHELD SCANNER....£225
ALINCO DJX10E+ACC HANDHELD SCANNER+CASE&CELL/CASE....£199
ALINCO DJX-2000 HANDHELD SCANNER + EDH16....£375
ALINCO DJX3 HANDHELD SCANNER C/W ACC and BOOK....£159
AOR AR5000+3 HIGH PERFORMANCE BASE SCANNER£1199
BEARCAT UBC-9000XLT BASE SCANNING RECEIVER....£175
STANDARD AX-700E BASE SCANNING RECEIVER....£229
AOR AR3000A WIDEDAND RECEIVER....£399
GRUNDIG YB-400 SHORTWAVE RECEIVER....£75
ICOM ICR-71E HF RECEIVER....£425
ICOM IC-R75DSP HF RECEIVER + DSP & SOFTWARE....£549
ICOM IC-R8500 WIDEDAND RECEIVER....£849
JRC NRD345 HF RECEIVER....£350
REALISTIC DX-394 HF RECEIVER....£69
SONY ICF-SW7600GR SHORTWAVE RECEIVER....£89
VIDEOLOGIC DRX-601ES DAB TUNER....£159
YAESU FRG-8800V HF RECEIVER + VHF CONVERTER....£325

HF TRANSCEIVERS
ALINCO DR-M03 10M FM MOBILE....£149
ALINCO DX-70TH HF/6M MOBILE TRANSCEIVER....£425
ICOM IC-575H 10M/6M BASE TRANSCEIVER 100/50W....£475
ICOM IC-737A 100W HF TRANSCEIVER....£699
ICOM IC-7400 HF/6M/2M100W TRANSCEIVER....£1095
YAESU FT-840+MD-100 100W HF TRANSCEIVER + BASE MIC....£499

ACCESSORIES
AOR SDU-5500 SPECTRUM DISPLAY UNIT....£599
COBRA CA79 HANDHELD ECHO MICROPHONE....£29
DEWSBURY S/TUTOR SUPA TUTOR/MORSE TUTOR....£25
DRAE DRA12 12 AMP POWER SUPPLY....£35
GLOBAL AT-2000 RX ANTENNA TUNER....£69
HITACHI KH-YG1 WORLDSPACE YAGI KIT....£39
ICOM IC-AT160 ICOM COAXIAL AUTO ATU....£169
ICOM PS-85 20A POWER SUPPLY....£129
ICOM SM-8 BASE MICROPHONE....£69.95
KENWOOD MC-90 DIGITAL DESK MICROPHONE....£120
KENWOOD PS-52 KENWOOD POWER SUPPLY....£159
MFJ 934 ANTENNA TUNER....£115
MICROSET PRI45A MAST HEAD AMPLIFIER 100W....£79
MML144/40 2M 40W AMPLIFIER+PRE-AMP....£59
PALSTAR PS-30M 25/30A POWER SUPPLY....£79.95
REACE FS1-5 SWR/POWER METER....£19
SCAN MAG MOBILE ANTENNA....£15
TONO Q-550 DATA TERMINAL....£69
WALKABOUT ANTENNA 5 BAND PORTABLE ANTENNA....£39
YAESU MH-35 SPEAKER/MIC....£19
YAESU YSK-100 REMOTE KIT FOR FT-100/FT-100D....£39
ZETAGI 1220 25AMP POWER SUPPLY....£69
ZETAGI HP-1000 ANTENNA TUNER/METER 26-28MHZ....£45

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SOUTH EAST COMMUNICATIONS
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STATION ACCESSORIES
Ameritron AL-800XCE 1.25kw amp save £750, now....£1249
MFJ 956 SWL ATU....£49
Icom SM-20 deluxe desk mic 600ohm....£99
Kenwood SP940 matching speaker for TS940S....£99
Global AT2000 SWL ATU....£79
Paccomm Spirit2 9600 baud TNC....£99
Garmin Street pilot mint european base maps....£399
Watson 30-35amp PSU with meters....£89
Datong FL-3 multimode filter....£99
Yaesu FL2100Z 1 KW amp....£499
Uniden all band lazer radar detector....£199
Kenwood SP-230 filtered speaker....£89
MFJ949E 300watt tuner with dummy load....£125
Kenwood MC-90 DSP desk mic for TS570/870....£129
Heil HM-10 dual insert studio quality mic....£99
Watson WMM-3 multimode data decoder....£45

