January 2007 £3.35 ISSN 0141-0857

Now in its 75th year!

Practical WIRELESS

pw

Britain's Best Selling Amateur Radio Magazine

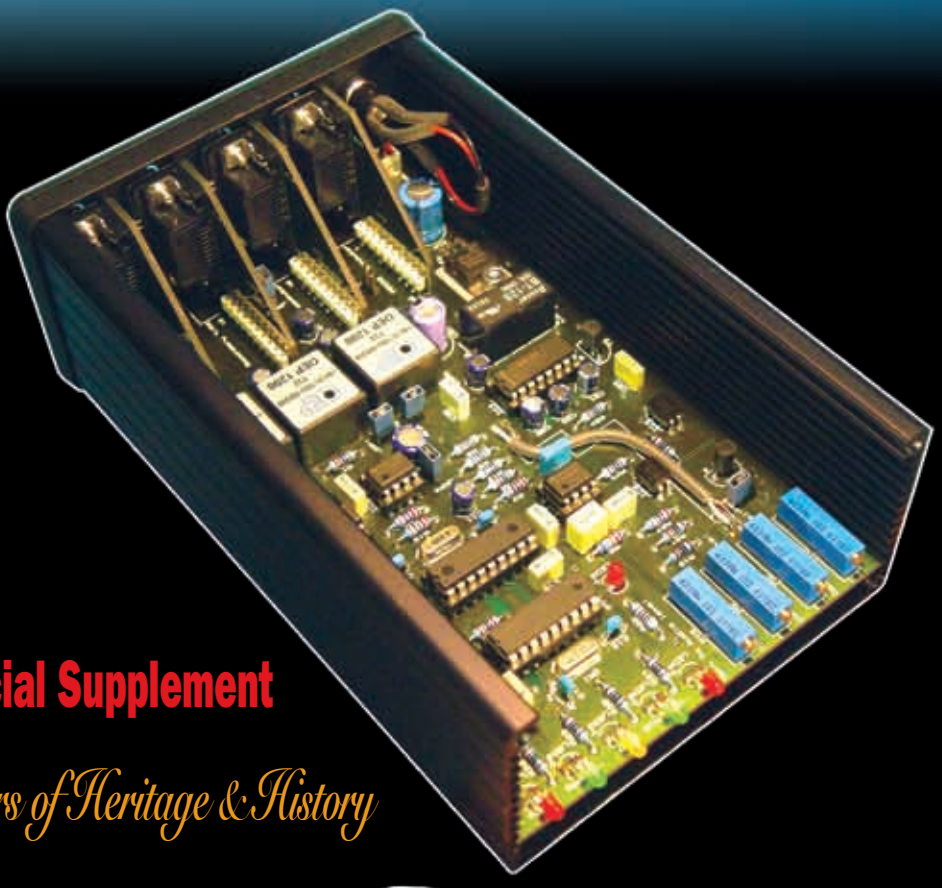
Top Band Antenna
Build a Slinky Long Wire

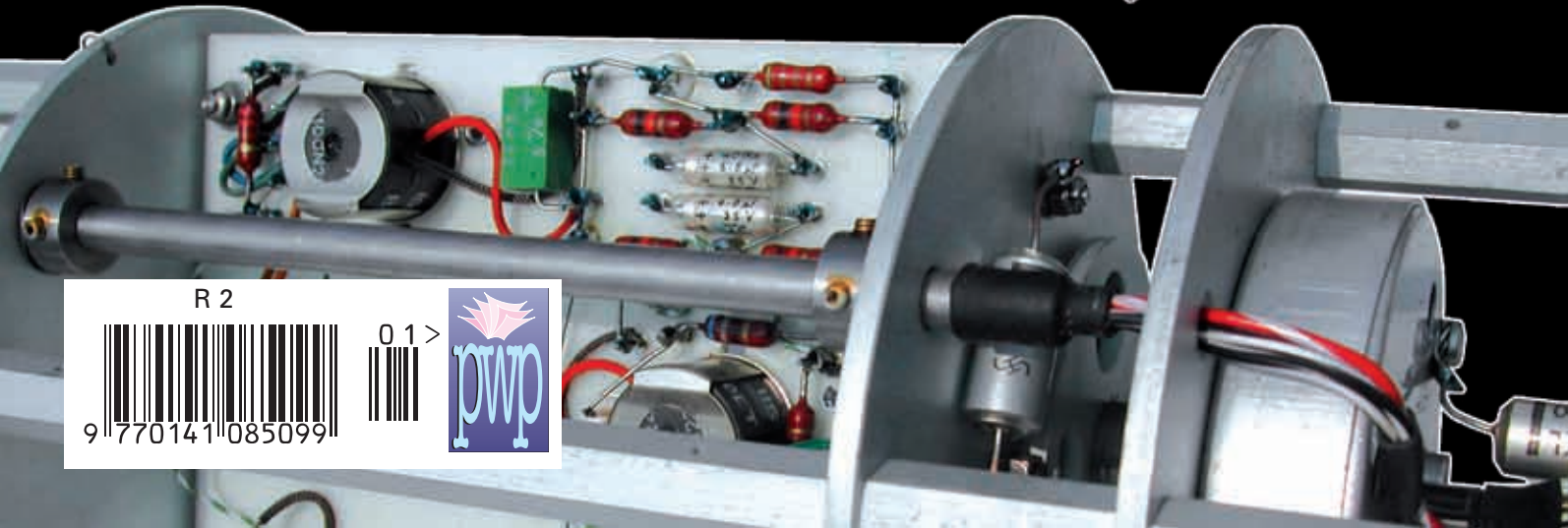
VOIP Linking Interface
Connect Your Radio to the Internet

