practical wireless - britain's best selling amateur radio magazine

pw

www.pwpublishing.ltd.uk

UK Exclusive!

FT-1802 144MHz Mobile On Test

- **Linking The K Rigs** The Kilve & Kilton Projects United
- **Build** G3TPJ's Simple 144MHz RX
- **Antenna Workshop**
  A 430MHz T-Lambda Antenna

9 770141 085082 05 >
May 2006
£3.00

WATERS & STANTON

UK'S L

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

Visit our eBay shop for more bargains!

eBay

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

UK Radio Communications Equipment Guide 2006

£3.95 + £1.75P&P

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

NEW SoftRock V6

80m / 40m Receiver
SSB CW AM inc Software

NEW

Experience the thrill and amazing low cost performance of Software Defined radio. The SoftRock receiver kit builds you a dual-band 80/40m all-mode receiver with Ten IF filters, 6kHz - 25Hz, programmable AGC, Full DSP, Digital display down to 1Hz, Peak/RMS S-meter, IF Shift, Live Panoramic Display, Spectrum Scope, Memory Data Base etc. It takes about an evening to build and comes with all components, circuit board and CD disc with programmes and construction guide. Just take the output into your sound card, load the software and experience performance that would cost you £600 plus for a normal radio!! Don't underestimate it!

£29.95!

PRICEMATCH!

PRICE MATCH

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

CALL FREEPHONE SALES 08000 73 73 88

PAY NOTHING 'TIL 2007!

BUY NOW PAY LATER AT ALL 3 STORES

AVAILABLE ON ALL SALES OVER £200

You won't find a better deal!

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

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

OR

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

ALL FINANCE SUBJECT TO STATUS WRITTEN QUOTATION ON REQUEST.

Software Defined Radio - The most exciting thing since SSB!

www.wsplc.com

FREEPHONE ORDER LINE **08000 73 73 88**

NEW

SOFTWARE DEFINED HF TRANSCEIVER

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

SDR-1000

1W - 100W, 160M - 10M.
Nothing else comes close to its performance. Spectrum display, superb receiver front end, and filter shape factors that were previously just dreams. **Welcome to Software Defined Radio! It simply has no equal. Call in to Hockley store for a demonstration.**
www.flex-radio.com

100W Version £995 C
QRP 1W Version £649 C

ICOM IC-E7

NEW

The IC-E7 is Icom's new stylish, compact and light-weight dual-band handheld transceiver. It covers 2m and 70cm transmit and a wideband receiver that covers 0.495 to 999MHz with the capability of receiving FM, TV audio and other communications. c/w BP-234 Li-Ion battery & charger.

SPECIAL OPENING OFFER PRICE! ~~£199.95~~ **£169.95 B**

YAESU FT-1802E

NEW

The FT-1802E is the new rugged 2m FM Mobile Transceiver from Yaesu, providing high power output and outstanding receiver performance on 2m. It provides up to 50W RF output with a selection of 4 power levels 5, 10, 25 and 50W and comes with a DTMF mic. Power supply is 13.8V DC.

£129 B

NEW

ICOM **IC-7000** 160m - 70cms Up to 100W (HF-6m) Digital Filtering

£999 C

Get IC-7000, TFT Screen and PSU for £1098

6" External TFT Screen £49.95 with built-in TV - *when purchased at same time as IC-7000 radio. Check out www.wsplc.com* **Code: TFT-7000** *Normally £99.95*

Get this 25 AMP Matching PSU for £49.95 when purchased at the same time as IC-7000 radio. Normally £79.95

Icom HF Transceivers

ICOM IC-756 PRO III

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

£2099 D

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

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

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

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

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

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

Going HF Mobile?

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

Kenwood HF Transceivers

KENWOOD TS-2000

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

New Lower Price **£1295 D**

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

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

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

TS-480SAT *Lower Price* £699 D
HF 160m - 6m with remote front panel. Auto ATU

PW Reader Offer
TS-480HX *Lower Price* £799 D
200 Watts
160m - 6m

Get this 45 Amp Supply for £99!

when purchased at same time as TS-480HX

Yaesu HF Transceivers

YAESU FT-1000 MKV

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

£2099 E

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

FTV-1000 *Lower Price* £599 C
6m transverter for FT-1000 Mk-V and Field. Probably the ultimate for 6m DXing.

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

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

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

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

FT-817ND £419 D
The ultimate QRP self-contained radio. Up to 5W output 160m - 70cm. New low price. UK warranty.

FT-817bhiDSP £529 D
FT-817ND with fitted bhi DSP module.

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

LOWEST PRICES

ZERO DEPOSIT ZERO INTEREST

Enquiries 01702 206835

Freephone Orderline 08000 73 73 88

Icom VHF/UHF Mobile/Base

ICOM IC-E208 *LIMITED OFFER*

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

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

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

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

Kenwood VHF/UHF Mobile/Base

KENWOOD TMD-700E

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

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

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

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

Yaesu VHF/UHF Mobile/Base

YAESU FT-7800E *SPECIAL OFFER*

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

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

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

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

Icom VHF/UHF Handhelds

IC-V82 *NEW* **£159 C**
2m FM Digital Handheld 7W

IC-U82 *NEW* **£159 C**
70cm FM Digital Handheld 5W

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

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

IC-E7 *NEW* **£199 C**
New 2m / 70cm handy wide RX

Kenwood VHF/UHF Handhelds

KENWOOD TH-F7E

• 144-146MHz Tx/Rx: FM
• 430-440MHz Tx/Rx: FM
Up to 6W out with Li-ion battery and **"scanner" style coverage from 100kHz to 1300MHz** including SSB on receive! This is a great radio to have at all times when you are on your travels.
£199 C

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

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

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

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

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

Yaesu VHF/UHF Handhelds

YAESU VX-7R
LIMITED SPECIAL OFFER

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

VX-6E	2m/70cm 5W.	**£189 C**
FT-60E	2m/70cm 5W	**£169 C**
VX-2E	2m/70cms min	**£119 C**
VX-110	2m handheld	**£94 C**

Alinco VHF/UHF Handhelds

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

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

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

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

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

W3FF NEW Mini Buddipole

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

£189 C
Order as W3-MBP

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

SGC HF Linear Amplifiers

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

Yaesu HF Linear Amplifiers

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

Watson Mobile Antennas

ANTENNAS

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

BASES

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

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

WATSON Low Noise PSUs

WATSON W-25SM

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

£79.95 C

NEW STOCK & OFFERS

YAESU VX-120 & VX-170 *NEW*

< VX-120
A 2m 5W handheld with an 8-key pad, Ni-MH batt & charger
£99.95 C

VX-170 >
A 2m 5W handheld with a 16-key pad, Ni-MH batt & charger
£109.95 C

YAESU FT-DX9000D *NEW*

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

bhi DSP Equipment

bhi NES10-2 MkII

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

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

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

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

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

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

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

NEDSP-1062-PCB **£89.95 B**
Amplified DSP module to insert in speaker path

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

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

WATSON WM-S Hands Free

WATSON WM-S

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

FT-897D SPECIAL!

FT-897D	£649
FP-30U Internal PSU	£199.95
FC-30 External ATU	£249.95
Total	£1098.90

ALL FOR JUST £849.95!

FT-897D	£649
2x FNB-78 Int Battery	£198
CD-24 Charge Adaptor	£99.95
PA-26U Batt Charger	£69.95
Total	£1016.90

ALL FOR JUST £849.95!

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

WATERS & STANTON

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

UK'S LOWEST PRICES!

NEW STOCK & OFFERS

FUJIKON
NOISE CANCELLING HEADPHONES NEW

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

FUJIKON NC-2 £18.95 B

FUJIKON NC-4 £19.95 B

POCKET MORSE READER

MFJ-461
Reads CW
Just hold near receiver speaker
£69.95 C

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

MFJ-936B Loop Tuner

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

£219.95 C

Antenna Accessories

Dipole Bits			
Kevlar	Strong 400lb strain line 200ft	£22.95	A
FW-PVC-50	50m clear PVC 2mm wire	£39.95	A
Flexweave	50m multi-strand 2mm wire	£29.95	A
HDCW	50m hard drawn 16g copper	£14.95	A
Insul-8	Black ribbed insulator	£0.99	A
WDC-50	SO-239 dipole centre insulator	£6.49	A
Egg-m	Medium ceramic egg insulator	£2.15	A
Egg-s	Small ceramic egg insulator	£1.75	A
WS-2580	25pcs 3" ladder line spacers	£9.95	A
Diamond 50 Ohm Baluns			
BU-50	1:1 1.7MHz 40MHz 1.2kW	£26.95	A
BU-55	1:1 3.5MHz - 75MHz 500W	£34.95	A
Antenna Traps (pairs)			
TR-200-14	200W bands 10m - 20m	£44.95	B
TR-200-10	200W 10MHz	£47.95	B
TR-200-7	200W 7MHz	£49.95	B
TR-200-3.6	200W 3.6MHz	£53.95	B
TR-1000-14	1kW bands 10m - 20m	£59.95	B
TR-1000-10	1kW 30m	£61.95	B
TR-1000-7	1kW 40m	£64.95	B
TR-1000-3.6	1kW 80m	£73.95	B
German Made High Quality Baluns			
HB-1-200	1:1 3.5 - 30MHz 200W	£25.95	B
HB-4-200	4:1 3.5 - 30MHz 200W	£25.95	B
HB-6-200	6:1 3.5 - 30MHz 200W	£25.95	B
HB-1-1	1:1 3.5 - 30MHz 1kW	£34.95	B
HB-4-1	4:1 3.5 - 30MHz 1kW	£41.95	B
HB-6-1	6:1 3.5 - 30MHz 1kW	£41.95	B
Remote 4:11.5kW Balun			
REM-BAL	For coax to ladder line match	£46.95	B
Patch Leads			
WPL-70	V low loss 75cm PL-259	£6.95	A
WPL-50	Standard 50cm PL-259	£2.99	A
WPL-50BNC	BNC version of above	£2.99	A
HQ-66	66cm RG-213 PL-259	£4.99	A
HQ-10m	10m long PL-259	£14.99	A

SGC External Auto ATU's

SGC SG-231

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

£349.95 C

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

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

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

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

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

Icom External Auto ATU's

AH-3 £379.99 C
1.8 - 28MHz. A hunky 120W PEP tuner that handles whips or wire longer than 2.5m. Waterproof.

Alinco External Auto ATU's

EDX-2 £299.95 C
1.8 - 30MHz 150W long wire tuner designed for use with DX-70 transceiver. Waterproof.

MFJ External Auto ATU's

MFJ-993B

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

£219.95 C

MFJ-991B £189.95 C
1.8 - 30MHz auto ATU. Similar to MFJ-993 but no digital display. Works with any HF transceiver. 150W PEP

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

SGC External Auto ATU's

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

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

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

Yaesu External Auto ATU's

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

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

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

Icom External Auto ATU's

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

Kenwood External Auto ATU's

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

Cushcraft HF Antennas

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

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

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

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

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

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

MA5B
£369.95 C

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

Diamond HF Antennas

DIAMOND CP6

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

*Bands: 3.5 -50MHz *Power: 200W *VSWR: Better than 1.5:1 *Socket: SO-239 *Height: 4.6m *Radials: 1.8m rigid adjustable **£239.95 C**

Radio Works HF Antennas

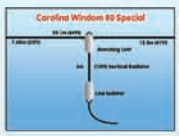
CW-160 £129.95 C
8-band 160m - 10m dipole with 22ft vertical radiating feeder. 1.5kW. Balun fed. 265ft long.

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

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

CWS-80 £109.95 C

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



G5RV Plus £59.95 B

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

Hustler Base Antennas

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

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

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

Butternut Antennas

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

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

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

Buddipole Products

LOWER PRICES!

HF Portable at its Best

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

W3-MBP £189.95 C
Same as the W3-BP but packs even smaller.

W3-BS £119.95 C
40m - 2m vertical is half a Buddipole. Ideal for QRP and rucksack - as used by Peter Waters G3OJV.

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

Super Antennas

MP1-SA Low Price £99.95 C
Screwdriver style adjustable HF QRP whip 40m - 70cm. 150W PEP. Max extended 185cm approx

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

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

High Sierra Mobile Whips

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

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

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

May 2006
On Sale 13 April
Vol. 82 No. 5 Issue 1189
(June Issue on sale 11 May)

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

Editorial Department
☎ 0870 224 7810
Fax: 0870 224 7850

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

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

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

Art Department
☎ 0870 224 7820
Fax: 0870 224 7850

Art Editor
Stephen Hunt
steve@pwpublishing.ltd.uk

Typesetting
Peter Eldrett
peter@pwpublishing.ltd.uk

Sales Department
Fax: 0870 224 7850

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

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

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

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

Finance Department
☎ 0870 224 7840
Fax: 0870 224 7850

Finance Manager
Alan Burgess
alan@pwpublishing.ltd.uk

Finance Assistant
Margaret Hasted

PW Publishing Website
www.pwpublishing.ltd.uk

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

Cover subject

Another month, another jam packed issue of your favourite radio read! This month we've another UK exclusive review for your to enjoy as the Yaesu FT-1802 takes centre stage, more projects for you to build in the form of the simple 144MHz project and options for linking **G3PCJ**'s Kilve and Kilton projects as well as all your regular favourites too, enjoy!

Design: Steve Hunt
Photograph: Courtesy of Yaesu UK

may 2006 contents

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

rob mannion's keylines

Rob Mannion G3XFD

Recently in the UK we've had an extremely interesting 'technical taster' of what's just round the corner regarding the entry of the People's Republic of China (Communist China) into the field of wide scale manufacturing of Amateur Radio equipment. The 'taster' appeared in the UK (I've not heard if they've appeared in the Republic of Ireland yet) in the form of apparently well-made v.h.f. and u.h.f. hand-held f.m. transceivers.

Rather amusingly, the Jing Tong transceivers I've seen - but not used (they've also been recorded as JT45/ and JT435 together with various other designations and names) are seemingly of the same design. The most common models appear to be the 144MHz type, with fewer of the 430MHz versions seen in use. Incidentally, the Jing Tong name, despite seeming to be an amusing joke - is actually a Chinese term and not some importer's attempt at reminding us of the Goon Show!

I first became aware of the arrival of the Chinese-made Jing Tong transceivers when I overheard a conversation in Polish on 144MHz - emanating from a nearby building site close to my home in Bournemouth. I also heard Russian voices in conversation and it was words such as 'concrete' and 'crane' that provided the clues as to what was going on!

I approached several building workers and - despite my limited Polish (and even more restricted Russian) I learned that the rigs - of course they don't have CE markings - had been introduced into UK from Eastern Europe by people coming to work here. At the time, when I spoke to Ofcom I was told by an official they hadn't heard of what was happening - but things soon began to move apace!

Of course, the eBay auction site soon had a good choice of Jing Tongs, but soon the importer (yes, they also seemed to be arriving in the UK to be sold) soon stopped. Despite this, occasional reports of Russian, Polish and even Spanish voices - connected with building sites - were being reported on 144MHz. However, the intrusions have now dwindled and I'm not hearing so much on 144MHz. Have they gone up to 430MHz I wonder, or are they using licence free p.m.r. radios?

I've heard varying reports of the quality of the Chinese Imports. Some readers tell me they think they're "Quite good", other Amateurs say they are "cheap and nasty". But, despite these comments everyone agrees that at less than £40 per unit (in some areas you could buy a pair of rigs for less than £50) they provided exceptionally good value for money.

I think we're in for a real surprise when China fully enters the Amateur Radio market! Just imagine, taking into account the almost Serf-like level of Chinese worker wages, the equipment prices are likely to be very cheap. However, there's one decadent Westerner (me) who would feel most uncomfortable in taking advantage of Chinese workers for the sake of my radio hobby.

Two ZN414/MK484 Projects

Because of a remarkable, and unavoidable coincidence we have two ZN414/MK484 projects in *PW* this month. This will no doubt bring some adverse comments - but it's a rare occurrence and in fact, both projects (**Oliver G3TPJ's** and **George G3RJV's**) are different in approach.

My Thanks

My thanks go to everyone who has written, telephoned and E-mailed me since I returned to the office. It's great to be back!

I was very pleased to see the favourable comments regarding the efforts of my colleagues who stepped in while I was ill. What particularly struck me was the appreciation by all correspondents that producing *PW* involves far more than the Editor. It's all too easy for readers to think the Editor does it all by himself but the days of **Fred Camm** - when he appeared to do everything by himself - are long gone! Producing a magazine can only be done by a dedicated group of colleagues nowadays.

In fact, **as I always point out during club visits** - this Editor is backed up by some very hard working colleagues. Everyone else here has at least three separate jobs, and they're often doing all of them at once while working on *PW* or *Radio User*. I'm the only staff member with one special job - but I could never manage the entire process by myself! Thanks again everyone.

Rob G3XFD

practical wireless services

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

Subscriptions

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

Components For *PW* Projects

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

Photocopies & Back Issues

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

Placing An Order

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

Technical Help

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

A new initiative has been launched which is designed to help you obtain your favourite magazines from newsagents. Called **Just Ask!** its aim is to raise awareness that newsagents can stock, order and in some cases even home deliver magazines.

We will be including the **Just Ask!** logo in the pages of this and future issues and have included a newsagent order form to help you to obtain copies.

So keep a look out for the logo and next time you visit your newsagent remember to **Just Ask!** about obtaining copies of your favourite magazines.

amateur radio waves

It's An April Fool!

● **Dear Sir**

The article featuring Churchill's Radio fascinated me. In the published article the author asked "What do reader's think"? In replying I think that the layout of the receiver, like the text, is a little unusual! The intermediate frequency (i.f.) transformers and valves would surely be interposed and not lined up side-by-side - ouch! Lots of feedback.

And - apart from the two power amplifier (p.a.) tank coils, to me the most interesting feature is a Japanese style loud speaker clearly supported on a 'Terry' clip! There's also a miniature jack socket marked 'GRAM' (no 'Gram' position on the wave change switch) and the power supply appears to be a PP9 battery!

But wait a minute - well done - I've guessed - it was the April issue! Thank you for a great magazine.

Tony Moggridge G0OEA
Leominster
Herefordshire

Editor's comment: Well done Tony! Your letter was the first one received and you win the Star Letter prize. I hope you enjoy the follow-up article by the wicked man himself - Oliver Tillet G3TPJ. Please see Keylines for further comment.

Bats In The Belfry?

● **Dear Rob**

Surely you don't expect us readers to believe that load of codswallop, Churchill's Radio indeed! You've got bats in the belfry my friend! Not as good as my Laser Antenna in April 1997!

Keep up the good work! PS: The bats here in Scotland are well fed, happy and contented in their belfry! 73.

John C. Cunningham (Jack)
GM3JCC
Perthshire
Scotland

Editor's comment: Well, our attempts at least got you to write to us Jack! I wondered if this April's Spoof would bring a reply from you. (GM3JCC prepared the very enjoyable Laser Antenna spoof in April 1997 - involving bats in a belfry).

Amazed At Wireless Condition!

● **Dear Sir**

Upon receiving my current (April) edition of *PW*, I was somewhat taken aback at the letter and photographs of the radio receiver on page 36.

First, let me say that I was amazed at the apparent overall condition of the unit. I presume that this is due mainly to its somewhat 'Shielded' storage in the Faraday building all these years?

However, I feel I am able to shed a little light on this receiver and its origins. The Official Government designation for this receiver, is an SP' set. (Set, receiving, Personnel). This unit is obviously a prototype, hence the serial number - 00F. ('F' being the date code). Therefore the overall description should read: " Set Personnel, Ser. No. 00F". Or put more logically - 'SP 00F'.

The band of intended operation, (Don't be fooled by the tuning scale), is obviously the 'S' - band, 337 - 380Mc/s, proven by the coils visible, the short antenna in the top of the cabinet, and lastly the hidden code letter 'S' in the designation.

The overall design seems to have been governed by materials available. The Gram/probe input socket is of highly secret Japanese manufacture, as is also the super - hi-flux loudspeaker. Quite how these components were obtained in wartime is a mystery. Of special interest are the connectors to the power supply; these being of a type not released to the general public until after hostilities had ceased.

The main hardware is definitely of British origin, the internal front panel and also the 'Wicker' loudspeaker fret, are in fact made from Aluminium, a scarce wartime commodity. I am led to believe, but unable to substantiate, that the source of aluminium for this particular receiver, was in fact, wait for it, a melted - down scrap aircraft! The rationale behind this, is that at the time this receiver was actually manufactured, the late **Lord Beaverbrook** had indeed reversed the process of housewives sending their aluminium saucepans to be turned into aeroplanes. Now the wartime aircraft had become the source of materials for this highly specialist receiver!

Finally, I regret that due to the vagaries of the Official Secrets Act, I am unable to allow you sight of a copy of the circuit diagram, as it is marked 'MOST SECRET', and cannot be released into the Public Domain until 01/04/2045.

I remain your most humble and obedient servant.

David R. Stone
Shrewsbury
Shropshire.

Editor's comments: Well done David! Thank you, and all the other readers who joined in 'the spirit of our annual joke'.

Junction 28 QRP Rally 2006

● **Dear Editor**

On behalf of the **South Normanton Alfreton & District Amateur Radio Club** I would like to apologise to everyone the many visitors and traders to the 2006 Junction 28 QRP Rally for the problems with parking and gaining access to the rally. These were, unfortunately, due to circumstances totally beyond our control.

The club only found out on the Tuesday afternoon before the rally that the Parish Council had commenced major building work to an extension to the Community Centre where the event is held. This resulted in our losing 80% of the parking capacity. And although we did know that building work was planned, **were not informed of any date, or that major disruption would result to access to the building**.

After serious debate the club decided that we would not postpone the rally, given that access was still possible and the very great difficulties that would arise in notifying traders and visitors alike that the event was being cancelled at such very short notice.

I know from discussions with the Parish Council, after finding out the work had commenced, that they did try and delay the work to avoid problems to the event. But owing to contractual problems the work had to commence at this time.

Despite the problems, the club is pleased to announce that the work will be completed in September of this year. This will result in greatly enhanced facilities for traders and clubs and over 200 extra car parking spaces for next year's event. We are also hoping to be in a position to start the convention talks again, which have been a popular feature at the rally.

The club sincerely hopes that the problems did not distract from *PW* readers enjoyment of the rally, and 95% of the feedback we've had as been very positive and that it was once again a very enjoyable event. So we look forward to seeing you again in the new building next year.

Russell Bradley G0OKD
Chairman SNA&DARC
South Normanton
Derbyshire

Editor's reply: Thank you for your letter Russell. A number of readers contacted *PW* to report on the situation. However, none of our readers wished - in the end - to have letters published. Everyone, myself included, realise that you were - because of the

inscrutable ways of local authorities - left with a 'Catch 22' situation. Although I was unable to attend myself this year, Ian Brothwell G4EAN's report on his trip to Junction 28 on *PW*'s behalf, forms this month's Topical Talk.

High Power & M3s

Dear Rob
I'm writing regarding the recent letters about M3s and their 10W power limit. I have full power allowance, but due to being surrounded by 800ft high hills it's a struggle to work outside Europe on h.f.

However out of the shack and working 'portable', I have an Icom IC-703 with max 10W out and it's on this that I have worked the DX I simply cannot at home. Working from a car and into a Sidewinder antenna from above Brixham, Devon, I worked Brazil 5&9 and when mobile in EI on top of the Wicklow Mountains 5W from my Yaesu FT-817 into a Diamond HR5 vertical worked Indonesia 5&9+.

Whilst the extra watts may help you queue jump in a pile up it's It's definitely worth getting up high or near the sea. You can use the ionosphere and get the best 'take off' to its best effect to work the DX. If you are limited at home, there's no reason an M3 cannot do just the same.
Dean Memory G8YTC
Devon

Higher Power?

Dear Rob,
I'm writing to take up the point you raised in Topical Talk for March 2006. However, to start, let me state where I am coming from. Although I have a full licence, nowadays I use the callsign 2E1RAF, accepting the power limitations it imposes.

Operating on h.f. using c.w. where I 'live' most of the time my callsign has a certain rarity, even producing a pile up from time to time. I am also a member of the G-QRP club so quite often 5W is the order of the day. I am a registered Foundation Licence instructor and responsible for producing a number of, mostly young, M3 licensees.

Like a lot of Amateurs I spend a lot of time just monitoring the h.f., v.h.f., and u.h.f. bands and I must also say that I've never heard an M3 Station boasting of using more power than the legal entitlement. Yes, there are some loud stations, but being an experienced QRP operator you get used to the odd and unexpected good report, I put it down to propagation - a subject that few of us fully understand! I wonder Rob, have you personally ever heard such a conversation, or is your assertion purely anecdotal?

Yes, there is a place for trust in the Amateur fraternity but by the same reasoning it is hard work on 10W s.s.b. Have you tried it yourself? I have and I failed miserably.

Is there therefore a case for increasing the Foundation power limit on h.f? And would it do any harm if the limit was increased?
Roy Walker G0TAK/2E1RAF
Old Hutton
Cumbria

Editor's comments: I've never - knowingly - worked an M3 who has used more than the 10W Roy. However, I have worked several M3s who had superb signals due to some thought being given to antennas. Interestingly (see letter from Dean Memory on the same subject) the strongest signals I've heard from M3s working on h.f., and received by G3XFD have been when I've been operating /P from my car and they've been doing the same. As Dean Memory says - you can make more of the power you've got with a temporary (better antennas, perhaps higher/near sea) site. I also have full power facilities, but enjoy working with less!

Letters Received Via E-mail

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

amateur radio rallies

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

April 23
Lough Erne ARC 25th Annual Radio Show
Contact: **Alan Gault**
Tel: **(07771) 811484\028 6634 1108**
E-mail: **alan.r.gault@homecall.co.uk**
The Lough Erne Amateur Radio Club 25th Annual Radio Show will take place in the Killyhevlin Hotel, Enniskillen, Northern Ireland. Doors open at 1200 and admission is £3/5Euros. There is car parking, refreshments, a Bring & Buy stand with no fees, traders big and small selling radio gear, components, electronics, computer components and various new, surplus and second-hand equipment.

May 1
22nd Dartmoor Radio Rally
Contact: **Rob 2E0ONO**
Tel: **(01752) 773711**
The 22nd Dartmoor Radio Rally will be held at Tavistock College, Crowndale Road, Tavistock, Devon PL19 8DD. It's the same location as last year with space for traders to display their wares and visitors to see them and talk to old friends. There is good access for disabled and plenty of car parking. Trade stands, Bring & Buy and refreshments. Doors open 1030 (disabled 1015).

May 7
The Midland Summer Radio, Electronic & Computer Rally
Contact: **Norman G8BHE**
Tel: **0121-422 9787/Mobile: 07808 078003**
E-mail: **NLGutteridge.aol.com**
Website: **www.midamradio.co.uk**
The Midland Summer Radio, Electronic & Computer Rally takes place at Alderbrook School, Blossomfield Road, Solihull, West Midlands B91 1SN. There will be traders in two halls, local clubs and special interest exhibits. Large free car park and refreshments. Doors open from 1000 to 1500 hours.

May 7
Thorpe Camp Museum Radio Group Car Boot Sale
Contact: **Anthony**
Tel: **(07718) 686264**
E-mail: **tcrm@hotmail.co.uk**
The Thorpe Camp Museum Radio Group wish to announce they will be holding an Amateur Radio car boot sale and rally to be known as The Dambusters Hamfest.The event will take place at the Thorpe Camp RAF Museum (Near Coningsby, Lincolnshire), which was the camp where the Dambusters were based. Admission will be, which will include admission to the musuem. There is ample car parking, food will be available, Snacks in the NAAFI. The whole site is on one level so it is suitable for the less mobile. There will be a special event station running with all contacts counting towards the Lincolnshire Award. The Camp has a permanent callsign GB4TCM, as well as its club call of MX0TCM. Other attractions will include a vintage military vehicle display and demonstrations of old military radios. Visitors will be able to find a map to the Museum at: **http://beam.to/tcrm** (please note that there is no www at the beginning of this address). For more details contact or E-mail:

May 21
The Mid-Ulster Annual Rally
Contact: **Vic MI0AEY**
Tel: **(02838) 331 909**
E-mail: **radiovic@tiscali.co.uk**
The Mid-Ulster Amateur Radio Club will be holding its annual rally at the Lough Neagh Discovery Centre, Oxford Island, Lurgan (off the M1 Lurgan exit), Northern Ireland. Doors open 1200. Admission £2/3 Euros. Talk-in and usual facilities including full disabled access.

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

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

amateur radio news & products

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

The G3BIK AD2005 Keyer

Ed Chicken G3BIK has drawn to our attention an error that crept into his PIC keyer Project, which appeared in *PW* January 2006. In Fig. 2 Q1 should be a BS170 N-channel MOSFET, with its flat side facing left, and not a 2N3819 JFet with flat side facing right.

Thanks to Ed for pointing this out. **Editor**

Open Day at QSL

On Sunday 21 May this year **QSL Communications** will be holding their annual open day. Doors open at 1000 and team QSL team would love to see you there! There will plenty to enjoy, a chance to meet the team and bargains to be sought.

Among those in attendance will be Yaesu UK, represented by **Paul Bigwood G3WYW** who will be demonstrating the new FT-DX9000 transceiver, along with other products. Kenwood UK will be represented by **David Wilkins G5HY** who will be demonstrating the TS-2000 and he will also have range of other Kenwood equipment on show. Icom UK will have the new IC-7000, IC-E7 and IC-V82 on display.

There are promises of special offers and deals on the day so make sure you don't miss out - go along! For more information contact QSL Communications at:

Unit 6, Worle Industrial Centre
Coker Road
Worle
Weston-Super-Mare BS22 6BX
Tel: (01934) 512757
E-mail: jayne@qslcomms.f9.co.uk
Website: www.qsl-comms.co.uk

Apologies From Swansea

Swansea Amateur Radio Society apologises to anyone who was inconvenienced by the very late change in date for their annual rally from 26 to 19th February. This was a result of a problem with the hall, which was not brought to the organisers' attention until advertisements had been placed in the press.

Announcements about the change were given out over GB2RS and as many people as possible were notified. The organisers would like to express their thanks to all the supporters and traders who changed their arrangements at very short notice, resulting in a slightly increased attendance on the 2005 rally. Nevertheless, the organisers have been informed that some people turned up on the orignally published day of February 26th, and they are very sorry for their wasted journeys.

E-mail: mj33@btinternet.com

Eddystone User Group Website

Chris Pettitt G0EYO Patron of Eddystone User Group from 1990-2006 and formerly Managing Director of Eddystone Radio Ltd (1984-1998) has sent the Newsdesk the following news:

The Eddystone User Group (EUG), dedicated to enthusiasts of the UK's most famous communications receiver manufacturer, and founded in 1990 by **Ted Moore G7AIR** is closing down as a membership organisation in April 2006. This is not because interest in this world-famous marque has declined in recent years; in fact , since 1997 under its organiser, **Graeme Wormald G3GGL**, its world-wide membership, at nearly 400, has never been higher.

It has been decided to close the EUG it at this high point because Graeme is now in his seventies and deserves his retirement! Running a membership organisation and producing the bi-monthly newsletter is a very time consuming task and Graeme's enthusiasm and dedication have taken the newsletter to new heights, making it one of the most popular vintage radio magazines in the UK.

During its lifetime the EUG has published some 96 newsletters (latterly known as *Lighthouse*) and numerous supplements charting the history of these famous radio receivers, which were manufactured in Birmingham from their beginnings in 1925 until 2000. The last newsletter will be published in April and whilst EUG as a membership organisation will cease, but EUG as an entity will continue via a dedicated website **www.eddystoneusergroup.org.uk**.

Through the new EUG website everyone will be able to access the mass of information the EUG has built up over the years. This will eventually include copies of the newsletters and supplements, the histories of the group and company, personalities, picture libraries, forums, the list is almost endless. Most of this information will be freely available to those who require it.

The EUG assets are being placed in a trust, which will be responsible for managing the website. Although the information on the site will be free to access, the trust will be seeking donations and sponsorship from those who wish to continue to support the trust devoted to the UK's most famous receiver manufacturer.

Mountain Goat Status Achieved

Clive Allanson M1YAM from Bradford, West Yorkshire, has become the 5th Radio Amateur in the English association to achieve the **Summits on The Air** (SOTA) Mountain Goat award for attaining 1000 activator points in the Summits On The Air programme. Clive made his qualifying activation on High Street G/LD-011 on 4 March 2006, his 165th activation in the programme.

Clive had never done any hillwalking prior to launch of SOTA, being attracted to the fell tops purely as a result of it! **Clive on The Cheviot G/SB-001**.

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

Beacon Replaced & Updated

After several decades of excellent service, the 144.430MHz beacon located at Wrotham in Kent, **GB3VHF**, (JO01DH), was replaced on Sunday 26 February 2006 with a new state-of-the-art beacon incorporating several new radio frequency (r.f.) and digital features. The beacon, which is the result of a year of design and construction by a team of four Radio Amateurs, provides facilities some of which have never been used in Amateur Radio beacons before.

At the heart of the beacon is a direct digital synthesiser designed, constructed and programmed by **Andy Talbot G4JNT**. This generates a signal directly at 72MHz and is L/C and crystal filtered and doubled to 144MHz before passing to the p.a. The DDS clock source will be locked to GPS with a short time-constant phase-locked loop, and will normally maintain an accuracy to within a few parts in 10^{-9} over a period of a few tens of seconds, and better than 10^{-12} long term. The frequency of the c.w. carrier (mark) being exactly on 144.430000MHz.

The most important feature of the new beacon is that by using the DDS, the beacon can be programmed to transmit new modes. As before, the beacon sends its callsign and locator in Morse, but using A1A (on/off) keying rather than FSK.

To enable the beacon to be monitored at extreme ranges, the beacon additionally transmits it's callsign and locator using WSJT JT65B mode. The GPS also provides for the precise timing of the keying sequence, such that the JT65B sequence will start at every even minute past the hour for 48 seconds duration.

The Morse sequence will commence at the start of each odd minute past the hour and last for 13 seconds. At the start of each odd minute 30 seconds past the hour, at a precisely timed point, 140 microseconds after the UTC one-second reference as signalled by the GPS receiver, the phase of the carrier is reversed, 28 times in total to fill up the 30 second time slot. The BPSK mode has been incorporated to allow users to become familiar with using precise timing methods to assist in experimentation with coherent signal recovery, to measure time of flight information and propagation testing. In the event of GPS lock being lost, the beacon will suspend the JT65B sequence and replace it with the Morse sequence, until such time as GPS lock is re-established.

The beacon antennas, which comprise of two 3-element Yagis beaming 288 and 348° and located approximately 48 metres a.g.l. are unchanged, and have been employed since the mid-1980's when the current mast replaced the original. The base of the mast is approximately 213 metres a.s.l.

The GB3VHF repeater group would particularly like to hear of reception reports of the beacon from all corners of the British Isles and from mainland Europe.

Rockets and Radio at Acle School!

For the second year **Norfolk Amateur Radio Club** (NARC) were recently invited to participate in **Acle High School's** Annual Science Day. The theme for this year's event was space, with the highlight of the day being the appearance of the 11m Nova/Starchaser 4 rocket that was launched above Morcambe Bay in 2001.

With the space theme in mind, NARC members provided an interactive display illustrating different methods of space communication, including a working model satellite, built by the club's young Bright Sparks group, through which visitors were able to communicate using hand-held radios. The Club also beamed live ATV pictures with captions from its SSTV and camera equipped Radio control model display to a large TV in the Schools entrance hall and NARC's MAC vehicle provided a traditional radio display next to the rocket outside.

Norfolk Amateur Radio Club is a thriving organisation with around 100 members and anyone interested in radio, communications or electronics is welcome to join. The club meets weekly on Wednesday evenings from 1930 at the Norwich Aviation Centre, Norwich Airport.. For more details take a look at: **www.norfolkamateurradio.org**

Lottery Winners

Macclesfield Wireless Society has won the Lottery! Macclesfield's long-standing Amateur Eadio club recently made an application to Awards For All, who are responsible for distributing National Lottery monies to local organisations and are now in line to receive £5000 to help with the cost of building a new radio room and meeting place in order to carry out its expanding programme of Amateur Radio courses for people of all ages and abilities in Macclesfield.

The Macclesfield Wireless Society was founded in 1958 by **Dr Eric Webster G3JQ**. An initial meeting took place at the old Liberal Club (now demolished) on Queen Victoria Street on 17 June 1958 and 11 local licensed Radio Amateurs were present. The 11 were: **G3IR Bert Poynton G3JQ, Eric Webster G3AHF, W. Howorth G3CZO, H. Buckley G3GAH , Tony Foster, G3GKG, Brian Horsfall G3HUR Dennis Brough G3IBB, Roy Walmsley G3LDT, Lou Bond G3LVJ, Fred Olwen** and **Bernard Haywood G3MKR**. Eric Webster's widow **Ali**, formerly **G0DJQ,** now holds her late husband's callsign, G3JQ, and remains a member of Macclesfield Wireless Society, indeed she's the oldest member!

In recent years, Macclesfield Wireless Society has specialised in providing Amateur Radio training courses leading to the Foundation and Intermediate level licences. In September 2005, **Jimmy Read** (then aged 12) became the latest of a string of youngsters to pass the licence exam and shortly afterwards, **Ray Eardley**, a pensioner from Congleton achieved the required standard. These students were taught by one of the club's registered tutors **Phil Archer G6AKK**, with support from club chairman **Allan Denny G0JNJ** and treasurer **Ronald Rous G0WUZ**. This was achieved despite the poor facilities in the crumbling rotting wooden shack, which is the club's current home, based in the grounds of the Pack Horse Bowling Club on Abbey Road.

However, with interest at an all-time high, and enquiries coming in from scores of local people, the society drew up plans for a new structure. This will replace the current housing, together with a purpose built radio operating room and a state of the art teaching facility complete with interactive whiterboard and data projector. The plans were met with approval from Awards For All and the Society received the good news that the application had been successful.

It's hoped to have all the new facilities in place by summer 2006. Anyone interested in joining the Society as an existing licensed Radio Amateur, or enrolling on a training course to become one, should contact **Ronald Rous** on **(01625) 430433** or E-mail: **ronaldrous@tiscali.co.uk.**

Steaming Back to Box with GB200IKB

This year sees the 200th Anniversary of the birth of that magnificent engineer **Isambard Kingdom Brunel**. Brunel is probably best remembered for engineering the construction of a network of tunnels, bridges and viaducts for the Great Western Railway (GWR). In March 1833, he was appointed their chief engineer and his work began with the line that linked London to Bristol. One of the major landmarks of this link was Box Tunnel, completed in 1841 it was the longest rail tunnel in the UK.

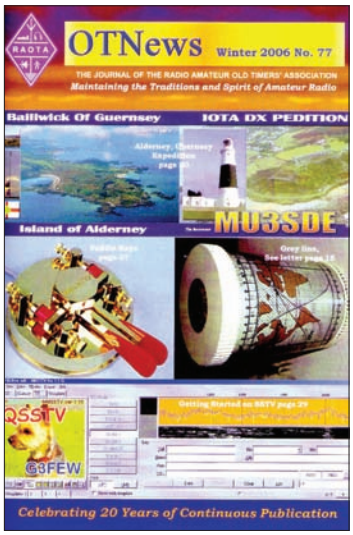
The GWR bisects the small village of Box (8km north east of Bath) and passes beneath Box Hill in the 3.2km long tunnel. As part of the Parish's celebrations of Isambard's birth, a small group of dedicated steam engine enthusiasts has arranged a celebration event, to be held on 29 May 2006.

It has been successfully arranged with the Severn Valley railway for one of their GWR locomotive to arrive in Box on the day, for a static display. The loco will form the centre piece for the day's celebration along with a live steam model railway and other attractions.

On the day of the event **Chippenham Amateur Radio Club** will be on-air using the callsign **GB200IKB**, from Selwyn Village Hall, Box. Activity will centre on the 3.5 and 7MHz bands, as well as 144 and 430MHz simplex or repeater working. All QSLs will be via the bureau or direct with s.a.e. to **G0GRI**, QTHR.

For more details and latest news of the Steam Back to Box event please see the village website at **http://www.boxparish.org.uk/** or E-mail: **lee@thehawthorns999.freeserve.co.uk**

News from RAOTA



The **Radio Amateurs Old Timers Association** (RAOTA) is a national (and international) club and does not itself hold club nights. Instead, it encourages RAOTA members to organise local get-togethers. These are informal social events where members and their guests can meet, eat and chat.