VHF/UHF TRANSCEIVERS
Icom IC229 50watt 2m mobile....£149
Yaesu FT8800 2m/70cm latest dualband mobile....£279
Kenwood TMG 707E 2m,70cm 50 watt....£199
Yaesu VX5R 6M,2M,70CM handi, last new unit....£249
Kenwood TM255E 2m 45watt multimode,mint....£399
Kenwood TR751E 2m 25watt multimode mobile....£349
Yaesu FT736R ,2m,70cm,6m all fitted....£799
Alinco DJG5 2m/70cm handheld charger etc....£199
Icom ICT8E 6m,2m,70cm tri-band handi,nicads....£229

HF TRANSCEIVERS
Kenwood TS690SAT HF+6m 100watt auto ATU....£699
President Lincoln 10m Amateur transceiver new....£199
Kenwood TS570D top class, DSP,auto ATU....£599
Icom IC756 auto ATU DSP mint....£999
Yaesu FT-900AT 100watt all mode detachable head....£549
Yaesu FT920 HF+6m 100watt auto tuner mint....£899
Alinco DX70TH HF+6M 100watt all mode....£499
Yaesu FT990DC auto ATU....£799
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Kenwood TS440SAT 100watt 100mem auto ATU....£499

SHORTWAVE RECEIVERS
Lowe HF250E remote control....£339
Grundig YB400 AM,FM,SSB shortwave portable....£89
Lowe HF225 0-30mhz keypad option bowed mint....£269
Sony SW55 portable receiver all mode 0-30mhz....£199
Target HF-3 0-30mhz all mode receiver....£99

SCANNERS BASE/MOBILES
Uniden Bearcat 220XLT 66-956mhz....£99
AOR3000A 0-2036mhz all mode,boxed and mint....£549
AOR8000 0-1900mhz all mode....£199
Yaesu VR5000 0-2600mhz all mode....£499
Bearcat 3000XLT 25-1300mhz nicads, as new....£149
Bearcat 780XLT 25-1300mhz trunk tracker....£249
Icom IC7100 25-2000mhz all mode 1000memories....£499
AOR 8200 0-2036mhz 1000memories mint....£299
Bearcat UBC278cxl base scanner 100mems demo....£139
AOR 8600 0-2040mhz....£455
Yupiteru MVT7100 0-1650mhz nicads etc....£169
Bearcat UBC780XLT 25-1300mhz demo....£275

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WATERS & STANTON
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HF Transceivers
Alinco DR-M03SX x2 10m FM Mobile 28-29.7MHz 10W....£159
Icom IC-703 HF& 6m All Mode QRP + Gen.Cov. RX, 105ch. 10W....£469
Icom IC-735 Base Transceiver with Gen.Cov. 12V....£399

VHF/UHF Base/Mobile Transceiver
AKD 6001 6m FM Mobile Channelised 25W....£99
AKD 7003 x2 70cm FM Mobile Channelised 3W....£99
Alinco DR-130E 2m Mobile, 35W, 20Memories....£99
Alinco DR-M06T x2 6m FM Mobile 10W CTCSS....£139
Icom IC-2100H 2m FM Mobile 55W 113ch. + CTCSS....£169
Icom IC-2350H 2m,70cm FM Mobile 50W, 35W....£299
Kenwood TM-451E x2 70cm FM Mobile 35W 2m RX, Full Duplex....£249
Kenwood TR-751E 2m All Mode Mobile/Base 25W....£329
Yaesu FT-1500M 2m FM Military Spec. Small Mobile 50W....£129
Yaesu FT-7100M 2m,70cm FM 50W,35W Full Duplex + Remote Head....£249
Yaesu FT-8100R 2m,70cm FM 50W,35W Full Duplex + Remote Head....£279

VHF/UHF Hand Held Transceiver
ADI AT-400 70cm FM Battery box 420-465MHz RX....£99
Alinco DJ-G5 x2 2m/70cm FM with wide RX....£169
Icom IC-A22E Airband H/Held + NAV/COM & headset adapter....£249
Yaesu FT-11R 2m FM H/Held + DTMF keypad....£119
Yaesu VX-1R 2m/70cm FM micro + Wide RX....£89