Hidden Secrets
Somerton Radio Station

Build The Rother
1.8MHz Modulator Transmitter

Starting This Month Special Supplement
Practically Yours 75 Years of Heritage & History





R 2
9 770141 085099 01>
pwp

WATERS & STANTON

Merry Ch
T

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, CHESTERFIELD RD, MATLOCK, DERBYSHIRE, DE4 5LE ENQUIRIES: 01629 832375 FAX: 01629 580020 -CLOSED MONDAYS
SCOTTISH STORE • W&S @ JAYCEE, 20 WOODSIDE WAY, GLENROTHES, FIFE KY7 5DF ENQUIRIES: 01592 756962 FAX: 01592 610451-CLOSED MONDAYS

IN STOCK NOW!

Radio Communications Equipment Guide 2007

368 Full colour pages, crammed full of the latest products, photos & technical spec. Carriage Discount Vouchers included

JUST £2.95!
(+ £1.75 UK P&P)

Great Deals!

AV-20 VSWR
* 3.5 - 150MHz
* 0 - 30 / 0-300W
* 3W FSD
* SO-239 sockets

£29.95 C

AV-40 VSWR
* 3.5 - 150MHz
* 0 - 30 / 0-300W
* 3W FSD
* SO-239 sockets

£29.95 C

Diamond SX-100
* 1.8 - 60MHz
* 30/300/3kW
* RMS PEP
* 13.8V lighting

£109.95 C

Diamond DL-30A / N
* 50 Ohm Load
* DC - 500MHz
* 15W / 100W short term
* Gold plated connect
* PL-259 (A) "N"

£20.95 A (PL)
£29.95 A ("N")

Watson CS-500
* 2-way coax switch
* DC - 500MHz
* 1kW (30MH)
* SO-239 sockets

£12.95 A

Watson Base Antennas

* W-30 2m/70cm 1.15m 3/5dB **£29.95 D**
* W-50 2m/70cm 1.8m 4.5.8dB **£39.95 D**
* W-300 2m/70cm 3m 6.5/9dB **£49.95 D**

A superb range of fibre glass verticals fitted shrouded SO-239 sockets and supplied with mast mounting clamps.
This Offer to PW readers exp. 31/1/2007

High Sierra USA
Sidekick Mobile 80 - 6m!
Go Mobile in minutes with this easy fit motorised antenna

Fits on our standard 3-way magnetic car roof mount. 12V lead with control box included. Superb efficiency.
£249.95 D (Magnetic mount £29.95 if purchased with Sidekick)

FAST SAME-DAY DESPATCH

www.wsplc.com

GREAT PART EXCHANGE DEALS

FREEPHONE ORDER LINE **08000 73 73 88**

YAESU NEW FT-2000 1.8-30MHz +6m 100W

Great Part Exchange Deals!

* *100W RF Output Power built-in mains power supply*
* *IF DSP with WIDTH/SHIFT and Contour Tuning*
* *First IF Roofing Filters*
* *Dual In-band Receive*
* *Robust Receiver Front End with optional High-Q μ-Tune Preselector*

0% Interest!*

Buy Now Pay Later!

£1999 D

FT-897D
Buy Now Pay Later! 0% Interest!*

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

£599 D

FT-857D
Buy Now Pay Later! 0% Interest!*

NEW LOW PRICE!

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

£549 D

FT-817ND
Buy Now Pay Later! 0% Interest!*

NEW LOW PRICE!

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

£349 D

FT-DX9000D
Buy Now Pay Later! 0% Interest!*

Deluxe Base Station HF Transceiver. 1.8 -30MHz, 50-54MHz (160m-10m + 6m Amateur Bands) Tx

FT DX-9000D 200W internal PSU	**£7,299 D**
FT DX 9000MP 400W ext. PSU	**£8,299 D**
FT DX-9000 Contest 200W no TFT	**£3,799 D**

**Buy Now Pay Later Terms & Conditions*

*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** after 10 months pay **29.8% APR** Repay £31.53 per month for 36 months, after the 10 month period . Total amount due £1135.08. Interest is calulated from the date of the agreement. All finance subject to status written quotation on request.*

New Low Interest Credit (LIC) Finance

10.9% APR We now offer Low APR finance over 24/36/48 month periods, payable fromdate of purchase. All finance subject to status written quotation on request.

MFJ, SGC & HEIL...

BUY NOW TO BEAT THE PRICE INCREASES!