The first get-together of 2006 for RAOTA members takes place in Derby, at the Brunswick Inn, on 20 May. This will be a re-run of last two year's highly successful Derby Get-Togethers except for an earlier start and later finish!

All RAOTA members and their guests are welcome to come along to the Get-together. If you wish to attend please contact, **Ian Brothwell G4EAN**, so that seating and catering can be arranged. Ian's contact details are: **56 Arnot Hill Road, Arnold, Nottingham, NG5 6LQ. Email: gensec@raota.org or Tel: 0115-926 2360**

A new Membership Secretary for RAOTA has recently been appointed - **George Miles G3VBE**. George is the person to contact regarding all aspects of RAOTA membership, including enquiries about RAOTA, enrolling as a member and renewing a membership.

The RAOTA committee is delighted to welcome George into this important post. The committee also expresses its thanks to George's predecessor, **Ted Rule G3FEW**. Ted was RAOTA's Membership Secretary for several years in addition to his ongoing role as Editor of *OTN,* the RAOTA magazine. With George as the new Membership Secretary, Ted can return to editing *OTN*, a major attraction of RAOTA membership, with a single-minded devotion.

Remember: RAOTA membership is open to anyone who shares the aims of RAOTA, (to maintain the spirit and traditions of Amateur Radio) and is active in Amateur Radio. There is a choice of membership categories and the choice is easy to make:

If you've been active in Amateur Radio for less than 25 years you can become an Associate member. If you've been active in Amateur Radio for 25 years or more then you can become a Full member. Please note that this choice is irrespective of holding an Amateur Radio licence. Listeners and holders of any Amateur Radio licence are warmly welcome to apply for membership of RAOTA.

Finally, RAOTA looks forward to enrolling its 2,000th member sometime in 2006. So, if you want to find out about RAOTA then please contact **George G3VBE** at: **65 Montgomery Street, Hove, East Sussex BN3 5BE. E-mail: memsec@raota.idps.co.uk Website: www.raota.org**

amateur radio clubs

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

Club Organisers: please include your event's full address, including its postcode, with any news item sent to us for publication.

BRISTOL
South Bristol ARS
Contact: **Len Baker G4RZY**
Tel: **(01275) 834282**
Website: **www.sbarc.co.uk**
Members of the South Bristol Amateur Radio Society meet on Wednesday evenings at the Whitchurch Folkhouse, Bridge Farm House, East Dundry Road, Whitchurch, Bristol BS14 0LN. Forthcoming meetings include: **April 19:** Horticultural Evening with **Mrs Susan Grace**; **26th:** On TheAir Evening; **May 3:** Workshop - Morse Code with **G4YZR** and 10th: 'Earthing - Why it is important' by **G4RZY** and **G3XED**. Why not go along and join in?

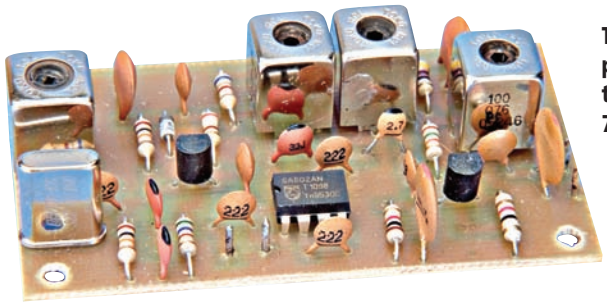
PLYMOUTH
Plymouth Radio Club
Contact: **Frank Russell G7LUL**
Tel: **(01752) 563222/ (07702) 456401**
E-mail: **frank@foxonezero.fsnet.co.uk**
Website: **www.parc.org.uk**
Meetings are normally held on the 2nd Tuesday of the month, starting at 1930 at the RAFA Club Ermington Terrace Mutley Plain, Plymouth. When a demonstration, talk or other special event has been booked, this part of the meeting will usually start at 2000. On Tuesday 9 May starting at 1930 there will be an inter-club quiz between the Plymouth Radio Club (PRC) and the Saltash and District Radio Club (SADARC) Entry will be £1 (to cover room hire and raffle). Take a look at the official club website is for a full programme of events.

SOMERSET
West Somerset ARC
Contact: **Simon Emary M0NDL**
Tel: **(01278) 641304**
Website: **www.westsomerset-arc.co.uk**
The West Somerset Amateur Radio Club meets on the 1st Tuesday of each month at 1930 at the West Somerset Community College, Gibbs Block 7, Bircham Road, Alcombe, Minehead TA24 6AY. New Members and visitors are always welcome. Why not come along and join the club?

STAFFORDSHIRE
Stafford & Districts Amateur Radio Society
Contact: **Graeme Boull G4NVH**
Tel: **01785 604534.**
E-mail: **graeme.boull@ntlworld.com**
Website: **www.g3sbl.org.uk/**
Stafford & Districts Amateur Radio Society meet on Thursday at 2000 hours in their shack, which is located in the AREVA T&D UK Ltd. factory in St. Leonards Avenue, Stafford.

doing it by design

This month Tony Nailer G4CFY delves deeper into the design of what will eventually form a 70MHz s.s.b. transmitter and describes the mixer v.f.o. for the project. As usual, for all you keen followers of DiBD - Tony has produced some helpful p.c.b. kits.



This month's project provides another step on the way to G4CFY's 70MHz s.s.b. transmitter.

In this column in March *PW* I published an article on the Portland - Rock Steady variable frequency oscillator (v.f.o.) with component values as a stand alone v.f.o. for 7MHz or as part of a local oscillator for 70MHz. This month I will continue onwards to develop the circuit for the 4 metre (70MHz) band local oscillator using the Portland v.f.o.

The 4 metre Amateur Radio band allocation is from 70-70.500MHz and the first consideration is that during the tuning swing of the v.f.o. there are no harmonics, which fall in that band. Now 1/9th of 70-70.5 is 7.777-7.8333. Also 1/10th of 70-70.5 is 7-7.05. Now you've been reminded of this, you should see that my choice of 7.1 to 7.6MHz for the Portland v.f.o. does not have any harmonics falling within the wanted band!

Using 9MHz SSB Filter

In a receiver or transceiver using a 9MHz single sideband (s.s.b.) filter the local oscillator needs to be 61 - 61.5MHz. Likewise, in a receiver or transceiver with a 10.7MHz s.s.b. filter the local oscillator needs to be 59.3 - 59.8MHz. To create these frequencies requires the v.f.o. to be mixed with another crystal controlled source. In the first case 53.9MHz and the second 52.2MHz. These can be generated directly using an impedance inverting Colpitts crystal oscillator, which was the subject of Doing It by Design in *PW* September 2004 .

Mixing the two signals together requires one of the range of mixers described in DiBD in *PW* May, July, and September 2005. The products of mixing need to be properly filtered and the wanted signal then amplified by a tuned amplifier (as described in DiBD July 2004, January 2005, or March 2005 *PW*).

With the exception of the filtering components, which have not yet been dealt with yet, all the other building blocks have been considered and highlights the value of this series. (*I agree - the DiBD approach really does work - **Editor***).

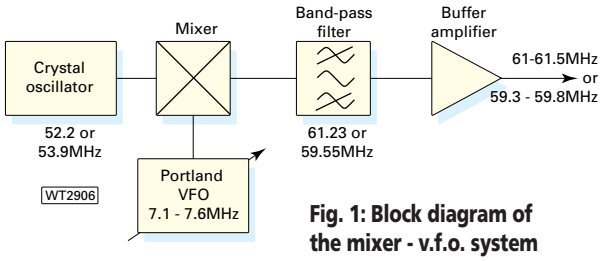


Fig. 1: Block diagram of the mixer - v.f.o. system (see text).

Mixer Block Diagram

A block diagram of the mixer - v.f.o. system is shown in **Fig. 1**. So, let's now take a detailed look at the design.

To start, it's important to know that the main requirement of any local oscillator is that all feed through signals, products, and harmonics are ideally 40dB or more below the wanted signal level. The principal outputs could be feed through of the v.f.o. at 7.35MHz and the crystal oscillator at 53.9MHz and the sum of these two at 61.25MHz and the difference at 46.55MHz.

The 53.9MHz signal is the closest to the wanted output so it would be necessary to balance this out. This immediately rules out the unbalanced diode, field effect transistor (f.e.t.), and m.o.s.f.e.t. mixers discussed in *PW* May 2005 DiBD.

The next possible choices of mixer are the two transistor push-pull type, or the single balanced diode type described in July 2005. Here, both the v.f.o. and crystal oscillator have large signal outputs, so the twin diode mixer could be used with the subsequent filtering getting rid of large amounts of feed through of the 7MHz v.f.o. as well as rejecting the unwanted difference signal.

Comparing the twin diode single balanced type with the double balanced ring type, there are only two more diodes and we can get rid of the v.f.o. feed through signal to acceptable levels. Alternatively, the SA602 integrated circuit (i.c.) mixer could be used and the signal levels and drive impedance of its inputs are much less demanding than the diode ring.

Note: Whilst I'm well conversant with the carrier suppression performance of the diode ring, which is of the order of -50dB from each port to output, I've not explored this yet with the SA602.

Two Buffers

My Portland v.f.o. was designed with two types of buffer. The diagram, **Fig. 2**, shows the circuit of Buffer 1 as previously designed to achieve 1.5V p-p into a 50Ω load. It could be used here in a modified form in conjunction with the SA602 mixer, which has an input impedance of about 1.5kΩ and requires only about 400mV p-p.

The original breadboard v.f.o. with Buffer 1 was still in existence, so I undertook a test with the emitter capacitor C11 removed. The output level was then 300mV p-p, just right for the SA602. A p.c.b. for Buffer 1 was laid out, and this is now available separately (or together with) with the v.f.o. p.c.b. and parts. The layout and component identification illustrations are shown in **Fig. 3**.

Moving on to the impedance inverting Colpitts oscillator, I used the board of September 2004 DiBD in the impedance inverting configuration with a surplus 52MHz crystal. On this occasion I chose to take the output from the collector where there are lower harmonics.

The circuit is shown in **Fig. 4**. I modified the board accordingly and when tested I found it fired on its series fundamental around 17MHz. No changes to the resistive loading seemed to alter this and I worked out that it was due to the drive level on the crystal. I altered the circuit so that the capacitor C2 coupling the crystal to the base became a low impedance only needed for d.c. blocking. The feedback capacitors C3 and C4 would then provide the resonating capacitance.

Using the 4028 TOKO coil with an inductance of 0.4µH the resonating capacitor was calculated as follows;-

Ct = 1 / (39.5*f*f*L),
Ct = 1 / (39.5*52*10^6*52*10^6*0.4*10^{-6})
Ct = 1 / (39.5*52*52*0.4*10^6)
Ct = 1 / (42723.2*10^6)
Ct = 0.0000234*10^{-6} or 23.4pF.

This could be achieved by two 46.8pF capacitors in series. So the feedback capacitors were changed to 47pF and the circuit re-tried. It then worked as it should on the third overtone.

A board for the SA602 as described in September 2005 was populated with the i.c. and just input and decoupling capacitors. It was then coupled to the v.f.o. and Buffer 1 and also to the Colpitts oscillator and the output viewed on the spectrum analyser. The two oscillator signals were at low level while the sum and difference signals were at high level.

Bandpass Filter

To select just the wanted product of mixing and to reject all other outputs I designed a bandpass filter. The arrangement is as shown in **Fig. 5**, and comprises two top coupled parallel tuned circuits with a high impedance drive input and a low impedance output.

Using TOKO coils type 0764 has a Q of 80 and an inductance of 0.21µH the resonating capacitance is found as previously.

Ct = 1 / (39.5*f*f*L),
Ct = 1 / (39.5*60*10^6*60*10^6*0.21*10^{-6}),
Ct = 1 / (39.5*60*60*0.21*10^6),
Ct = 1 / (29862*10^6),
Ct = 0.0000334*10^{-6} = 33.4pF.

So L1 and L2 are 0.21µH, C1 is 33pF and C3 and C4 have a series total of 33pF.

The reactance of the coil is XL = 2*Pi*f*L.

XL = 2*Pi*60*10^6*0.21*10^{-6},
XL = 2*Pi*60*0.21 = 79.168Ω.
The dynamic resistance Rd = *Q**XL.
Rd = 80*79.168 = 6333Ω.

To feed the base of an amplifier transistor stage requires this to be reduced to about 300Ω, which represents a step down of 20:1. As a first approximation this will require a capacitance ratio for C4 to C3 of 4.5:1. If C3 is 39pf then C4 needs to be about 175pF.

Trying 39pF and 180pF in series gives;-

Ct = C3*C4 / (C3+C4),
Ct = 39*180 / (39+180),
Ct = 32pF. (Close enough!).

Incidentally, experience has shown me that critical coupling between TOKO coils occurs when the top coupling capacitor is around a fifteenth of the value of the resonating capacitance. In this case then C2 would be 2p2.

Tests with the bandpass filter connected to the output of the mixer did the job of selecting the required product and rejecting the unwanted signals. The signal level was about 250mV p-p and would need to be amplified for use to drive a diode ring front end mixer.

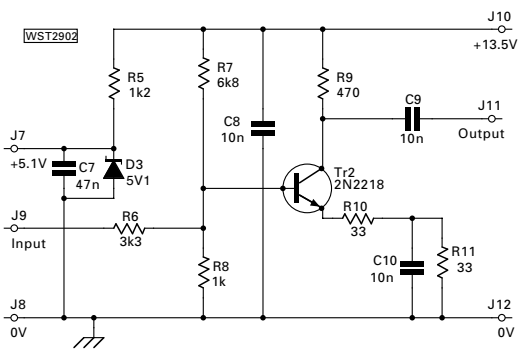
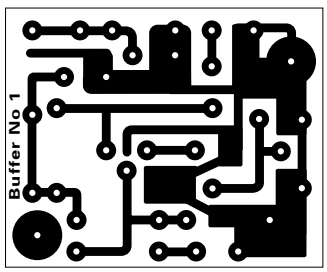
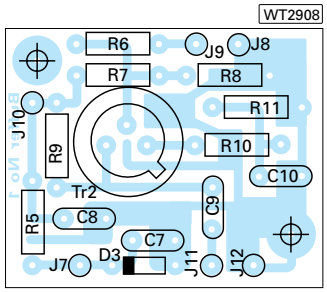


Fig. 2: The Portland v.f.o. was designed with two types of buffer. The diagram shows the circuit of Buffer 1 as previously designed to achieve 1.5V p-p into a 50Ω load (see text).





Final Circuit

For the final circuit a common emitter amplifier was designed and added to the breadboard and is shown with the complete circuit in **Fig. 6**. Originally R7 was 10kΩ, R8 1kΩ, R10 was 47Ω and C15 was fitted. The gain was then far too high and the output stage would oscillate when input and output were in tune.

Next, capacitor, C15 was removed so that the gain would be mainly set by the ratio of the dynamic resistance of the tuned circuit (L4 C17 C18) divided by R10, 47Ω. The output dropped significantly so a lower value of R10 was chosen and R7 and R8 recalculated to keep the emitter current about 5mA.

The process continued until the values shown were arrived at to achieve the maximum output before the onset of instability. With these values the coils L2 L3 and L4 could all be tuned or peaked without oscillation and with an output of around 1V rms, 2.8V p-p into the 50Ω load.

With any mixing system there will be the generation of intermodulation distortion products and these should be 40dB below the wanted output. This unit has these products generally better than 45dB down.

Portland Tuning

The Portland v.f.o. tuning 7.1-7.6MHz has its 8th harmonic sweeping across the range 56.8-60.8MHz. At the bottom end it is well away from the pass band of the wanted output, and is about 42dB down from the wanted signal.

Unfortunately, at the top end it's only 200kHz from the band edge and hence is only 32dB down. It means that when using a 9MHz i.f. and listening to an S3 signal on 70.5MHz, an S9 signal on 70.3MHz would produce an equal size interfering signal in the i.f. pass-band. It would create an even greater problem with the version for use with a 10.7MHz i.f. as the output band is then 59.3 to 59.8MHz and this harmonic of the v.f.o. on 7.1-7.6 sweeps across the range 56.8-60.8MHz.

The best solution to the problem is to use a different v.f.o. frequency and different mixer crystal. Having determined that 1/9th of 70-70.5 is 7.7777-7.8333, and 1/8th of 70-70.5 is 8.75-8.8125MHz, so there's

Fig. 3: A p.c.b. for Buffer, this is now available separately (or together with) with the v.f.o. p.c.b. and parts. The layout and component identification illustrations are shown here (see text).

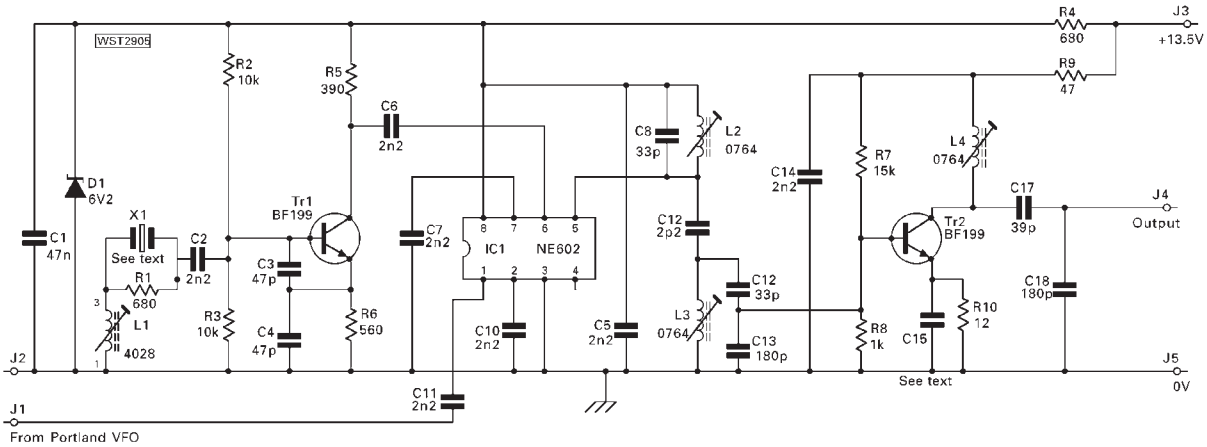


Fig. 6: A common emitter amplifier was designed and added to the breadboard and is shown with the complete circuit (see text).

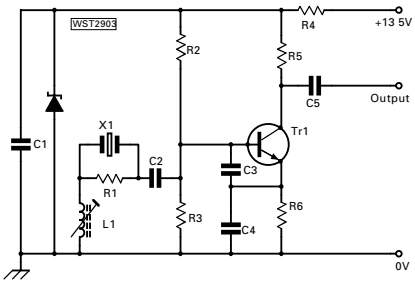


Fig. 4: The impedance inverting Colpitts oscillator, where G4CFY used the board of September 2004 DiBD in the impedance inverting configuration with a surplus 52MHz crystal (see text).

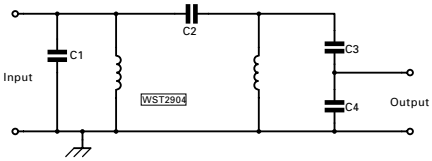


Fig. 5: The bandpass filter (see text).

another window between 7.8333 and 8.75MHz.

The 7th harmonic of 7.8333-8.75MHz is 54.8-61.25MHz, which overlaps with the local oscillator frequency of 59.3-59.8MHz of the 10.7MHz i.f. version. Trying 7.9-8.4MHz gives the 7th harmonic as 55.3-58.8MHz which avoids the 59.3MHz by 500kHz. This means that (contrary to my earlier work) that a v.f.o. on 7.1-7.6MHz would be ideal for a local oscillator for a 4 metre rig using a 9MHz or 10.7MHz i.f. I now find (as you do quite often) that there's a better solution.

The requirements for a 9MHz i.f. are a local oscillator on 61-61.5MHz produced by mixing a 53.1MHz crystal with a Portland v.f.o. running 7.9-8.4MHz.

The requirements for a 10.7MHz i.f. are a local oscillator on 59.3-59.8MHz produced by mixing a 51.4MHz crystal with a Portland v.f.o. running on 7.9-8.4MHz.

Being now confident that I've found the best v.f.o. and crystal oscillator frequencies to achieve the required result, a p.c.b. was laid out and is shown together with a component identity in **Fig. 7**.

Original Retuned

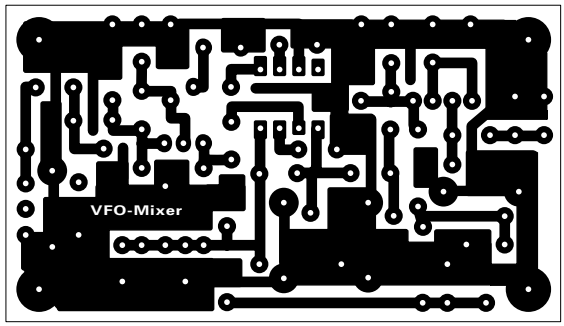
My original Portland v.f.o. which tuned 7.09-7.61MHz was then re-tuned to the required range and produced 7.855-8.455MHz. **Note:** This is a 90kHz excess swing which can be reduced by increasing the 1.5kΩ resistor in series with the tuning potentiometer. I changed this resistor to 3.3kΩ and achieved a swing of 7.88-8.42MHz.

That completes the work and it's really impressive to switch on the combination and observe a 60MHz local oscillator signal that just doesn't seem to drift. Oh how we would have loved this unit back in the crystal controlled days of a.m. on 144MHz in the early 1970s!

If you wish to correspond regarding this article or previous ones subscribe to the list **pw-g4cfy-on@pwpublishing.ltd.uk**

by sending a blank E-mail with the word subscribe in the subject box. When you receive confirmation from the server you can send an E-mail to **pw-g4cfy@pwpublishing.ltd.uk** and your comments will be answered by myself or the *PW* team.

PW



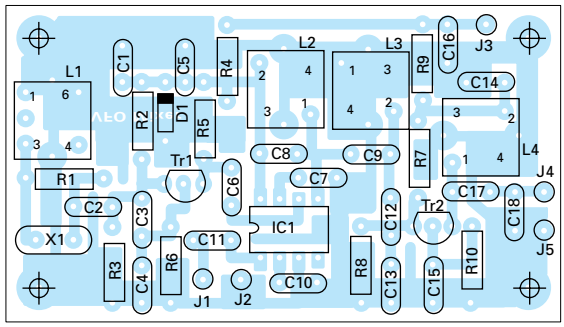


Fig. 7: Confident he'd found the best v.f.o, and crystal oscillator frequencies to achieve the required result, G4CFY designed a p.c.b., and this is shown together with a component identity illustrations (see text).

Kits & Bits

Portland v.f.o. and Buffer 1 p.c.b.s £5.00 the pair.
Components and potentiometer £9. Suitable box RS 381 5120 undrilled £4.50, drilled £8.
Ready-built v.f.o. on 7.9-8.4MHz £46.50.
Mixer-v.f.o. p.c.b. £5.10. Components including crystal for 9MHz or 10.7MHz £18.20.
Ready built Mixer-v.f.o. board £29. (State i.f. required when ordering).
Postage on p.c.b. and components 75p. Postage on box kit or box built £1.50.

Please make cheques payable to **A.J. & J.R. Nailer**, and address to: **Spectrum Communications, 12 Weatherbury Way, Dorchester, Dorset DT1 2EF.**

The Yaesu FT-1802E 144MHz FM Mob

Richard Newton G0RSN, ever keen to enjoy the hobby, agreed to evaluate the latest offering from Yaesu UK on behalf of PW. And from what he's written, he seems to have enjoyed the process!

As usual it was busy when I arrived at the *PW* Broadstone offices. The Editor was crashing away on his keyboard and it was hectic in Editorial, as I arrived to collect the latest rig for review.

As Group Production Editor **Donna Vincent G7TZB** and I stood in the *PW* office, we were talking about the rig she was asking me to review. It suddenly struck me how much technology has moved on! This came home to me as we glibly chatted about the fact the rig I was to try out. It turned to have an output power of 50W, extended receiver coverage and over 200 memories - and we were talking as if mobile radios had always been that way!

When I got my Amateur Radio Licence I remember being very excited about the fact I had a Trio (Kenwood) TR2300. This was a rig that was small enough to put in the car and had a whole watt, yes 1W, of output power!

Richard G0RSN enjoyed using the FT-1802, he says it made him seriously reconsider the term 'basic'!

Fig. 1: As the FT-1802 does not have a demountable front panel/control head, temporary mounting site was found by using the glove box in G0RSN's car. This photograph demonstrates how cramped the location was, but despite relying on convection cooling only, the FT-1802E showed no signs of distress. This view also features the microphone unit, the MH-48, which rather impressed G0RSN in operation (see text).

The Yaesu FT-1802

The Yaesu FT-1802, was the subject of our conversation. It's a single band Amateur Radio mobile rig for the 144MHz band and transmits from 144 to 145.995MHz. **Note:** The review unit also had an extended receive range of 136 to 174MHz (this review covers the Amateur Radio functions only). And for those keen to practice their c.w. the unit is provided with a Morse Tutor!

Incidentally, I'd already heard this rig described as being one of the more basic models of Amateur Radio equipment available. However, as I was actually holding the transceiver, the previous comment got me thinking; "this kind of re-defines the word 'basic' for me!

It would seem that 'basic' now describes a rig with over 200 memories channels, various scan options, an extended receive range and a variable output power setting up to a maximum of 50 watts. The 'basic' would also include adjustable transmit deviation and other extended features - all in a package measuring 140 x 40 x 146mm without its knobs. Basic? I'm not so sure, so I accepted the offer of having a closer look!

Smart & Simplistic

On opening the box I was struck by the smart but simplistic look of the rig. Yaesu have put some thought into what features they have assigned to the front panel buttons.

I was pleased to see that the reverse function was provided. This facility means you can instantly monitor the other frequency if you are using a split frequency,

Fig. 3: General view of the FT-1802 f.m. transceiver, showing the large, clear display.

ile Transceiver

Fig. 2: Richard used a temporary magnetic mount to evaluate the transceiver and the whole assembly was installed in less than half an hour, although it was "not the recommended way to do it" says Richard! (see text).

such as repeaters. Great for checking whether you're able to have a simplex chat when you are taking to a station through a repeater. As a mobile operator I find this a very useful function indeed.

The ability to change output power was also provided - this is excellent. I'm always keen to only use as much power as I need! On the occasions I need to 'up' the power - often because I'm going through a bit of a problem area - I do not want to have to be fiddling around looking for menu options as you have to do on some rigs.

However, I noticed a couple of things that I was initially unsure about. For example, the rig doesn't have a cooling fan. This surprised me for a rig capable of 50W, but then I noticed that the entire bottom and rear of the rig was heat sink!

The second thing that struck me was that FT-1802 did not have a detachable head. I wondered whether this was going to make it difficult to mount in my vehicle? However, it really depends on your own circumstances, what car you have and how willing you are to drill holes!

The MH-48 Microphone

Personally, I can say was rather delighted to see that Yaesu had supplied the MH-48 microphone with the transceiver, **Fig. 1.** This has a 16 alphanumeric keypad and four function buttons. In receive mode the keypad can be used for direct entry of a frequency, a fantastic bonus that saves time and effort. In transmit mode these keys generate dual tone multi frequency (DTMF).

The four function keys are user programmable but come pre -programmed with some great features available from the transceiver. **Button 1** acts as a **Monitor** control, and while it's depressed this feature will remove squelch and any squelch control settings such as Digital Coded Squelch (DCS) or continuous tone squelch system (CTCSS) in order that you can check a frequency to see if it's in use.

Button 2 activates the **Smart Search** option on the rig. This facility comes into play when you the transceiver searches above and below the current operating frequency. It will then automatically stores any busy frequency it finds in a special bank of 31 memory channels. This is a great way to identify where the local activity is with no pain at all. In fact you can set the rig to just do this continuously - or just in a single sweep.

Button 3 activates the tone search feature. This is where the rig will scan incoming signals and if the signal has CTCSS or DCS it will identify what the code is, and display it for you. It will search either one or the other depending on the feature you have selected.

Button 4 controls a 1750Hz tone burst for the repeaters that still use this to access them.

The microphone also has a rather great backlight that can be turned on and off. It was great in the dark as it's very effective and backlit the key pad beautifully!

Strength-To-Strength

Fig. 4: Internal view of the transceiver.

I have to say that over the past 10 years I have seen Yaesu go from strength-to-strength as far as their supporting literature is concerned. The manual supplied with the rig has over 80 pages of easy to understand instructions and examples. It's very well laid out and takes a user from the basics through to the more advanced features and walks you through every step so that you can get the most out of the rig.

Some of the more advanced features included are full encode and decode squelch control feature. With enhanced Paging and Code Squelch, using two pairs of tones, you can page specific stations and even set the rig to automatically answer back! This is for use with stations using equipment that have similar features.

Interestingly, another feature that I've seen before, again particular to Yaesu, is the **Automatic Range Transponder System** (ARTS). This is where two radios carrying the feature can be set to 'poll' one another and bleep or just display whether the two radios are in communications range.

I own a Yaesu VX1, which also has the ARTS feature, and each time I have a Yaesu rig to review - I enjoy using ARTS. I get my boys, **Tom M3TJN** and **Oliver M3ORN** who are 12 and 10 years old to carry my VX1 set to low power when they are off on their bikes or off to play on the nearby field. I use the other Yaesu rig set to low power and I instantly have early warning of them wandering off too far!

If the FT-1802 gave the out of range warning it would be just a case of putting up the power and giving them a shout to make sure everything was 'okay'. If I get no reply at least you know that the radios are in range and working fine. So the breakdown in communication is due to another reason - such as the game of football being far more interesting than Dad calling on the radio!

In The Car

I honestly thought it was going to be a nightmare getting the rig in the car! But due to the compact size of the rig, I was able to slip it into my passenger side glove box, Fig. 1, and it wedged there like it had been tailor-made to fit!

I found a magnetic mount base and quarter-wave antenna, **Fig. 2**, and ran that through the car. Fantastic! What I had anticipated being an awful job was actually great fun and it took less than half an hour before I was up and running on the air.

Richard's advice: At this point I want

to make it very clear that **I don't** recommend this as an example of how to mount a mobile rig into a vehicle! I had to be wary of the fact that the transceiver didn't have a cooling fan - relying on the heat sink to cool it (bearing in mind the heat sink, the rig was, by then, wedged into a small space with a minimum flow of air!). Also, I had to be wary that rig was not fully anchored in by screws.

Finally, when I turned the FT-1802 on in the car I saw that it displayed the voltage being supplied to the rig for a moment - before clearing to the normal display. I really liked this as a little check that the power supply or battery was working at a suitable voltage.

I tuned up and down the band and heard two stations in contact on 145.425MHz. **Arthur G3RZV** who was in the Oakdale area of Poole about 10km (approx 6.5 miles) away from me and **Bill G3OAF**, who was just down the road from me on the outskirts of Wimborne Minster in an area called Colehill. They were both good signals with me.

The Yaesu FT-1802E has four-power setting to choose from, 50, 25, 10 and 5W. I chose the 25W setting and waited, when the time was right I called, "break please"!

I was soon invited in and had a really great chat with both Bill and Arthur. Bill reported the audio from the Yaesu FT-1802E as being..."Quite crisp, fully quieting and a nice transmission".

Arthur said, "Nothing to criticise Richard, you are hitting full scale, modulation is excellent quality".

Operating Mobile

With the help of my wife, **Diane M3HJN**, I then took the rig mobile. When driving in the car, where I would normally hear the squelch break with noise when passing the pub down the road (QRM from electronic cash registers, gaming machines , etc.) the Yaesu FT-1802E did not murmur, in fact it generally seemed very quiet while driving around. Diane was very pleased, as despite being licensed - a noisy radio is a radio that should have an **Off** button in the off mode as far as she is concerned!

I tuned to 145.500MHz and called "CQ", to my personal delight, and utter amazement I got a reply from **Terry M3TFW**. Terry lives in Poole, about 10km down the road. Terry was a short wave listener (s.w.l.) for very many years and is now having a huge amount of fun with his M3. It was great to get a report from him!

Terry commented; "The rig sounds perfect Richard, absolutely perfect, no noise at all". Incidentally, Terry was using his Icom IC-207 and a Diamond collinear antenna.

Main Station Antenna

Next I put the Yaesu FT-1802 on the main station antenna, a Tri-Band collinear on top of my Tennamast, at about 8 metres above ground level (a.g.l.). I called "CQ" on the high power setting, while tuned to 145.500MHz.

Keith G4OCH/M, came back to me, and was a booming signal, and although Keith is from the Birmingham area he was sat in his car, just 2km down the road from me eating his lunch!

In between his lunch Keith reported on the Yaesu FT-1802 as being, "Good audio Richard, solid sound, clean quality and no hum, buzz or anything". Keith was using a Kenwood TM-271E.

Hot on the heels of the mobile contact was a slightly more long distance contact with **Mark G0EBB**. Mark was near East Grinstead, in West Sussex, about 137km (85m) away from me. Mark was using a Kenwood rig, feeding his 9-element vertical beam with 100W, at 183m (600ft) above sea level. A very impressive set up.

Mark gave me a 5 and 5 report with fading, but I was only able to give him a 3 and 1 to 4 and 1 with heavy fading. Mark said that the audio as, "very good, natural but a bit quiet". **Note:** This may have been due to the difficult path but the good thing about the Yaesu FT-1802E is that you can set the microphone gain in the menu set up. There are nine settings in all and even the transmit deviation has a wide and narrow setting.

Mark then pointed out he was hearing me far better than I was hearing him. He said, "Do you think it's a bit deaf Richard"?

To compare things, I then connected my Icom IC-7400 and Alinco DJ-140 to the same antenna. The reception on the IC-7400 was worse than the Yaesu FT-1802. Even with the pre-amplifier in circuit I could not hear Mark at all on the IC-7400, however the Alinco faired slightly better and I have to say it had the edge on reception.

I have to be honest, to even get a contact that far away from my station on the 144MHz on f.m. is a rare event! I was actually really impressed with the way the Yaesu FT-1802 performed, albeit the microphone gain setting may have benefited by adjustment, to being a bit more punchy to help with cutting through the noise. However, Mark was very patient and a great help so a big "thanks" go to him!

The final contact was with **Paul G4STB**, just down the road in Bournemouth, about 7km (4 miles) away. Paul had been monitoring my contact with Mark and was using an IC-706 with a dual band collinear antenna.

Paul said, "I'm very impressed with the FT-1802, very crisp, very sensitively produced audio without too much sibilance".

So, in summing up I think the measure of a radio is how easy it is to use and how much fun do you have using it on air. The Yaesu FT-1802E scores highly on both of these criteria, I started the review saying that someone has called this rig "basic". I think that ease-of-operation should not be confused with being "basic", especially where the Yaesu FT-1802 is concerned.

PW

Product
Yaesu FT-1802 f.m. mobile transceiver.

Company
Yaesu UK Ltd.

Contact
Sales on Tel: (01962) 866667,
FAX: (01962) 856801,
E-mail: sales@yaesu.co.uk

Pros & Cons
Pros: I think the measure of a radio is how easy it is to use and how much fun do you have using it on air. The Yaesu FT-1802 scores highly on both of these criteria.

Cons: No detachable control head.

Price: £139.95

Supplier: My thanks for the loan of the review unit go to **Yaesu UK, Unit 12, Sun Valley Business Park, Winnal Close, Winchester, Hampshire SO23 0LB.**

Fig. 5: View of the rear panel showing the die cast alloy heat sinking (see text for comments).

AMATEUR & CB RADIO KITS & MODULES

TRANSVERTERS for 2 or 4 or 6 metres from a 10 metre rig, or 4 or 6 metre from a 2 metre rig. Includes new overtone local oscillator, and integral interface unit. 20dB receive gain, 25W transmit power. Low level drive dual IF versions **TRC2-10dL, TRC4-10dL & TRC6-10dL,** high level drive single IF versions **TRC2-10sL, TRC4-10sL, TRC6-10sL, TRC4-2sL, TRC6-2sL, Complete kit £163.00. Built £244.00**

TRANSMIT AMPLIFIERS, for 2 or 4 or 6metres, single stage switched class AB linear. Diecast box with SO239 connectors. 1W to 5W drive, 8W to 30W output, Types **TA2SA, TA4SA, TA6SA. Complete kit £59.00, Ready Built £82.00.** 5W to 20W drive, 22W to 60W output, Types **TA2SB, TA4SB, TA6SB, Complete kit £65.00, Ready built £88.00.**

TRANSMIT AMPLIFIER & RECEIVE PREAMP, for 2 or 4 or 6metres. Receive gain adjustable 0-26dB gain. Switching for either part or straight through. RF & DC switched on transmit. Diecast box with SO239 connectors. 1W to 5W drive, 8W to 30W output, Types **TARP2SA, TARP4SA, TARP6SA. Complete kit £72.00, Ready Built £109.00.** 5W to 20W drive, 22W to 60W output, Types **TARP2SB, TARP4SB, TARP6SB, Complete kit £75.00, Ready built £112.00.**

MELLSTOCK 4M AM 1W TX Two channel transmitter with 1W carrier power and high quality audio from integral speech processor. Subject of PW Sept and Oct 2005 articles. **PCB £16**. Mod transformer **£9.50.** Complete kit with PCB, transformer, mic gain pot, channel switch & mic chassis plug **£57.50**. Complete kit plus drilled and labelled box and other hardware **£76.50**

MELLSTOCK 4M AM RX Two channel double superhet receiver to go with the Mellstock transmitter. 0.4uV sensitivity. Subject of PW Nov 2005 article. **PCB £10.** Components including volume pot, channel switch, crystals, & signal meter **£47.00**.

CB to 10FM CONVERSION, suitable for CB's with LC7136/7 or TC9119P PLL IC's. Puts the rig on 29.31 - 29.70MHz. Each board is aligned prior to despatch. Data available for a variety of chassis types. Please state rig type when ordering. **SC29 Built & aligned £23.00.**

NOISE SQUELCH a really effective cure for FM background noise. Allows weak signal reception without loss. Can be panel controlled or preset. **NS1000. PCB Kit £11.25, PCB Built £16.75.**

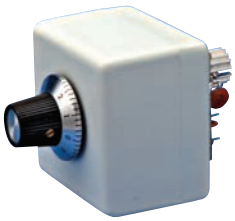
STATION PREAMPS for 2 or 4 or 6metres. RF & DC switched. Adjustable 0-26dB gain. 100W power handling. **RP2S, RP4S, RP6S, PCB & Hardware kit £29, Ready Built £47.**

MASTHEAD PREAMPS, for 2 or 4 or 6meters. 20dB gain 1dB NF. 100W through handling. RF switched & DC fed via the coax. Heavy duty waterproof masthead box, and a DC to RF station box with SO239 connectors. **RP2SM, RP4SM, RP6SM, PCB & hardware kit £38.00, Ready Built £57.00.**

MASTHEAD PREAMPS 400W rated, for 2 or 4 or 6metres. RF switched. DC fed via a separate wire. 20dB gain 1dB NF. Heavy duty waterproof masthead box with SO239 connector. **RP2SH, RP4SH, RP6SH. PCB & hardware kit £45.00, Ready Built £78.00.**

TWO TONE OSCILLATOR as featured in PW March 2005. A vital piece of test equipment used together with an oscilloscope for setting up AM, DSB, & SSB transmitters. **PCB & bits £10.00. PCB assembled £20. PCB & hardware kit £25. Ready Built £52.50.**

SPEECH PROCESSOR increases the average sideband power of SSB transmitters without driving the PA into clipping. Includes filtering to enhance the higher voice tones to increase intelligibility, and it sounds nice too. Panel control for clip and output level. Supplied with plugs & sockets to suit most popular rigs. Type **SP1000, PCB & Hardware kit £29.00, Ready built £63.50.**



PORTLAND VFO as featured in March 2006 PW. 7-7.2MHz as local oscillator for a direct conversion receiver or transceiver. Otherwise as 7.1-7.6MHz to use in conjunction with a mixer-vfo system as local oscillator for a 4 metre receiver/transmitter with a 9MHz or 10.7MHz IF. The version shown in the article included a PCB for Buffer No 2 with output level to drive diode ring mixers. Also available with Buffer 1 directly compatible with the mixer-vfo in the May issue PW. **VFO PCB with Buffer 1 or Buffer 2 PCB and parts kit with potentiometer £14.50. PCB and parts kit with drilled box £23.50.**

MIXER-VFO for 4metres as described in DiBD PW May 2006. A crystal oscillator and mixer and amplifier producing 61-61.5MHz or 59.3-59.8MHz local oscillator signal when used in conjunction with the Portland VFO.
PCB & parts kit £23.30. Ready built and tested £34.00.