Shortwave Receivers
AOR AR-7030 0-32MHz All Mode Receiver 12V with PSU....£449
Grundig YB-400 Portable Receiver with FM stereo and SSB....£69
Icom IC-R71E 100kHz-30MHz All Mode Receiver Mains....£329
Kenwood R-5000 100kHz-30MHz All Mode Receiver Mains....£499
Lowe HF-225 30kHz-30MHz All Mode Receiver 12V....£249
Lowe HF-250 30kHz-30MHz Receiver 12V PC Compatable....£329
Sony ICF-SW55 Portable Receiver with FM stereo and SSB....£179
Sony ICF-SW100E Pocket Receiver with FM stereo and SSB....£115

Scanners Mobile/Base
Fairhaven RD-500VX x2 10kHz-1750MHz All mode, 13000+ Ch. 12V + PSU£599
Icom IC-R7000 x3 25MHz-2GHz All Mode Base 99Ch. mains....£449
Icom IC-R8500 100kHz-2GHz All Mode Base 12V with PSU....£949
Win-Radio WR-1550e 150kHz-1500MHz All Mode PC Controlled Receiver 12V £329

Scanners Hand Held
AOR AR-8200 x2 530kHz-2040MHz All Mode 1000Ch....£249
Opto R-10 30MHz-2GHz FM Interceptor....£129
Yupiteru MVT-3300 66-1000MHz (with gaps) AM,FM 200Ch....£89
Yupiteru MVT-7000 200kHz-1300MHz AM,FM,WFM 200Ch....£125
Yupiteru MVT-7300 x3 521kHz-1320MHz All Mode + 8.33kHz step....£229
Yupiteru MVT-9000 II 0.5-2039MHz All Mode 1000Ch. + voice inverter....£249
Yupiteru VT-225 108-142,150-160,220-391MHz AM,FM 100Ch....£145

Station Accessories
AOR SDU-5500 Spectrum Display Unit for Receivers + PC control....£599
BNOS 12/30E 12V Stabilised 30A power supply....£69
Datong ASP Auto Speech Processor....£95
ERA Microreader RTTY,Morse Decoder and Tutor....£79
Global AT-1000 0.5-30MHz SWL ATU....£59
Global AT-2000 150kHz-30MHz SWL ATU with Q selector....£69
JPS ANC-4 500kHz-80MHz Antenna Noise Canceller 250W....£69
JPS NIR-10 Noise / Interference Reduction Unit....£199
JPS NTR-1 DSP Noise Reducer....£99
Kantronics KAM Plus Multimode Data Controller with Pactor,Dual Port..£199
Kantronics KPC-9612 x2 Dual port Dual speed Packet TNC Controller....£229
MFJ MFJ-259 1.8-170MHz Digital SWR Analyser,Resistence....£149
MFJ MFJ-422BX Compact Electronic Paddle Keyer (fit your own key)....£49
MFJ MFJ-462B RTTY,ASCII,CW,AMTOR Reader with Display....£119
MFJ MFJ-1214PC Multimode Interface for IBM FAX,CW,RTTY,ASCII....£119
MFJ MFJ-1278 Multimode 10 mode Data Controller....£175
MFJ MFJ-1289M IBM Multimode Control Software....£49
MFJ MFJ-8621 2m Packet Transceiver only....£129
M.Modules MML-144-30-LS 2m 1-3W in, 30W out Linear with Preamp....£69
Mirage B-34G 2m 0.2-8W in, 35W out Linear with Preamp....£89
Morseman Morse Tutor Morse Tutor....£39
Opto 3000A + 10Hz-3GHz Frequency Counter....£289
Opto Linx RS-232 interface and software for CI-C,AOR....£75
PacComm TNC-220 HF/VHF Dual Port 9k6 Packet TNC....£69
SEM QRM Eliminator Interference Reduction Unit....£69
SEM VHF TranZmatch 2m atu....£29
SEM TranZmatch 80, 40, 20 & 10m High Quality atu....£69
SML SWR-25 3.5-150MHZ 100W SWR,PWR meter....£29
Toyo T-200 3.5-500MHz 200w Dummy Load....£39
Vectronics AT-100 0.3-30MHz Active SWL Antenna 10dB gain....£59
Watson WAT-2 500kHz-30MHz SWL ATU....£39
Watson WMM-1 Multimode Modem....£49
Yaesu SP-102 Matching Filtered Extension Speaker+ 2 inputs....£69