PIPTONE end of message bleep for weak signal SSB use. Tone and amplitude adjustable, relay switched. **PT1000S PCB Kit £7.25, PCB Built £11.75.**

KAYTONE end of message Morse letter K for a distinctive signal which might help get the difficult DX. Adjustable pitch, speed, and level. Relay switched.
KT1000. PCB Kit £9.00, PCB Built £15.50.

SPECTRUM COMMUNICATIONS

12 WEATHERBURY WAY, DORCHESTER, DORSET, DT1 2EF. Tel & Fax 01305 262250.

Mail order only. Prices include postage. Cheques payable to A.J. & J.R. Nailer.

e-mail tony@spectrumcomms.co.uk Web site www.spectrumcomms.co.uk

Amateur, CB, Hospital Radio Links, OB Links.

The Propagator part 2

Rob Hannan G4RQJ continues with his Propagator project, looking at methods of guying as well as h.f. attachments.

The Propagator with the beam in place can be used hand-held, and can also be supported with the aid of a rocky cairn or fence. Longer periods of operation from grassy flat areas make some form of guying desirable with the option to erect the antenna single-handed. I developed the guy plate shown in **Fig. 9** by cutting a 55mm triangle from 8mm plastic sheet (varnished plywood would be equally suitable).

Drill a hole in the centre, so it's a push fit over the handle section, and a hole at each corner to attach the guys. These should be made from 4m lengths of hook-up wire, use a bright colour you won't regret it!

Sliding buckles are made from the same material as the plate. These are simply 35mm by 8mm strips with three holes, one at each end and one in the centre. Push the guy through one end hole, back through the other, back yet again through the centre hole and terminate in a knot. This buckle will slide easily when tensioning the guy but will lock against slackening.

When using guys remember to slip the guy plate onto the handle section from the beam end and slide it down until it rests against the grip. Now fit the beam to the handle and the handle to the upper prop section but do not extend the prop yet. Put the base of the Propagator on your chosen spot and holding it with one hand push a tent peg into the ground about one and a half paces out. Place the loop of a guy over the peg. Repeat at the appropriate angle with the other two guys. Now extend the prop, adjusting the guys as you go, until it is at full extension and vertical. Tighten the prop-locking collar and your system is ready for action (**Fig. 10**). The friction between the guy plate and handle will hold the beam on heading. To rotate simply relax the tension on one guy slightly and turn the prop.

Interests In HF?

If your interests are h.f. rather than v.h.f., the Propagator can still do a good job for you in the field. A 3/8in threaded top can be provided and a mobile whip mounted with appropriate guy/radials. The whip can be carried inside the prop. (You may have to file the nut at one end of the whip to a round profile so that it will fit inside the prop).

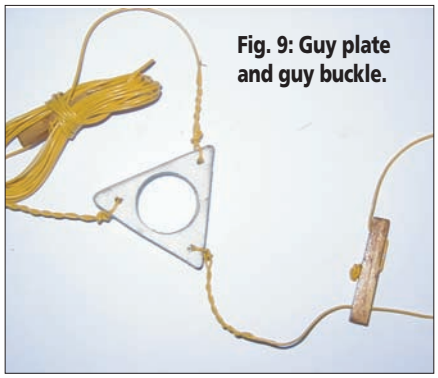


Fig. 9: Guy plate and guy buckle.

Fig. 10: Guyed Propagator with 144MHz beam.

A version of a radial anchor plate with antenna mount is shown in **Fig. 11**. The original version of this was made using a lathe but the 'MkII' was made using a readily available plumbing fitting. The body of the device is a plastic push fit 15 to 22mm pipe connector. It carries the legend BS 729/21990 CLASS S P.B.Q'PEX and came from the local B&Q emporium. Try to make sure at the time of purchase that your fitting has sufficient space in the centre to accept the guy anchor terminals, as some don't.

Set aside all the internal washers, which will not be needed for this project. Remove the head of the prop, which normally holds the washing line. The 15mm end of the plumbing fitting should be a snug fit on the prop end. The ferrule may require a little reaming out. Next drill holes in the central body to accept the three terminals.

An easy way to mark off the holes for the terminals is to take a length of solder and wrap it round the body to form a single turn. Take the single turn and fold into three. Cut off one of the three sections and use it as a measure to mark off for drilling. Set aside all the insulated spacers from the terminals, which will not be needed, then fit the terminals temporarily and assess how much must be removed from each to allow them to just meet in the centre of the fitting (**Fig. 12**).

Cut the terminals to length and refit them to the body, using single nuts on two of them and two nuts with a solder tag on the third. This will be the connection point for the radials. Now with a large hot iron and some flux, solder the three terminals together. Try not to touch the plastic!

Antenna Mount

The antenna mount is made from the shell of a bulkhead N-type connector. An old defective connector from a rally will do. The beauty of this shell is that the hole in its centre is the correct core size for a 3/8in thread so, take a suitable tap and run it through the connector. This is where your mobile whip will fit. Now secure the connector to the larger of the ferrules from the plumbing fitting with four small self-tapping screws remembering to place a solder tag under one of them. This will be the connection point for the coaxial inner.

At this point, you need to decide if you're going to use a dedicated coaxial feed for this antenna. If so then you can connect it directly to the mount. Drill a small hole in the central body, pass the coaxial braid through and solder it to the tag on the radials. Now screw on the large ferrule and solder the coaxial inner to the tag on the N-type body. Waterproof the coaxial end with a suitable sealant and the job is done.

If, like me, you do a lot of 'changing things about' then you may like to fit a BNC connector to the assembly, allowing quick changes. In this case cut the BNC mounting plate as shown in Fig. 12 from a piece of thick pcb material. The plate is secured to the assembly by the small ferrule and the BNC connector is wired to the solder tags as before. Remember to waterproof the rear of the BNC with your favourite 'goo'.

Make up a set of three radial/guys for

the band of interest. In the case of the 144MHz band the radial should be about 480mm (19in) of hook-up wire, a light insulator can be made from a short ring section cut from 25mm plastic conduit

The guy should be 3m (10ft) of hook-up wire, one end fastened to the insulator and the other fashioned into a suitable loop to fasten to a metal tent peg. I find it best to use a different colour of wire for each set of band radials but use a common colour for all the guy sections making it easier to sort out in the field.

Radial/guy combinations for other bands can be made up from the usual quarter-wave formula, bands below 14MHz make the combinations impracticably long although there is room for experiment with loading here. For the bands up to144MHz use the appropriate commercial whip with a 3/8in fitting, the radials must be better than a car!

Originally Built

As I explained in Part 1 (April issue), this is an ongoing project and it has become obvious that a lot of **Summits on The Air** (SOTA) and **Worked All Britain** (WAB) activity takes place on 7MHz and both activities are a good source of contacts for the QRP portable station. In addition, the arrival of the FOXTROT channels has provided a new area for experimenting with antennas in the field.

The Propagator, as originally built, will carry a 7MHz mobile whip and three radials but this is not the ideal antenna for inter-G working. Far better to use two of the quarter-wave radials as the legs of a half-wave dipole and dispense with the whip. How then to raise the centre feed point as high as possible without carrying extra poles? The answer is to use the boom from the 144MHz beam as an additional mast section. This will require one extra connecting piece (**Fig. 13**) to join the boom to the handle section.

Once again, a 15-22mm push fit plastic plumbing fitting is pressed into service together with a cable gland. Ream out the ferrule from the 15mm end of the fitting to accept the bulkhead end of the gland. If you are lucky or rich enough to own a tap of the correct size you can cut a thread to accept the gland, there being no room for the backing nut. Otherwise make the fit as tight as possible and on assembly secure the whole set-up with epoxy resin.

At the other end of the adapter take a 650mm piece of 22mm plastic pipe and make a normal pipe joint with the fittings supplied. Dismantle the joint temporarily and place a blanking disk in the bottom to prevent epoxy resin leaking into the 15mm end. A 1p piece works well and is cheap.

Re-assemble the joint, packing it and the 22mm pipe with epoxy resin. Make sure the pipe is full with no air bubbles trapped by judicious poking into it with a matchstick then set aside to cure. Once cured, the 22mm pipe must be reduced slightly in diameter in order to be a push fit into the handle section. If you have a lathe it's easy, otherwise it's emery paper and blisters!

The wire dipole centre is built into a 35mm plastic film can (I claim no originality for this) and is shown in **Fig. 14**. Take a 100mm piece of wood dowel about 9mm in diameter that will just slip into the 'cane' boom and taper it along its length to about 5mm at one end. Drill a 5mm hole in the centre of the base of the film

Fig. 11: Antenna mount and radial anchor.

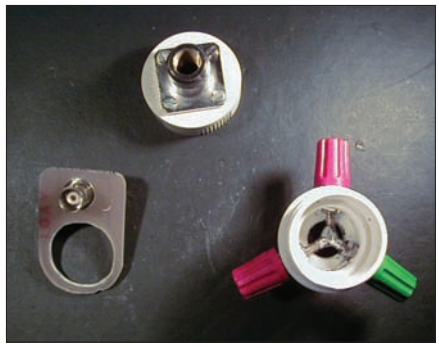


Fig. 12: Antenna mount details.

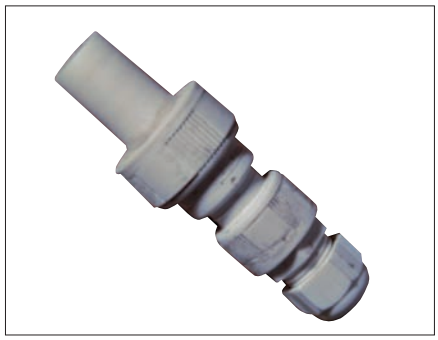


Fig. 13: The handle to boom adapter for extended mast use.

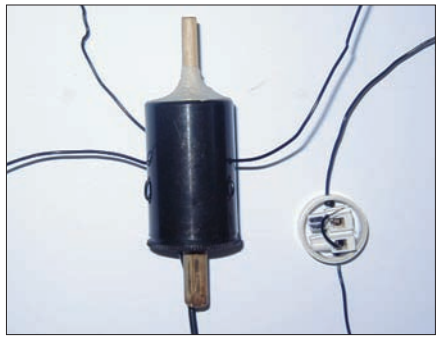


Fig. 14: The 7MHz dipole centre.

cassette and a slightly larger hole in the centre of the cassette lid. Put the lid onto the cassette and push the dowel as far as it will go through the two holes from the lid end. This will be the final location for the dipole centre.

Remove the dowel and drill a small hole in the cassette lid, off-centre to allow access for the coaxial feed line. Push one end of the cable through the hole and prepare the end to receive the dipole legs. These are insulated multi-strand hook-up wire. Mine are black, a poor choice, as they cannot be seen against a grass and mud background so once on the ground they disappear. Use red or bright coloured wire so you can see the tangles!

Drill three small holes, one above the other, at the entry point into the film can. Pass the element wire into the top hole, out through the centre one and in again through the lower hole, which will provide a secure anchor. Repeat for the second element. Solder the elements to the coaxial cable, one to the inner, one to the outer, insulate well and waterproof the end of the cable to be on the safe side. The third wire to the film cassette is simply a back guy. In this case drill four small holes rather than three, pass the wire back out of the cassette through the fourth hole and twist it back upon itself, no electrical connection is necessary. The dipole legs should be about 10m long. Terminate the ends as insulators, once again made from an off cut from the handle section.

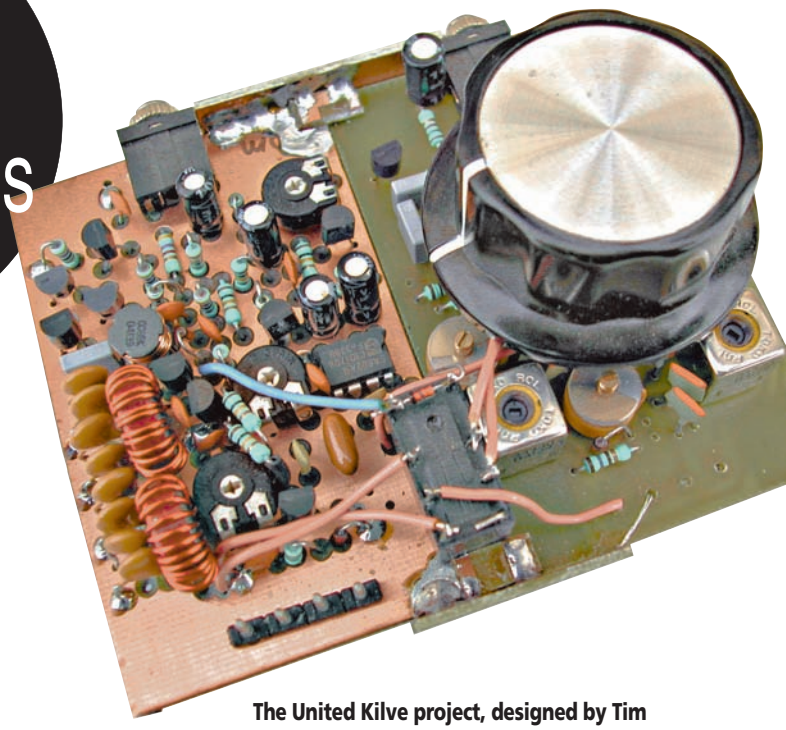
If operation on the FOXTROT channels is required additional sections can be connected to the ends of the dipole by placing small pieces of chocolate block inside the insulators. The additional sections should each be 3.7m long. Remember to provide another insulator at the far end of the new section. A trap would be a better solution but has not yet been investigated, changing bands is a case of walking to each end in turn and connecting or disconnecting at the chocolate block as appropriate.

Constant Development

The Propagator is under constant development and this, almost certainly, is not its final form. It has been used on over 75 summit expeditions as walking aid, antenna and to repel over enthusiastic livestock.

It can also do duty as a photographic monopod and I have a 50MHz 2-element beam that will mount on it but that's another story. Build a propagator, you will not be disappointed! **PW**

Linking the K Rigs



Tim Walford G3PCJ continues his articles on the Kilve/Kilton projects. This time he's describing the linking of the two projects to provide a range of options on a deceptively simple design, requiring some enjoyable constructional experimenting for the keen builder!

The United Kilve project, designed by Tim Walford G3PCJ. In this month's article Tim provides some suggestions and further projects to help you get the best out of the designs he's prepared (see text).

The earlier *PW* articles on the Kilve receiver and Kilmot/Kilton transmitters hinted that these rigs can be linked together. However, because they are relatively simple, with many options for enhancement, I'm not providing 'wire-by-wire' change lists; instead you'll have to experiment a little!

It's impractical to fully define all the possibilities so, this article only provides the general suggestions. But if you are hesitant about making the alterations, I suggest that you familiarise yourself thoroughly first with how the rigs work. Then ask friends or more knowledgeable people at your local Radio Club, to comment on your proposal. Your approach will greatly assist club members by letting them see what you've built and hear how you propose to alter the circuits.

There are also some new kits for matching either transmitter to your antenna, and dealing with the higher bands – see the panel at the end of this article. So, I hope you'll enjoy this latest update.

Antenna Changeover

Unless you're using electronic changeover, the antenna is most easily changed between receiver and transmitter by a relay. To help this process, both the K transmitters have the circuits to drive a 12V relay - but there was not space on either printed circuit board (p.c.b.) for the actual relay!

The diagram, **Fig. 1**, shows how to connect the relay and its essential anti-spike diode to either transmitter. One contact set of the relay switches over the antenna; the other set can be used to mute the receiver (by disconnecting the headphones) or to switch off the Receiver Incremental Tuning (RIT) – see later.

At this simple level, the transmitter still has to be separately tuned from the receiver. However, it's quite easy to mount the small relay on its back using rigid wire connections to the tags. The photograph, **Fig. 2**, shows a Kilve rigidly attached by strips of p.c.b. material to a Kilmot transmitter, with the relay and diode across the main board joint. A few off-cuts of p.c.b. material and wire improve the rigidity, and

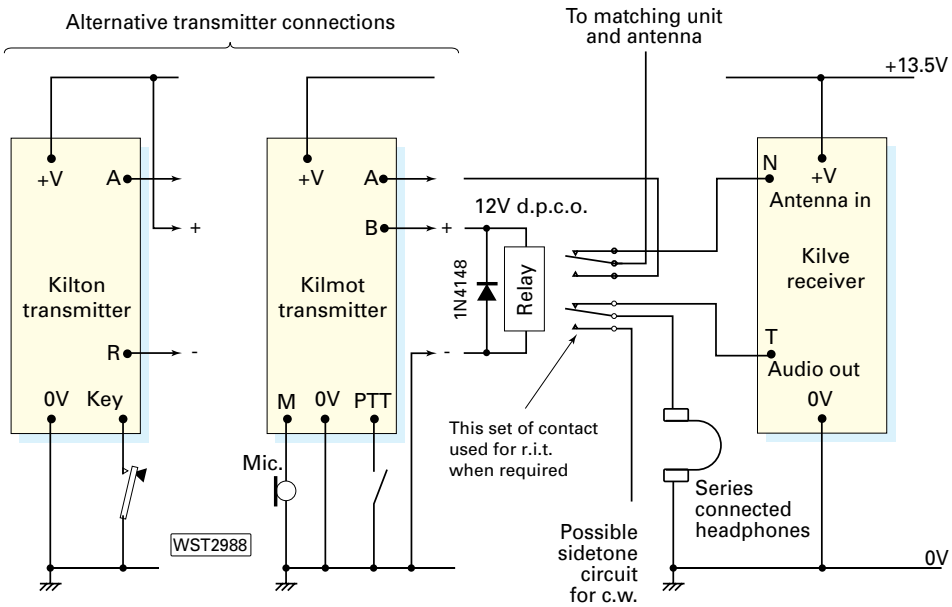


Fig. 1: The diagram shows how to connect the relay and its essential anti-spike diode to either transmitter. One contact set of the relay switches over the antenna; the other set can be used to mute the receiver (by disconnecting the headphones) or to switch off the Receiver Incremental Tuning (see text). To improve rejection of BCI (broadcast interference), the necessary antenna T/R changeover and receiver muting can be done with the T/R relay as before. The diagram, shows the alterations in diagram form. The photograph in Fig. 2, actually depicts this arrangement.

electrical connectivity, of the joint between the earth tracks of the single-sided receiver p.c.b., and the copper ground-plane of the transmitter's double sided p.c.b.

Note: I advise that you keep all the r.f. wires rigid and as short as is reasonably possible. If you are going to add the Mini-Bridge kit, this has space for the T/R relay and diode (see later).

Operating 3.5MHz Phone

Let's now look at operating on 3.5MHz 'phone. In principle this is relatively easy because the local oscillator (l.o.) frequency for double sideband suppressed carrier (referred to as d.s.b.) 'phone is the exactly same for transmission and reception.

However, the Kilmot's l.o. has to use a ceramic resonator (or crystal on higher bands) for the reasons explained last month; but there's no reason why the receiver's l.o. requirements cannot be obtained from the transmitter's oscillator so that a single tuning control will alter both. This makes the receiver's variable frequency oscillator (v.f.o.) parts redundant, allowing the PolyVaricon to be used instead of the original Kilmot trimmer to alter both transmitter and receiver frequency.

The original receiver local oscillator coil and capacitors can be re-connected as a second r.f. filter on the input of the receiver to improve rejection of BCI (broadcast interference), etc. The necessary antenna T/R changeover and receiver muting can be done with the T/R relay as before. The diagram, Fig. 2, shows the alterations. The photograph actually depicts this arrangement.

Operation On 3.5MHz CW

Now we'll take a look at transceiver operation on 3.5MHz c.w. The problem here is that the receive frequency needs to be offset slightly from the working frequency to obtain a beat note. In the same way as for 'phone operation, the transmitter's ceramic resonator oscillator can be used, but the oscillator has to be altered to run continuously, with the incremental tuning control switched off during transmission.

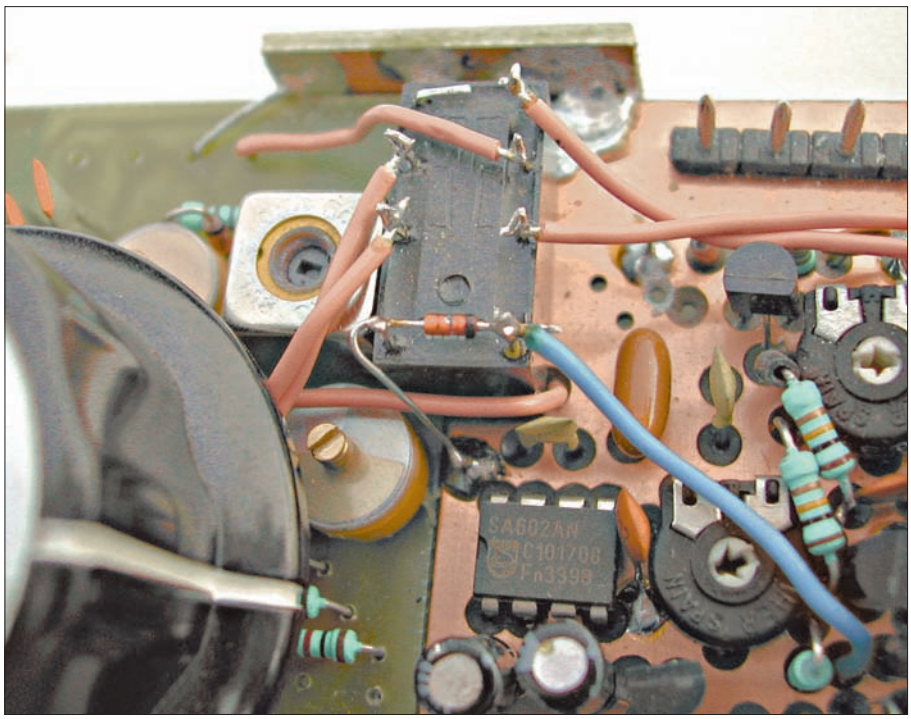


Fig. 2: The photograph, shows a Kilve rigidly attached by strips of p.c.b. material to a Kilmot transmitter, with the relay and diode across the main board joint (see text).

I actually prefer to use an extra potentiometer, or shafted preset control, to remotely control a voltage variable capacitor diode (varactor diode) connected to the oscillator's tuned circuit. The preset's supply needs to be stabilised, so I used the 5V supply line of the Kilton.

Note: The shafted preset is wired in series with two resistors so that it can be shorted out when the offset is not required. This can be achieved either by an extra switch while setting the main tuning for zero beat with the other station, (prior to tuning off with the preset to obtain a reception beat note), or automatically by the T/R relay when transmitting. This approach allows you to select either sideband (up or down from the main tuning) for least interference by other stations, and caters for the RIT adjustment range altering across the band.

Incidentally, if you can't obtain a low capacitance varactor diode like the BB205, then I suggest you use a Zener diode whose nominal Zener voltage is roughly double the tuning voltage!

The diagram, **Fig. 3**, shows a typical circuit. As before, the redundant parts of the

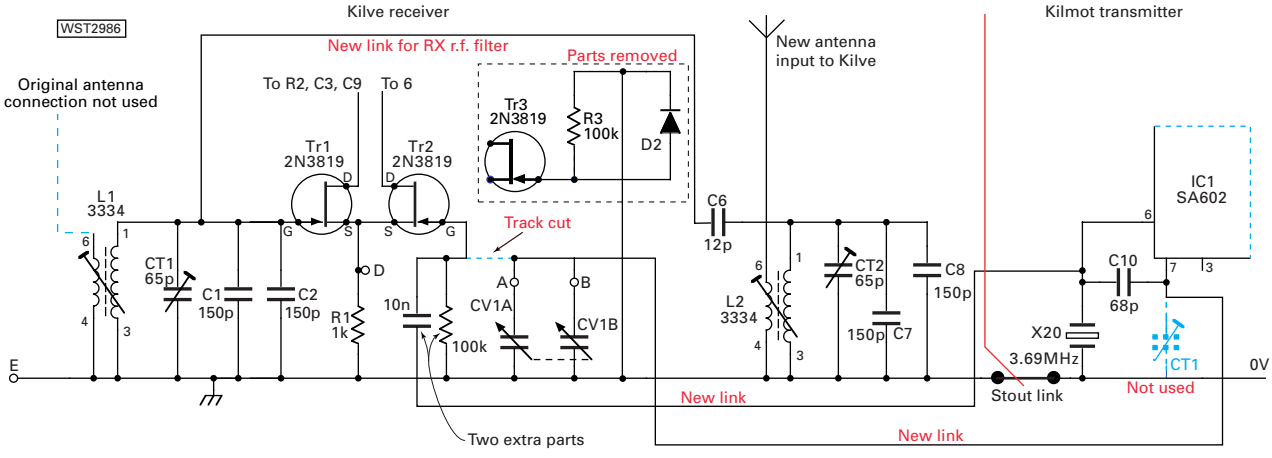


Fig. 3: If readers can't obtain a low capacitance varactor diode like the B205, G3PCJ suggests the use of a zener diode whose nominal zener voltage is roughly double the tuning voltage. The diagram, shows a typical circuit. As before, the redundant parts of the receiver local oscillator can be used for the main tuning and a second r.f. input filter. Also shown are modifications fro higher bands (see text).

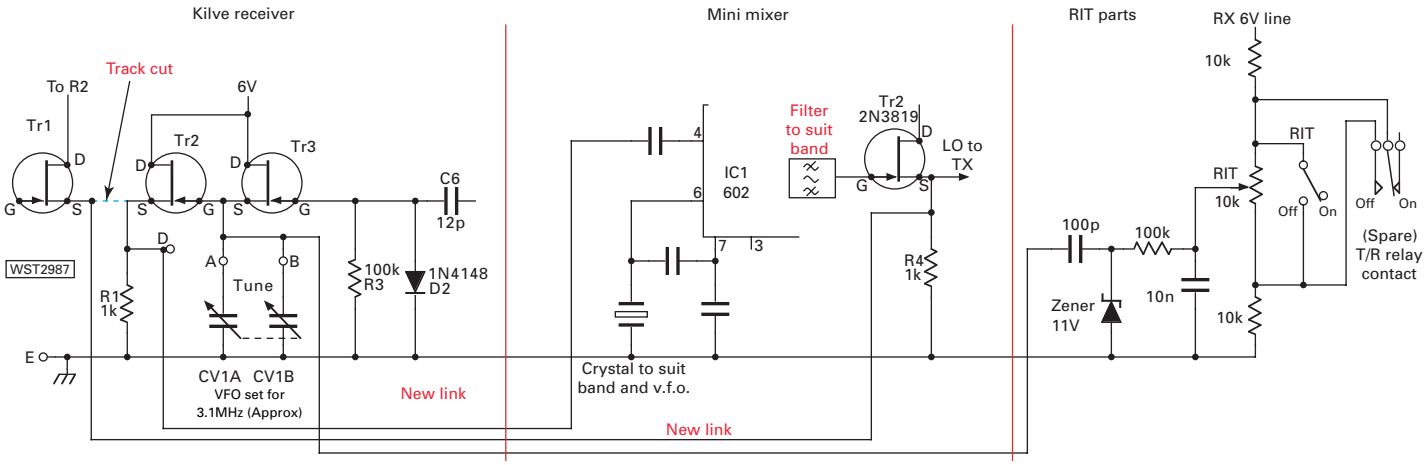


Fig. 4: Morse (c.w.) operation will need RIT to provide the receiving offset and G3PCJ suggests the approach using resistors, preset, varactor diode/zener, control switch and relay can be used. This diagram shows a typical arrangement.

Editorial note: A complete kit of parts (Mini mixer, crystal and RIT) is available - see Kits & Bits panel.

receiver local oscillator can be used for the main tuning and a second r.f. input filter. Note: Receiver muting or 'phones changeover to a receiver sidetone source is no longer possible, this is because the spare T/R relay contact set is needed for the RIT.

Higher Bands

We're tuning up to the higher bands now and above 3.5MHz, the transmitters need either a crystal oscillator or a l.o. crystal mixing scheme to prevent unwanted changes in frequency during transmission, and to improve their frequency stability over time.

However, although it's getting away from the concept of really simple rigs, the easiest approach is to use the Kilve's v.f.o. in conjunction with a mixer, whose other input comes from a crystal oscillator. And to help, the Mini-mixer kit is suitable for this and includes the band-pass filter to select the desired band's mixer output.

Altering the Kilve's v.f.o. to run at about 3.1MHz allows crystals of 4, 7 and 11MHz to cover the 40, 30 and 20m band by mixer addition without problematical harmonics. This is actually a better frequency scheme than the one I provided in the transmitter instructions.

The approach is fine for 'phone operation with the polyvaricon being used for the tuning, and where the same frequency is used for transmission and reception. But c.w. (Morse) operation will need RIT as described above to provide the receiving offset – the same approach using resistors, preset, varactor diode/zener, control switch and relay can be used. **Fig. 4** shows a typical arrangement. A complete kit of parts (Mini mixer, crystal and RIT) is available but will require some ingenuity to mount the RIT parts!

Antennas & Transmitters

On to the all important antenna now! My preference is for balanced antennas with equal length arms, up high and with plenty of wire! Ideally, I think you should connect them to the equipment with open ladder line having parallel wires about 100 to 152mm (4 to 6in) apart; otherwise you could use the ready made slotted twin feeder cable.

I also think it's desirable - but not imperative - that the antenna lengths be resonant (i.e. correct length) for the band in use, and I also think you have a suitable antenna matching unit, that can tune out the unwanted reactance to reduce the mismatch even more. The matching device, with associated indicator, can be at the shack end of the feeder.

For these, or indeed any singleband rig, the matching unit can be simplified to deal only with the anticipated load impedance.

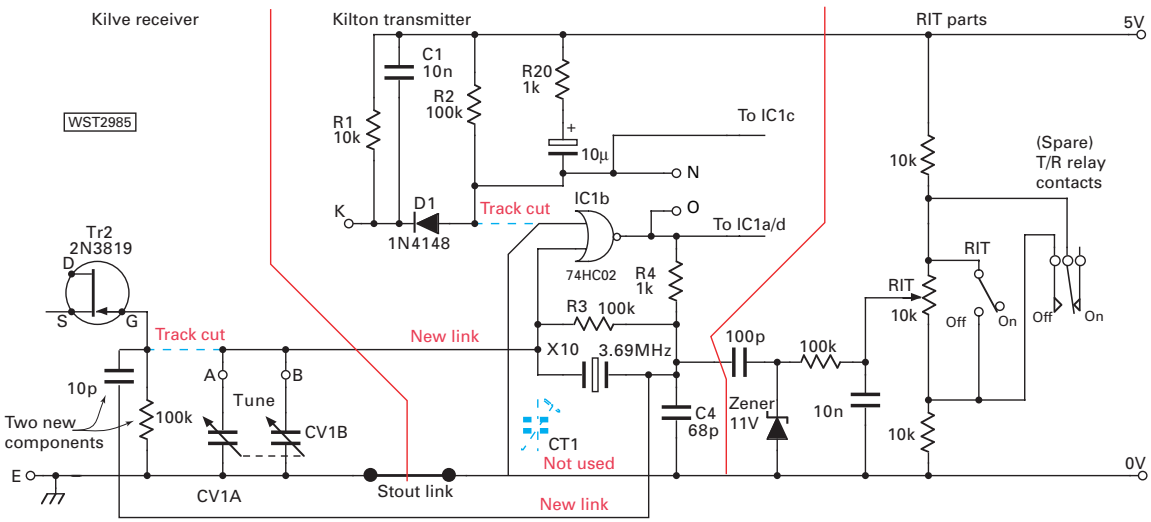


Fig. 5: The 3.5MHz c.w. transceiver.

Hence the development of the Mini Matcher kit, which I've made in the same physical style as the K rigs.

The Mini Matcher uses the classic T arrangement of two variable capacitors with an inductor between them to the chassis. To cater for uncertainty over the actual load impedance, there's a choice of three inductance values selected by a centre-off toggle switch.

The toroids used in the kit are wound to suit the operating band and type of antenna. **Note:** The winding advice is too complex to fully explain within the space available in this article, but it's included in the kit instructions.

To cater for balanced transmission lines, the Tmatch is fed from a 1:1 r.f. input transformer so that the output is electrically isolated from the input side of the chassis or earth. While the matching circuit is not fully balanced, the antenna's radiation pattern is far more likely to be disturbed by other metallic objects in its immediate vicinity. This output arrangement can also feed unbalanced antennas that are worked against a proper r.f. earth or counterpoise.

Matching Indicator

You'll need something to tell you when the matching unit controls are giving the desired 50Ω load to the transmitter. At QRP levels, this is most easily done with a bridge circuit that tells you when the load on its output is 50Ω resistive.

The new Mini Matcher has the same physical size (50 x 80mm) and style as the other units. It uses a resistive bridge with a simple r.f. voltmeter, which can either indicate bridge balance, or the output r.f. voltage (or power with a square law scale). Its calibration is not important since the matching unit controls are adjusted for the lowest meter reading with the bridge in circuit (bridge balanced condition); the bridge is then switched out and the meter shows the output r.f. from the set-up!

When active the bridge circuit also ensures that the transmitter has a safe load while tuning up - even if the antenna load is open or short circuit! The p.c.b. also has provision for an optional relay/diode under the meter; there are two positions for it, firstly as a T/R relay (to save you having to find a space for it elsewhere!), or alternatively, to act as a **tune** relay.

In the latter role, the relay switches the matching bridge in/out of circuit by remote d.c. control from a **tune** control switch as in some more complicated rigs. Incidentally, both the antenna matching kits can be used with separately tuned receiver and transmitter, or any other breed of QRP rigs.

There are plenty of options with these circuits so I hope you will be encouraged to have a good dabble. You do so without much risk of damage, and enjoy that special thrill of making contacts with something else that you have built yourself! Meanwhile I must design the 50Ω test gear that will be subject of my next article!

PW

Kits and Bits

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

Kilve DC receiver - any band 3.5 to 14MHz, £19
Kilmot d.s.b. 'phone 1.5W transmitter, £24
Kilton c.w. 1.5W transmitter, £19
Transmit crystals - 7.030, 7.159, 14.060, 14.318MHz, £2
Relay/diode - T/R or Tune, £2
Mini Mixer kit & RIT bits – (specify band/crystal), £23
Mini Matcher kit, £19
Mini Bridge kit, £19

Please note: P&P is £2 per order. Please send your orders with a cheque direct to **Walford Electronics, Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ**. Further information is available at **www.users.globalnet.co.uk/~walfor**

Errors & Updates

Reference the *PW* April Kilmot article, Tim Walford G3PCJ brings several errors to our attention. Tim writes: " On the Kilmot circuit diagram, Fig 2., C6 should be 10nF not 10µF, and C13 should be 470pF and not 1kΩ as marked".
Editor's comment: Thank you Tim and my apologies to everyone for our mistakes. **G3XFD**.

Fig. 7: The matching indicator (see text).

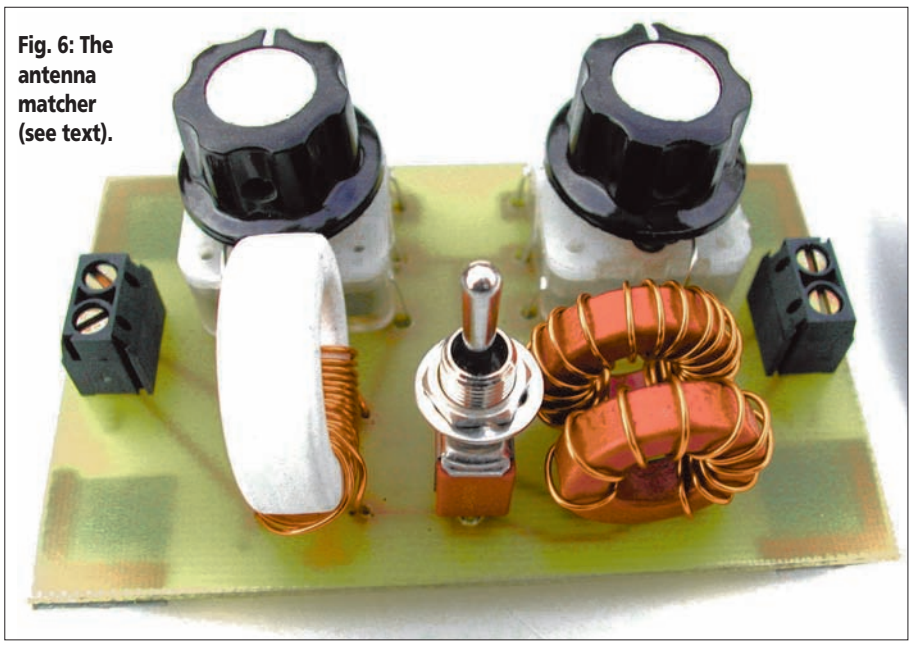


Fig. 6: The antenna matcher (see text).

RADIOWORLD

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

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

KENWOOD TS-2000

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

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

1 YEAR WARRANTY **£1,295.00**

KENWOOD TS-480SAT

New HF+6m. HX-200W - £1099.00

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

1 YEAR WARRANTY **£699.00**

KENWOOD TM-271E

2m 60W FM Tansceiver

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

1 YEAR WARRANTY **£187.00**

KENWOOD TS-570DGE

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

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

1 YEAR WARRANTY **£789.00**

KENWOOD TS-50S

100W Moble HF. 1.8-30MHz.

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

1 YEAR WARRANTY **£594.00**

KENWOOD TMD700E

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

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

1 YEAR WARRANTY **£424.00**

KENWOOD TMG707E

2m & 70cms. Dual Band. Det Front

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

£265.00

KENWOOD Handhelds

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

www.radioworld.co.uk

YAESU FT-1000MP

HF Base DSP. MkV 200w £2099.00

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

FT1000MP FIELD **£1,699.00**

NEW YAESU FT-1802E NEW

50W FM Mobile Transceiver

8 Memory Banks,
50 Watts Output,
APO - Automatic Power-Off,
ARS - Auto Repeater Shift,
Busy Channel Lock-Out,
Backlit DTMF Mic,
DTMF Memories,CTCSS
Encode, CTCSS Decode,
CW Trainer,
Password Function

2 YEAR WARRANTY **£125.00**

YAESU FT-897D

HF 6m 2m 70cm.100W Transportable

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

MMB-80 Bracket £15.95

2 YEAR WARRANTY **£649.00**

YAESU FT-857D

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

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

FREE DSP **£579.00**

YAESU FT-817ND

HF 6m 2m 70cm. Portable / Mobile

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

FREE BATTERY & CHARGER **£Phone**

YAESU FT-840

100w Mobile / Base 1.8-30MHz.

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

2 YEAR WARRANTY **£389.00**

YAESU FT-8800/8900

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

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

2 YR WARRANTY

YAESU FT-2800M

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

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

2 YEAR WARRANTY **£159.00**

www.radioworld.co.uk

ICOM IC-7800 FLAGSHIP

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

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

2 YEAR WARRANTY **£6,400.00**

ICOM IC-756 PROIII NEW

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

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

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

ICOM IC-7400

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

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

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

ICOM IC-706 MkII G

Last Few Remaining

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

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

2 YEAR WARRANTY **£749.00**

ICOM IC-7000 (NEW)

HF, VHF & UHF Mobile Transceiver

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

2 YEAR WARRANTY **£999.95**

ICOM IC-718

HF 100W TX. Dual VFO. Auto Notch.

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

2 YEAR WARRANTY **£439.00**

ICOM IC-910H / X

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

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

2 YEAR WARRANTY **£1087.00**

ICOM & YEASU Handhelds

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

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

www.radioworld.co.uk

01922 414796

ORDER HOTLINE

Email: sales@radioworld.co.uk

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

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

Credit Cards Accepted

MasterCard VISA VISA Electron SWITCH SOLO

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

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

MFJ. Tuners

Tuners, Meters, Analysers.

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

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

Analysers

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

Dummy Loads

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

MFJ-418
Morse Decoder / Tutor
£69.95

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

Heil Audio

Microphones, Headsets, Accessories.