Miscellaneous
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1155 RX, d.f. and p.s.u., £100. 1155 coilpack (unused), £25. B2 RX, £100. TCS12 RX for spares, only, £15. Drake R4 RX, £100. Drake SSR1 RX, £100, carriage extra. Peter G8CKM, Shropshire. Tel: (01939) 250679 or E-mail: peterparker2@lineone.net

Aerial package: 2m (144MHz) portable base 5-element Yagi, rotator and controller, 2m (144MHz) 5λ8 whip, large diameter magmount, £60 the lot (plus P&P). Will split, p/ex h.f. a.t.u./s.w.r. meter. Rod, Flintshire. Tel: (01352) 715244.

Alinco DJ-195E 2m (144MHz) hand-held with keypad, as new, two years old, complete with case, charger, d.c. power lead, original box, with manual, £100 o.v.n.o. Tel: N. Yorkshire (01969) 624100.

Alinco DJ-X3, still in box, no recharge batteries, £45. Ian, Gwent. Tel: (07816) 034075 1700 to 2000.

Complete station for sale comprising: Icom IC-756PRO MkI, mint condition, Ameritron AL811, almost new, Yaesu tuner FC-102 including new 4-way remote antenna selector, MQ1 Minibeam, almost new, Yaesu FT-8100 dual-band f.m. mobile, mint condition. Offers invited. Dave on (01673) 849470.

Diamond SX200 s.w.r./p.w.r. meter, £24. AKD WA1 v.h.f./u.h.f. wavemeter, £18. AKD WA3 absorption wavemeter, £18. Kent twin paddle Morse key, £26. MFJ 401C Econo keyer, £18. All excellent condition, o.n.o. Tel: West Midlands (01902) 843447 after 1830.

FDK 2m (144MHz) transceiver, output variable, 1-25W, £100. Alinco 2m (144MHz) transceiver, 5-45W, £50. Both had very little use. ERA MkII MicroReader, c.w./RTTY, £25, full instructions. Copies *PW*/*SWM* from Oct 1986, in binders, offers. Bob Hamilton G0DYB, Manchester. Tel: (01942) 870954.

Icom IC-R75 receiver with p.s.u., mint, boxed, with 'Miracle' whip antenna, new, boxed, complete rig including some books, all new, £495 o.n.o. Tel: South West Midlands 077200 36964 - could deliver up to 100 miles.

Kenwood TS-140S transceiver, general coverage RX, s.s.b., c.w., a.m., f.m., 1.8-29.7MHz, 100W output, plug-in adapter to limit output to 10W if desired, boxed, g.w.o., £275. Alinco DJ-G5E 2m/70cm (144/430MHz), f.m. hand-held transceiver, dual receive, with manual and charger, v.g.c., £150. John GM4AQO on (01592) 874719.

MFJ-910 h.f. mobile antenna matcher (new/unused), £15. MFJ-914 auto tuner extender (new), £45. MFJ-815B 1.8-60MHz cross needle peak reading s.w.r./wattmeter (new), £60. SP140 mobile speaker (new), £10. Derek GW0CSR, Caernarfon. Tel: (01286) 674455.

Morse transceiver programme for PCs, £5.20. E-mail: poisonpen@poisonpen.freeserve.co.uk or telephone (01297) 23421.

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Racal RA1772 receiver with operating instructions and workshop manual, excellent condition, prefer buyer collects, needed any info. or circuit diagrams for GEC/Marconi communications receiver, RC410 or RC411, expenses reimbursed, £350. Fred on

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Racal RA17L, g.w.o., £60. Eddystone 659 marine receiver, ideal for spares or rebuild, £30. G4KOW, QTHR. Tel: 0208-304 1269.

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Silent Key Sale: Yaesu v.h.f. 2m (144MHz) all-mode base station transceiver, model FT-221, old but in good working condition, could do with a little TLC. Runs off 12V d.c. or 115V a.c., £100 o.n.o. Heathkit h.f. transceiver, model SB-101, c.w., u.s.b., l.s.b., covers 80, 40, 20, 15 and 10m (no WARC bands), 100W, built from a kit by a Chartered Electrical Engineer and with a matching mains power supply, sensible offers please for this collectors items. Yaesu v.h.f. 2m (144MHz) f.m. mobile transceiver, model FT2B (old), crystal-controlled, with several popular channels and with matching mains power supply unit, £30 o.n.o. - (2m on the cheap). Bench oscilloscope, dual beam, 25MHz bandwidth, Goldstar model OS-9020A, in original box and in as new condition, £150 o.n.o. Carriage at extra cost on all items. Tel: N. Lincolnshire (01427) 752284.