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

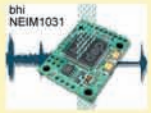
Call for Leads and Accessories

Adonis Microphones

AM-708E
Variable Compression
2 Microphone Outputs
£129.95

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

bhi DSP



Noise Cancelling Solutions for Amateur Radio & SWL

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

Watson Supplies

W30-AM

0-15VDC
30/35A Peak
£119.95

W25-XM
NEW

13.8VDC
25A Switchmode
£99.95

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

Diamond Supplies

GZV4000
5-15 VDC
40A Peak
£154.95

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

Frequency Counters

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

FC130	£79.95
Hunter	£59.95

Call for further details

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

Super Hunter
£149.95

Daiwa Accessories

Cross-needle meters

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

Coax Switches 2/4 Way.

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

Avair Meters

AV-200
HF / VHF PWR SWR meter

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

Palstar Tuners

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

AT-1500CV **£389.00**

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

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

Watson Antennas

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

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

Bencher Antennas

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

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

Hustler Antennas

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

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

West Mountain Radio

RIGblaster Models

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

Tonna Antennas

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

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

Diamond Antennas

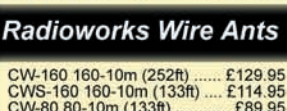
HF10FX 10m Mobile	£39.95
HF15FX 15m Mobile	£39.95
HF20FX 20m Mobile	£39.95
HF40FX 40m Mobile	£39.95
HF80FX 80m Mobile	£42.95
CR8900 10/6/2/70	£72.95
CP6 Base 6m-80m	£239.95
X50 Base 2/70	£54.95
X200 Base 2/70	£84.95
X300 Base 2/70	£99.95
X510 Base 2/70	£124.95
X700 Base 2/70	£249.95

Cushcraft Antennas

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

TGM Antennas *Mini Beams*

** Call for prices on TGM upgrade kits.*



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

Radioworks Wire Ants

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

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

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

www.radioworld.co.uk

RADIOWORLD

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

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

LDG Electronics

AT-1000

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

£449.95

LDG Z-100

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

£115.00 ***BEST SELLER****

LDG TW-1 TALKING WATTMETER *New*

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

£109.00

LDG AT-100Pro *New*

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

£169.95 ***New****

LDG RBA 1:1 & 4:1

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

£29.95

LDG AT-897

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

£199.95

Accessories:

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

W4RT Electronics

One-Plug-Power

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

OPP-817
£54.95
NEW! 2300 mAh Large Capacity FT-817 Internal Battery Solution Still use Internal 817 Charger

OPP-897
£89.95
One Plug Power for the FT-897 4500 mAh; Fully Compatible with the FT-897 and Yaesu Charger.

NEW!

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

One-Big Punch

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

OBP
£49.95
Speech Compressor for the Yaesu MH-31 mic and FT817 FT857, FT897. Improve the TALK POWER.

MAX PUNCH
£165.95
You can also enjoy the "MAX PUNCH" option that features the HC-4 with the OBP and the HC-5 (w/o OBP). The TONE switch is used to select which element is operational.

HAND MIKE
£57.95
W4RT Electronics Microphone with One BIG Punch Speech Compressor included.

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

One-Board-Filter

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

OBF
£229.95
Replace two filters in the space of one. OBF includes the two optional filters and fitting.

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

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

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

One-Touch-Tune

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

OTT-817
£54.95
It requires no external power and works with both manual and automatic tuners.

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

*NEW** FT-817 Stand

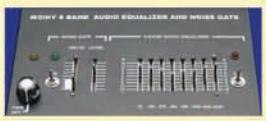
£19.95
Simply snaps into position. Adjust for desired height. Complete with non slip feet and allen wrench.

Professional-Grade FT-817 Stand

W2IHY Technologies

*Available and IN STOCK now**

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



W2IHY 8 Band Audio EQ Noisegate

£229.95

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

£299.95

W2IHY 2 Band Processor

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

£119.95

Adapter cables to fit Icom - Kenwood - Yaesu £22.95

ATX Walkabout

ATX Walk--about PL-259

£47.95

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

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

The Miracle Whip

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

Power Limits 25W PEP 10W Cont.

£127.95

In Stock*

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

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

Portable Masts

Telescopic Masts Inc Guy Rings

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

Mobile Mounts

Solarcon MAGZ-17 TRI-MAG

£39.95

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

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

RM Amplifiers

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

£249.95

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

£329.95

01922 414796

ORDER HOTLINE

Email: sales@radioworld.co.uk

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

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

Credit Cards Accepted

MasterCard VISA VISA Electron SWITCH SOLO

Do a great deal better @ RADIOWORLD

01922 414796 - www.radioworld.co.uk

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

Linear Amp U.K.

Challenger Mk3 **£1795.95**

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

SGC. Smartuners

SGC-230 200Watts **£339.95**

SGC-230 HF..... £339.95
SGC-231 HF+6m £349.95
SGC-235 HF-500w £749.95
SGC-237 HF+6m £299.95
SGC-237 Porta £529.95
SGC-237 PCB £279.95
SGC-239 HF..... £185.95
MAC-200 ..... £339.95
SGC-211,1.8-60MHz 60W..... £189.95

Rotators

YAESU

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

Feeders & Wire

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

RG58U ..... £0.50 per Metre
RG8 Super ..... £0.70 per Metre
RG213 ..... £1.00 per Metre
W103 Westflex ..... £1.30 per Metre
RG-8 75 Metre Drum Special . £39.95

Flexweave 50m Flex £29.95
Flexweave-PVC-50 50m £39.95
Enamelled Copper Wire 50m . £12.95
Hard Drawn Copper Wire 50m £14.95

Rotator Cable: - Color coded Cable
3 core ..... £0.45 per Metre
7 core ..... £0.79 per Metre
8 core ..... £1.09 per Metre

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

Wonder Wand *New

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

MB-160 Mono 160m £49.95
MB-80 Mono 80m £49.95
MB-60 Mono 60m £49.95

Wonder Wand 40m-70cm £89.95

C-POISE Wander-Wand Tunable Counterpoise System £59.95

The UK's No.1 Used Equipment Trader

Second Hand List.

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

BHI NEIM-1031 Noise Eliminating Module £89.00
432-50 70cms Amp 50w £99.00
AEA PK-12 Packet Terminal £69.00
AKD 6001 6m FM Trx £135.00
Alan HQ-2000 SWR / Watt Meter £25.00
Albrecht AE 485S 10m Mobile Transceiver £125.00
Alinco DJ-G5 Dual Band Handy £159.00
Alinco DJ-G5 Dual Band Handy £159.00
Alinco DJ-V5 Handheld £99.00
Alinco DJ-X10 Wide Band Rx £200.00
Alinco DJ-X2000 Intelligent Receiver £275.00
Alinco DR-112 2m Mobile Transceiver £99.00
Alinco DR-150 2m Trx £120.00
Alinco DR-430 70cm FM Mobile Transceiver £99.00
Alinco DX-70TH HF & 6m transceiver £375.00
Alinco DX-77E HF Transceiver £389.00
Alinco EDX-2 Auto ATU £219.00
Ameritron AL-811 £499.00
AOR 350L Bar Element £30.00
AOR 350M Bar Element £30.00
AOR 8200-PC Computer lead £45.00
AOR AR-1500 Wideband Receiver £89.00
AOR AR-3000 £349.00
AOR AR-3000 Wide Band Receiver £350.00
AOR AR-7030 £550.00
AOR AR-7030 HF Receiver £550.00
AOR AR-8200 2 £199.00
AOR AR-8200 Mk II £199.00
AOR AR-8200Mk3 Scanner £275.00
AOR AR8000 £189.00
AOR LA-350 Loop Antenna £129.00
AOR SDU-5000 Spectrum Display Unit £299.00
Avair AV-200 VSWR/POWER Meter £30.00
Bearcat UBC-120XLT Scanner £69.00
Bearcat UBC-278 XLT Scanner £99.00
Bearcat UBC-780XLT Scanner £199.00
Bnos 20AMP PSU £89.00
BNOS LP50-3-50 6m linear amplifier £99.00
Codan 9360 SSB transceiver £399.00
Comet CD-270D Meter £49.00
CX-201 Diecast Coax Switch £10.00
Daiwa CNA-1001 £149.00
Datong FL-2 Multimode Filter £69.00
Dewsbury Electronics Supa-Tuta £35.00
Diamond SX-100 Meter £65.00
Diamond SX-200 Meter £69.00
Drake R8E HF Receiver £425.00
EDC-16B adapter £9.99
FRT-7700 £69.00
FT-290R 2m Multi mode £150.00
FT-817 £375.00
Fujion F-2000A Finder £99.00
FV-101DM Digital Memory VFO £199.00
Global AT2000 SWL ATU £59.00
GRE PSR-214 FM Base Scanner £89.00
Heil BM-10-5 Headset £50.00
Hora C-150 2m FM Handheld Transceiver £79.00
HS-5 Deluxe Headphones £30.00
IC-275H - 2m Base Transceiver 100W £399.00
IC-7400 HF, 6m & 2m transceiver £899.00
ICE 413 2m Band Pass Filter £30.00
Icom AT-180 AUTO ATU £225.00
Icom Ic at-500 automatic ATU £250.00
ICOM IC-207H Dual Band Mobile £149.00
Icom IC-2340H Dual Band Mobile Transceiver £169.00
Icom IC-24ET Dual Band Handy £139.00
Icom IC-703 HF, 6m Portable £399.00
Icom IC-706MKIIG £649.00
Icom IC-706MkIIG DSP £649.00
Icom IC-718 HF All Band Transceiver £389.00
Icom IC-718 HF Transceiver £379.00
Icom IC-735 £299.00
Icom IC-7400 HF, 6m & 2m Transceiver £899.00
Icom IC-746 HF/6m Transceiver £799.00
Icom IC-751 HF Transceiver £400.00
Icom IC-756Pro £995.00
Icom IC-756Pro III HF / 6m Transceiver £1795.00
Icom IC-910H 2m/70cms base 100w £899.00
Icom IC-R2 Wideband Receiver(Scanner) £89.00
Icom IC-R2 Wideband Receiver(Scanner) £8900
Icom IC-R3 Hand held Scanner £250.00
Icom IC-R70 HF Rx £299.00
Icom IC-R72 Receiver £350.00
Icom IC-R75 £449.00
Icom IC-R8500 Receiver £899.00
Icom IC-R8500 RX £999.00
Icom IC-T7E Dual Band Handy £139.00
Icom IC-W31E Dual Bander £160.00
Icom ut-102 Voice Synthesizer Unit £25.00
ICS AMT-2 Terminal Unit £49.00
Jil SWR Meter £15.00
JPS NIR-10 Noise Unit £99.00
JRC NRD-525 HF Receiver £399.00
Junker Pump Key £75.00
Kamtronics KAM Multimode TNC £140.00
Kantronics KPC-3+ TNC £129.00
Kent Straight Key £45.00
Kenwood AT-250 Auto ATU £199.00
Kenwood AT-50 ATU £175.00
Kenwood BO-9 Base Unit £39.00
Kenwood IF232 £50.00
Kenwood MB-201 £20.00
Kenwood MC-60A Microphone £80.00
Kenwood PS-31 Power Supply £129.00
Kenwood SM-230 Station Monitor £499.00
Kenwood SO-2 Hi-Stab Oscillator £69.00
Kenwood SP-31 Loudspeaker £59.00
Kenwood SP-950 Loudspeaker £90.00
Kenwood TH-79E Dual Band Handy £149.00
Kenwood TH-D7E Dual band Handy £199.00
Kenwood TH-F7E Dual Band Handheld £189.00
Kenwood TH-G71E Dualband Handie £129.00
Kenwood TH-K2E 2m Handie £99.00
Kenwood TL-922 HF Linear Amplifier £849.00
Kenwood TM-G707E Dual Band Mobile £189.00
Kenwood TR-751E 2m Multi-mode transceiver £325.00
Kenwood TR-9130 2m Multi-Mode Transceiver £249.00
Kenwood TR-9500 70cms Multi-Mode Transceiver £220.00
Kenwood TS-140S HF Transceiver £299.00
Kenwood TS-2000 All Mode Transceiver £1099.00
Kenwood TS-2000X HF/6m/2m/70cm & 23cm £1499.00
Kenwood TS-440S HF Transceiver £399.00
Kenwood TS-570DG/E £675.00
Kenwood TS-570S HF / 6m Transceiver £649.00
Kenwood TS-690SAT HF -6m Transceiver £599.00
Kenwood TS-790E Dual Band Base Transceiver £799.00
Kenwood TS-850S /AT £699.00
Kenwood TS-870S HF Transceiver £949.00
Kenwood TS-950SD HF Transceiver £1099.00
Kenwood TS-950SDX HF Transceiver £1499.00
Kenwood TSU-8 CTCSS encoder £30.00
Kenwood VS-1 Voice Synthesiser £39.00
Kenwood VS-2 Voice Synthesizer £30.00
Kenwood YG-455C IF Filter £65.00
Kenwood YK-88C-1 500Hz CW Filter £40.00
Kenwood YK-88CN-1 CW 270Hz Filter £40.00
Linear Amp Challenger II amplifier £1199.00
M/Mods 144/100 £119.00
M/Mods 432/50 £99.00
Magellan GPS 315 Receiver £129.00
Manson EP-850 50A Power Supply Unit £120.00
Maplin YN48C Dip Meter £49.00
MCL1100 EasyReader £59.00
MFJ-1272B TNC / Mic Switch £20.00
MFJ-1701 6 Way Antenna Switch £40.00
MFJ-442 Elec + Memory keyer £89.00
MFJ-722 CW / SSB Filter £59.00
MFJ-784 DSP Filter £149.00
MFJ-9015 15m cw Trx £84.26
MFJ-906 6m ATU £49.00
MFJ-914 £39.95
MFJ-921 VHF 200 Watt ATU £50.00
MFJ-941E Versa Tuner £79.99
MFJ-949E Manual ATU £109.00
MFJ-962D Versa Tuner £220.00
MFJ-969 ATU £130.00
Microset PC2S 30 Power Supply £99.00
Microset PT 135 PSU £120.00
Microset R50 2m Amp £79.00
Mirage B-108 2m Linear Amplifier £129.00
Mizuho ATU £40.00
MML432-30L £89.00
MML432-50 70cm's Linear Amplifier £79.00
MVT-7100 Scanner £139.00
NES-10-2MKII bhi DSP Noise eliminating Speaker £69.00
NEUMANN U 87 Ai condenser microphone £1100.00
OptoElectronics X Sweeper £1199.00
Palstar PS-30N PSU £79.00
Pro.Sis.Tel Rotator and Head Unit £289.00
Proset-Plus £109.00
Realistic DX394 HF Receiver £119.00
Realistic Pro-2006 Scanner £129.00
Realistic Pro-2012 £79.00
Realistic Pro-26 Scanner £89.00
Realistic Pro-28 Scanner £35.00
Realistic Pro-43 Scanner £89.00
Rexon RL-501 Dual Band Handy £89.00
Rode Classic 1 studio condenser microphone £550.00
SEM TranZmatch £89.00
SGC SG-230 Auto ATU £259.00
SM-20 Deluxe Base Station Desk Mic £89.00
SMC 150PL Dummy Load £29.00
Snooper S5-R Safety Alert System £119.95
Standard C-156E 2m Handheld £125.00
Standard C468 70cm Handy £59.00
Target HF3 HF3 RX £99.00
Tentec Paragon HF Base Inc. Speaker £700.00
TenTec RX-350 HF Receiver £799.00
Timewave DSP-59+ Filter £129.00
Timewave PK-12 Packet £99.00
Tokyo Hy-Power HT-106 6m Transceiver £199.00
Tono Theta 777 TNC £49.00
Trio (Kenwood) AT-230 Antenna Tuner £149.00
Trio (Kenwood) YK-88C IF Filter £40.00
VECTRONICS DL-2500 High Power Dummy Load £119.00
Vibroplex Vibro Keyer Deluxe £119.00
Watson W-25AM Power Supply £75.00
WELZ DL-600 Dummy Load £49.00
Wimo R-150 HF Linear Amplifier £89.00
Yaesu FC-20 Auto ATU £175.00
Yaesu FC-30 Antenna Tuner Unit £149.00
Yaesu FC-757AT Auto ATU £169.00
Yaesu FL-2025 25W Linear Amplifier £99.00
Yaesu FP-707 PSU £110.00
Yaesu FR-101 HF RX £399.00
Yaesu FRG-100 HF Receiver £299.00
Yaesu FRG-100 HF Receiver £299.00
Yaesu FRG-7700 HF Receiver £199.00
Yaesu FRG-9600 VHF-UHF Receiver £199.00
Yaesu FRT-7700 £70.00
Yaesu FRT7700 Antenna Tuner £69.00
Yaesu FRV-7700 Converter for FRG-7700 £60.00
Yaesu FRV7700 Converter £60.00
Yaesu FT-1000 "CLASSIC" HF Transceiver £1399.00
Yaesu FT-1000MK V 200w £1499.00
Yaesu FT-1000MP / AC HF Transeceiver £999.00
Yaesu FT-1000MP Mark -V Field £1299.00
Yaesu FT-101Z, With Digital Display Fitted £299.00
Yaesu FT-101ZDmk3 HF Transceiver £325.00
Yaesu FT-101ZDmkIII HF Transceiver with FM fitted £325.00
Yaesu FT-290MkII 2m Multi-mode transceiver £250.00
Yaesu FT-416 2m Handy £79.00
Yaesu FT-41R Handheld Transceiver £120.00
Yaesu FT-470R Dual Band Handheld £129.00
Yaesu FT-5100 VHF/UHF transceiver £175.00
Yaesu FT-51R Dual Band Handy £149.00
Yaesu FT-690Rmk2 6m Multi mode £275.00
Yaesu FT-707 HF Transceiver £220.00
Yaesu FT-726R VHF/UHF Base Transceiver £399.00
Yaesu FT-736R 2m/70cm Base Multimode £499.00
Yaesu FT-736R 6m, 2m & 70cm Base £699.00
Yaesu FT-736R Multi- Band Transceiver+6m+23cms £899.00
Yaesu FT-736R"MUTEK" 2m / 70cm 6m/ Base £749.00
Yaesu FT-747 HF TRANSCEIVER £250.00
Yaesu FT-767GX HF, 6m & 2m transceiver £599.00
Yaesu FT-76R 70 cms Handheld Transceiver £99.00
Yaesu FT-7800 2/70 mobile £199.00
Yaesu FT-817 Portable Transceiver £375.00
Yaesu FT-817ND HF 6m VHF UHF 5W Transceiver £379.00
Yaesu FT-840 HF Transceiver £299.00
Yaesu FT-847 Multi-Band Transceiver £849.00
Yaesu FT-8900 Quad Band Mobile Transceiver £279.00
Yaesu FT-890AT HF Transceiver £425.00
Yaesu FT-897D Multiband Portable Transceiver £569.00
Yaesu FT-902DM HF transceiver £325.00
Yaesu FT-920AF HF / 6M Base £749.00
Yaesu FT-990 /AC £899.00
Yaesu FT857 Multiband Mobile £425.00
Yaesu FTV-1000 200 W Transverter £475.00
Yaesu FTV-901R 2m / 6m Transvertor £275.00
Yaesu FV-901DM VFO £175.00
Yaesu MD-1 Desktop Microphone £75.00
Yaesu MD-100 Desktop Microphone £79.00
Yaesu MH-29 Speaker Microphone £49.00
Yaesu MMB-31 Mobile Mounting Bracket £15.00
Yaesu MW-1 Remote Control Mic £60.00
Yaesu NC70 Battery Charger £60.00
Yaesu PA-11C £20.00
Yaesu SP-8 Loudspeaker £89.00
Yaesu SP-901 Loudspeaker £0.00
Yaesu SP-980 Speaker £80.00
Yaesu VR-500 100kHz-1300MHz Scanner £149.00
Yaesu VX-110 2m Handy £79.00
Yaesu VX-1R Dual Band Handy £89.00
Yaesu VX-2E Dual Band Handy £99.00
Yaesu VX-5R Tri-Band Handy £149.00
Yaesu VX-5R Yaesu 6m / 2m / 70cm £149.00
Yaesu VX-7R (Silver) Tri-Band Handy £169.00
Yaesu YH-77STA Lightweight Stereo Headphones £30.00
Yupiteru MVT-225 £149.00
Yupiteru MVT-3300EU Scanner £99.00
Yupiteru MVT-7100 £140.00
Yupiteru MVT-7100 Scanner £149.00
Yupiteru MVT-7300 Scanner £179.00
Yupiteru MVT-9000 MK2 Scanner £249.00
Yupiteru MVT-9000 Scanner £199.00

OR VISIT OUR WEBSITE

www.radioworld.co.uk

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

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

42 Brook Lane
Great Wyrley
Walsall WS6 6BQ

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

A Simple 144MHz Receiver

Oliver Tillett G3TPJ isn't joking and pulling your leg this time readers! Instead, he's come up with a remarkably simple little receiver for 144MHz. It's very effective and would make an ideal club project. Try it and see!

The G3TPJ Simple 144MHz receiver (see text for full description and comments).

I have no doubt quite a few readers have pondered building a piece of v.h.f. equipment but found the prospect of circuit alignment rather daunting. Hopefully, this simple project will help to 'break the ice' and have a go!

The receiver is based on a Motorola MC3362. This integrated circuit (i.c.) is a dual conversion frequency modulation (f.m.) receiver which will work up to 200MHz. The audio output is quite low, so I've added a TDA820 audio amplifier. I have also included a beat frequency oscillator (b.f.o.) and muting arrangements. Facilities are in place for the later addition of automatic scan and dwell tuning.

Basic Block Diagram

Let's start by looking at the basic block diagram, **Fig. 1**. Using the diagram we can see that radio frequency (r.f.) signals enter Pin 1 via an impedance matching circuit. The first mixer amplifies the signal and converts the r.f. to 10.7MHz. This intermediate frequency (i.f.) signal is filtered externally (between Pins 19 and 17) and then fed into the second mixer. Mixed with 10.245MHz from crystal X1 (at in 4) this converts to a 455kHz i.f. signal, and again amplified.

After external band pass filtering (between Pins 5 and 7), the low i.f. is fed into the limiting amplifier and detection circuitry. The coil L2 is the quadrature detector resulting in an audio output at Pin 13.

The r.f. signal levels are monitored and result in a variation of current at Pin 10. By adjusting the value of potentiometer R1, a suitable 'carrier detect' threshold voltage can be created at Pin 11. It's this voltage I've used for muting purposes.

Frequency Alignment

When it comes to frequency alignment and setting up, there are just three coils to worry about. The antenna input coil (L1) consists of just a few turns of wire. And while not critical this can be tweaked for best reception once stations are being received.

With the tuning control at mid position the oscillator coil (L3) must be adjusted to give a local oscillator signal of 134 3MHz, this is the only really fiddly bit. During this procedure it would be handy to have a signal generator or beacon signal available. **Note:** There's a buffered local oscillator (l.o.) output on Pin 20 if a frequency meter or receiver are to hand. This l.o. frequency when mixed with an incoming r.f. signal of 145MHz, will provide a first i.f. of 10.7MHz (r.f. minus l.o. 10.7).

Note: If the coil is adjusted (by mistake) to 155.7MHz a 10.7MHz output will still be obtained (l.o. minus r.f. 10.7). This higher l.o. frequency however, has the disadvantage of being more unstable and inverts sideband signals.

The 10 turn tuning potentiometer may need a resistor in series with it in order that the tuning span is reduced to just the 2MHz range needed for 144MHz.

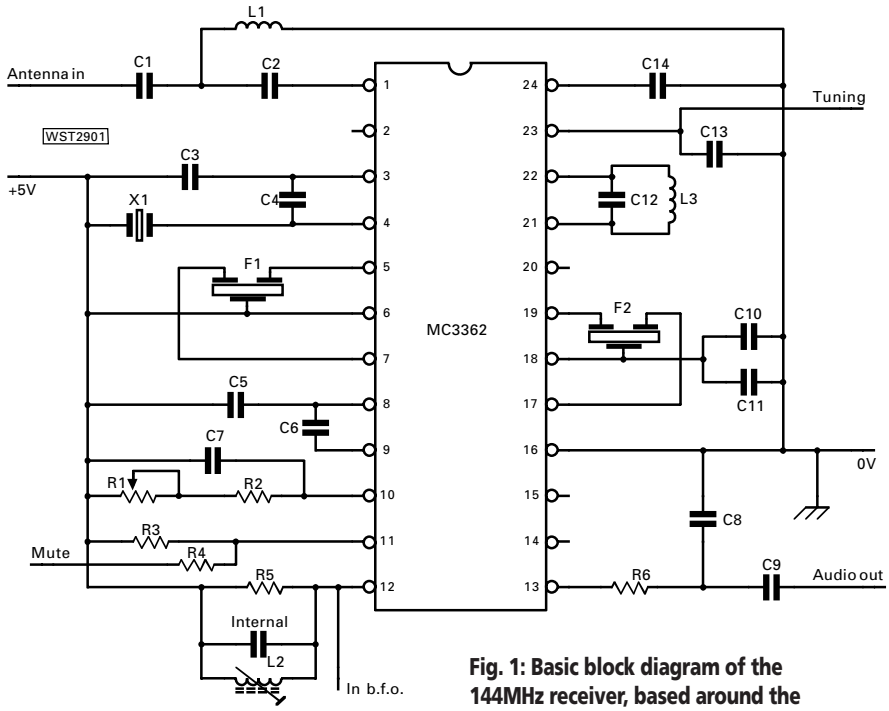


Fig. 1: Basic block diagram of the 144MHz receiver, based around the MC3362 i.c. (see text).

Other Adjustments

Other adjustments include muting: With no r.f. signal present Pin 11 should be 'high' (approx 4.4V). This voltage (via R4) turns on the muting transistor Tr40, its associated relay thus operates. The relay contact drastically reduces the audio signal entering the audio amplifier, the audio being by passed to earth via R30. Whilst Tr40 is conducting the front panel light emitting diode (l.e.d.) will not glow.

Once a signal is received the voltage on Pin 11 reduces causing Tr40 to switch off, muting is thereby removed and the l.e.d. illuminates. The switching threshold needs to be set by R1.

The quadrature detector coil (L2) is easily adjusted for best audio quality and level. The associated capacitor shown in the drawing is included in the base of the purchased coil.

Beat Frequency Oscillator

With a carrier detected the b.f.o. needs adjusting to create a suitable heterodyne. To adjust it, tune to the centre of a carrier, switch the b.f.o. on and trim C20 for a suitable tone. **Note:** The capacitor, C21, may need to be changed between 27 and 56pF.

Practicalities & Stability

Due to the high frequency of the first l.o. (134MHz) mechanical rigidity is important. A wobbly front panel of metal (close to L3) could vary the oscillator frequency every time you touch it! Even then the frequency stability is not perfect, whilst listening to an f.m. station tuning adjustment may be needed after a minute or so. After all it is a simple receiver!

Loudspeaker Choice

Care needs to be taken over the choice of loudspeaker. Before choosing a speaker I like to feed several with audio and compare them in the preferred case. The TDA 820 will use less current when driving a higher impedance speaker and 8Ω upwards is to be preferred.

The physical location of the speaker is important. The magnet in the speaker is also important this is because the magnetic field from the speaker can cause the reed relay to stick in either its on or off position. It's my recommendation that on any equipment check

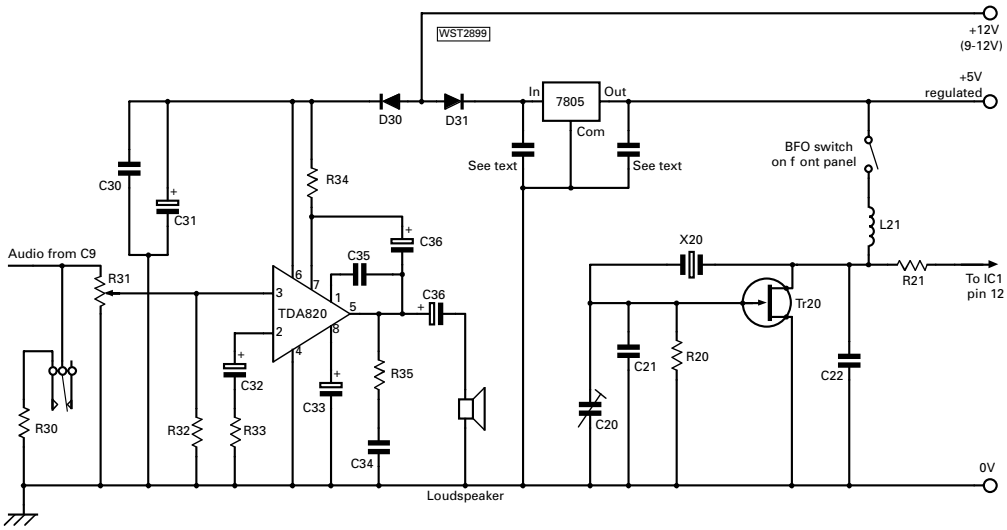


Fig. 2: The audio amplifier used on the 144MHz receiver (see text regarding placement of the loudspeaker unit in the project to negate problems with magnetic fields).

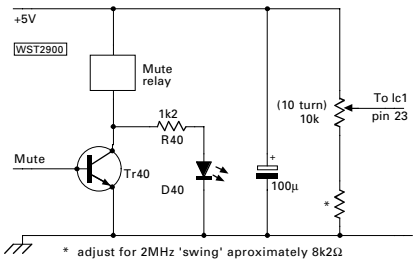


Fig. 3: The muting circuitry used by G3TPJ on the receiver project (see text).

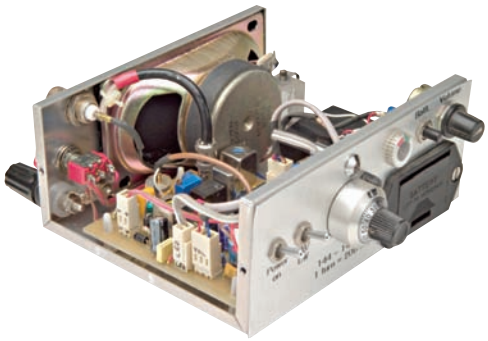
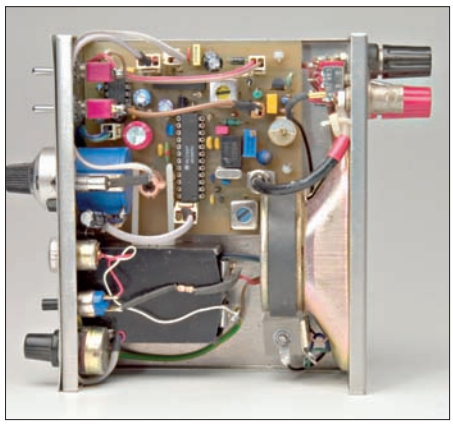


Fig. 4: View of complete project showing loudspeaker (see text regarding field effects on reed relay).

Fig. 5: Looking down on the complete G3TPJ project.



that the operation of reed relays will not be effected before drilling the speaker holes!

Break-through

I built the receiver as my own introduction to the 144MHz band and have only used it with a short whip antenna. However, If a large antenna is used, break through from strong signals outside the Amateur Radio band may occur. This would be due to the lack of a tuned circuit in front of the first mixer. (An external band pass filter could be added if this was to become a problem).

Components & Surface Mount

The integrated circuit was also produced in a surface mount package. I've not checked the availability of this MC3362DW version.

Whilst most components are common enough I offer the following tips. Sycom (who advertise in *Practical Wireless*) will no doubt have most of the parts.

Additionally J.A.B. Components (**Tel: 0121 682 7045**) sell the filters. The MC3362P is available from both the above, as well as Cricklewood Electronics (**0208 452 0161**), Keytronics (**01279 505543**) and *PW* advertiser Bowood Electronics (**01246 200222**).

My final p.c b. size is 3.1 x 2.7 inches (79 x 69mm). For a 1.5 times oversize copy of the track layout, drilling layout drawing and component overlay please send three second class stamps and your address to: To **Oliver Tillett G3TPJ, 27 Cranbrook Drive, Gidea Park, Essex RM2 6AP.** Good luck and enjoy the project! **PW**

Parts List

Resistors (0.25W)		
1Ω	1	R35
47Ω	1	R30
56Ω	1	R34
100Ω	1	R33
1.2kΩ	1	R40
8.2kΩ	1	R6
10kΩ	2	R3, R32
39kΩ	1	R5
51kΩ	1	R2
100kΩ	1	R4
1MΩ	1	R20
3.9MΩ	1	R21
Variables		
10kΩ	1	R31
100kΩ	1	R1
Capacitors		
Disc ceramic		
2.2pF	1	C12
6.8pF	1	C1
33pF	2	C21
50pF	1	C4
120pF	1	C3
220pF	1	C35
1nF	1	C2
Polyester		
10nF	1	C8
0.1µF	6	C5, C6, C7, C11, C13, C14, C22, C31
0.22µF		C34
Electrolytic (16V working)		
10µF	1	C9
47µF	2	C10, C33
100µF	3	C30, C32, C36
220µF	1	C37
Variable		
90pF	1	C20

Semiconductors		
IN4001	2	D30, D31
IN4148	1	D20
7805	1	IC3
BC547		Tr40
MPF102	1	Tr20
MC3362P	1	IC1
TDA820M	1	IC2
Ceramic filter		
CSB455E		X20 (455kHz resonator)
CFW455F		F1
CFSH10.71M	1	F2 (may be marked SKM1 or Taiyo 10912C)
Crystal		
10.245MHz		X1(fundamental, 30pF)
Inductors		
Toko YHCS 17104 GO2		L2 (or Toko YMCS 2A740AAE)
Toko SI 18 series		L3 (red 2.5 turns)
1mH		L20
L1		3 or 4 turns, 3 or 4mm former or self supporting

Relay = Dry reed i.e. Meder SIL12K 100-71D or Hamlin HE3621A0510 or similar with quench diode included, the higher the resistance the better. Molinex PCB connectors were used throughtout with a sub-miniature Belling Lee coaxial PCB connector leading to a rear panel BNC connector.

yaesu

Yaesu FT-817ND Bundles

Bundle 1. FT-817ND 'Vanilla' - Basic FT-817 ..... **Only £399.95**
Bundle 2. FT-817ND + YF-122C 500Hz CW Filter ..... **Only £429.95**
Bundle 3. FT-817ND + YF-122S COLLINS SSB Filter ..... **Only £429.95**
Bundle 4. FT-817ND + SLA-817 100W Amplifier ..... **Only £619.95**

● And don't forget the Miracle Antenna or Miracle Ducker from Canada. Pop this superbly engineered antenna straight on the back of your FT-817 and operate 3.5MHz & 70cm. **Only £109.95**

All ML&S FT-817ND's include 2 Years Warranty, Metal Hydride batteries, charger, mic, etc. Why not add a CSC-83 Carry Case for only £19.95?

FT-857D + ATAS-120 Bundle

Still only £799 for both (Rig only £579)

Yaesu FT-897D Bundles

5-Ways to buy your FT-897! **High Power version of the FT-817. Use as a transportable, (20W) or as a base/mobile (100W)**

Bundle 1. FT-897D 'Vanilla' Basic FT-897 HF-70cm Transportable. ..... **Only £649**
Bundle 2. FT-897D + LDG AT-897 & MP-4128 Rig, LDG Auto-ATU, 22Amp PSU ..... **Only £818**
Bundle 3. FT-897D, FP-30 7 FC-30
The most compact HF base with built-in mains PSU & Bolt-On Auto ATU ..... **Only £849**
Bundle 4. FT-897D, 2 x FNB-72, CD-24 & PA-26
The ultimate HF/V/U system with both batteries, charger & adapter ..... **Only £849**
Bundle 5. Ultimate FT-897D System!
As above but with MP-4128 23 Amp PSU & LDG AT-897 Auto-Tuner. ..... **Only £1039**

NEW!

Stop Press! New! FT-2000
A New 100W HF & 6M Base Transceiver.
Available October 2006. Price TBA. Check out the news page on our website for up-to-date information.

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

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

Yaesu FT-8800 Similar to the FT-7800 but can receive on 2 & 70 simultaneously. **ML&S: £289**

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

NEW!

Yaesu FT-1802E
2m FM Mobile.
5-50W out. Very similar to the FT-2800.
ML&S: £139

Yaesu VX-2E Micro Handie 2/70 with scanner. Complete with Li-ion battery, charger & antenna. **Now only £119.95**

Yaesu VX-6E Latest twin band handie with built-in morse tutor. **£189.95**

Yaesu VX-7R The UKs best selling Triple Band Handie. **ML&S: £219**
or with lapel microphone: **Only £229**

Quadra VL-1000 The easiest way to get 1kW output from any Yaesu HF Transceiver. Plug in 240V, attach rig & antenna and you have a fully automated amplifier with auto tuner. **£Call (always in stock)**

Icom

Icom IC-PCR1500
The latest version of the famous PCR-1000.
The Icom PCR1500 wideband computer receiver connects exte nally to your PC via a USB cable. This provides compatibility with many computer models, even laptops. Incredible coverage is yours with reception from 10kHz to 3300MHz . Modes of reception include AM, FM-Wide, FM-Narrow, SSB and CW. (CW and SSB up to 1300 MHz only).
ML&S Price: £369.95

Icom IC-R1500 **Another new model from Icom Japan.**
Identical to the NEW PCR-1500, the R1500 has the addition of a remote head front panel for vehicle mount. The Icom R1500 wideband computer receiver connects exte nally to your PC via a USB cable. The radio can also be controlled via the supplied control head (with not all functions supported).
ML&S Price: £419.95

Icom IC-7000 see www.ic-7000.com
A full blown mini-IC-756pro111 that you can use in the car or at home. We've all been waiting for this World Class Transceiver from Icom for over a year. In a package no bigger than the original IC-706, Icom have produced a FULL DSP HF/6m/2m & 70cm rig with many many features including a first - TFT Colour Display built into a mobile size radio.
Only £999.95.
If you see it cheaper then call!

Icom IC-7000 Bundle
The New IC-7000 bundled with the IC-5LD TFT 5" Display & a MyDEL MP-4128 compact PSU. (As shown) **Only £1199.85**

IC-5LD **Alternative**

When ML&S looked for a suitable TFT LCD screen to match the new IC-7000 one of the main criteria was 'close-up' definition. Most small 12V screens on the market are designed to work as a 'TV' monitor viewed from 36 plus inches. The IC-5LD was offered because at any viewing distance (including the all-important 'close up'), the 'black' background still appears very 'black', making the image easy on the eye. Compare the one to the right of the IC-5LD and you can clearly see the difference in a screen from a competitor. **You choose.**

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

Icom IC-7400
+ SM-20 + SP-21 + MP-250A
100W HF, 6m and 2m complete with internal ATU - What a package!
New IC-7400 with Matching Desk Mic, Speaker & MyDEL Metered Base PSU.
Only £1349 (Rig only: £Call)

Icom IC-7800mkII **NOW IN STOCK**
The Icom Flagship Base Transceiver just keeps getting better & better. Now fitted with 3 Roofing Filters for even more receiver performance. **On permanent display next to the FTdx9000. Defer payment for 12 months - Interest FREE! RRP: £6400.00**

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

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

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

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

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

NEW Icom IC-E7E **The latest micro Twin Band Handie from Icom!**
2m/70cms. Lithium-Ion battery pack provides long battery life. The stylish appearance is a refreshing change of design in this category. If you want a quality handheld, this is for you.
ONLY £169 in stock now!

kenwood

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

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

TS-570DGE From M3 to G3 the TS-570 still sets the standards in easy to use HF operating.
Whilst most transceivers on the market cover everything including 6/2/70, Kenwood continue to make this excellent HF-Only Transceiver for the serious DX operator.
It offers 100 Watts out (variable) and comes complete with a microphone and DC lead. As the TS-570 has a high speed Auto Tuner already fitted, all that is required is a power supply, (See the new MyDEL MP-4128) and a simple antenna and you're away!

TS-570DGE Bundles
1. TS-570DGE 100W, with Auto ATU & DSP 'Vanilla' **£799.95**
2. TS-570DGE + MP-4218 23A PSU **£859.95**
3. TS-570DGE + MP4128 PSU & MC-60A Desk Mic **£969.95**
4. TS-570DGE + MP4128 PSU, MC-60A Desk Mic & SP-23 Desk Speaker **£1029.95**

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

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

Kenwood TM-D700E The unique 700E is not only a dual-band FM rig but has APRS and TNC built-in.
RRP: £519, ML&S: £439 or 48 x £12.99 p/m

Kenwood TH-D7E
A 2/7- Handie with TNC and APRS capability. **RRP: £359, ML&S: £319.95**

Kenwood TH-F7E 2/70 Handie with Gen Cov RX. If you must have SSB RX on your dual-bander then buy one!
£289.95, ML&S: £219.95

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

SBS-1 Real-time Virtual Radar

Combining state-of-the-art electronics and new technological advances has enabled Kinetic Avionic Products Limited to produce the revolutionary SBS-1.

Key Product Features

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

£499.95 plus £10 P&P

As Reviewed in October 2005 Short Wave Magazine

BS-1100-Kit-A External Antenna

An external Base antenna for far greater range complete with 10m low loss coax.

£110.00 p&p £7.50. (UK Mainland)

ML&S are appointed distributors for the SBS-1 and associated products.
For full details see our website:
www.SBS-1.co.uk
Overseas distributors required
E-mail: **Kinetic@SBS-1.co.uk**

Full range of Palstar now in stock

AT-AUTO

AT1KM Meter 1200 Watt Antenna Tuner..**£289**
AT1500CV 1500 Watt Antenna Tuner **£369**
BT1500A 1500 Watt Double L Balanced Antenna Tuner **£439**
AT-AUTO 1500 Watt Automatic Antenna Tuner **£829.95**
AT4K 2500 Watt Antenna Tuner **£629.95**
AT5K 3500 Watt Antenna Tuner **£829.95**
DL2K 2000 Watt Dummy Load **£139.95**
DL5K 5000 Watt Dummy Load **£279.95**

EMTRON HF Linear Amplifiers

"The Best Built Amplifiers in the World"

DX-1D Cool 1kW, small foot print. **£1699.95**

DX-2 Slightly larger than the DX-1 but offering 1500W key down.....**£2799.95**

DX-2SP Already the most popular of the range, same as DX-1 but a minimum of 2kW output (2500W PEP) **£3199.95**

DX-3 Emtron's "Big Gun" using a GU-78B and producing in excess of 3kW key down. **£4599.95**

DX-4 If you thought the DX-3 is over the top how about the DX-4 producing over 4kW, or run on 3-phase for 5kW! **£6399.95**

New! Sommerkamp Linear Amplifiers

New to ML&S, for the full range see our web site under "Amplifiers".

SLA-300
1-8-30MHz Linear Amp, up to 300W output 2-15W drive. Band-Pass filters for each band. **Only £299.95**

SLA-817 Designed for the FT-817/IC-703 offering100W output.**Only £229.95**

SLA-50V/U
Ideal for any dual band Handie/mobile or base, DUALBAND (2/70) .5-20W I/P 50-100W PEP LINEAR AMPLIFIER. **£229.95**

SLA-200
Increase your 2m output! 1-50W I/P 60-250W-PEP 2M LINEAR AMPLIFIER. **£229.95**

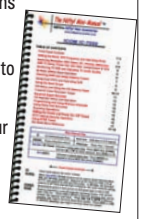
SLA-517 More power on 6M. 6M 1-10W I/P 50-100W PEP LINEAR AMPLIFIER. **£199.95**

Nifty Equipment Manuals

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

Mini-Manuals are fully laminated and spiral bound booklets, 4.25 x 8 inches, providing simplified step-by-step instructions for all your radio's features.

These short-form manuals are smaller, more durable and easier to use than manuals normally supplied with a radio. Compact - small enough to be kept with your transceiver. Very rugged.



Quick Reference Cards are designed as a three-page foldout the size of a credit card for easy carrying in a wallet or purse.

See our web site under "Books"

Have you any USED HAM RADIO EQUIPMENT FOR SALE?

- Not only do I pay the most for quality gear, I can arrange collection and pay either cash or credit direct onto your Debit Card.
- My company has an excellent reputation because we are trusted - that goes a long way in this day and age.
- If you have any Amateur Radio equipment, however small or old, we're interested. From SWR meters to the top of the range Base Station, the transaction will always be the same.... **top price and treated professionally**.

73 Martin G4HKS

Apply now for your very own ML&S Store Card

Conditions Apply

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

ML&S martin lynch & sons

Suppliers of Communications Equipment

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

Tel: 0845 2300 599
FAX: 0845 2300 339 local call numbers

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

Open 6 days a week, mon-sat 9.30-5.30

New product!

MyDEL CG-2000 Remote ATU.
A simple to use remote end-fed wire ATU for 160m - 10m

Working frequency:	1.6-30 MHz (50 MHz not guaranteed)	
Input impendence:	50 ohm	
Max. input power:	150W PEP	
Min. input power:	10W (5-15W)	
Power supply:	13.8V +/- 10%	
Current drain:	< 0.8 A	
Auto tuning time:	Approx. 2 sec. (first time tuning)	
	< 0.5 sec (return to memorized frequency)	
Memory channels:	150	
Usable wire length:	6" 30 Mhz	> 2.4 meters
	1.6" 30 Mhz	> 8 meters

NEW!

Only £149.95!

Ten Tec Orion 2

At last! The new Orion 2 has arrived. Using mode appropriate crystal roofing filters & IF-DSP as part of the main receiver, the new Orion 2 is still in a league of its own. For full details see: **www.hamradio.co.uk/orion2.shtml**

NEW!

TenTec 566AT Orion 2 with internal ATU.....**£3599.00**
TenTec 566 Orion 2 without ATU.....**£3349.00**

LDG Tuners & Accessories

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

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

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

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

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

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

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

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

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

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

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

NEW PRODUCT!

FT-Meter. External meter.

Add-on analogue meter for the FT-857 and FT-897. Just plug & go! Enables you to read signal strength. Discriminator, power output, s.w.r., ALC etc. **£39.95**

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

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

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

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

, Miracle Antenna, Hustler, Tokyo-Hypower, Tom Tom, Diamond, Yaesu, Palstar & Comet and many more

ML&S martin lynch & sons

Suppliers of Communications Equipment

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

Tel: 0845 2300 599

FAX: 0845 2300 339 local call numbers

Web: www.hamradio.co.uk

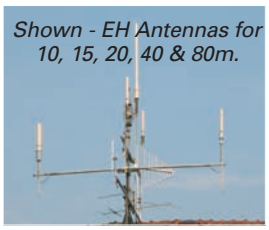
E-mail: sales@hamradio.co.uk

Open 6 days a week, mon-sat 9.30-5.30

MyDEL ML-S Hands Free Mic

Complete system for Yaesu, Icom & Kenwood transceivers.

The New MyDEL ML-S Mobile Microphone with gooseneck boom fits under the sun visor hinge. Features a PTT remote control with rubber O-Ring for connecting to gear lever. Unit is powered from transceiver. Includes FREE connecting lead to your rig. **£39.95**



Small Garden? No Garden?

arno elettronica EH ANTENNA

Install an EH Antenna for HF today.

Available for any band 10m-160m. All antennas are beautifully built and pre-tuned at the factory. Supplied with fixing clamps & clear installation instructions. Easily fine tuned with outer ring sleeve. You will be totally amazed at how well they work. No ATU required. Just plug-in and work!

Cobra 10,12,15,17,20. All 90cm long, all 500W RTTY/AM ..... **All £105.00 each**
Cobra 30 &40 Both 1kW, 93cm long, both 500W RTTY/AM ..... **Both £105.00 each**
Venus 80, 155 (1.913 - 1.930) **& 160** (1.830 - 1.850). All 2kW, all 248cm long (500W RTTY/AM) ..... **All £179.00 each**

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

Miracle Antennas

Miracle Whip Others try & copy it but never quite get there. **£109.95**
Miracle Ducker Like the Miracle Whip but has BNC socket in lieu of whip to connect random wire. **£109.95**
Miracle Ducker IL Latest model! Identical to Ducker but has BNC plug for mounting instead of PL-259. **£109.95**
QPAK The best QRP ATU money can buy. **£149.95**

Daiwa Meters

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

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

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

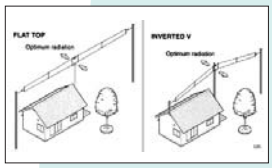
Daiwa CN-801:V SWR/PWR Meter 140-525MHz
Power range: 20/200W ..... **ML&S only £119.95**

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

Tigertronics Sound Card - Radio

For all available Digital modes, the SignaLink SL-1+ also supports the latest Voice modes such as Internet Repeater Linking (EchoLink, VOIP, etc.), Remote Base, and Voice Keyer operation. Tell us which rig you have and we will supply you with the correct leads. **£69.95** **Extra leads from £14.95**

New! Icom IC-AH710 Broadband Antenna



The ICOM AH-710 preassembled multi-band, commercial-grade folded dipole is designed to get HF operators owners on the air fast. No ATU required. Covering all amateur bands from 1.9 to 30 MHz [VSWR < 2:1 1.9-18 MHz, VSWR <2.5:1 18-30 MHz]. It is 80.3 feet (24 m) long and can handle up to 150 watts. The AH-710 can be installed as a Flat Top or an Inverted-V **£199.95** **(RRP £319)**

Buddipole Portable Antennas

Antenna Mounting Hardware from

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

W3-BP DELUXE
The complete package from Buddipole..... **£354.96**

see web for full range

Miniature Palm Keys

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

Full range of Kent Keys now available!

Hustler 6-BTV Only £229.95

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

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

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

MyDEL Power Supplies 2-Year Warranty

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

MyDEL MP-250A Only £89.99

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

MyDEL MP-4128 Only £69.99

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

Why pay more for the same unit?

Yaesu FP-1030A £179.00

A power supply for Life? Probably. 25-30 Amp, linear (not switch mode), 2 year warranty & FREE UK mainland carriage.

New! W-45XM & W-65XM

Two heavy duty Switch Mode PSU's very silent and massive current supply. Ideal for our range of Sommerkamp HF/VHF Amps.

W-45XM 45A (peak) 38A (cont) **£129.95**
W-65XM 65A (peak) 58A (cont) **£179.95**

MFJ PRODUCTS AT LOWER PRICES

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

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

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

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

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

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

MFJ-949E 300 Watt Antenna Tuner. More Hams use MFJ-949's than any other antenna tuner in the world! Why? Because the world's leading antenna tuner has earned a worldwide reputation for being able to match just about anything. **£124.99**

MFJ-974H 160 Thru 6 Meters Balanced Line Antenna Tuner. The MFJ-974H is a fully balanced true balanced line antenna tuner. It gives you superb current balance throughout its very wide matching and frequency range. **£159.95**

MFJ-993B 300 Watt IntelliTuner Automatic Antenna Tuner. The MFJ-993 IntelliTuner lets you tune any antenna automatically balanced or unbalanced - ultra fast. It's a comprehensive automatic antenna tuning center complete with SWR/Watt-meter, antenna switch for two antennas and 4:1 current balun for balanced lines. **£209.95**

MFJ-994 Similar to 993 above but 600 Watts. 1.8-30MHz, Auto ATU **£269.95**

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

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

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

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

E&OE.

Antenna Workshop

A T-Lambda Antenna For 430MHz

John Heys G3BDQ, shows you how to make a simple vertically polarised wide-band antenna for the 430MHz band.

One of the antenna designs that appeared in Volume three of the ARRL *Antenna Compendium* is the T-Lambda antenna. This antennas design was developed by **Robert Wilson AK7KK** a professional antenna planner for Broadcast Stations.

During 1995 I constructed an antenna using his design data for the 144MHz band, that proved to be very successful. And the model I constructed then, still hangs from a beam in my loft. The T-Lambda (Tλ) is a vertically polarised 'skeleton' version of the well known Discone antenna. Like the Discone, this antenna's very broadband and can be made for the v.h.f. and the h.f. bands easily. The T-Lambda type of antenna is smaller than equivalent ground plane antennas, as well as only needing just two sloping radials.

At the Tλ's feed point the impedance is a convenient 50Ω, and when the antenna is designed for the centre frequency of a particular bend it displays an almost level s.w.r. figure right across that band and usually has an s.w.r. of around 1.3:1 or better. So, there is no need to use an a.t.u. or extra matching network.

About a year ago I acquired a new transceiver, which will operate on all the h.f. bands and additionally covers the 50, 144 and 430MHz bands. Having no wish to chase DX on 430MHz, I just needed a small but efficient antenna for local and repeater f.m. work.

Because of my complete satisfaction with a loft located Tλ for 144MHz that I'd constructed earlier, I decided that I'd make a version for the 430MHz band. Again I used AL7KK's design figures and very soon had my tiny version of the T-Lambda antenna up and running.

The photograph shows the completed antenna clamped to a small diameter fibre-glass pole and it is actually positioned inside my upstairs shack. The picture may look a little 'artificial', as I have painted the thicker vertical and horizontal elements with a matt finish coat of the mat-black paint that's supposed to be for refurbishing (or making) blackboard. I did this to make them show up more clearly in the photograph only, there's no need to copy this.

The T-Lambda fixed atop a two and an half metre pole. Its small size is obvious from the QSL cards in its vicinity.

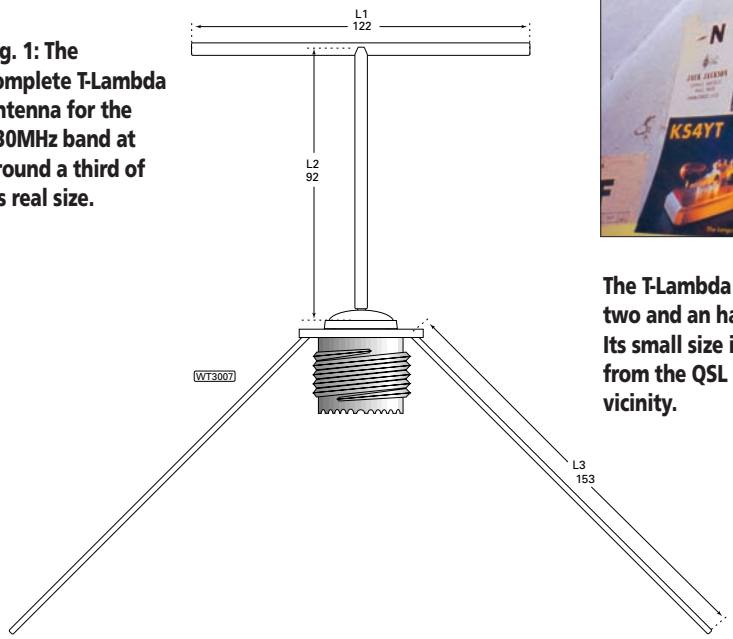


Fig. 1: The complete T-Lambda antenna for the 430MHz band at around a third of its real size.

Antenna Heart

The heart of the antenna is an SO-239 coaxial socket that is shown in **Fig. 1**. I decided to build a make myself a sturdy version of the antenna so, used thin 4.5mm (3/16in) diameter copper tube for the T that's marked as L1 and L2 (see Fig. 1). The sloping radials are made from stiff 2mm (14/16s.w.g.) copper wire, which may be either enamelled or bare.

By using copper tube for the vertical L2, the

bandwidth of the antenna will be wider than when a vertical wire is used. The tube also simplifies the soldered connection to the central spigot of the SO-239. The horizontal to bar L1 performs like the top of a centre fed Marconi 'T' antenna and is there to give top loading but not to radiate. the antenna currents on either side of the centre point will cancel out which almost eliminates the reception and transmission of horizontally polarised signals.

A high wattage soldering iron or a gas iron will be needed to solder the copper tube, an operation. This is perhaps the only tricky part of the construction work.

Just two sloping (at 45°) radials, (labelled L3) are required and their upper ends are soldered to opposing corner holes in the square base of the SO-239 coaxial socket. It is best to give the area around these holes a good 'going over' with a file, both top and bottom before attempting any soldering.

The 50Ω coaxial feeder should run down vertically and be equidistant from the radials until it is well below them. By doing this there will be no need for a current balun (clamp-on or coil) to prevent r.f. running down the outer surface of the coaxial copper braid.

A thin nylon or similar insulated chord may be attached to the centre of the horizontal top of the antenna if it is to hang from a beam or something similar. My version instead uses nylon cable ties to clamp the SO-239 socket to the top of my non-metal pole.

Setting Up & Testing

Using low power, say, five watts, the antenna can be tested in the shack and checks made of the s.w.r. ratios over the whole band. A small change in the 90° angle between the sloping 'radial' wires can be made to achieve the best s.w.r.

The reading can be brought down to be close to unity, although the difference in signal reports between unity s.w.r. and a slightly worse figure of 1:1.3 is negligible. Should the antenna be positioned out of doors it must be thoroughly moisture proofed. A liberal covering of the coaxial socket with a silicon-rubber sealant with the sealant applied over the position where the coaxial cable enters the PL259 plug would prevent moisture ingress to the feeder.

It is said that 'height is everything' when discussing antennas, and this is no doubt true when considering antennas for v.h.f. My 430MHz Tλ was not located in the loft for there were already enough wires antennas up there. Also, at my age clambering up and into the roof space is not something undertaken lightly or too often!

With the antenna positioned in my shack the construction of the house means that where the T-Lambda is positioned it can fire right through some QSL cards and the external roofing slates. With just a few watts I can receive a huge signal from the repeater at Charing, Kent, some 26 miles from my QTH and have no difficulty in working through it. My local repeater is about 4km (1.5 miles) away and despite an intervening hill is a tremendous signal at all times.

Other Bands

The reader may be inclined to make a T-Lambda for the 50 or 144MHz bands, and if this is the case copper wire can be used for L1 and L2 (Fig. 1). This will reduce the antenna's weight with little effect upon its performance. Here are the dimensions:-

50.1MHz L1 = 1.061m L2 = 0.794m L3 = 1.329m
145MHz L1 = 0.366m L2 = 0.274m L3 = 0.459m

My earlier article concerning the T-Lambda antenna was published in *Practical Wireless* in 1996 and was part of the Antenna Workshop (*Antennas To Go*) and described the construction and use of T-Lambda antennas on the h.f. bands.

The T-Lambda designs for h.f. antennas are easy to make, effective, and require just a couple of end support masts to hold up the horizontal wires. **PW**

Churchill's Radio?

Churchill's Radio - an April Fool spoof or was it a case of PW being hoaxed? Oliver Tilllett G3TPJ perpetrator of the 2006 traditional April spoof reveals all! And in introducing our loker - the PW Editorial staff confirm Oliver's joke brought a large response (see letters pages) - and a number of readers thought the magazine had been well and truly hoaxed!

The not-so-old 'Wartime' radio built by G3TPJ. Despite Oliver's admission of the April Fool spoof - he confirms that case is made from a wartime Australian cheese box!

Oliver Tillett G3TPJ writes: Hopefully you were intrigued by my 'spoof' letter in the April issue. And I can confirm everything was true except references to the receiver itself! The case was indeed made from a Second World War crate marked 'Australian Cheddar Cheese', the set however, is much more recent and smaller than first appears!

Always looking for something to build I embarked on this miniature 'valved radio'. It stands just eight inches high and as some of you guessed the valves are made from shortened test tubes, filled with kitchen foil for a metallic effect. These, with the various coils and screening cans are simply glued to the chassis. Even the loudspeaker transformer is just for show, although the Editor tells me a

number of you spotted the modern loudspeaker!

Works Well!

Although most of the components visible are non operational, the set does work and rather well. This is thanks to the little printed circuit board (p.c.b.) under the chassis. The circuit is quite straightforward, and with a little though you too could have fun producing something similar.

Editorial note: *I can vouch for the fact the receiver works well as Oliver tried to fool me with the project when I visited him last summer. However, what gave the game away for me was the modern loudspeaker and the rapidity of the set coming on after initial power was applied. I must admit though it had me fooled for a few moments. It's a working radio and great joke hence the April Fool spoof!* ***G3XFD****.*

Making The Case

The case can be made from any old pieces of wood (floor boards, orange boxes, etc.). To help form some nice curves I used 'Quarter Round Beading', a rod of this is often used to hold the edge of linoleum down against a wall.

Once the case was nailed together, a walk to the model shop was called for. Here I bought a thin sheet of Balsa wood, which was to act as a veneer. The strong winds on the way home reduced the size of my sheet several times! The 'veneer' was cut to shape and glued over my rough woodwork, a wood stain was then applied. For the rear panel I use a piece of plastic from an old loudspeaker grill.

The Chassis

My steel chassis was actually part of an old oscilloscope sub assembly. Fortunately, I rarely discard anything, this was just what I needed!

On top of the chassis I mounted the tuning capacitor. A front plate fixed to the chassis holds the speaker and pulley wheels for the cord operated dial pointer.

For the front plate I glued a paper dial for the four frequency bands covered. These are visible through the Perspex® window above the loudspeaker aperture.

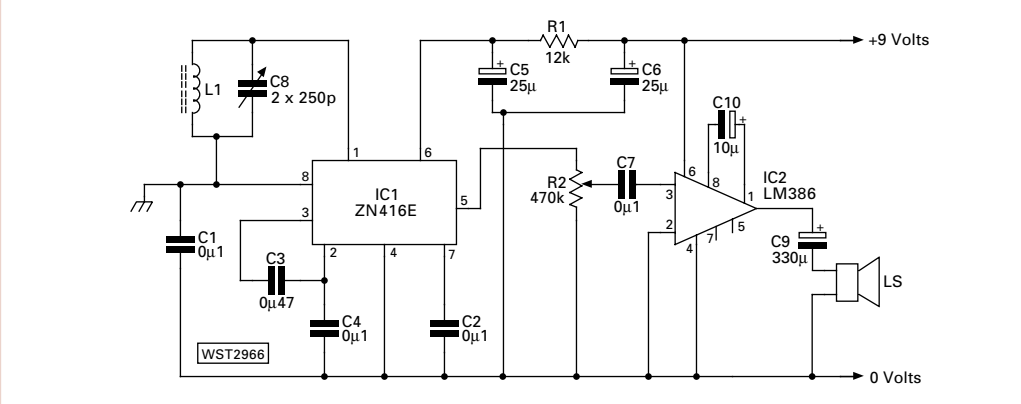


Fig. 1: The ZN416E one chip t.r.f. radio that can be disguised to look like an elderly reciver! (see text).

Our old family Murphy radio had a rotating drum behind its glass window, this carried all the station names. In my version the drum is a Balsa veneered plastic tube, inside which my ferrite rod antenna is hidden.

For the short wave I put a three turn loop antenna in the roof of the box. The two white wires to the right of the picture are the feeds from these two antennas. To assist chassis withdrawal the loop antenna feed passes down through a coil and plugs into a chassis connector. This coil (not being glued in place) can simply be lifted to gain access to the connector. The mains cable in the photograph is a dummy as the set is driven by a PP9 battery!

Circuit Description

By now I expect that many of you will have guessed that IC1 is the ZN416E (the 8 pin DIL version of the ZN414) very sensitive tuned radio frequency receiver that feeds low level audio via a logarithmic volume control to IC2. In IC2E the audio drives the loudspeaker and increases the normal amplification by about 100 times.

The antenna signal is fed into IC1 pins 1 and 8. Pin 8 is coupled to earth via C1, thus Pin 1 is the 'live' end of the antenna signal.

The tuning coil should be wound on a ferrite rod and the leads from the tuning capacitor (C8) to p.c.b. kept as short as possible. C2 and C4 decouple internal signal parts to earth whilst C3 trims audio quality. The receiver (IC1) needs only 1.3V to work thus the 9 Volt supply is reduced through R1 to achieve this.

The Antenna

The antenna, L1 can be wound onto a card former, then when completed it can be slid up and down the ferrite rod and set for optimum sensitivity. I suggest you try 80 turns to start with.

Once the medium wave has been catered for, turns can be added or a second longer coil made for long wave. Frequency is increased by reducing turns on the coil. Using different coils and taps selected by a band switch (this method avoids the complications and damping effects of different coils on one antenna rod) my set covers:

Long wave	160 270kHz
Medium 1	600 1350kHz
Medium 2	1.3 2MHz
Short Wave	5.3 9.1MHz

PS: If you really want to 'spoof' people don't forget to mark the dial in the old style kilocycles and Megacycles per second (Mc/s)!

Tuning Capacitor

Both gangs of the tuning capacitor are only used for the 'Medium 1' band. For the short wave the loop antenna is used. Short wave stations become particular strong at night whilst the medium and long wave should be strong all the time.

Editorial note: *The original ZN414 specifications sheet (the Ferranti version, the late lamented company who developed the i.c.) points out that the sensitivity of the 10 transistor receiver drops off dramatically above 2MHz. However, in practice this remarkable little chip works extremely well up to 7MHz and is still effective at 9 to 10MHz. However, selectivity on the crowded 49 and 31 metre broadcast bands is a an enjoyable reception challenge!* **G3XFD.**

Note: To increase sensitivity an external wire antenna can be added. This would need a couple of turns wrapped around the ferrite rod before connecting to the chassis.

Such a receiver can be fun it can puzzle non radio types very easily and prove to be fun to build. But I advise you not to try to sell it as a vintage receiver! **PW**

Parts List

Capacitors	Resistors
C1 0.1µF ceramic	12kΩ 0.25 Watt
C2 0.1µF ceramic	R2 470kΩ Log (volume)

C3 0.47µF ceramic or poly
C4 0.1µF ceramic
C5 25µF 16V electrolytic
C6 25µF 16V electrolytic
C7 0.1µF ceramic
C8 2 x 250pF air spaced for tuning
C9 330µF 16V electrolytic
C10 10µF 16V electrolytic
C1 ZN 416E
IC2 LM 386
Loudspeaker, 8 to 16Ω, Ferrite rod, Switches, knobs, etc.

Valve & Vintage

Ben Nock G4BXD welcomes readers back to the vintage spot in PW and continues his discussion on the Second World War American Command' equipment.

A big hello once again from the 'Kidderminster collection'. Hopefully, by now the weather is getting better and the rallies are flowing freely! In this month's column I shall be concluding the Command Station project started in the February issue. So, let's go to it!

The Command equipment transmitter is screen grid modulated. The screen voltage is set at about half of that for keyed continuous wave (c.w.) operation for telegraphy, and the modulation swings the screen voltage up and down - modulating the carrier in the process. The amount of modulation power required is quite small. In the original unit a single 1625 valve was used and around 5W of audio is more than enough. I could have gone for full anode and screen modulation but it's just a matter of how original you want to make the system.

A simple, single-ended output stage with suitable transformer coupling could have been used. However, the presence of a Woden UM1 transformer on my spares shelf lent itself to producing a slightly higher power modulator which could also be used for other applications.

A search of the valve stock produced a couple of 6BW6 type output valves which are listed as giving 15W of audio for a 300V high tension (h.t.) supply. This was far in excess of what was needed but I felt the extra audio might prove useful in other applications at a later stage. (Of course, if you were going to build a unit solely dedicated to this transmitter then a smaller unit could be constructed).

The circuit diagram, **Fig. 1**, and that of the modulator are quite straight forward, and is taken from the RSGB *Handbook* of many years ago (the diagram is copyright of the Radio Society of Great Britain and are reproduced with their kind permission). It's a simple crystal microphone pre-amplifier using an EF86 or similar, a splitter section, 12AT7 for example, and a pair of output valves.

None of the components are too critical, I used 2.7kΩ for 3.3kΩ, 180kΩ for 220kΩ, 0.005µF in place of 0.01µF and what ever small electrolytic I had to hand. In fact, after construction I found that by connecting the crystal microphone directly across the microphone gain potentiometer, and by removing the EF86 there was more than enough audio to modulate the set.

Around 310V h.t. should be applied to the anodes if using 6BW6, other valves may need a different voltages for best results. There are numerous types that could serve in this role and choice could lie with your existing valve stock.

Another double-pole switch, SW2, in **Fig. 2**, is used to apply power to the modulator. It's used to switch the screen grid of the transmitter between a fixed voltage and the output of the modulation transformer. The original plug connection wiring details are shown in **Fig. 3**.

The Receiver

There are no real modifications that need be done to the receiver. Any poor de-coupling capacitors can be replaced of course. Despite its age the Command receiver boasts quite a nice bit of design and construction.

The audio output of the receiver is wired for 8kΩ, or high impedance headphones. There is provision on some sets to set this to a 600Ω output. Either way a standard valve output transformer wired across the output then feeding a low impedance speaker, is the basic solution.

The receivers were designed to be operated remotely, that meant the radio operator's position in the aircraft was apart from the set and a remote control box was used. In most of the sets available today though, previous owners have already fitted the required controls in the space below the main tuning dial. These consist of a volume control and a switch for the b.f.o. line.

Comments from other Command receiver

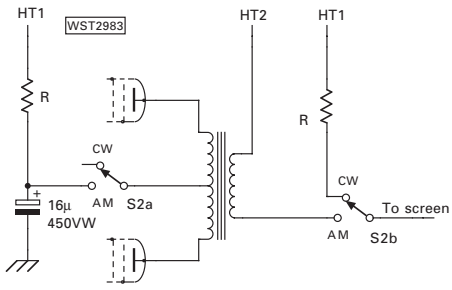


Fig. 2: The a.m./c.w. switching (see text).

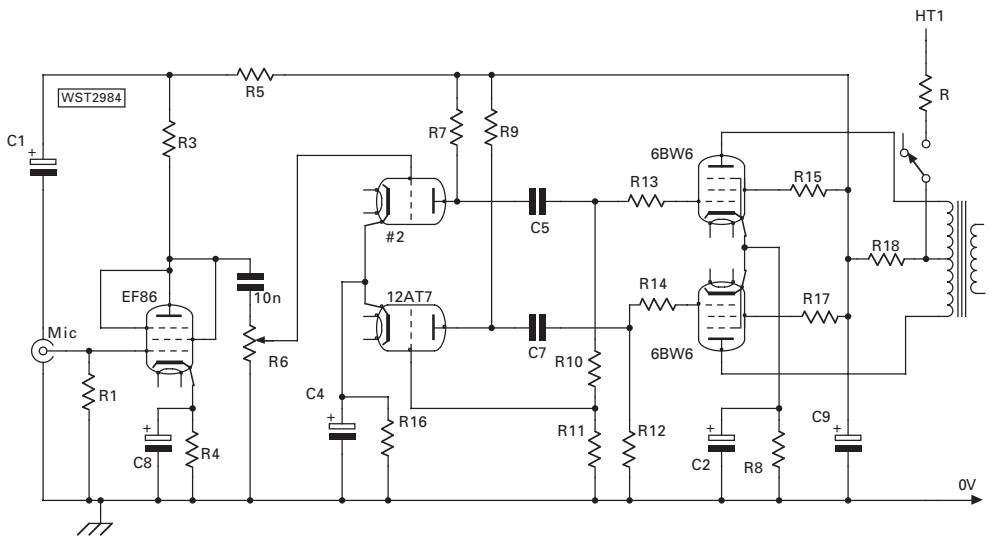


Fig. 1: The circuit diagram, is quite straight forward, and is taken from the RSGB Handbook of many years ago (the diagram is copyright of the Radio Society of Great Britain and are reproduced with their kind permission). It's a simple crystal microphone pre-amplifier using an EF86 or similar, a splitter section, 12AT7 for example, and a pair of output valves (see text).

users on the air included the complaint of their selectivity is being "as wide as a barn door". And suggestions that narrow i.f. filters should be fitted. While this is an option it does somewhat distract from the originality of the set in my opinion.

Transmitter Modifications

As few modifications as possible were carried out on Command transmitter. Of course, restorers could do all sorts of clever things to the set to make it 'better' - but a line has to be drawn where originality ends and a total rebuild begins.

I replaced several capacitors, due to their age and conditions rather than design considerations. Next I added a few extra decoupling capacitors to the oscillator h.t. rail and the power amplifier (p.a.) heaters.

The only real modification was to the output circuit. In original use the radio frequency (r.f.) output was taken via a rotating link coil inside the tank coil, and then a small roller coaster inductor was used to match the trailing wire antenna in the aircraft. These small roller coaster coils have invariably corroded and tarnished over the years and it's quite unlikely they would really be needed.

During testing of the transmitter in the c.w. mode, I found that a greater output could be obtained into the dummy load if additional coupling was added. A 4-turn link of well-insulated wire was then added in series with the rotating coupling link on the 3.5MHz set, 2-turns on the 7MHz versions, and wound around the base of the tank coil. This increased the output considerably and loaded the transmitter to around 50W of r.f.

Then I shorted out the roller coaster and - as a previous owner of the 3.5MHz set had already fitted an SO239 socket - I then modified the set so the output of the link was taken directly to the socket. The 7MHz transmitter still had its original antenna connector so, I connected the extra link to this.

On The Air

The receivers perform very well on the air and for such a simple little set it really is amazing how well they work. Tuning is very smooth and the beat frequency oscillator (b.f.o.) while its injection may be a little low, is fine for resolving c.w. and single sideband signal (s.s.b.) signals.

In the original role the Command set simply had a single connecting wire between the two or three antenna terminals. The system included a small box with antenna changeover relay and an r.f. current meter.

I found that the adjustment of the screen voltage when operating on amplitude

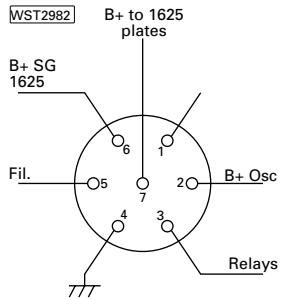


Fig. 3: The connections to the original transmitter (see text)

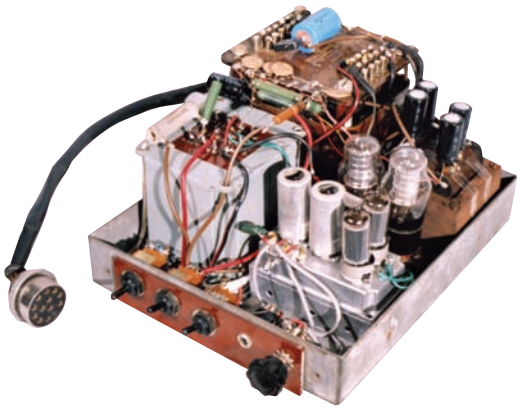


Fig. 5: The finished power supply modulator with matching rack connector.

modulation (a.m.) affects the quality of the transmitted audio. The voltage should be around 200V and the audio gain on the modulator is increased to the point where a slight flick of the p.a. current can be seen. Use of visual indicator, oscilloscope or signal monitor for example, greatly simplifies the setting process, the audio being adjusted while you're observing the modulation envelope.

On using c.w., the full screen voltage of 400V is applied, and the set is keyed via the relay in the oscillator and p.a. cathode. It's worth mentioning that, having tried several transmitters in my rack, you may find it's like a lottery - luck being required - regarding the quality of the c.w. note.

However, one transmitter here in my collection was near perfect, no chirp and had a good keying shape! Another transmitter proved very poor, with a jumpy signal, moving in frequency on each keying stroke.

Note: As the chassis of these sets is made from very thin aluminium, the rigidity of them leaves a lot to be desired. Using the Command set in its rack does help this but it has to be wondered just how they sounded when used in bombers running four massive engines and being pounded by anti-aircraft flack. Probably no one really cared about a T9 note in those days!

This project, the finished items are shown

Fig. 4: The modulator sub chassis built on small Eddystone diecast box.

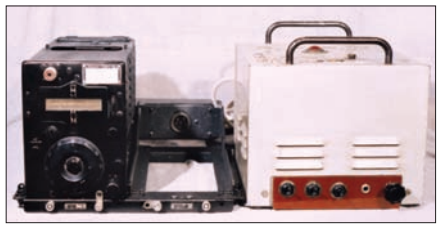


Fig. 6: The transmitter rack and power supply.

in **Figs. 4**, **5**, and **6**, has shown me though that a very simple and well thought out idea does work, even 60 years on. These small, lightweight sets can still be used, are very reliable and it's obvious why they proved so popular with Radio Amateurs after the Second World War.

I have an interesting book that details the many modifications to the the Command sets. Many of these comprehensively detailed mods have appeared in the American *CQ* magazine over the years. There's even mention of running the transmitter at 800V with 200W input, providing 100W of r.f. The Command sets really were versatile.

My Thanks

My thanks to **Ray Robinson** for permission to use extracts from his very detailed article on the Command sets, which can be found at:
http://www.shlrc.mq.edu.au/~robinson/museum/command.html

Finally for this time, I can report that it's been a good winter period here in Kidderminster, with many new additions to the collection to bring you in future issues. Included in the list there are a nice German Second World War transmitter, a Russian man-pack set, and even a Chinese station - so watch this space!

As usual I can be contacted via E-mail at **military1944@aol.com** or via the post a**: 62 Cobden Street, Kidderminster, Worcestershire DY11 6RP**. You'll find photographs of other sets at **www.qsl.net/g4bxd**. I look forward to being with you again real soon. Cheerio. **PW**

ICOM

VHF/UHF DUAL-BAND FM TRANSCEIVER

IC-E7

stylish

compact

lightweight

and...

desirable

Icom UK Ltd. Sea Street, Herne Bay, Kent CT6 8LD.
Telephone: 01227 741741. Fax: 01227 741742.
e-mail: sales@icomuk.co.uk website: www.icomuk.co.uk

Count on us!

WEB DIRECTORY

Rocket Radio
E-mail: sales@rocketradio.net
www.rocketradio.co.uk

Nevada
E-mail: sales@nevada.co.uk
www.nevada.co.uk

Waters & Stanton
E-mail: sales@wsplc.com
www.wsplc.com

LAM Communications
E-mail: sales@lamcommunications.net
www.lamcommunications.net

To advertise here call
020 7731 6222

Sycom

P. O. Box 148, Leatherhead
Surrey KT22 9YW

Phone 01372 372587
Fax 01372 361421

Robin G3NFV

Toroids, Ferrites and Toko

Try us for:
- Resistors
- Capacitors
- Switches
- Semiconductors
- Cable connectors
- and much more

COMPONENTS AND AMATEUR RADIO EQUIPMENT PURCHASED

E-mail: robin@sycomcomp.co.uk
Web: www.sycomcomp.co.uk

PCP Technologies

Made in the UK for Radio Amateurs

THE TRANZMATCH-R
3.5MHZ - 30MHZ BALANCED/UNBALANCED
1KW AERIAL MATCHER WITH PWR/VSWR METERING INCORPORATED
for all aerial systems (wires, doublets, G5RV's & dipoles)
full details at www.aerialmatchers.co.uk
Unit 3A, Knightsbridge Business Centre, Cheltenham GL51 9TA
Tel: 01242 680979 Fax: 01242 680068

We're here to make advertising better.

(Not to make better advertising. Sorry.)

Here at the Advertising Standards Authority, we judge ads on whether they're harmful, misleading, or offensive. Not on whether they're funny, clever or they look good. Which is just as well, really.

Telephone 020 7492 2222 www.asa.org.uk

ASA
Keeping advertising standards high

JOHN'S RADIO ELECTRONICS TEST AND COMMUNICATION EQUIPMENT

LARGE QUANTITY SALE EX-MOD

MARCONI TF2019A Synthesized signal generators. 80kHz to 1040Mc/s - AM, FM - high class with many functions - £285 each.
HP COMMUNICATION TEST SET 8922M 10 to 1000Mc/s + GMS 83220E converter 1710 to 1900Mc/s. DCS, PCS, MS - £500.
HP COMMUNICATIONS TEST SET 8922M OPT 010 (Dual) etc. - £750.
TEKTONIC 2445A OSCILLOSCOPE 150Mc/s four channel - £300.

ALL UNITS PRICED EX WORKS WITH INSTRUCTIONS - TESTED, BASIC WORKING. CARRIAGE AND PACKING IF REQUIRED, EXTRA.

Phone for appointment or to request items lists, photos, site map. All welcome. Private or trade for sales, workshop repairs or callibration.

Please contact Patricia at Smithies Mill, 885 Bradford Road, Birstall, Batley WS17 8NN.
Phone 01924 477377
Web site: www.johnsradio-uk.com www.johnsradio.com

QSL COMMUNICATIONS

TELEPHONE 01934 512757
E-mail: jayne@qslcomms.f9.co.uk

ICOM IC-7000

Small compact all mode transceiver. Colour TFT display. Full function hand microphone. Digital IF filters, IF DSP.

KENWOOD TM-D700E

2m/70cm Dual band mobile with APRS

OPEN DAY
SUNDAY MAY 21st
KENWOOD, YAESU, ICOM DISPLAY STANDS AND TALKS ON NEW RADIOS

YAESU FT-DX 9000

Paul Bigwood from Yaesu will be demonstating and giving a talk on this radio at our OPEN DAY.