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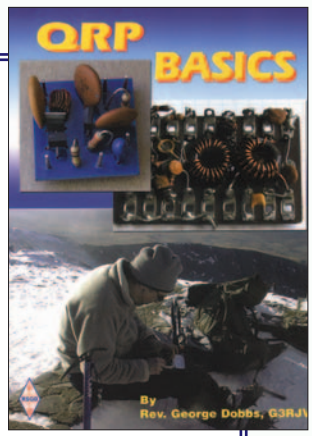

George Dobbs G3RJV the author of *QRP Basics* is well known in the Amateur Radio hobby as the founder of the G-QRP club and author of Carrying on the Practical Way here in *PW*. In this book George explores the attraction of low power operating (QRP) and in doing so shares his extensive knowledge with the reader. The setting up and use of an inexpensive, low profile radio station are explored and there's a wealth of practical advice and projects to have a go at building. Both novice and seasoned QRPers will benefit from the hints and tips given in QRP Basics.

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topical talk

Epic Weekend Journey

Rob EI5IW/G3XFD thoroughly enjoyed the second Mayo Rally organised by the Mayo Radio Experimenters' Network (MREN).

In mid-November Rob Mannion G3XFD/EI5IW joined the Mayo Radio Experimenter's Network at their second rally in Knock. Despite what might be considered an epic weekend journey Rob realises that the keen EI, GI and GM operators we meet at UK rallies - face similar journeys regularly!

Regular readers will know that whenever possible I have a short break in the West of Ireland. Usually I take my car over on the Irish Ferries from Pembroke Dock. However, for the Mayo Rally on Sunday 17 November, I left home at 0400 on the Saturday and drove to Bristol Airport on my first leg to Dublin. Connection times were too risky for the once-a-day Bournemouth to Dublin flight, leaving only 30 minutes before the Knock connection. Hence the flight from Bristol!

Arriving in Dublin before 0900 I enjoyed the City sights again and a wonderfully tasty fish and chip lunch (local freshly caught fish) in Howth. And of course I travelled by the Dublin Area Rapid Transit (DART) train!

Belmont Hotel

Arriving at the large but very remote Knock International Airport I was transported to the Belmont Hotel in Knock itself by **John Corless EI7IQ** (thanks John!), arriving in my room just before 1900. Tired as I was after a 0300 start I appreciated what John and other keen EIs (together with GI and GM visitors) go through when they join us at UK rallies.

Despite the long day, the exercise provided worthwhile. I'm planning to fly for other visits to Scotland (for example) during 2004. **But be aware if you ever use the airport - when you leave Knock there's an unavoidable 10 Euro local surcharge levied as you pass the departure gate!**

The Mayo Radio Experimenters' Network (MREN) Rally itself was held on Sunday 16, starting at 1100 hours. The weekend weather was delightfully clear and sunny for November and visitors came from near and far. Indeed, I was very pleased to see former **RSGB President Terry Barnes GI3USS** arrive from Bangor in County Down, especially as he'd transported the *PW* stand stock for me! Without Terry's help I could have only carried a few sample magazines with me.

Personally, I think that the MREN event was more a convention than a rally. Although it was only the second event I think it's quickly earning a good reputation. Well organised by friendly people - it was thoroughly enjoyable and it was amazing to see just how far west Amateur Radio hobbyists will travel to meet friends, find the bargains and chat about special interests.

Four Metre Fans

While on the subject of special interests, even though I was aware that 70MHz activity is rapidly growing in EI, it was an extremely pleasant surprise to find myself literally surrounded by keen 4m enthusiasts during the rally.

I also discovered that the next *PW* 'Activity Afternoon' (AA) on 70MHz is keenly awaited! The announcement will be made in Keylines when the date has been finalised for the next 'AA'.

Finally on this topic - I hope to announce a very special project for 70MHz operators soon. Watch this space and let's hope the v.h.f. conditions are better and we can achieve better DX!

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