SPECIAL OFFERS ON MOST RADIOS PURCHASED OR ORDERED AT OUR OPEN DAY.
MAP ON WEB-SITE www.qsl-comms.co.uk

Carriage charge dependent on items

UNIT 6, WORLE INDUSTRIAL CENTRE, COKER ROAD, WORLE, WESTON-SUPER-MARE BS22 6BX **www.qsl-comms.co.uk**

Carrying On The Practical Way

This month the Rev. George Dobbs G3RJV discusses soldering and nails! An ideal way to help youngsters start off in the radio hobby says George - after you've read the appropriate quotation!

" It is ready for the soldering: and he fastened it with nails, that it should not be moved".
Isaiah Chapter 41, verse 7 Old Testament.

Some time ago I mentioned my *Ladybird* book of the 1970s. Faced with the problem of not being able to solder with a group at a school radio club, I had to resort to other methods. It was not, in those days, a case of health and safety rules but the simple fact we didn't have enough soldering irons. After trying several methods, I settled on the use of small brass screws, with screw cups to trap the leads against a wooden base board.

There have been several commercial bread-boarding methods produced over the years. I well remember buying one of my sons an electronic kit that used springs to trap the connecting wires. It worked but was rather fiddly when several wires were anchored to the same point. I've also used several forms of push-in and grip type boards.

For the beginner, the translation from a circuit diagram to a completed project can be a problem unless a clear layout diagram is used. This month I want to show a simple way of building little projects which directly relates to the circuit diagram.

The idea was suggested to me by **Johnny Apell SM7UCZ**, mentioned in my last column. He's a keen constructor and experimenter and has a liking for trying to reproduce old valve circuit designs using methods of construction appropriate to the era in which they were first conceived. Over the years we have exchanged many circuit ideas via E-mail.

Front Page Picture

It's rare for the humble projects I present in this column to make the front page of the magazine. So it was gratifying to see a front page picture of the little transmitter I built on the top of a sardine can (*PW* Jan 2005).

The subject, featured on the cover, was a scaled down version of the W1FB Tuna Tin transmitter using just one transistor. A few weeks ago SM7UCZ sent me an E-mail circuit and picture of his version of the Mini-Tuna transmitter. It was built using a technique he had employed in the past for beginners in radio construction. I doubt if Johnny was taking his cue from Isaiah, but it does use nails and soldering!

The method is best illustrated by the photographs in **Figs 1** and **2**. The circuit is drawn, or printed, on a sheet of paper, which is stuck to a wooden base board. Small copper plated panel pins are then placed at the interconnection points of the circuit.

The components are added over the appropriate circuit symbols by soldering them to the copper plated pins. This method is very simple and has the advantage that the component placements relate directly to the circuit drawing.

Johnny had found the method useful when building projects with beginners, and it can be adapted for use with almost any simple circuit with discrete components. I liked the look of what he sent so decide to try it with a couple of simple projects.

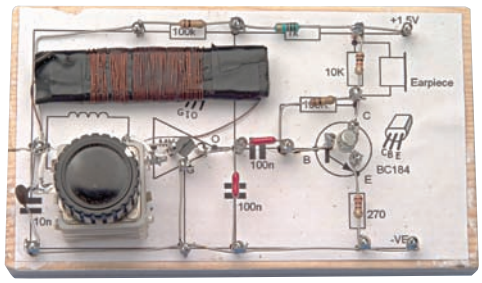


Fig. 1: Using the board, and paper drawing technique. The solder terminals are copper plated hardboard pins (available for B&Q and other DIY shops (see text).

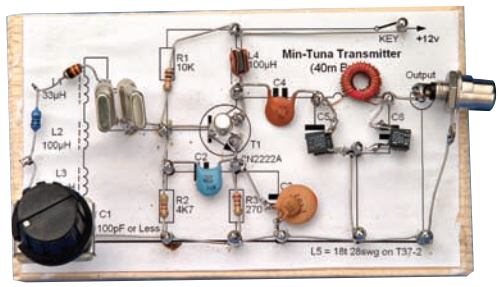


Fig. 2: The Min-Tuna VXO crystal controlled transmitter for 3.5MHz built using the copper-plated pin technique (see text).

Building An AM Radio

A popular project for beginners is the simple receiver using the MK484 a.m. receiver integrated circuit (i.c.). The MK484 is the replacement for the Ferranti ZN414 chip that was first produced in the 1970s.

The three pin i.c. contains a ten transistor radio including automatic gain control (a.g.c.) in a small casing that looks exactly like a low power transistor. It requires very few external components to produce a very effective a.m. radio and has been widely used for training young people in electronic construction.

The i.c. gives very satisfying results from only a few parts. An MK484 will drive a sensitive high impedance earpiece directly but usually some audio amplification is added.

The circuit for a simple a.m. radio is shown in **Fig. 3**. This is no more than the basic application sheet circuit. The capacitor C1 and inductor L1 form a tuned circuit for the required frequencies. This circuit assumes that L1 is wound on a ferrite rod which acts as the antenna as with most a.m. receivers.

The MK484 requires a low supply voltage (1.5V) and the series resistor of 1kΩ (between the output and the supply) controls the a.g.c. action by setting the voltage available to the chip. The value could be reduced to increase the gain of the radio but this would be at the expense of audio quality and possible instability.

A single transistor audio stage is added to the output. This is a typical high gain audio amplifier using a bipolar transistor. I used one of my many 2N2222 devices. Many similar transistors would work; the original application circuit used a BC184. The audio signal appears across the 10kΩ resistor in the collector. Constructors with a nice pair of high impedance headphones could connect them in place of the resistor. A much cheaper way is to connect a crystal earpiece across the resistor.

Editorial note: *Standard telephone earpiece inserts (available surplus for around 50p) work very well indeed in series with the output of the MK484 and the 1.5V supply when using the i.c. without a separate*

amplifier. It's also worth experimenting with the telephone earpiece used instead of the 10kΩ resistor. The volume obtained is more than generous! ***G3XFD****.*

Inductor & Capacitor

The inductor, L1 and C1 could be culled from an old a.m. radio. Many of the very cheap a.m. radios will yield a ferrite rod antenna with windings for the medium wave-band and a polyvaricon type tuning capacitor.

I found a suitable capacitor (it needs to be in the 200 to 500pF range) but had to wind a coil for L1. Using a ferrite slab in my junk box I wound 60 turns of thin wire (about 30 s.w.g.) to hit the medium wave-band.

Whatever ferrite rod can be found, a winding of some 60 to 65 turns will probably hit the band. The longer the rod, the better it will function as an antenna.

However, the chief object of this exercise is to look at the method of construction. To this end, I have a very useful circuit drawing program for my computer and was able to print out the circuit diagram at an appropriate size to fit in the components. Even without this facility, it would be quite easy to draw the circuit out by hand and use that as the layout drawing.

School Or Club Project

Astute readers could (especially if you do it for a school/club project) photocopy the circuit diagram from this article. A photocopier with a zoom facility could be used to get a reasonable size for the drawing. My prototype drawing contained the circuit in a width of about 100mm, although it could have been a little smaller and still held all the parts easily.

So, where do the copper plated pins go? The answer is - wherever there is a connection 'dot' on the diagram is a good place to put a pin. Incidentally, I got my copper plated pins from our local B & Q store. They're sold in 125 gram packs as "Copper Plated 20mm Hardboard Nails" (B&Q code AVF-063268).

Glue or Sellotape the circuit drawing to a soft wood base and gently tap the nails until they are about half way in the wood. The next, and vital, stage is to tin the copper pins with solder. Apply heat to the pin and using the heat of the pin itself, run solder down the sides to produce a shiny layer.

Wrapping the component wires one turn around the pin gives enough rigidity for a clean solder joint. Some connections, like the ground leads and direct interconnections are made using tinned copper wire. I also found it useful to place the pins for the MK484 and the transistor a little inside the circuit drawing to bring them closer together.

The whole wiring process is very easy and produces quite an effective a.m. radio. My little ferrite slab was not a very good antenna

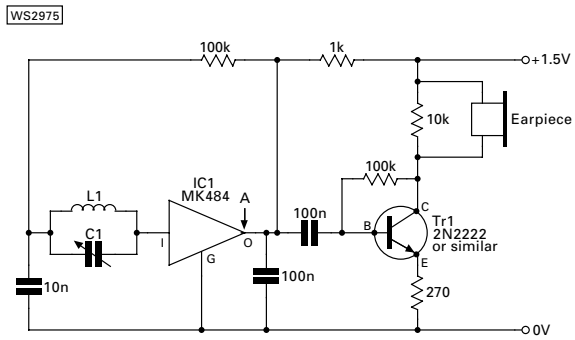


Fig. 3: Original circuit for MK484 from applications leaflet. If used without extra a.f. amplifier, a telephone earpiece insert can be used to advantage, connected between point A and the junctions of the 100kΩ and 1kΩ resistor (see text).

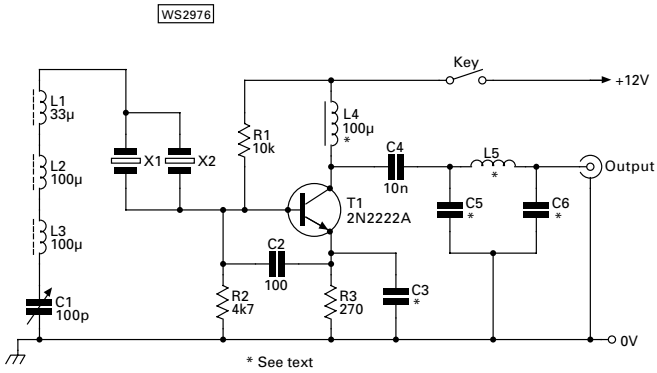


Fig. 4: Circuit of the Mini-Tuna transmitter (see text).

but performance can be enhanced by using an external antenna wire, the end of which is wrapped several times around the coil.

Mini-Tuna Transmitter

I also offer the circuit that SM7UCZ sent to me as his example of the copper plated pin construction method. It's his 3.5MHz version of the Mini-Tuna. The circuit is shown in **Fig. 4**. It roughly follows my earlier circuit in this column but readers may notice quite a difference around the crystal section.

There are two crystals and three inductors with a variable capacitance. This is to maximise the Variable Crystal Oscillator (VXO) effect. The addition of inductance and variable capacitance allows the oscillator to be tuned either side of the nominal frequency of the crystal. The multiple inductance idea derives from DJ1ZB and does actually produce more of a frequency swing.

The Super VXO

The use of two crystals (X1 and X2) comes from a circuit idea called the "Super VXO", developed by **JA0AS** and **JH1FCZ**. Their original circuit, shown in **Fig. 5**, is an example for the 10MHz (30 metre band).

The Japanese designers found that using two crystal of identical frequency they could get a wider frequency swing in a VXO circuit. The circuit first appeared in JH1FCZ's little magazine interesting called the *Fancy Crazy Zippy*. The circuit has been very popular with QRP operators using simple VXO controlled transmitters.

The circuit shown in Fig. 2 provided around a 25kHz frequency swing on the 80m

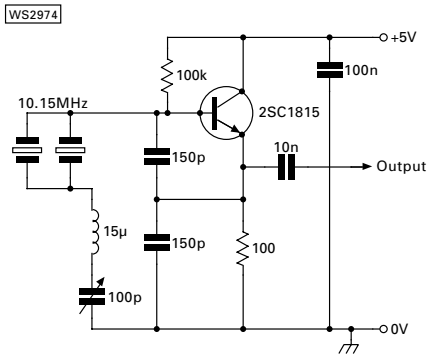


Fig. 5: Original Super VXO circuit (see text).

Band (MHz)	C3 (pF)	C5 (pF)	C6 (pF)	L5 (µH)	Formed by winding (turns)	(wire)	(on)
3.5	750	430	430	4.7	33	0.28mm	T37-2
7.0	470	470	470	1.28	18	0.32mm	T37-2
10.0	330	330	330	0.96	15	0.38mm	T37-2
14.0	270	270	270	0.72	13	0.38mm	T37-2
L4 is a 100µH moulded choke or 10/12 turns on a ferrite bead							

Table 1.

band using two 3.560MHz crystals. The collector choke (L4) is shown as a 100µH choke, but I used a home-made inductor made from 12 turns of 32 s.w.g. wire wound through a ferrite bead.

Table 1 gives component values for four bands. I only tried it on 3.5MHz. The values for the other bands were suggested by SM7UCZ.

The little transmitter delivers around 100mW of r.f. output; about the same as my former project. But I found that trying to shift the VXO too far from the crystal frequency produced a very chirpy output. It's a fun circuit nevertheless..... and built in a novel way! **PW**

The Bridge Of Sines

Stefan Niewiadomski introduces the concept of the Wien-bridge operation, then shows you how to make a four-range sinewave oscillator using the circuit.

A wide-range sinewave audio oscillator is a useful piece of test gear, and can be used for testing audio pre-amplifiers and power amplifiers, and audio filters. The unit described here is simple and cheap to build and covers the frequency range 18Hz-64kHz in four ranges with a variable output amplitude of up to about three volts peak-to-peak (p-p).

The unit is powered from an external single rail 9-12V power supply, and this saves the cost and complexity of a built-in mains powered supply. It also has the advantage that the risk of mains induced hum can be kept out of the unit. alternatively the unit can made self-contained, by powering from an internal 9V battery.

Classic Oscillator

The textbook classic oscillator is shown in **Fig. 1**, a Wien-bridge sinewave oscillator circuit. I've shown it using an operational amplifier (op-amp) as the active element, though transistors (or valves) can, and have been used in previous years to supply the necessary gain block.

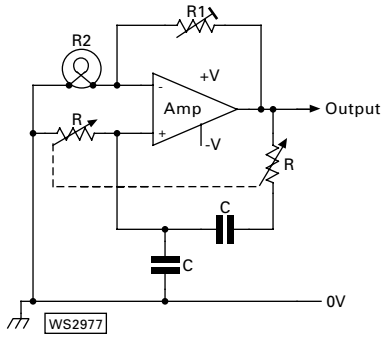


Fig. 1: The skeleton circuit of the dual feedback Wien-bridge oscillator.

Note: *For those of you who may not have had much to do with op-amps, they may be considered as 'perfect' amplifiers with one output and two input connections. One input is called the inverting input and is shown with a negative sign '-' (**–input**). As the signal goes 'up' the output signal falls and vice versa. The other non-inverting input is shown with a positive sign '+' (**+input**) and with this input, the output signal closely follows the input signal up and down in level.* **Editor**

The voltage gain (G) of such an op-amp circuit is given by:

G = (R1 + R2)/R2. And in the final circuit, R1 is replaced with a pre-set variable resistor and R2 is shown as an incandescent filament bulb. The reason for these changes will be explained later, but first we need to look at the frequency response of the RC feedback network shown between the output and +input of the op-amp.

To get the circuit to oscillate it is necessary for the RC network to present a 0˚ phase shift from the output back to the input of the op-amp so that a re-enforcing action occurs which causes the circuit to oscillate.

The frequency of oscillation of the Wien-bridge oscillator is given by:

Fosc = 1/(2*π*R*C). For example, with R = 10kΩ and C = 0.1µF, the formula gives Fosc = 159Hz.

Shown in **Fig. 2**, is the simulated response of this 10kΩ/0.1µF network at frequencies close to 150Hz. The left-hand axis is the gain axis (in dB) and the amplitude response of the circuit shows a minimum loss of about 9.54dB at 159Hz. A voltage loss of 9.54dB represents a gain of 0.333 from the input to the output of the RC network.

In Fig. 2, the right-hand axis is the phase axis (in degrees) and the phase response shows a 0˚ phase shift at 159Hz, thus verifying the frequency of oscillation formula shown above.

From the curves of Fig. 2, you can see that the voltage gain of the op-amp needs to be greater than 9.54dB, (three times) to compensate for the loss in the RC network and therefore maintain oscillation. Since it's impossible to provide a gain of exactly three (to exactly counteract the loss of the phase shift network) a form of gain adjustment and amplitude stabilisation is needed to ensure that the gain can be set initially.

The circuit I've used, automatically adjusts both gain and output amplitude even when the frequency is varied. Whilst not perfect, it works well enough.

The 'classical' Wien-bridge design has a negative-temperature coefficient (NTC) thermistor, such as the RA53, in the circuit to provide gain stabilisation. The RA53 is very difficult to get hold of these days, and would be more expensive from the few sources where it is still available, than the rest of the project. The bulb shown in Fig. 1 does the same job as the thermistor, as it too has a non-linear resistance characteristic.

From my experiments, I've

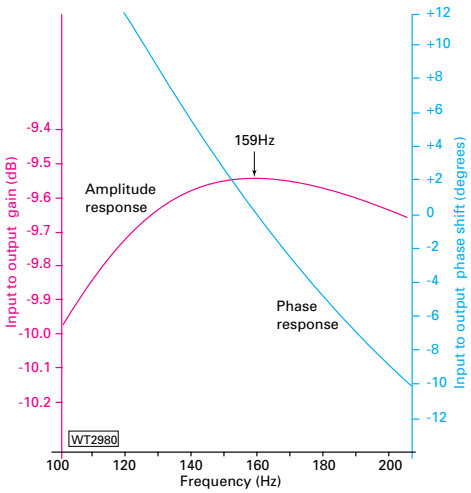


Fig. 2: The overall gain and phase relationships of the Wien-bridge circuit.

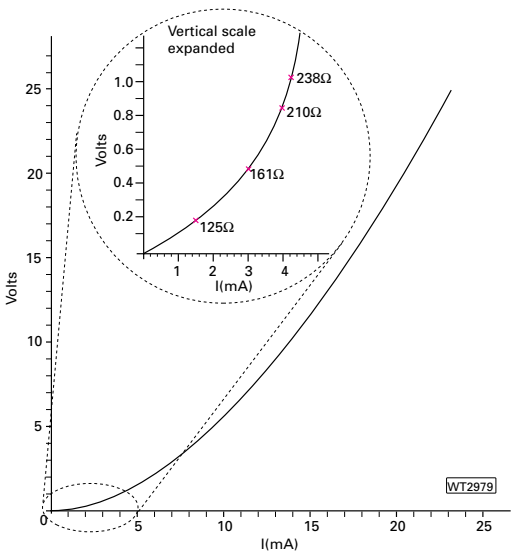


Fig. 3: The voltage/current curves of the 28V/24mA bulb show a decidedly non-linear relationship.

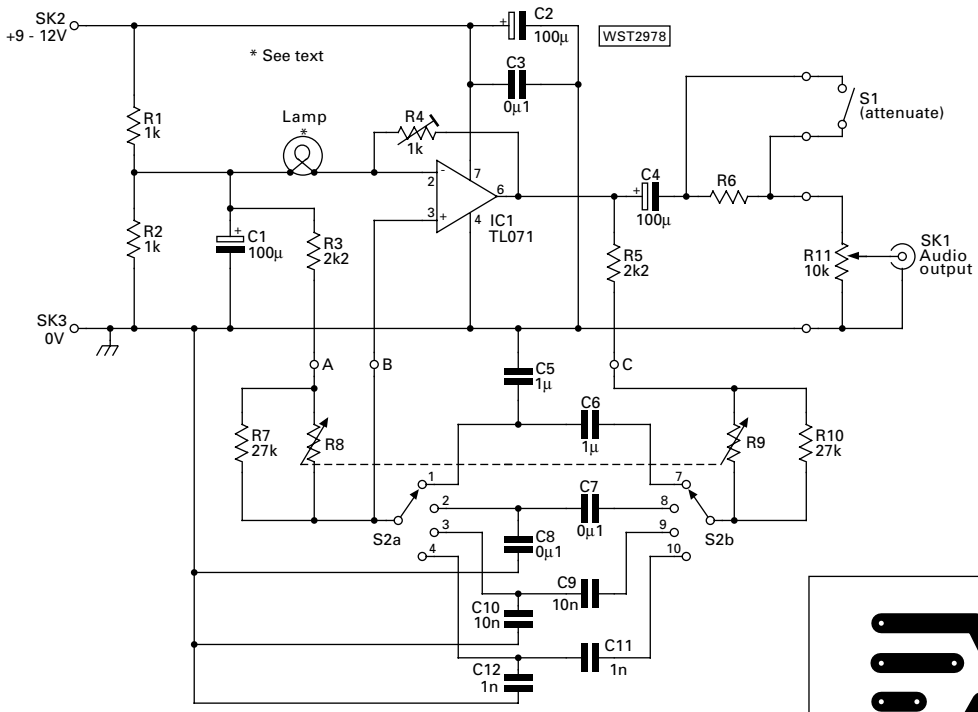
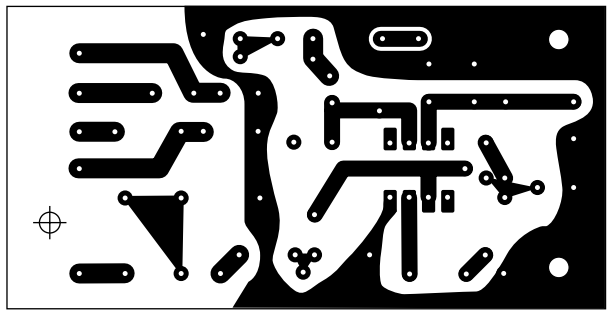
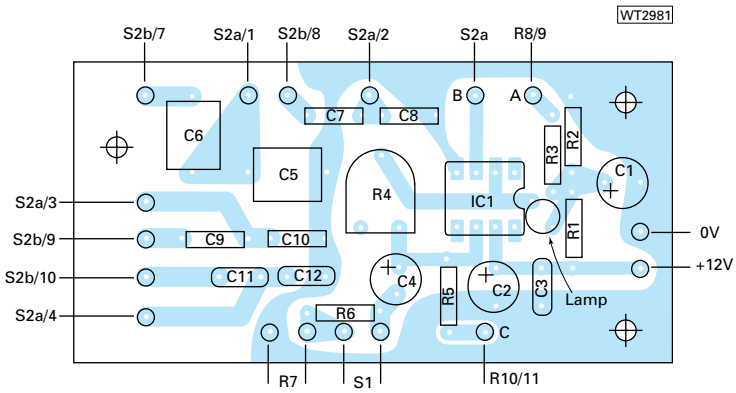


Fig. 4: The expanded four-range oscillator circuit diagram.

Fig. 5: A suitable p.c.b. and overlay for Stefan's





shown in **Fig. 3** a graph of the measured current through a 28V 24mA bulb, as the voltage across it is varied. It can be seen that the curve is non-linear: a normal resistor would be shown as a straight line passing through the origin.

When feeding the bulb with low supply voltages the resistance is less than it is at its notional working voltage. For example, at 0.2V the current through the filament is 1.6mA, indicating a resistance of 125Ω. Fed with one volt the filament current is 4.2mA, indicating a resistance of 238Ω. The inset graph shows a 'blow-up' of the low voltage region, for clarity.

Looking back at the op-amp gain equation again, and replacing the R2 with the bulb, the bulb's filament resistance changes to stabilise the gain can be explained. For a given oscillator output voltage level, R1 will have been set to maintain oscillation.

Let's say the op-amp gain need of three is met by setting R1 to be 300Ω. Then R2 (the resistance of the bulb) that sets a gain of three is 150Ω {(300 + 150)/150} = 3, which is exactly what we need.

Now imagine that the a.c. output level rises slightly, the increased feedback to the **–input** of the op-amp, now causes the temperature of the bulb's filament rise to become, say 160Ω.

Under these circumstances the overall gain of the op-amp is {(300 + 160)/160} = 2.875, and so the signal voltage at the op-amp's output falls, so reducing the voltage across R2 back towards the value that causes its value to be 150Ω. This is a classical feedback-stabilised network.

One slightly irritating problem with thermistor (or filament bulb) stabilisation is that, whenever the frequency is changed, the output voltage 'bounces' while the temperature of the element stabilises. This comes about because of the time constant of the heating effect. However, you get used to this, and ultimately it's worth the bother, for the low distortion that the amplitude stabilisation method provided.

Circuit Description

Now to closer look at the circuit description,. Look at **Fig. 4** that shows the schematic for the complete unit. Resistors R1 and R2 form a potential divider network to provide a mid-rail voltage to the op-amp IC1. This enables the circuit to be run from a single rail supply, rather than the split rail as shown in Fig. 1. It also makes the circuit much easier to power, enabling operation from a single 9V battery if needed.

Capacitor C1 decouples this mid-rail supply back to the 0V rail. The other capacitors, C2 and C3 decouple the +V supply to pin 7 of the op-amp. The centre-rail point connects via LP1 to the **-input** of IC1 and back through R7 to the output of the op-amp.

The combination of the resistance of the lamp and pre-set resistor R4 sets the gain of the op-amp and allows the gain to be set to the value needed to maintain oscillation and stabilise the oscillation level over a large frequency range.

The ganged potentiometers R8 and R9 along with R7 and R10 and C5-C12 form the RC phase-shift networks for the four frequency ranges, as selected by S2. The parallel combination of the 100kΩ potentiometers and R6 and R7 across them gives a range of about 0-21kΩ. If you already have a stereo potentiometer other than 100kΩ, you can use different values for R7 and R10 to give the necessary overall range. Resistors R3 and R5 set the lowest 'R' value at 2.2kΩ when the variables are set to their minimum (0Ω) value.

With the values shown, the prototype unit oscillated at the following frequencies for the four ranges:

Range	F_{Low}	F_{High}
1	18Hz	76Hz
2	71Hz	710Hz
3	665Hz	7kHz
4	6.62kHz	64kHz

Shopping List

Semiconductors

TL071	1	IC1 (for other devices, see text)

Resistors

Fixed (0.25W)		
1k	2	R1, 2
2.2k	2	R3, 5
27k	2	R8, 11
100k	1	R6
28V/24mA	1	Lamp (LP1 - wire terminal bulb - Maplin BT44X or similar)
Variable Rotary		
1k	1	R4 (linear preset)
10k	1	R7 (log unit)
100k	1	R9, R10 (dual gang unit)

Capacitors

Electrolytic (16V working)		
100µF	3	C1, 2, 4
Polyester		
10nF	2	C9, 10
100nF	2	C7, C8
1µF	2	C5, 6
Ceramic		
1nF	2	C11, 12
0.1µF	1	C3 (50V working)

Miscellaneous

Miniature toggle switch, 2-pole 4-way rotary switch, 8-pin DIL socket for IC1, printed circuit board, 1mm terminal pins, knobs for the controls and S2, insulated connecting wire, p.c.b. mounting screws and nuts. Phono and other sockets as needed.

The values chosen give a slight overlap across the ranges, meaning that there are no gaps between 18Hz and 64kHz. If desired, the ranges can be changed by fitting different capacitor values for C5-C12. Capacitor C4 provides d.c. isolation for the output of the unit and the combination of R6 and R11 provide output level control. If you consider S1 closed, than the audio output level at SK1 is set by the rotation of R11.

If S1 is open, then it can be seen that R6 acts to reduce the output voltage by a factor of about 10. And so a much lower output level will be available even when R11 it at its furthest clockwise setting. This control allows very low audio signal levels to be supplied to sensitive amplifiers being tested.

In the prototype unit IC1 was mounted in an eight pin d.i.l. socket so that several pin-for-pin compatible devices could be tried. Initially, I used a TL071 op-amp for the prototype unit, but other op-amps with the same pin-out such as the NE5534N can be used.

The NE5534N and similar op-amps are low noise devices, and are preferable to the nosier 741 type, which, if you happen to have one in your junk box, will still work.

External d.c. power voltages between nine and 12V work well. The actual supply voltage make little difference due to the fact that R1 and R2 are equal in value. This keeps the mid-rail supply to IC1 at half the supply rail no matter what the voltage is.

The Prototype

The prototype unit was built on a printed circuit board and **Fig. 5** shows the p.c.b. tracking (at life size) and component layout for the board. The components should be mounted in order of increasing size, taking care to correctly orientate the socket for IC1 and the electrolytic capacitors. Mount the tiny bulb last of all, keeping the leads at least 10mm long and being careful to solder it onto the p.c.b. as quickly as possible.

Insert several suitable terminal pins into the holes for the inputs and outputs to the board to facilitate unit wiring, rather than trying to insert wires into the board itself. I've also shown in Fig. 5 the connections to the chassis-mounted components of the unit.

Note that R7 is mounted across the terminals of R8 and R10 is mounted across the terminals of R9. In the prototype unit, all the connections were made using single core wire, rather than screened audio coaxial, which wasn't deemed necessary. The front panel layout isn't critical, and can be modified to suit any enclosure you have to hand.

Setting Up & Operating

Thoroughly check the locations and polarity of the component on the p.c.b. and check that all the solder joints are good, with no solder bridges or shorts on the underside of the board. Double-check the wiring from the p.c.b. to the controls and sockets, especially the power wiring.

Set R4 (the preset on the p.c.b.), R8/9 and R11 to about mid-setting, S1 to open-circuit and connect the external 12V supply. Check that the unit doesn't take excessive current. The prototype unit took a little over 9mA.

If you have an oscilloscope available, monitor the unit's output at SK1. Rotate R4 slowly until oscillation starts and a sinewave is seen. Note that as it's rotated further the waveform becomes clipped. This is where the gain of the op-amp stage is much greater than the value of three needed to maintain oscillation. Adjust R4 until the waveform looks unclipped, while still maintaining reliable starting when switched off and on, and for all settings of S2 and R8/9.

Rotate R11 and check that the output level varies, with maximum output of about three volts peak-to peak at its fully clockwise setting. Check that the wiring to R11 is correct in that the output level increases as the potentiometer is rotated clockwise.

Check that the wiring to S2 is correct. Then, using a frequency counter select the different ranges, check that you get a similar frequency coverage as given above. Also check that the frequency doesn't change significantly as R11 is rotated from minimum to maximum.

Note that the output level 'bounces' slightly as the frequency is changed. This is normal, and doesn't make much difference to the use of the unit in practice.

Check that the wiring to R8/9 is correct in that the output frequency increases as the potentiometer is rotated clockwise.

Now switch S1 and note that the output level drops to about one tenth of its previous value. This shows that the attenuator effect of R6/R11 is working correctly.

If you don't have access to an oscilloscope, connect a set of high impedance headphones to SK1. Rotate R4 until oscillation starts and adjust gradually for a position where reliable oscillation is always obtained across the four ranges. This setting should also give low output distortion.

With relatively 'normal' hearing, you can actually hear the point at which the output waveform starts to become distorted. Most usually, this is when the output waveform takes on a 'rasping' tone as the waveform is clipped.

So, there you are, a useful piece of test-equipment! I hope that you enjoy building the project.

PW

TETRA
COMMUNICATIONS LTD
Linking PMR to Amateur

Tetra Communications are able to supply converted PMR radios for the 2mtr, 4mtr, 6mtr and the 70cms band, including repeater base stations .....

Models for 2m, 4m and 70cms

New microphones from £9.99 and
New speakers from £4.99

We hold over 7,000 used radios in stock at any one time.

We also hold 10,000 plus spares for all models, including PSU's and Controllers

All these models are available for 2 mtrs, 4 mtrs, and 70cms
Icom U200 & V200
Maxon PM150
Key KME & KM
Tait 2000
Philips FM1200
Motorola M110, GM340, GM350, GM360

Philips FM1200


Motorola GM350


Key KME


Maxon PM150

Tait 2000

Icom U200

Available for 6m only

The GE Rangr below is available to cover the whole of the 6 mtr band in FM.

Contact us

If you have any questions regarding the above then you are welcome to give me a ring on 01604 234333 or 07836 600700, Gary G6NYH
TETRA Communications Ltd,
Victoria Chambers,
1 Victoria Road, Northampton, NN1 5EB
Or by the written word to G6NYH@AOL.COM
www.tetra.tv

CASH / CHEQUE / DOLLARS / EURO's / VISA / MASTERCARD / AMEX

VHF DXer

REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

DAVID G4ASR TAKES A LOOK AT RECENT PROPAGATION OPENINGS ON THE VHF AND UHF BANDS

I often commence the VHF DXER column with a synopsis of propagation events that have occurred during the previous months. I know why I do this, but some new readers have queried the reasons. And my main reason is that contacting stations in far-away places is one of Amateur Radio greatest challenges, especially if you choose to do it on the v.h.f. and u.h.f. bands.

If you are a newcomer who seldom works as far as the next county, a 200km contact is genuine DX. But if you're keen, you will grow in competence and achieve an understanding that transitory propagation modes exist that will increase the range of your station to many hundreds and sometimes thousands of kilometers. And that is worth aiming for.

Unless you can understand the different ways by which v.h.f. and u.h.f signals can travel far beyond the horizon, you run the risk of missing the best long distance contacts. Operators who work DX on the v.h.f. bands often use short-lived and 'unreliable' propagation modes such as Sporadic-E (Sp-E), aurora (Au), tropospheric enhancement (tropo), meteor scatter (m.s.) and moonbounce (e.m.e.). Professional radio users regard many of these long-distance modes as merely an occasional nuisance to everyday communication over shorter ranges, so they still have not been fully explored. By exploiting these modes to work long distances and by doing it as often as possible Radio Amateurs can still contribute to the development of radio science.

There are numerous propagation modes that occur on the bands from v.h.f through to microwaves but those of Sporadic-E, aurora, tropo, meteor scatter and moonbounce are amongst the most common. During January and February all of these modes were reported by UK stations so, I'll now take a look at what DX was worked using these types of propagation on the v.h.f. and u.h.f. bands during the recent winter period.

SPORADIC-E

Sporadic-E is a mode that creates a significant increase in ionisation in the E-layer (at a height of around 100km) and occurs mainly in the summer period. However, it also occurs to a lesser extent during the winter period (December-January) with occasional openings being reported on the 50 and 70MHz bands. Some events can be very intense and low power contacts are often made up to 2000km away and sometimes even further.

Openings on the 50MHz band were reported on January 1, 7 and 29. The opening on January 29 also reached the 70MHz band and was reported to have peaked around 90.1MHz within the Band II f.m. broadcast band.

There were two Sp-E openings on January 1. The first between 1100-1200UTC to Austria (OE), Croatia (9A), Italy (I), Romania (YO), Slovenia (S5), Yugoslavia (YU) and between 1540-1700UTC to Czech Republic (OK), Poland (SP), Slovakia (OM) and Austria. DX worked from England, Scotland and Wales included the stations of IK5YJY, OE5MPL, OK2POI, OM5CW, SP5ENA, S51UF, YO2IS, YU1EU and 9A8A.

The next Sp-E opening occurred on January 7 and also consisted of two phases. The first opening between 1115-1145UTC was from Scotland (GM) to the Czech Republic and from Wales (GW) to Italy. Later in the day between 1545-1800UTC operators in G, GI, GM, GU and GW reported making 50MHz contacts with stations in Germany (DL), Italy, Malta (9H1TM), Poland, Sicily (IH9YMC) and Slovenia.

An intensive 50MHz opening was reported on January 29 to stations in southern Europe and northern Africa. Between 1515-1830UTC contacts were made on c.w. and s.s.b. with stations in Ceuta & Melilla (EA9IB), Gibraltar (ZB3B), Morocco (CN8IG), Portugal (CT), Spain (EA) and Italy. The 70MHz band was also open between 1650-1815UTC to Portugal, a new country with access to the 70MHz band. Two s.s.b. stations were active, CT1FFU (IM59) on 70.610MHz and CT1HZE (IM57) on 70.625MHz. Stations in the UK had to operate split with two v.f.o.s, transmitting between 70.100-70.130MHz and listening around 70.600MHz.

AURORAL ACTIVITY

Because we are rapidly heading towards Sun Spot minimum there has been relatively little auroral activity reported on the v.h.f. bands. During large-scale auroral openings DX contacts can be made on the 50, 70, 144 and 430MHz bands with stations up to 2000km away.

Some brief openings were reported on January 1, 2, 4, 6, 13, 30, 31 and February 6 and 20. Most of these events were quite weak reaching only the 50MHz band with the exception of the opening on January 26 that made it to the 144MHz band. Stations in Scotland and northern England reported making c.w. contacts on the 144MHz band into Germany, Norway (LA) and Sweden (SM).

TROPO ENHANCEMENTS

Tropospheric enhancements occur quite often and are more likely to affect the 144, 430MHz and higher frequency bands than those at the lower end of the v.h.f. spectrum such as the 50 and 70MHz bands. These propagation modes (there are a number of variants, such as scattering and ducting) are caused directly by local weather conditions that occur in the atmosphere unlike many of the other modes that occur in the ionosphere (e.g. Aurora, m.s. and Sp-E).

Lifts in conditions enable contacts to be made with stations up to a distance of 1500km or so. Some openings may be fairly brief lasting for a few hours whereas others can exist for days at a time. Tropo conditions were excellent at the beginning of this year especially in the 7-day period from January 28 to February 3 when DX contacts were made on all bands from 70MHz through to 24GHz, some of them in excess of 1500km.

The microwave bands were in very good shape with s.s.b. contacts being reported on the 10GHz band with the stations of DJ6JJ (JO31), DF9QX (JO42), HB9AMH/P (JN37), OZ1FF (JO45), OZ2OE (JO45), SM6AFV (JO67), SM6EAN (JO57) and SM6ESG (JO67). The 1.3GHz band was really humming with many c.w. and s.s.b. contacts being made with stations over large areas of Europe such as Denmark (OZ6OL), France (F5PEJ), Germany (DL7VTX), Luxembourg (LX1JX), Netherlands (PA5DD), Norway (LA3EQ/P), Sweden (SM7GEP) and Switzerland (HB9AMH/P). Everything that could be found on the microwave bands was also on the 430MHz band but even more so! Some UK stations were making some really long-distance contacts such as MM5AJW to SP6IWQ at 1547km, MM5AJW to OK1TEH

Fig. 1: The four by 7-element 144MHz array at the QTH of David Johnson G4DHF

at 1455km and G8VHI to SP2MKO at 1330km.

Reg Wooley G8VHI (Northamptonshire IO92) mentions that conditions on the 430MHz band were very good and that he worked a number of Polish stations over 1300km away. On the 1.3GHz band he worked into Norway for a new country and also made it into Sweden (JO86) for his best DX on that band at 1240km.

Paul PE7B reports that on February 1 he operated portable on the 430MHz band from a hilltop location in Belgium (JO30). Using a Yaesu FT-817ND low-power transceiver and a home-made 6-element Yagi the station of **ON/PE7B/P** made a number of s.s.b. contacts including the stations of G4DEZ (JO03) at 507km, G3LTF (IO91) at 532km, G8LHT (IO93) at 597km and best DX of the evening GM6CMQ (IO86) at 880km. The station of MM3ERP (IO87) was heard at 59+ but no contact could be made over the 947km path.

METEOR SCATTER

With regular monotony meteor scatter contacts are now being reported daily by operators using JT6M on the 50MHz band and FSK441 on the 144MHz band. Actually, it's not quite as bad as that because these new 'digital' modulation schemes are providing a breath of fresh air within the v.h.f. bands and many newcomers are discovering that contacts in excess of 1000km can easily be achieved with low power and a small antenna. I call it regular 'monotony' because in its simplistic form this mode is literally 'plug and play' DXing with almost guaranteed results for minimum effort.

During January and February many UK operators reported making JT6M contacts on the 50MHz band with stations such as CT1FJC, DF2UQ, EB1EHO, F5GTR, HB9QQ, IS0/I0JU (Sardinia), IW3SNU, LA8NK, LX3DX, OE5MPL, OK1KRY, OH3JR, OZ0JD, SM0TSC, SP9HWY, S57RR and 9A8A. There's even some JT6M activity on the 70MHz band with stations such as CT1FFU, OZ1DJJ, S59MA and 9A1Z being contacted by UK operators.

MOONBOUNCE

Moonbounce contacts have normally been the domain of stations running very high power into very large antenna systems with tracking in both the azimuth and elevation planes. But now many stations are making moonbounce contacts by running less than 400W into a single Yagi pointing horizontally at the Moon when it is rising or setting. They are all using JT65, one of the new modes that utilises a p.c. and its soundcard to carry out digital signal processing to extract very weak signals from below the noise floor.

Martin Andrew GM6VXB (Aberdeenshire IO97) reports making his first 144MHz moonbounce QSO with the station of S52LM (JN65) about 1 hour before moonset on January 6. Martin mentions that he was quite surprised to make the JT65B contact as he has no elevation (though the Moon was at 16° above horizon), no pre-amplifier and only 200W to an 11-element Yagi. He does acknowledge that S52LM was running 1.5kW to a group of four 17-element Yagis but it still shows what can be achieved with a small station.

At moonrise on January 7th GM6VXB decoded signals from S52LM, ES6RQ (KO28) and LA4YGA (JO48). A week later at moonrise on January 14 he worked the stations of RA3AQ (KO85) and RN6BN (KN95). All these contacts were made random, i.e. not previously scheduled, Martin having spotted them on the DX cluster. He will definitely be trying to make more contacts during some of the EME contests later in the year and may put up two 17-element Yagis with elevation if the bug bites.

David Johnson G4DHF (Lincolnshire IO92) has sent in a report of his 144MHz moonbounce activity. He is using a simple home designed array consisting of four 7-element Yagis, shown in **Fig. 1**. Each Yagi is built onto a glass fibre fishing pole and uses 3mm elements and plastic pipe clamps so it's extremely lightweight. He has done away with much of the metal fixings too so he was able to press an old KR500 elevation rotator into service with no problems.

Having full elevation control greatly extends the operating time over stations that can only beam at the Moon when it's on the horizon. The driven element of each Yagi uses a 50Ω dipole feed that requires no matching other than a simple balance to unbalance balun. David has now finished building an 8-Yagi array and is waiting for better weather before erecting them on his tower. He is aiming to complete a larger 16-element array by the summer and may possibly build a dual polarisation system, consisting of elements in both the horizontal and vertical plane. Stations worked on c.w. in January include: F3VS, IK1FJI, IK2DDR, IK3MAC, LZ2US, OK1MS, OZ1HNE, RN6BN, SP7DCS, SV1BTR, K5GW, W5UN and KB8RQ. David mentions that c.w. activity is now quite busy even during weekdays and that he frequently hears the station of IK2DDR calling on 144.053MHz when the Moon is visible.

MORE ON FOUR

Last month, I mentioned that at the beginning of 2006 there were 20 DXCC countries (CT, CT3, CU, EI, G, GD, GI, GJ, GM, GU, GW, OX, OY, OZ, ZB, ZC, ZS, S5, 5B, 9A) with authorisation to use the 70MHz band. Well the good news is that there are now 21!

Claude Passet 3A2LF secretary of the IARU Society, the Association des Radiamateurs de Monaco (ARM) reports that effective from January 26 new allocations for the Amateur Radio service in the Principality of Monaco include the 50MHz and 70MHz bands. The Four Metre allocation is 70.000-70.500MHz (Secondary shared status) with a power level believed to be 100W output.

DEADLINES

That's it for this month. Keep a look out for all the different propagation modes and see what DX you can work. Thank you for your reports and please keep sending them in to the address given at the top of the column by the last weekend of the month.

73 David G4ASR

DAVID BUTLER G4ASR
YEW TREE COTTAGE
LOWER MAESCOED
HEREFORDSHIRE HR2 0HP
TEL: (01873) 860679
E-MAIL: g4asr@btinternet.com

Trader's Table

The equipment for sale on this page is secondhand or ex-demonstration

Disclaimer

Advertisements from traders for equipment that is illegal to possess, use or which cannot be licensed in the U.K. will not be accepted. While the publishers will give whatever assistance they can to readers or buyers having complaints, under no circumstance will the magazine accept liability for non-receipt of goods ordered, late delivery or faults in manufacture.

THE SHORTWAVE SHOP

01202 490099

TRANSCEIVERS

ICOM IC 703 HF+50Mhz QRP TCVR.....£350
ICOM IC 756 HF/50Mhz TRANSCEIVER.....£849
ICOM IC 207 VHF/UHF TRANSCEIVER.....£135
ICOM IC2725 VHF/UHF MOBILR TCVR.....£199
ICOM IC706 HF/VHF TRANSCEIVER.....£396
YAESU FT2800 VHF TRANSCEIVER.....£115
YEASU FT990 HF TRANSCEIVER.....£495
YAESU FT1000 MK5 HF TRANSCEIVER.....£1295
YAESU FT1000MP HF TRANSCEIVER.....£995
YAESU FT736 50/144/70cm TRANSCEIVER.....£495
YAESU FT730 UHF TRANSCEIVER.....£85
TRIO TR7500 VHF TCVR WITH PS6 PSU.....£85
TRIO TR7500 VHF TRANSCEIVER.....£55
ALINCO DX70TH HF/50MHZ TCVR.....£275
KENWOOD TS 811E 70cm BASE TCVR.....£325
PALSTAR KH-6 50Mhz HANDIE.....£65
STANDARD C5800 VHF ALL MODE TCVR.....£135
YEASU FT690R1 50Mhz PORTABLE TCVR.....£95
ALINCO DJS41 UHF TRANSCEIVER.....£50
KENWOOD TH-G71E VHF/UHF H/H TCVR.....£95
KENWOOD TH F7E VHF/UHF H/H TCVR.....£145
NAVICO AMR1000 145Mhz TRANSCEIVER.....£50
ICOM M15 MARINE TRANSCEIVER.....£90

RECEIVERS

SANYO WS1000 WORLDSPACE RCVR.....£85
HITACHI KH WS1 WORLDSPACE/SW RX.....£85
FAIRHAVEN RD500 RECEIVER.....£495
PRO 2045 BASE SCANNER.....£95
ICOM IC-R8500 ALL MODE BASE RCVR.....£795
SANGEAN AT818 PORTABLE HF RCVR.....£85
ROBERTS 9914 PORTABLE HF RECEIVER.....£55
AOR 3000A WIDE BAND RECEIVER.....£350
GRE PSR225 BASE SCANNER.....£135
LAFAYETTE HA 600A HF RECEIVER.....£85
TEN TEC RX350 HF RX WITH SPEAKER.....£795
AOR AR7030 HF RECEIVER.....£495
ICOM IC R75 HF RECEIVER.....£450
BEARCAR 9000XLT BASE SANNER.....£135
YAESU FRG7700 HF RECEIVER.....£125
YAESU VR500 WIDE BAND H/H RCVR.....£145
BEARCAR 9000XLT BASE SANNER.....£175

ACCESSORIES

AMERITON AL811 HF LINEAR AMP.....£495
BHI NES10-2 DSP SPEAKER.....£55
MFJ 259B ANTENNA ANALYSER.....£155
ICOM SM 20 BASE MICROPHONE.....£90
PROCOM AFR2010 DATA DECODER.....£155
WONDERWAND HF ANTENNA.....£45
KENWOOD SP31 BASE SPEAKER.....£59
YEASU SP8 BASE SPEAKER.....£95
KENWOOD RM-1 REMOTE FOR TS850.....£25
KENWOOD R2000 REMOTE HEAD TS2000.....£145
YAESU FT767 VHF MODULE.....£85
YAESU FT767 UHF MODULE.....£85
YAESU FT767 50Mhz MODULE.....£85
ASTATIC 2000 BASE MICROPHONE.....£39
WATSON W30 DUAL BAND RF AMP.....£45
MFJ 462B MULTIREADER.....£89
DIAWA SW110 SWR/PWR METER.....£39

For latest list please see www.shortwave.co.uk

NEVADA

023-9231 3090

Alinco DJC7 Handy Transceiver c/w Soft Case/Earphone/ERW4C Interface Lead.....£149
Trio TS700s 10w All mode 2m Base Tx with Ext VFO.....£299
Bearcat 30XLT 200 Channel, Air, Marine Scanner with Broadcast FM.....£40
Bearcat UBC220XLT Handheld Scanning Receiver.....£90
Bearcat UBC780XLT Base Scanning Receiver with Trunk Tracking.....£199
Fairmate HP2000 All Mode Scanning Receiver.....£107
Icom R20 Wideband All Mode Scanning Receiver.....£215
Maycom FR100 Handheld Scanning Receiver (5 Bands).....£59.95
Uniden UBC180XLT Handheld Scanning Receiver.....£99
Uniden UBC220XLT Handheld Scanning Receiver.....£90
Yupiteru MVT7300 All Mode Scanning Receiver.....£159
Yupiteru MVT9000 MK I Wideband Scanning Receiver.....£229
Yupiteru MVT9000 MK I Wideband Scanning Receiver.....£159
Icom 706 II HF/UHF Transceiver.....£495
Icom 706 Mk I 0-200Mhz Transceiver.....£399
Palsltar R30 HF Portable/Base Receiver.....£275
Realistic HTX-10 10m 25w All Mode Mobile.....£145
Yaesu FT1000 Mk V 200w Base Station Transceiver.....£1599
Yaesu FT897 100w HF/VHF/UHF Transceiver.....£595
Perstel Bluenote Personal DAB Radio.....£59
Zetagi M27 Antenna Matcher.....£20
ADONIS AM-601 Desk Microphone (Wired 8 pin Yaesu).....£39
Alinco EDX2 Automatic Antenna Tuner.....£199
Amdat ADC60 Frequency Standard Clock.....£99
Dewsbury S/TUNER Super Tuner.....£25
Elmic CONTROLS Noise Limitor.....£10
Icom AT160 Coaxial Auto ATU.....£179
Icom AT180 Tuner.....£199.95
Icom AT180 Auto Tuner.....£249
Icom SP21 Loudspeaker.....£45
Kenwood MB201 Mounting Bracket.....£10
Kenwood PS30m 20amp Power Supply.....£110
MFJ 9406 6m SSB Transceiver c/w microphone & manual..£139
Pakratt 232 Data Terminal & Leads.....£99.95
Palstar PS04 2-4 Amp Power Supply.....£14
Uniross Charger and Batteries.....£12
Watson WM2000 Base Microphone.....£80
Yaesu CD24 Charger for FT897/FNB78.....£75
Yaesu MH35A2B Speaker/Mic for older models.....£19

Check our web site for latest Items available. E&OE Prices quoted are in pounds sterling and exclude carriage.

WATERS & STANTON

01702 206835

Icom IC-3230H 2m 70cm FM Mobile,45/35W Ful Duplex.....£249
AOR AR-3000 100kHz-2036MHz All Mode Receiver 400ch. 12V + psu.....£449
Kantronics KAM plus Multimode Dual Port Data Controller + Pactor.....£199
Icom IC-M11 VHF Marine FM H/held T ansceiver 6W + sp mic.....£149
Icom IC-2SRE 2m FM H/held transceiver + 25-950MHz AM, FM, WFM receiver.....£129
GRE PSR-282 66-512MHz (with gaps) AM,FM Hand Held Receiver 200ch.£69
Yaesu FT-1 R 2m FM H/Held T ansceiver + DTMF keypad.....£99
MFJ MFJ-784B Tunable DSP Audio Noise Filter.....£189
Alinco DJ-190T 2m FM H/held Transceiver + CTCSS.....£99
Icom IC-R3 0 5-2450MHz AM,FM,WFM Receiver 450Ch + 2" TFT colour TV.....£269
MFJ MFJ-852 Power Line Noise Meter.....£69
BNOS TL50-144-25 6m 25W Linear Transverter wi h 2m IF at 1W 12V DC (5A max).....£89
Icom IC-R3 0 5-2450MHz AM,FM,WFM Receiver 450Ch + 2" TFT colour TV.....£269
Roberts R-827 Portable 0-30MHz w th FM Stereo & SSB via BFO.....£119
Icom IC-R3 0 5-2450MHz AM,FM,WFM Receiver 450Ch + 2" TFT colour TV.....£269
Kantronics KAM plus Multimode Dual Port Data Controller + Pactor.....£199
GRE PSR-282 66-512MHz (with gaps) AM,FM Hand Held Receiver 200ch.£69
Alinco DJ-C1 2m FM Micro Hand Held + CTCSS & Wide RX.....£69
Alinco DJ-191 2m FM H/Held w th DTMF keypad.....£119
Icom IC-R3 0 5-2450MHz AM,FM,WFM Receiver 450Ch + 2" TFT colour TV.....£299
Kantronics KAM Multimode Data TNC.....£99
ADI AT-200 2m FM H/Held Transceiver w th Nicad & Charger.....£89
Alinco DJ-480E 70cm FM H/Held Transceiver + Nicad & Charger.....£89
ADI AR-446 70cm FM Mobile 35W + CTCSS.....£129
Yaesu FT-290RII 2m All Mode Portable 2 5W.....£199
Yaesu FL-2025 2m clip-on 25W Linear (for FT-290R II).....£99
Ameritron AL-80B 10-160m 1kW Linear Amplifier wi h 3-500 Tube.....£799
Palstar KH-6 6m FM H/Held w th CTCSS.....£75
MFJ MFJ-910 1 8-30MHz 200W Automatic Matcher.....£16
MFJ MFJ-9340K 1watt 40m QRP CW T anceiver Kit.....£139
Kenwood MC-55 Mobile "Gooseneck" Microphone wi h 8-pin mic plug....£29
Yaesu VR-500 100kHz-1300MHz All Mode Receiver 1000Ch.Alpha.....£149
Yupiteru MVT-3300 66-1000MHz (wi h gaps) AM, FM 200Ch.....£95
MFJ MFJ-934 1 8-30MHz 300W ATU wi h Artificial Ground.....£139
TGM Communications MQ-34SR Four Band Three Element Hybrid Quad Antenna.....£349
GRE PSR-282 66-512MHz (with gaps) AM,FM Hand Held Receiver 200ch.£69
Alinco DJ-446 446MHz PMR H/Held + Nicad & Charger.....£89
Alinco DJ-C7 2m / 70cm Handheld W th CTCSS.....£89
Sony ICF-SW55E Portable Shortwave Receiver w th FM stereo and SSB £189
Icom PS-55 12V 20A Matching PSU.....£149
SML SWR-25 3 5-150MHz SWR / Power Meter 100W.....£29
MFJ MFJ-616 Speech Intelligibility Enhancer.....£119
Yaesu FT-290R MkII 2m All Mode Portable T ansceiver 2 5W.....£199
Icom IC-703 HF& 6m All Mode QRP Mobile T ansceiver + Auto ATU, Gen Cov. 10W.....£449
Icom IC-R3 0 5-2450MHz AM,FM,WFM Hand Held Receiver 450Ch + 2" TFT colour TV.....£249
JPS NIR-12 Noise & Interference Reduction Unit.....£199
Icom IC-703 HF& 6m All Mode QRP Mobile T ansceiver + Auto ATU, Gen Cov. 10W.....£449
Yupiteru VT-125 II 108-142MHz Handheld Airband Receiver 20Ch.....£89
PLL WAB-10 108-140MHz Airband Receiver + MW & FM mono/stereo.....£25
Icom IC-R8500 100kHz-2GHz All Mode Receiver 1000ch. 12V + PSU.....£899
Microwave Modules MML144/30-LS 2m 1-3W in, 30W out Linear w th Preamp.....£69
AKD 2001 2m FM Mobile T ansceiver Channelised 25W.....£89
Optoelectronics Model 40 "Scout" 10MHz-1.4GHz Frequency Counter + Reactive Tune & 400ch.....£199
CDX SWR-7RM 7MHz HF PWR/SWR meter 60W w th Antenna Matcher...£39
MFJ MFJ-418 Pager size Morse Tutor w th LCD Display.....£49
SEM QRM Eliminator Interference Reduction Unit.....£69
AOR AR-8200 III 530kHz-3GHz All Mode H/Held Receiver 1000Ch.....£279
Yaesu FC-700 3 5-30MHz 150W ATU wi h Dummy load.....£109
HORA C-408 70cm FM Micro T ansceiver (2 x AA batteries).....£59
Palstar KH-6 6m FM H/Held w th CTCSS, NiCd, Charger, DC lead.....£75
Yupiteru MVT-9000 II 0 5-2039MHz All Mode Receiver 1000Ch + voice inverter.....£259
Zetagi M-500 3-200MHz 2kW SWR/PWR meter.....£59
AOR AR-3000A 100kHz-2036MHz All Mode Receiver 400Ch. 12V w th PSU £499
Sony ICF-SW07 Min Receiver + FM stereo, SSB & "One Touch" tuning..£169
Sony ICF-2001D Portable SSB/AM Receiver wi h HF & VHF Airband 32Ch £149
Icom IC-703 HF& 6m All Mode QRP Mobile T ansceiver + Auto ATU, Gen Cov. 10W.....£429
AOR AR-8200 II 530kHz-2040MHz All Mode H/Held Receiver 1000Ch.....£230
Kenwood TS-570DG HF Base T ansceiver w th Gen. Cov + ATU & DSP filter 100W 12V.....£699
Alinco DJ-X10 100kHz-2000MHz All Mode H/Held Receiver 1200Ch.....£135
Icom PS-85 13 8V 20A (max) Matching PSU.....£179
Kenwood TS-50S HF Mobile/Base Transceiver w th Gen Cov RX 100W 12V.....£449
Yupiteru VT-225 108-142,150-160,220-391MHz AM,FM Receiver 100Ch.....£129
Icom IC-PCR1000 500kHz-1300MHz All Mode PC Controlled Receiver 12V + psu.....£199
Kenwood TR-751E 2m All Mode Mobile/Base Transceiver 25W.....£249
SGC MAC-200 1 8-60MHz Microprocessor controled ATU wi h 5 Inputs, 200W.....£199

Please check our website for latest list.
www.wsplc.com

HF Highlights

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

Geoffrey M1EDF's QSL card.

CARL GW0VSW SAYS ITS BEEN A BUSY MONTH, JUDGING BY YOUR REPORTS!

The bands have been rather up and down recently but the past few weeks have seen conditions lifting to provide much better h.f. propagation. Most bands have been open during daylight hours and have been allowing long distance work to take place with some regularity.

Top Band 1.8MHz is being worked by some reporters with very 'basic' antennas and with good results. Don't let your antenna system put you off using the lower bands. You may be surprised what you can tune up on 1.8 and 3.5MHz to enable you to add some countries to your low band logs! And although you may not get long haul DX but should certainly be able to work throughout Europe. You won't know until you try!

DX NEWS

If you need Vietnam in your logbook try listening out for Stan Matejicek OK1JR (ex-5N0MSV, D2FGC, YB0AJR, ZA/OK1JR etc.) who has been in Vietnam now for seven months and has finally received the callsign **3W9JR**. His licence is limited as he can only operate on 14, 18, 21 and 24 MHz c.w. and s.s.b. at the moment. The licence is valid for 12 months and he expects to stay in Hanoi for approximately two years.

Stan hopes he will get permission to operate on the low bands, 50MHz and using digi-modes shortly. He can only operate during his spare time so look for him during the weekdays after his working hours around 1000-1600UTC. However, he is already planning more activities during weekends and contests. His equipment is an FT-1000MP MKV Field with 100W into a 12-element LPD for 10-30MHz with long wires and dipole following shortly. The QSL route is via his father **Ivan Matejicek OK1JN, Lipova 4, Jablonec Nad Nisou, Czech Republic** (direct only).

The QSL Manager, **Allan Hickman G0IAS** has said that **Harry Berry 7Q7HB** is back in Malawi and will be in 7Q-land until early May. This time he has taken with him software to be active on the Digital modes and has already been heard on 21MHz s.s.b. around 21325kHz after 1420UTC. The QSL route is via **G0IAS, The Conifers, High Street, Elkesley, Retford, Nottingham DN22 8AJ**. If anyone has a question or requires a sked you can E-mail Allan at **allan.g0ias@btinternet.com** though he cannot guarantee your request.

UPDATE ON QSLS

Some QSL information for you now and Giancarlo IK4QIB reports he is receiving cards for V44KJ, but he is not and has never been the QSL manager for this call. The correct QSL route is via WB2TSL.

Czech operator **David Klimosz OK1RK** has said he has the last bundle of blank cards for the QSOs he made as 5N0/OK1AUT, 5N0ZKD, 5N99ZKD and 5N0W during his stay in Nigeria. As he is not a member of the OK QSL bureau, those who still need a card should send their request direct only to **David** at **Paprskova 1339/10a, 14000 Praha 4, Czech Republic**. Please note that he can only confirm contacts made with 5N0W between 1999 and May 2000 as contacts after this were made by OK1DXE.

Back to Allan G0IAS now, who has said "The clock is winding down for outstanding QSL cards for **ZD6RM** and **7Q7RM**. I will close the logs for these operations on the anniversary of Ron MacFarlane's death in September. I have 'all' his hand written logs covering more than 50 years of operating from Nyasaland (ZD6) and Malawi (7Q7), as well as the log when he was GM3EAK from 1947". Is there anyone out there that still needs one of those cards? This could be of special interest to 50MHz operators because most of the keen DXers on that band will have worked Ron for a first or only 7Q on 6 metres!

YOUR REPORTS

On to your reports and first off this month is **Leighton Smart GW0LBI** in Trelewis, Mid-Glamorgan who found 1.8MHz "Good most evenings" from 2030 on. Stations logged included OK1DIG (Czech Republic) 2030, ES1GO (Estonia) 2032, IQ3GO (Italy) 2105, SP3DOI (Poland) 2200 and YU7JDE (Serbia & Montenegro) 2300UTC using his Yaesu FT-100 with 50W c.w. to a 58m long wire antenna with counterpoise.

Ted Trowell G2HKU on the Isle of Sheppy in Kent also worked 'Top Band' logging 9H1ZA (Malta) EU-023 at 1601, and ZC4LI (UK Sovereign Bases on Cyprus), GU4YOK (Guernsey) EU-014, VO2AC (Canada), EA6IB (Balearic Islands) EU-004 and LX7I (Luxembourg) around 2200UTC using a Ten-Tec Omni 5 at 70W to a G5RV.

In Worcester Park, Surrey **Eric Masters G0KRT** found IK2FWA (Italy) 1651, PC5M (Netherlands) 2035, OY1CT (Faroe Islands) EU-018 at 2041, OK2W (Czech republic) 2104, ON4IA (Belgium) 2109, DL1VDR (Germany) 2125 and SN7C (Poland) 2226UTC. All contacts were made using a Kenwood TS-570DG and running 100W into an 27m end-fed wire antenna with a loading coil attached and tuned by an SGC230 auto tuner.

In Middlesborough **Keith Winward 2E0JKD** used s.s.b. on 3.5MHz listing PA0IJM

(Netherlands), G3RCV/P and ON5UR (Belgium) using his Kenwood TS-570DG to a experimental 39m wire loop at 11.5m with fan tail counterpoise.

Using PSK31 for the first time was **Martin Addison M3JUQ** in East Finchley, North London. Martin found ON3VHF (Belgium) 0910, OE1XXU (Austria) 0936, OH4JPV (Finland) 1558, IO0BIA (Italy) 1801, YU7HC (Serbia & Montenegro) 1730, S57YX (Slovenia) 1936, 9A2JK (Croatia) 1944 and IW2NLU (Italy) at 1957UTC using a Yaesu FT-840 at 10W to a folded half size G5RV antenna.

THE 7 & 10MHz BANDS

In Tamworth, Staffordshire **Geoffrey Powell M1EDF** works 'all c.w.' and enjoyed some time on 7MHz finding CT/DJ5YQ (Portugal) 2030, VK6RZ (Australia) Peter in Western Australia at 2035, YT7FT (Serbia & Montenegro) 2100, P40LE (Aruba) SA-036 at 2130 and T94LZ (Bosnia & Herzegovina) 2133UTC while 10Mhz provided Z34M (Macedonia) 1947, EN6CW (Belarus) 2034, ZB2FK (Gibraltar) 2042, ER1DA (Moldova) 2058, and a string of US stations including K3VZY Sam in Yeadon, Pennsylvania. Geoffrey decided to take his Amateur licence in 1999 but was a keen s.w.l. before this and still monitors h.f. aircraft transmissions from the South Atlantic on 8.861MHz and Asia on 11.396MHz

Also on the 7MHz band was **Panagiotis 'Panos' Dadis SV1GRN** who uses a Yaesu FT-847 at 100W to a home-brew parallel wire dipole at about 6.5m above ground. LX1KC (Luxemburg) 1935, JA9CZE (Japan) 1927, UT7ZZ (Ukraine) 2138, CU2AF (Azores) EU-003 at 2004 and 9K2YM (Kuwait) 2151UTC all made his log at his home in Athens, Greece. Panos (a great *PW* supporter) also enjoys PSK31 and was pleased to receive a card direct from G8RW who lives in Bromley, Kent confirming their digital QSO.

On to the 10MHz band where Ted G2HKU used the 'key' once again catching PY1OTO (Brazil) at 2200UTC and slightly later W8EGB (USA) Clyde in Mancelona, Missouri at 2230UTC.

THE 14MHz BAND

The 14MHz band was by far the most popular with our reporters this month and was open for most of the day. In Cumbria **Roy Walker 2E1RAF** made a great number of c.w. QRP contacts on this band and they included SP2JL (Poland) 0940, UA9KZ (Asiatic Russia) 1007, UR3IFY (Ukraine) 1014, F9XN (France) 1025, SM4CPW (Sweden) 1033, YO9APK (Romania) 1041, HA200CVM (Hungary) 1354, W8DL (USA) Don in Charleston, West Virginia at 1358 all made using a Yaesu FT-897 transceiver and 5W into an 80m wire loop just above ground.

In Biggleswade, Bedfordshire **Owen Williams G0PHY** made s.s.b. contacts with W8GEX/P/KP (US Virgin Islands) NA-106 at 1236, 5H1C (Tanzania) 1620 and Z22JE (Zimbabwe) at 1706UTC using his Yaesu FT-757 and 100W s.s.b. to a dipole antenna.

Martyn Medcalf M3VAM in Chelmsford, Essex used s.s.b. once again logging UR0IM

On the keyboard G8RW was worked on PSK31 by Panagiotis 'Panos' Dadis SV1GRN (a great friend of *PW*).

(Ukraine) 1214, HA5CQ (Hungary) 1237, 9A2YM (Croatia) 1251, IQ0FR/P (Italy) 1303 and RK3DZB 1438UTC using an Icom IC-746 and long wire antenna with SGC-237 auto tuner for his h.f. activities.

In Nuneaton **Chris Colclough G1VDP** seemed to "hear and work everything" as conditions were so good. He had voice contacts with CE0Z (Juan Fernandez Island) SA-005 at 0145,

Harry Berry 7Q7HB's QSL card.

ZL6QH (New Zealand) OC-036 at 0924, TT8PK (Chad) 0956, C31SG (Andorra) 0955, EA9IB (Ceuta & Mellila) 1046, EW6GF (Belarus) 1058, 3V8DLH (Tunisia) 1118, W8GEX/KP2 (U.S. Virgin Islands) 1155, CO8LY (Cuba) NA-015 at 1216, ZC4KRS (U.K. Sovereign Bases on Cyprus) AS-004 at 1226, 5H1C (Tanzania) 1451, 6O0N (Somalia) 1515, ET3AA (Ethiopia) 1530, A92GR (Bahrain) AS-002 at 1409, S79HP (Seychelles Islands) AF-024 at 1639 and 7X4AN (Algeria) at 1640UTC using his Cushcraft MA5B mini beam and Yaesu FT-1000 Mark V Field with UK Ranger Linear Amplifier at 400W. Also on the band was Keith 2E0JKD who ran 10W to his wire loop and had voice QSOs with LY3DA (Lithuania), HG4F (Hungary), UT7I (Ukraine) and IK1BBC (Italy) though no times were given!

THE 18MHz BAND

The s.s.b. log of **Jim Pedley GM7TUD** included 3V8DLH 0923 the Lufthansa Amateur Radio Club DXpedition to Tunisia, 5H1C (Tanzania) 0935, S92RI (Sao Tome & Principe) AF-023 at 1259, 5H1C again using PSK31 at 1242, 6O0N (Somalia) 1344 online logs for this call are now available at **www.i2ysb.com/6o0n/log.htm** KG4WW (Guantanamo Bay) NA-015 and EA8/DJ3XD (Canary Islands) AF-004 at 1603UTC. His new Cushcraft MA5B beam appears to be working well with his Kenwood TS-450S transceiver.

Jim says "I was just sitting listening to **3Y0X** on 14MHz c.w. and the pile-up was absolutely horrendous. I am still amazed at how many operators do not know how to listen and follow the DXpeditions instructions. How difficult is it to understand listening up? Yet still there is still a pile up on his transmit frequency slowing everything down. What's more, the 'band police' keep sending up, up, up, and the station receiving his report on the split frequency has to ask for a repeat because of the QRM. Absolutely incredible"!

Back in London Martin 2E0MCA tried both voice and PSK31 on the band. RA3CQ (European Russia), LA6KOA (Norway), LZ2WO (Bulgaria), EW6DX (Belarus), UT4EK (Ukraine) and 3V8SF (Tunisia) were logged on s.s.b. between 1051 and 1410UTC while PSK31 was used to work ES3RM (Estonia) 1412, YO4UQ (Romania) 1423 and K2TE (USA) Ed in Merrimack, New Hampshire at 1537UTC.

THE 21MHz BAND

On 21MHz Jim managed 5H1C (Tanzania) with RTTY at 1144, 6O0N (Somalia) 1316, FH/G3TXF (Mayotte Island) AF-027 at 1307 and G4FWQ/6W (Senegal) at 1313UTC all c.w. while Panos SV1GRN lists s.s.b. stations VU2DSI (India) at 1114 and OH3GE at 1126UTC.

Also spending time here was Chris G1VDP whose voice QSO's included ZB2IF (Gibraltar) 0955, OD5NH (Lebanon) 1028, ZS4MB (South Africa) 1048, CN8IG (Morocco) 1049, HZ1YB (Saudi Arabia) 1052, SV9CVY (Crete) EU-015 at 1055, A41MX (Oman) 1122, TZ9A (Mali) 1355, TI8CBT (Costa Rico) 1527 and S92RI (Sao Tome & Principe) 1541UTC and Owen G0PHY used 100W s.s.b. again to reach 3V8DLH at 1208UTC.

SIGNING OFF

Well that's it for another month and a busy one it's been judging by the long lists of DX sent in by our reporters. This made it difficult to pick the best of the stations you worked and I hope I managed to fit you all in? My thanks go to all of you and also to **Tedd Mirgliotta KB8NW** editor of the *OPDX Bulletin* and **Mauro Pregliasco I1JQJ/KB2TJM** editor of the *425 DX Newsletter* for the DX information. Until next time have a good DX filled month. **73, Carl GW0VSW**

CARL MASON GW0VSW
12 LLWYN-Y-BRYN
CRYMLYN PARC
SKEWEN, WEST GLAMORGAN SA10 6DZ
Tel: (01792) 817321
E-MAIL: carl@gw0vsw.freeserve.co.uk

The April 2006 issue of radiouser is filled to the brim with radio, radio and more radio! With more regular columns, more features and more pages, it's everything the radio listener could possibly want - all in one great new magazine.

radiouser

April 2006 issue

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

- **Reviews**: Chris Lorek puts the tiny Icom IC-E7 dual-band hand-held through its paces. There's a superb wideband (495kHz to 999.990MHz) receiver tucked away inside this VHF/UHF hand-held transceiver.
- He also looks at Scancat-Lite Plus, an affordable program that will help organise and program your scanner with frequencies.
- **Military Matters**: Kevin Paterson updates even more frequencies, this time within the London Military Zone. He also reports on the launch of HMS Daring and a Sea King helicopter that was spotted landing in a supermarket car park!
- **Scanning Scene**: Bill Robertson has frequencies for everything from Luton Airport to your local supermarket check-out operators. Also, if you would like to try Digital Speech Decoding, we have all the details.
- **Sky High**: Godfrey Manning details all the major changes to south-west airspace, giving the new frequencies and reporting points.
- **Scanning in Action**: We take a look at Restricted Service Licences. They enable the radio station operator to provide a radio service that has restricted coverage compared to traditional broadcasters.
- **Decode**: Mike Richards looks at STANAG 4285, one of a relatively new breed of HF communication systems that deliver high speed data over difficult short wave links.
- **Where Have All the Sunspots Gone**?: How many stations from Australia have you heard recently? Why is the 13m broadcast band 'dead' for much of the time? The answer is propagation and the things that affect propagation more than anything else are sunspots. Steve Telenius-Lowe discusses the solar cycle and its effect on radio signals.
- **Hidden or Secret Antennas** : Just because you can't put up an outside antenna doesn't mean you can't still enjoy your radio. Richard Marris gives you some clever ideas to help you build your own hidden antennas.
- **Wireless on Wheels** : Mark Savage and Chris Brand chart the history of radio in the car, a partnership we now take for granted.
- **In Marconi's Footsteps** : Steve Nichols takes his family on a tour around some of the most historic and futuristic radio sites in Cornwall, from museums to Goonhilly.
- **New Products**: All the latest news about radios and accessories to interest the scanning, airband and broadcast listener, including a weather satellite receiver, a new type of charging unit and an SSB capable world-band radio.

Incorporating the very best of both Short Wave Magazine & Radio Active

April Issue on sale at your newsagent now Only £3.25

Coming up in the May Issue

Improving your Reception using a Long Wire Antenna: Steve Telenius-Lowe encourages readers to experiment with their antennas as anyone can use a long wire - even if you don't have much space.

SBS-1 Files: Looking at the world of virtual radar for the aviation enthusiast.

Quick & Easy Mod for the Sony SW7600GR: A great radio that just lacks good reception on Top Band, this mod will correct that problem.

Reviewed: The Palstar R30 communications receiver with Collins mechanical filters should join the rank of those classic receivers. The filters certainly lived up to their reputation and made the receiver a joy to use.

Questions & Answers: Have you a radio-related question you'd like answered? Our resident expert will explain your receiver, propagations antenna or scanner queries.

Scanning in Action: We've all seen those yellow speed cameras at the side of the road - they seem to be multiplying as every week goes by. But what about the blue poles and cameras we see at the roadside and on motorway bridges, just what do they do? the TrafficMaster system is explained.

Military Matters: Kevin Paterson travelled the length of the country to make sure he was there for the retirement of the Sea Harrier aircraft, join him for this historic occasion with our Sea Harrier Retirement Special.

Reviewed: The President Walker CB radio is put through its paces. Built for the European market, it could prove very popular with those who travel through the UK and Europe.

The May issue is on sale at your newsagent on 27 April...don't miss it!

IF YOU'VE SEEN RADIOUSER AND LIKE WHAT YOU'VE READ, MAYBE YOU'D LIKE TO SUBSCRIBE. RADIOUSER IS ONLY £36 FOR A YEAR - SAVE £3 AND GET YOUR VERY OWN COPY DELIVERED EACH MONTH!

E-Mail: ru@webscribe.co.uk Website: www.webscribe.co.uk
Mail: RU Subscriptions, PO Box 464
Berkhamsted, Hertfordshire HP4 2UR, UK.
Tel: 01442 879097 Fax: 01442 872279

Joint subscription with Practical Wireless now available. Only £61.

PW Publishing Ltd.,
Arrowsmith Court, Station Approach, Broadstone,
Dorset BH18 8PW, UK web: www.pwpublishing.ltd.uk

Data Burst

JACK TAKES A LOOK AT GOOGLE EARTH - THE INTERACTIVE WORLD MAP - EXPLAINING HOW IT CAN HELP YOUR AMATEUR RADIO OPERATION

I'm sure that everybody these days has heard of Google, the Internet search engine, but have you heard about Google Earth? Produced by the same company, this is a truly novel computer program, which looks set to be of great use to Radio Amateurs and Short Wave Listeners (s.w.l.s.) If you haven't tried it yet, you really should. It's quite an eye-opener.

Google Earth is basically an interactive world map. At its core is a 3D model of the whole Earth overlain with a mosaic of satellite images and aerial photographs. So, rather than seeing a diagrammatic representation of the land, you're seeing actual pictures of it. Overlain on top of that are numerous graphical layers that can be turned on or off individually. These include conventional road maps, name labels, political borders and so on.

The whole thing is interactive and searchable, so you could fly around the islands of Hong Kong, explore Paris or trace the course of the M1. Enter your postcode and you'll see your home. Type in the name of a town in Brazil and the world will spin and zoom to show you what it looks like from the air.

All this would be enough to make Google Earth a very powerful and useful program, but what makes it uniquely flexible is that anybody can create and publish additional graphical objects and Internet links that are pinned to geographical locations on the map. This means that any specialist group – be they Radio Amateurs, bird watchers, military historians or whatever – can produce and share content that is totally specific to their particular needs.

Before exploring some of the possibilities, we need to look at the basics. Google Earth is a self-contained program, not a website, so you need to download it and install it on your computer. There are separate versions for Macs and Windows PCs, and both are available entirely free. There is also an enhanced version (for Windows only) that costs $20 (about £11.50) per year. It offers more speed, better printing and links to GPS. I doubt that most users will need it, but it's not onerously expensive if you do.

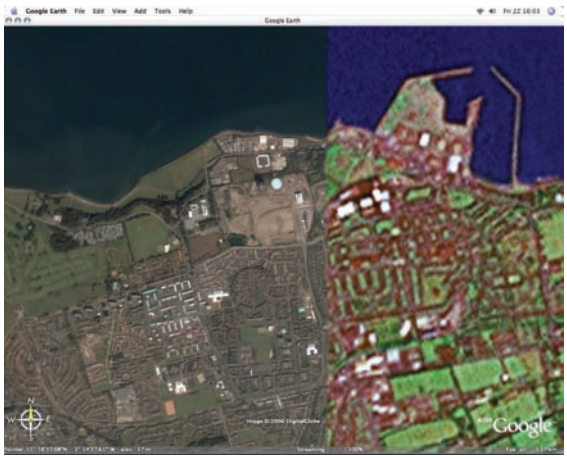


Fig. 1: Where they join, photographs and satellite images generally line up very well as you can see in this view on the outskirts of Edinburgh. The difference in resolution is obvious though.

Fig. 2: The 3D model lets you see terrain anywhere in the world. This is Santiago de Chile with the high peaks of the Andes rising up from its edge.

ESSENTIALLY A VIEWER

The program you install is essentially a viewer, all the actual map data is downloaded as required from the Google Earth servers. What this means is that in order to get the full experience you really do need a fairly powerful computer with fast graphics and a permanent broadband Internet connection. Inevitably, this will exclude quite a few people, but that's unavoidable given the amount of computing that's involved and the quantity of data that needs to be shifted. However, if you can provide enough power and bandwidth, you'll be rewarded with the ability to fly smoothly around the world and zoom in at will on any place you want. Even if your machine isn't at the cutting edge of speed, it's still worth giving Google Earth a go – movement will be slow and jerky, but the images will still be as good.

As I mentioned, the view is a mix of satellite images and aerial photographs so the level of detail varies enormously, **Fig. 1**. At its best, it allows you to clearly see individual cars and you can even make out people in some areas. At the other extreme are relatively low resolution satellite images that don't provide much detail below the scale of roads and fields. In general, large cities are better covered than rural areas and remote uninhabited corners of the world have the least detail.

A lot of the imagery came from old

American spy satellites and aircraft, so it's not surprising that you get much better resolution in Havana than in Harrogate. However, the logic behind this isn't always obvious. Why, for example, are some apparently empty bits of desert or mountain so detailed, and why is there a rectangular block of data missing from Alaska?

Conspiracy theorists can have a great time debating the significance of such variations, but the truth is probably quite mundane and to do with what's available and what they've got round to entering. Anyway, new images and data are constantly being added so the coverage is steadily improving.

All well and good, but what does this have to do with Amateur Radio? Well, there are many ways that Google Earth could be used to support radio activities, and new ideas are popping up all the time.

At the most basic level, simply being able to see the geography of another QTH is interesting. If you're working someone who lives at Acacia Avenue, you can find the street and quite possibly even pick out their house. Because Google Earth is a 3D model, you can also tilt your view from the vertical and see the actual relief. So, if your contact in Santiago de Chile mentions that he can see the Andes looming over the city, you can share his view and look around to admire the local scenery, **Fig. 2**.

A fascinating way to waste endless hours and days is to search for interesting antennas on Google Earth. Provided that you're looking in an area covered by good photographs rather than satellite images, it's even possible to see some of the bigger amateur arrays. Obviously, wires and aluminium tubes don't show up, but the larger towers and dishes certainly do, especially if you have a fairly sharp display. If you fancy an easier challenge, many of the large radio astronomy, military, broadcast and satellite communications sites are quite easy to find, **Fig. 3**.

What makes Google Earth really useful, rather than merely fun, is being able to superimpose those graphical objects and layers onto the basic image map. There are some obvious possibilities, such as callsign prefixes or the Maidenhead locator grid, but you don't really need such a complex and detailed map for those.

Instead, what about layers for DXpeditions or Lighthouse Days? A map of beacons and repeaters would be useful too. Remember that Google Earth contains a fairly detailed 3D terrain model so finding line-of-sight paths for v.h.f and u.h.f. communications should be possible. Automatic plotting of spots from a DX Cluster would be another useful trick, although that would depend on the call's geographical co-ordinates being available through an online source.

INTEGRATION

Integration with existing radio software also offers a lot of scope. The developers of Ham Radio Deluxe have been working on building links to Google Earth and I'm sure that other software teams will be looking at this too.

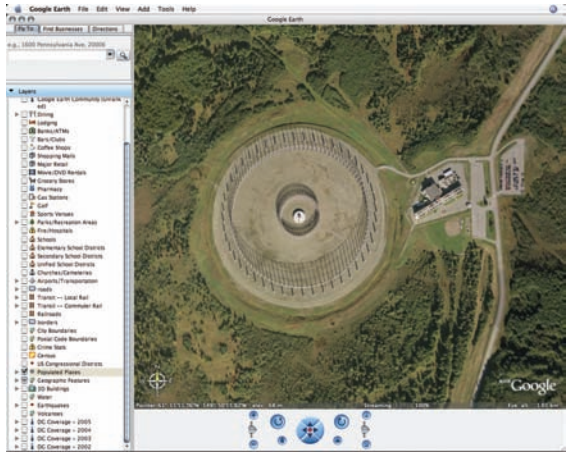


Fig. 3: This large h.f. direction finding array is on the outskirts of Anchorage, Alaska. Many antennas, even some Amateur ones, can be seen in various parts of the world.

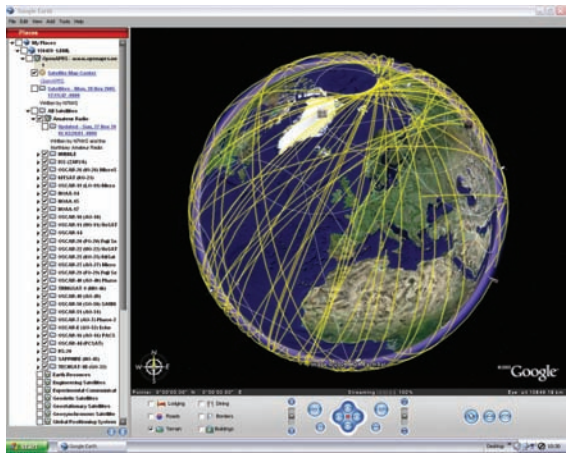


Fig. 4: A group of Californian Radio Amateurs has produced this overlay which can show the orbits of almost 800 satellites. Here, just the Amateur satellites are visible.

There are also many ways that you could use Google Earth for your own needs, without ever publishing the results. For example, keeping a visual record of QSOs and QSLs, or recording the places where you've operated mobile. Anything, in fact, that has a geographical connection could be plotted onto Google Earth's images.

You don't even need to confine yourself to the surface of the Earth. If you zoom out you'll begin to see the atmosphere around the Earth's rim and eventually you'll see the whole planet against a generic starry background. A group of Californian Radio Amateurs led by N7NXS has been helping to fill this void by creating a Google Earth overlay showing the orbits of almost 800 satellites including, of course, all the amateur radio satellites, **Fig. 4**.

This works through what's known as a Network Link, which is like a special form of URL. In this case, it points to a server where all the satellite data is available in a form that's compatible with Google Earth's maps. Once the link is installed you can then choose which satellites to view and whether to see their orbits and footprints. Clicking on any satellite image opens a small page that has additional data about it.

This is not a live satellite tracking map. The image, at least for now, is a static snapshot. However, it shows very clearly the potential of this approach. Given enough resources, there's no reason why it couldn't be made almost-live by having Google Earth regularly connect to the server and download the latest positional data.

The possibilities, as I hope you can see, are tremendous and we're barely scratching the surface of what could be achieved. If you want to give it a try, you can download Google Earth from **http://earth.google.com/**

There's also a discussion forum for Google Earth users at **http://bbs.keyhole.com/**. If you search this forum site for Amateur Radio you'll find the latest ideas that are being developed and talked about. The network link for satellite orbits can be downloaded from **http://www.openaprs.net/**

Impressive though Google Earth undoubtedly is, I hope its arrival won't undermine some of the really excellent radio mapping software that's already out there. Programs such as DX Atlas, for example, provide a very clear way of showing things like propagation conditions, prefixes, locators, the grey-line and so on. For that sort of uncomplicated large-scale data, graphical simplicity is a definite advantage. Unnecessary detail simply gets in the way. On the other hand, if you're planning a DXpedition to some remote island, wouldn't it be good to recce the best sites before you go?

Cheerio for now
Jack

JACK WEBER
C/O PW EDITORIAL OFFICES
ARROWSMITH COURT
BROADSTONE
DORSET BH18 8PW
E-MAIL: databurst@pwpublishing.ltd.uk

mail order...huge range in stock...fast delivery...

the pwpublishing RADIOBOOKSTORE

Please try to order from an up-to-date issue to ensure correct prices and availability.

UK Scanning Directory 9th Edition

This book will not disappoint!

The UK Scanning Directory is Britain's largest and best selling VHF/UHF frequency directory and the undisputed leader in the field. No other book dares to list so many frequencies and in such great detail. ONLY £19.75

Airband

	Pages	Price
● **AIRBAND RADIO GUIDE**. 6th Edition (abc)	122	£8.99
● **AIRBAND RADIO HANDBOOK**. David Smith (Sutton)	190	£12.95
● **INTERNATIONAL AIRBAND RADIO HANDBOOK**. David Smith (Sutton)	192	£9.99
● **AIR TRAFFIC CONTROL**. 9th Edition (abc)		£8.99
● ORDER NOW **AIRWAVES 2006**. (Photavia)	144	£10.95
● **AIRWAVES SELCAL - CIVIL & MILITARY DIRECTORY**. (Photavia)	176	£11.95
● ORDER NOW **CALLSIGN 2006**. (Photavia)	????	£10.95
● ORDER NOW **CIVIL AIRCRAFT MARKINGS 2006**. Wright & Peel. (abc)	368	£9.99
● **FLIGHT ROUTINGS 2005**. T. Williams	180	£10.00
● ORDER NOW **MILITARY AIRCRAFT MARKINGS 2006**. March & Curtis. (abc)	208	£9.99
● **BRITISH ISLES ATLANTIC TRANSITION CHART** (AERAD)	1020x520mm	£10.50
● **BRITISH ISLES LOW ALTITUDE CHART** (AERAD)	1020x520mm	£10.50
● **NORTH ATLANTIC ROUTE CHART** (AERAD)	1020x520mm	£10.50

Scanning & Shortwave Frequency Guides

● **BUYING A USED SHORT WAVE RECEIVER**. 4th Edition. F. Osterman	78	£5.95
● **FERRELLS CONFIDENTIAL FREQUENCY LIST**. 13th Edition	540	£21.50
● **KLINGENFUSS GUIDE TO UTILITY STATIONS 2005/6** plus free 2006 supp'	552	£30.00
● **KLINGENFUSS SHORTWAVE FREQUENCY GUIDE 2006**	496	£23.00
● **KLINGENFUSS SHORTWAVE FREQUENCIES CD 2006**	-	£17.00
● **KLINGENFUSS RADIO DATA CODE MANUAL**. 17th Edition	600	£30.00
● **PASSPORT TO WORLD BAND RADIO 2006**. (IBS)	592	£17.50
● **RADIO LISTENERS GUIDE 2006**	160	£5.45
● **SCANNERS 4**. SCANNING INTO THE FUTURE. Bill Robertson	245	£9.95
● **THE ESSENTIAL GUIDE TO SCANNING**. Martin Peters	108	£6.00
● **UK SCANNING DIRECTORY - 9th Edition**	544	£19.75
● **WORLD RADIO TV HANDBOOK 2006**. (WRTH)	688	£22.50

Antennas/Transmission Lines/Propagation

● **25 SIMPLE INDOOR & WINDOW AERIALS**. E.M. Noll. (Babani)	50	£1.75
● **25 SIMPLE TROPICAL & MW BAND AERIALS**. E.M. Nol.l (Babani)	54	£1.75
● **AN INTRODUCTION TO RADIO WAVE PROPAGATION**. J.G. Lee. (Babani)	116	£3.95
● **ANTENNA COMPENDIUM**. Vol 3. (ARRL)	285	£18.99
● **ANTENNA FILE**. (RSGB)	285	£18.99
● **ANTENNA TOOLKIT** (inc. CDROM). Joseph J. Carr	214	£25.00
● **ARRL ANTENNA BOOK** (inc. CDROM). 20th Edition	944	£32.00
● **BACKYARD ANTENNAS**. Peter Dodd G3LDO. (RSGB)	200	£18.95
● **EXPERIMENTAL ANTENNA TOPICS**. H.C. Wright	70	£3.50
● **HF ANTENNA COLLECTION**. Edited by Erwin David G4LQI. (RSGB)	233	£19.95
● **HF ANTENNAS FOR ALL LOCATIONS**. 2nd Edition. Les Moxon G6XN. (RSGB)	322	£19.99
● **INTERNATIONAL ANTENNA COLLECTION**. G. Brown M5ACN. (RSGB)	250	£11.95
● **INTERNATIONAL ANTENNA COLLECTION 2**. G. Brown M5ACN. (RSGB)	200	£11.95
● **RADIO PROPAGATION PRINCIPLES & PRACTICE**. Ian Poole G3YWX	102	£14.95
● **RECEIVING ANTENNA HANDBOOK**. Joe Carr	189	£17.50
● **VHF UHF ANTENNAS**. Ian Poole G3YWX. (RSGB)	128	£13.99
● **WIRE ANTENNA CLASSICS**. (ARRL)	200	£10.50
● **MORE WIRE ANTENNA CLASSICS**. VOL 2. (ARRL)	200	£12.50

Beginners/Licence/Manuals

● **ADVANCE! THE FULL LICENCE MANUAL**. Alan Betts G0HIQ & Steve Hartley G0FUW. (RSGB)	104	£11.99
● **AMATEUR RADIO EXPLAINED**. Ian Poole G3YWX. (RSGB)	150	£9.90
● **AN INTRODUCTION TO AMATEUR RADIO**. I.D. Poole. (Babani)	150	£4.99
● **FOUNDATION LICENCE NOW!** Alan Betts G0HIQ. (RSGB)	32	£4.99
● **INTERMEDIATE LICENCE - BUILDING ON THE FOUNDATION**. Steve Hartley G0FUW. (RSGB)	76	£6.99
● **NOVICE RADIO AMATUERS EXAMINATION HANDBOOK**. I.D. Poole. (Babani)	150	£4.95
● **SECRET OF LEARNING MORSE CODE**. Mark Francis. (Spa)	84	£6.95

Design & Construction

● **COIL DESIGN & CONSTRUCTION MANUAL**. (Babani)	106	£3.95
● **PRACTICAL PROJECTS**. G. Brown M5ACN. (RSGB)	208	£13.95
● **PROJECTS FOR RADIO AMATEURS & SWL**. R A. Penfold. (Babani)	92	£3.95
● **RADIO & ELECTRONICS COOKBOOK**. (RSGB-Newnes)	319	£16.99
● **RF COMPONENTS & CIRCUITS**. Joe Carr. (RSGB-Newnes)	398	£22.50
● **THE ART OF SOLDERING**. R. Brewster. (Babani)	84	£3.99
● **UNDERSTANDING BASIC ELECTRONICS**. (ARRL)	314	£15.50
● **THE SUPERHET RADIO HANDBOOK**. I.D. Poole. (Babani)	104	£4.95

Shack Essentials

● **AMATEUR RADIO MOBILE HANDBOOK**. P. Dodd. (RSGB)	114	£14.99
● **AMATEUR RADIO (VALUE) LOGBOOK**. (RSGB)	80	£4.95
● **ARRL HANDBOOK 2006** inc CD	1152	£32.00
● **ARRL OPERATING MANUAL**. 8th Edition. (WSL)	420	£18.50
● **GREAT CIRCLE MAP**. (PWP)	400 x 400mm	£1.50
● **LF TODAY - GUIDE TO SUCCESS 136kHz**. M Dennison. (RSGB)	128	£11.95
● **RADIO AMATEURS MAP OF THE WORLD**	-	£8.00
● **RADIO AMATEURS WORLD ATLAS** (A4 size, DARC)	20	£8.00
● **RSGB AMATEUR RADIO OPERATING MANUAL**. (RSGB)	224	£19.95
● **RSGB PREFIX GUIDE**. (RSGB)	34	£8.95
● **RSGB YEARBOOK**. 2006 Edition. (RSGB)	504	£18.95
● **RSGB RADIO COMMUNICATIONS HANDBOOK**. 8th Edition. (RSGB)		£19.99
● **CALLSEEKER GB AMATEUR CALLSIGN LISTING CD 2006**		£14.95
● **RECEIVING (VALUE) STATION LOGBOOK**. (RSGB)	80	£4.95

Microwaves

● **AN INTRODUCTION TO MICROWAVES**. F.A. Wilson. (Babani)	134	£3.95
● **INTERNATIONAL MICROWAVE HANDBOOK**. A. Barter. (RSGB-ARRL)	474	£24.95

QRP

● **LOW POWER COMMUNICATIONS**. 2nd Edition. (ARRL)	240	£13.95
● **LOW POWER SCRAPBOOK**. (RSGB)	320	£12.99
● **QRP BASICS**. George Dobbs G3RJV. (RSGB)	204	£14.95

VHF & Higher

● **ALL ABOUT VHF AMATEUR RADIO**. W. I. Orr W6SAI. (ARRL)	163	£8.95
● **GUIDE TO VHF/UHF AMATEUR RADIO**. Ian Poole G3YWX. (RSGB)	180	£8.99
● **VHF/UHF HANDBOOK**. Dick Bidduph G8DPS. (RSGB)	180	£22.00

Crystal Sets

● **CRYSTAL RECEIVING SETS & HOW TO MAKE THEM**. (Lindsay)	124	£7.95
● **CRYSTAL SET LOOPERS, A THREE TUBER & MORE**. Volume 8 Xtal Set Society Newsletter	128	£10.50
● CRYSTAL SET BONANZA Vol 9, 10 & 11. Xtal Set Society Newsletter	226	£15.00
● **THE XTAL SET SOCIETY NEWSLETTER**. Volume 1 & 2 Combined. Phil Anderson W0XI	96	£14.00
● **THE XTAL SET SOCIETY NEWSLETTER**, Volume 4. Phil Anderson W0XI	88	£7.00
● **THE XTAL SET SOCIETY NEWSLETTER**, Volume 5. Phil Anderson W0XI	88	£7.00

Historical

	Pages	Price
● ***ORDER NOW* 1940s AMATEUR RADIO BOX SET.** *(RSGB) 6 book set*	450	£15.99
● ***100 RADIO HOOK UPS** 2nd Edition (reprinted)*	48	£3.35
● ***AMATEUR RADIO - A BEGINNERS GUIDE.** (1940 REPRINT) (Lindsay Publications). Douglas Fortune W9UVC*	156	£7.70
● *COMMUNICATIONS RECEIVERS - THE VACUUM TUBE ERA. R.S. Moore*	141	£17.95
● ***HOW TO BUILD YOUR RADIO RECEIVER***	100	£7.20
● ***MARCONI'S ATLANTIC LEAP** (H/B). Gordon Bussey. (Marconi)*	96	£6.99
● ***POP WENT THE PIRATES.** Keith Skues*	568	£14.99
● ***RADIO & RADIO OPERATORS FROM SPARKS TO SATELLITES.** (Package with Swedish hardback book, English spiral-bound translation and CD with printable PDF files) Birgitta Guftafsson*	255	£25.00
● ***THE SAGA OF MARCONI OSRAM VALVE.** B. Vyse & G. Jessop*	346	£25.00

Valves

	Pages	Price
● ***HOW TO BUILD THE TWINPLEX REGENERATIVE RECEIVER.** T.J. Lindsay*	63	£6.75
● ***HOW TO BUILD YOUR FIRST VACUUM TUBE REGENERATIVE RECEIVER.** T.J. Lindsay*	127	£8.25
● ***HOW TO BUILD YOUR RADIO RECEIVER** (A4) (Popular Radio Handbook No. 1)*	100	£6.70
● ***HOW TO MAKE A NEUTRODYNE RECEIVER.** Webb*	63	£5.95
● ***SECRETS OF HOMEBUILT REGENERATIVE RECEIVERS.** C.F. Rockey*	127	£8.75

Electronics

● ***ELECTRONIC PROJECT BUILDING FOR BEGINNERS.** R.A. Penfold. (Babani)*	110	£4.95
● ***GETTING THE MOST FROM YOUR MULTIMETER.** R.A. Penfold. (Babani)*	102	£4.99
● ***NEW LOW PRICE* UNDERSTANDING BASIC ELECTRONICS** (ARRL)*	316	£12.99

Binders

● ***PRACTICAL WIRELESS OR SHORT WAVE MAGAZINE***	£6.50

how to order

By Post: Write to the Book Store, remembering to include your name, address, daytime telephone number and payment details (Sterling, cash not accepted), at: **Book Store, PW Publishing Ltd., Broadstone, Dorset BH18 8PW.**

By Telephone: Call the Book Store, Monday to Friday 9am to 4pm. Outside these hours your order will be recorded on an answerphone. **Call: 0870 224 7830**

By Fax: If you wish to FAX your order to us please mark it for the attention of the Book Store and send it to: **FAX: 0870 224 7850**

By E-mail: bookstore@pwpublishing.ltd.uk

Photocopies & Back Issues: To order a Back Issue please call the Order Line to check availability. We can photocopy articles from issues that are not available and we have a Review List going back years!

Back Issues (non-current): *SWM* @ £5.00 (£5.50), *PW* @ £4.75 (£5.25), *RA* @ £4.60 (£5.10).

Postal Charges: (UK) one item £1.75 / Two or more items £2.75.

EUR/RoW: One item £2.75 / two or more items add 75p for every item.

Review List: £2* (* includes P&P - add a further £1 for EUR/RoW)

Photocopies / Reprints: (Articles over 3 years old) £3.00, UK £4.00 overseas

order form

Photocopies are acceptable

Please send me the following books:

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

.....Price (£).....

Total cost of books ordered: .....Price (£).....

Postage & Packing charges
Please remember to add P&P to your order. (£).....

UK
£1.75 P&P for one item, £2.75 for two or more (UK)

Airmail
£2.75 P&P for one, £4.25 for two, 75p extra per item for three or more

Total cost of order including postage.....Price (£).....

Send this completed form to:

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

Payment Details. Please note: For security purposes, you must include your house number and postcode.

Name .....

Address.....

.....

.....

Postcode.....

Telephone (Daytime) .....

I enclose my Cheque/Postal Order for £.....

Please note: Cheques MUST made payable to PW Publishing Ltd. and please write your cheque guarantee card number on the reverse.

or please debit my Access/Visa/Amex

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry Date ..... Security No.

or please debit my Maestro/Solo

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐ ☐☐☐☐

Expiry Date ..... Security No.

Start date ..... Issue No (if on card).....

Signature.....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at the time of going to press.
Please note: all payments must be made in Sterling, cash not accepted.

Classified Ads

To advertise on this page see the booking form below.

DISCLAIMER Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. *Practical Wireless* advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The publishe s of *Practical Wireless* wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

Classified Advertisment Dept.
PW Publishing Ltd,
Arrowsmith Court,
Station Approach, Broadstone,
Dorset BH18 8PW

Valves

VALVES AND ASSOCIATED COMPONENTS Available from stock as well as manuals and service information. Phone or SAE for your requirements. Chevet Book Supplies, 157 Dickson Road, Blackpool FY1 2EU.
Tel: (01253) 751858 or Fax: (01253) 302979.
E-mail: chevet@globalnet.co.uk

VALVES:- OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAE for FREE list to: Wilson Valves, (Jim Fish G4MH), 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ.
Tel: 01484 654650/649380/650725.
Mobile:- 07733 283084.
Fax: 01484 655699.
E-mail: wilsonv@zoo.co.uk
Visa etc. Fast & personal service.

VALVES AND ALLIED COMPONENTS IN STOCK Ring for free list. Valves/ books/magazines wanted. Geoff Davies (Radio). Tel: 01788 574774.

TOP PRICES PAID

for all your valves, tubes, semi-conductors and ICs.

Langrex Supplies Ltd.

1 Mayo Road, Croydon, Surrey CR0 2QP.

TEL: 0208-684 1166. FAX: 0208-684 3056.

Repairs

REPAIRS TO ALL AMATEUR AND VINTAGE Rx/Tx Cost effective service. Phone or call in for details. Medway Aerials, Rear of 14 Luton Road, Chatham, Kent ME4 5AA.
Tel: 01634 845073.

REPAIRS TO ALL AMATEUR EQUIPMENT call for details. G0PGY Electronics, 56 Bassenhally Road, Whittlesey, Cambs PE7 1RR. 01733 351538.

Aerials

GAREX ELECTRONICS VHF/UHF accessories and aerials, PMR equipment and spares. www.garex.co.uk

Tel: 0771 4198 374
PO Box 52, Exeter EX4 5FD.

Societies

ROYAL NAVAL AMATEUR RADIO SOCIETY seeks your support and membership. Qualify? Join today!
www.rnars.org.uk

QSL Cards

FULL COLOUR QSL CARDS for all your QSL needs. Shirts and caps with callsigns and also ham cartoons by GW3COI. For free samples contact Chris M0DOL. E-mail: qslers@aol.com P.O. Box 184 Northampton NN3 9JH

For sale

Qtz x-tals 455kHz to 150MHz Std 10.106, 10.245, 10.7, 11.155MHz £1.00/unit. Callg 3.56, 7.030, 21.06, 28.06 £1.00/unit. 1.4MHz fltrs £14.00. 10.7MHz 10kHz fltrs £3.25 P&P £1.00 + VAT. IQ Electo 0208 391 0545. vincent@jakomin.fsnet.co.uk

AOR AR-7030 enhanced version communictions receiver. As good as brand new. £400.00. Tel: 01268 765051.

PARTS FOR TWO KEF204 RADIOS. Cases, tuning capacitors, switches, transistors etc. No pcb or circuit diagram. Also, 1000uF 35V radial Thomson capacitors unused, 14 sealed bags (200). Offers. 01189 585770 or 07979 503229 (Reading).

Wanted

OLD HALF INCH FERRITE RODS Must be half inch in diameter and be six inches long or more. Tel: Peter Tankard 0114 2316321.

WANTED FOR CASH

COMMUNICATION RECEIVERS

Valve or solid state – working or not. Older or obsolete amateur radio equipment. Transceivers, station accessories, etc. Ex-Govt. wireless equipment. Radio books and magazines. We can collect anywhere in U.K. We also have a selection of the above items for sale in our shop. Open Tuesday, Thursday, Friday and Saturday 10am-6pm. Prior phone call before visiting appreciated.

Chevet Supplies, 157 Dickson Road, Blackpool FY1 2EU. Tel: 01253 751858. Fax: 01253 302979.

E-mail: chevet@globalnet.co.uk

ORDER FORM FOR CLASSIFIED ADS

PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0870 224 7820, Fax: 0870 224 7850.

Please insert this advertisement in the ..... **issue of Practical Wireless** (if you do not specify an issue we will insert it in the next available issue of PW) for ..... insertion/s. I enclose Cheque/P.O. for £.....(42p per word, 12 minimum, please add 17.5% VAT to total).

Name: .....

Address: .....

.....

.....

.....

Telephone No.: .....

Box Number @ 70p: Tick if appropriate ..... ☐

Category heading: .....

Please photocopy this form or write on a separate sheet if you prefer

Bargain Basement

SEND YOUR ADVERT TO:-
***PRACTICAL WIRELESS*, BARGAIN BASEMENT, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW**

For your advert in Bargain Basement please remember to include your dated, coloured corner flash from this page along with your entry.

YOUR ATTENTION PLEASE!

Bargain Basement rules - £4 per advert

Please write your advert **clearly** in **BLOCK CAPITALS** up to a maximum of **30 words**, plus **12 words f**or your contact details on the form provided and send it together with the dated corner flash and your **payment of £4** (**subscribers** can place their advert **free of charge** as long as they provide their **subs number and corner flash**), cheques should be made payable to **PW Publishing Ltd.**, credit card payments also accepted.

Send your advert to **Bargain Basement, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or E-mail your advert to **peter@pwpublishing.ltd.uk** (If you don't want to include your credit card details on your E-mail, just 'phone us on **0870 224 7820**.

Please help us to help you by preparing your advert carefully. Any advert which contains **??** marks indicates that the advertiseng dept. could not read/interpret the wording.

Please avoid FAXing your advert - it could delay publication.

Advertisements from traders or for equipment that it is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. **No responsibility will be taken for errors and no correspondence will be entered into on any decision taken by the Editor on any of these conditions.**

You should state clearly in your advert whether equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

FOR SALE

AOR AR-88 £120. AVO-8, £80. Evershed bridge Megger .01-1MΩ 250V, 50. Metrotest clamp meter, 1000 amps/volts, £30. Metrotest Megger 1000V, £30. All G.W.O. postage extra. Various radio books 1950(ish), £5 each. SAE list. Tel: John 01752 560209.

AR-880 WORKING ORDER with manual, £55. Vangard KW-77 HF receiver, working order with manual, £45. No offers. Tel: Bob 0778 843 4835 (Doncaster).

CHASE LFR-1000 VLF/LF receiver. 9kHz-150kHz. Chase HFR-2000 HF receiver. 130kHz-30MHz. High quality instrument, standard measuring receivers. Phone weekdays after 6pm or anytime weekends for more details. Offers invited. Tel; David 01723 506190 (North Yorkshire). E-mail: david.sloss@metronet.co.uk

EDDYSTONE 940 with diecast speaker, £85. Advance H-1 signal generator, £20. Heathkit distortion meter IM-12, £15. Heathkit VV meter V7AUK, £15. Heathkit speaker units, £10 pair. Truvox R/R 7.5" tape recorder, £10. SAE other items. Tel: Bruno G4FZG QTHR 01242 256295 (Cheltenham).

HF-150M (MARINE) excellent condition including manual, keypad and PSU, £175 o.n.o. Eddystone EC-10 MkI very good original condition and working, £65 o.n.o. Tel: Paul 01780 740699 evening or 07963 320939 daytime (Lincolnshire).

ICOM IC-756 HF/6m mike and manual £675 o.v.n.o LDG AT-11MP auto tuner, £130 o.v.n.o Magellan GPS315 hand-held GPS all items plus postage and insurance.Tel: Tony G4SJI 01430422657. Mobile 07749505309 (South Cave Nr Hull).

JRC NRD-535 RECEIVER immaculate condition. Perfect working order complete with manual, mains lead and RS-232 lead for computer control, £450 o.n.o. Tel: David 01302 390604 anytime (Doncaster). E-mail: radio_david@yahoo.com

KENWOOD AT-230 MANUAL 200W tuner, £95. VGC, CW filter. Kenwood YK-88C-1, £40, as new. Tel: David 0183 839616 (Fife).

KENWOOD TS-2000 HF/6/2/70, £990. Heil mic HM-10 with stand, £50. Watson PSU W25AM, £70. Yaesu (2) FT-817, £375, £325. Bencher key BY-2 twin paddle, £75. Whip antenna 10-15-20, £25. Post extra. HRO rec with PSU, £50. collect Essex area. Tel: Denis 01245 440788.

MOSLEY TA-33 JUNIOR HF beams KW-200B transceiver. Heathkit GDO Western SWR/PWR meter. Offers. Telephone for information, inspect and collect only. Tel: 01934 843144 (Somerset).

OSCILLOSCOPE 10MHz, £25. BC-906 frequency meter, £15. MEK-2 new, £20. MM-831, £5. Portable mast, 12ft, £20. Low-pass filter, £10. Various manuals, £5 each. All good condition plus packing and post. Tel: 01827 51591 (Staffordshire). E-mail: james.anderson48@tiscali.co.uk

PIC PROGRAMMED as electronic morse keyer 5-35w.p.m. Automatic switch-off. Iambic or non-Iambic. Very simple to make. Full details provided, only £10. E-mail: chick@chickene.freeserve.co.uk

***PRACTICAL WIRELESS* BACK NUMBERS** for sale. 1990 to 2004. All good condition at £2 each inc. P&P. Tel: Alan 01454 850795 (Nr. Bristol).

YAESU FT-857D with PSU, ZV-4000 and manual. Brand new, boxed, litted used. FT-857D only £450. FT-857 plus ZV-4000, £550. Carraige at cost. Tel: G3ATI 01394 412161 (Boyton).

YAESU FT-902D SPARES PC panels ganged tuning inductors. Yaesu MH-138 condenser microphone with up/down buttons and keypad tone generator. Genuine W2DU balun. Controller for CD-45 rotator. Yaesu FT-726R handbook and manual. Avometer model 7. Tel: 01904 794680 (York).

WANTED

1.5MHz CRYSTAL any type of holder. Also, Eddystone 898 dial drive assembly to finish. G2DAF transmitter. Tel: Ken 01759 304315 (York).

AIR WOUND COIL 6TPI 14 gauge wire or similar for aerial project or info as to where one can be obtained. Tel: Arthur G1KRW 01952 811026 (Shropshire).

BC-348 REQUIRED in good condition by WWII RAF radio veteran. Can you help, please? Your price paid. Tel: Norman 01944 738404 (North Yorkshire).

CW TAPES 30w.p.m. long hand, for practice. Trying to raise from 20w.p.m. to 30w.p.m. with little success. Any tutoring would be appreciated. Re-numeration by discussion. Tel: Myles 01234 711538 (Buckingham).

MEDIUM SIZE KNOBS RF-1 AF gains, etc. for AR-88D Rx. Tel: G4MNB QTHR 01793 331585 (Swindon).

MFJ-9015 (CUB) P/ex okay. Tel: David 0183 839616 (Fife).

MOTOROLA OR SIMILAR MC1496 and MC1590 IC's. Tel: Simon, M5POO on 01434-633913 or E-mail: simon@nomis.co.uk

OLD HALF INCH FERRITE RODS must be half inch in diameter and be six inches long or more. Will pay good money for the rods. Tel: Peter Tankard 0114 2316321 from 9am to 10pm (Sheffield).

STILL WANTED Selector switch for MFJ-949 ATU. Tel: 0161 775 8444 (Manchester).

bargain basement order form

Please insert this advertisement in the next available issue of *Practical Wireless*.

❑ **For Sale** ❑ **Wanted** ❑ **Exchange**

Please note: For security purposes, you must include your house number and postcode. Don't forget the corner flash!!

Name.....

Address .....

.....

..... **Post code** .....

Telephone Number.....

please write in block capitals

CARD NUMBER

Signature..... Security number

Switch issue number (if on card).....

Start date of card..... Expiry date of card .....

My Subs Number is.....*(or mailer label)*.....

	(30)		

CONTACT DETAILS FOR ADVERT.

Please only write in the contact details you wish to be published with your advert, ie. do you want your name & address, or just your telephone number?

Your advert, you decide! PLEASE - No FAXed Ads!

			(12)

B.B. May '06

Subscribe to Practical Wireless

- *Never miss an issue*
- *Have it delivered to your door*
- *Subscribers get their copies before they reach the shops*
- ***PW** is Britain's best selling Amateur Radio magazine*

Joint subscriptions now available - Save £££s

On-line facilities are now available as well as the usual way to pay by cheque, postal order and credit card.

order a new subscription

Simply pay with a credit card on-line using our secure server.

check the status of a subscription

Existing subscribers can now log in to their own accounts and see how many issues they have left to run.

update your details

If you move or change your personal details, you can now update them on-line without having to write in to let us know.

renew an existing subscription

We've made renewing easier too. Everything you need to renew is now available on-line as well as by regular mail.
(Subscribers still get a reminder in the post when it's time to renew).

To order a subscription please contact our new subscription agency:

Practical Wireless Subscriptions
PO Box 464
Berkhamsted
Hertfordshire HP4 2UR. UK

Credit Card Orders taken on:
(01442) 879097
between 9am - 5pm. Outside these hours your order will be recorded on an answering machine.

FAX Orders taken on **(01442) 872279**

Internet Orders can be placed at:
www.webscribe.co.uk

or **via E-mail** to: **pw@webscribe.co.uk**

Please note cheques should be made payable to PW PUBLISHING LTD and CASH is NOT accepted.

Subscription Rates

(Please tick appropriate box)

		Practical Wireless SAVE £££s	
1 YEAR	UK	£33	❑
	Europe Airmail	£41	❑
	ROW Airmail	£50	❑
3 YEARS	UK	£89	❑
	Europe Airmail	£111	❑
	ROW Aimail	£143	❑

Special Joint Subscription

(Please tick appropriate box)

		Practical Wireless and RadioUser SAVE £££s	
1 YEAR	UK	£61	❑
	Europe Airmail	£75	❑
	ROW Airmail	£92	❑
3 YEARS	UK	£166	❑
	Europe Airmail	£203	❑
	ROW Aimail	£262	❑

I wish to order a one/three year subscription to practical wireless starting with the.....issue.
I wish to order a joint one/three year subscription to practical wireless and radiouser starting with the.....issue.

Payment Details

I enclose my Cheque/Postal Order for £.....*
made payable to PW Publishing Ltd.
or please debit my Access/Visa/Amex* card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Security Number: ☐☐☐

MasterCard VISA AMERICAN EXPRESS *Expiry Date.....*

or please debit my Switch card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐

Security Number: ☐☐☐

SWITCH *Date.....Switch Issue Number (if on card) .....*

Switch Expiry Date.....

Signature .....

Name .....

Address .....

.....

.....

.....

.....

Please note: For security purposes, you must include your house number and postcode.

Postcode .....

Daytime Tel. No .....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at time of going to press.

Please note: All payments must be made in Sterling. Cash not accepted.
Cheques made payable to PW Publishing Ltd.

*(*Delete as necessary)*

Photocopies of this page are acceptable

rob mannion's topical talk

This month Ian Brothwell G4EAN provides the topical talk. Ian very kindly represented PW at the Junction 28 QRP rally in South Normanton in North Derbyshire on 11 March. It seems as though he had a busy time!

Popular *PW* advertiser Will Outram (Bowood Electronics, Chesterfield) said it was a "Cracking rally" and he met many readers. Will told the Editor he's going to make a "real effort to get his Amateur Radio Licence soon". So, watch this space readers!
Photograph courtesy of G4EAN.

Ian G4EAN writes: When we (that's **John Fletcher G4EBT** (formerly of **Kanga**), **Ray Parkinson** - an s.w.l. and budding Amateur, and myself) arrived at the entrance to the Junction 28 rally car park we were politely told that the car park was already full. We would have to move the car after unloading our goods (for the **South Nottingham ARC** and *PW* stands).

When we pulled into the car park itself we could see the problem! Building work had just started around the front and right hand side of the South Normanton community hall. Some of the car park had already been dug up and the usual entrance to the hall was inaccessible.

The rally organisers had almost no notice about this work. Personally, I felt the rally organisers were right in choosing to go ahead with the rally rather than cancel or postpone it at such short notice.

The entrance to the hall (for both traders and rally-goers) was actually towards the rear left of the building. As the *PW* stand was towards the front right of the hall I had a long walk. It was fortunate that our magazines and posters were in just one large bag! By the time I'd taken some photos and set out the *PW* stand it was 1000, the rally had opened and the hall was soon crowded with rally-goers.

As neither **Rob G3XFD** nor **Tex G1TEX** could attend this rally I had the *PW* stand to myself. It was really nice to meet so many enthusiastic readers. My small stock of *PW* back issues almost sold out and we got through several pages of visitors' signatures!

This was the fifth J28 QRP rally. It's now a well-established event, which I enjoy very much indeed. It is organised by the **South Normanton and District ARC**. The rally was based in a single large hall for the trade and club stands with a bar area off the hall and a kitchen/dining area also off the hall.

The theme of this enjoyable event is 'Amateur Radio' and it is a rally for the radio enthusiast. There was a good range of stands and it was not hard to find components, books and magazines (including some very old and collectable copies of *PW*), Amateur Radio equipment, domestic radios, test equipment, tools and other goodies.

It was quite a boost for my nostalgia to see so many transceivers from the 1970s and 1980s. There were also several club stands including the **G-QRP**, **South Nottinghamshire** and **Derby & District** clubs. There was an **RSGB** bookstall in the bar area and a few traders in the car park. Rather remarkably, it was not until the rally started to close down that we had a short shower of cold rain or sleet!

I'm already looking forward to the 2007 rally. The building works should be finished by then, giving the rally a bigger home. Finally, my thanks go to all the people at **SNADARC** for making the rally happen and to John G4EBT for the lift to/from the rally.

Editor's thanks: *Ian normally gives up his day to help me at this delightful rally, but due to circumstances he was left in charge this year. Thanks very much indeed Ian, you are a credit to Amateur Radio, a great friend of PW and its Editor. I look forward to attending the 2007 event with Tex G1TEX!*
Rob G3XFD.

Index to Advertisers

KENWOOD
Listen to the Future

On or off the road, Kenwood's new TM-271E delivers powerful mobile performance with 60W maximum output and such advanced features as multiple scan functions, memory names, and TNC connectivity for packet communications. Yet this tough, MIL-STD-compliant transceiver goes easy on you, providing high-quality audio, illuminated keys and a large LCD with adjustable cool-green backlighting for simple operation, day and night.

● 200 memory channels (100 when used with memory names) ● Frequency stability better than ±2.5ppm (-20~+60°C) ● Wide/Narrow deviation with switchable receive filters ● DTMF microphone supplied ● Data connector for packet communications (using 1200/9600bps TNC) ● CTCSS (42 subtone frequencies), DCS (104 codes) ● 1750Hz tone burst ● VFO scan, MHz scan, Program scan, Memory scan, Group scan, Call scan, Priority scan, Tone scan, CTCSS scan, DCS scan ● Memory channel lockout ● Scan resume (time-operated, carrier-operated, seek scan) ● Automatic repeater offset ● Automatic simplex checker● Power-on message ● Key lock & key beep ● Automatic power off ● Compliant with MIL-STD 810 C/D/E/F standards for resistance to vibration and shock ● Memory Control Program (available free for downloading from the Kenwood Website: *www.kenwood.com/i/products/info/amateur.html)*

144MHz FM TRANSCEIVER

TM-271E

60W Model

- **High RF power output (60W)**
- **Alpha numeric LCD and illuminated keypad**
- **200 memories, memory name function**
- **MIL-STD 810 C/D/E/F and E-Mark**
- **DTMF Microphone**
- **CTCSS, DCS and 1750Hz functions**
- **Built in TCXO**

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

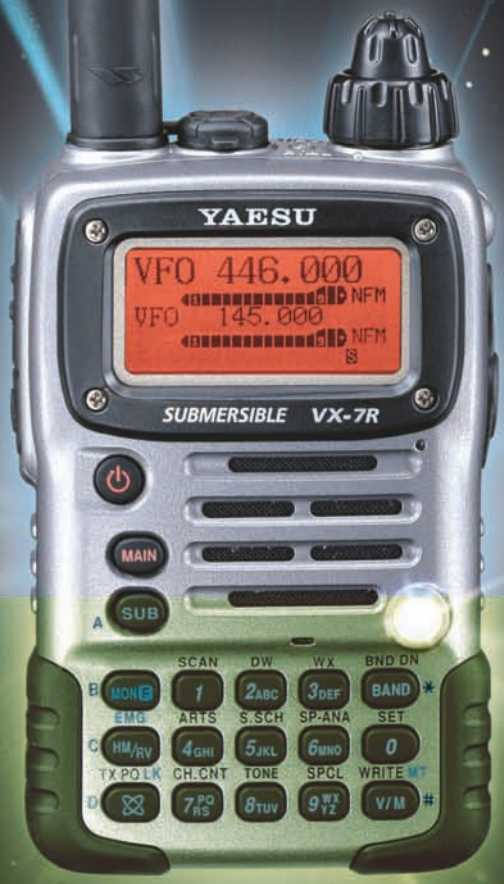
Kenwood Electronics UK Limited

www.kenwood-electronics.co.uk

50/144/430MHz 5W FM Transceiver

VX-7R

ULTRA-RUGGED, SUBMERSIBLE TRI-BAND MAGNESIUM HANDIE



The Brightest Star in the Ham Radio Galaxy

YAESU
Choice of the World's top DX'ers