MFJ

MFJ-929 £199.95 D
Compact IntelliTuner
Compact 200W 1.8-30MHz Coax or Random Wire Auto ATU

MFJ-927 £229.95 D
Remote IntelliTuner
Compact 200W 1.8-30MHz Auto ATU with Power Injector

MFJ-976 £429.95 D
Balanced Line ATU
1.8-30MHz 1500W Balanced Line Antenna Tuner

SGC

SG-231 £349.95 D
SmarTuner
1.8 to 60MHz, 3 - 100W (PEP) VSWR: <1.4:1 typical

SG-237 £299.95 D
Compact ATU
1.8 to 60MHz, 3 - 100W (PEP) 40W max CW, VSWR: <1.4:1

SG-239 £189.95 D
Mini SmarTuner
1.8 - 30MHz, 1.5 - 200W (PEP) VSWR: Typically less than 2:1

SG-211 £189.95 D
Mini SmarTuner
1.8 - 60MHz, 1 - 60W (PEP or CW), VSWR: Typically <2:1

HEIL

PR-780-PTT £179.95 C
Deluxe Base Microphone
Dynamic cardioid studio mic w/ CB-1PTT base (needs CC-1-XLR) lead.

HC-4 £29.95 A
Dx Quality Mic Insert
Response from 500Hz to 3.5kHz with a 10dB mid-range peak.

HC-5 £29.95 A
Normal Quality Mic Insert
Response from 350Hz to 4kHz with a 6dB mid-range peak.

HTSS £52.95 C
Traveler Single Side Headset & Boom Mic
Requires HSTA patch lead

HTDS £79.95 C
Traveler Double Sided Headset & Boom Mic
Requires HSTA patch lead

HSTA £17.95 A
HSTA-YM for Yaesu modular
HSTA-706 for Icom modular
HSTA-KM for Kenwood modular
HSTA-K8 for Kenwood 8-pin
HSTA-IC8 for Icom 8-pin
HSTA-KHT for Kenwood
HSTA-IHT for Icom handhelds
HSTA-VX for Yaesu handhelds

The UK's Power Supply Specialist.

Don't settle for cheap "Del-Boy" copies

Watson Power-Mite

11-15V Variable. 20A continuous 23A peak, 100 - 260V AC in. 2 x Meters 150 x 55 x 165 mm

£49.95 C

Watson W-25SM

13.8V Fixed. 23A continuous 25A peak 115 / 230v AC in. 229 x 180 x 73 mm

£67.95 C

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

ristmas & A Happy New Year
o All Our Customers

Enquiries 01702 206835

Freephone Orderline 08000 73 73 88

ICOM

IC-7800 — Buy Now Pay Later!
The Ultimate Icom! **0% Interest!***

FREE SP-20 Base Station Speaker with Filters worth £164.95

200W HF Built-in AC PSU

£6,395 D

IC-756PROIII — Buy Now Pay Later!
0% Interest!*

HF + 6m 100W All-Mode

£1999 D

IC-7000 — Buy Now Pay Later!
0% Interest!*

HF/VHF/UHF All-Mode Transceiver

Rig Only £899.95 D

TFT-7000 5.6in Monitor/TV for IC-7000 **Exclusive to W&S**

Deal1 - IC-7000 with Watson Power-Mite portable psu. £929 D

Deal2 - IC-7000 with TFT-7000 Video Monitor / TV. £989.95 D

Deal3 - IC-7000 with Power-Mite & TFT-7000. £1009 D

IC-7400 — Buy Now Pay Later!
0% Interest!*

100W HF-VHF

Rig Only £1,199 D

Deal1 - IC-7400 with SM-20 Desk Mic & SP-21 Speaker £1,235 D

IC-718 — Buy Now Pay Later!
0% Interest!*

100W HF Transceiver

£439 D

IC-706 — Buy Now Pay Later!
0% Interest!*

HF/VHF/UHF All-Mode Transceiver

£749 D

IC-703 — Buy Now Pay Later!
0% Interest!*

The lovely 10W QRP HF-6m radio with built-in Auto ATU

£449 D

KENWOOD

TS-2000 — Buy Now Pay Later!
0% Interest!*

All-Mode Multi-Bander

£1295 D

*1.8MHz - 440MHz *1200 MHz Option
*100W 1.8 - 146MHz *50W 70cms 10W 23cms
*Dual Watch HF/VHF *Comprehensive DSP
*DX Cluster Auto Tune *Built-In TNC
*Auto ATU 1.8MHz - 52MHz
*Transverter Display

TS-2000X - As Above but fitted 23cms £1739 D

TS-480SAT — Buy Now Pay Later!
0% Interest!*

100W HF+6m

£679 D

*1.8MHz - 52MHz 100W *Built-In Auto ATU
*Removeable Front Panel
*Comprehensive DSP
*Speech Processor *Quad RF Mixer
*CW Message Recorder *PSK31 Compatible

TS-480HX - As Above but 200W and no ATU £765 D

TS-570DGE — Buy Now Pay Later!
0% Interest!*

LAST FEW!

*1.8MHz - 30MHz 100W *500kHz - 30MHz RX
*AF DSP *CW Auto Net *Auto ATU

£799 D

bhi Christmas Specials

bhi ANEM

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

~~£119.95~~ **£104.95 C**

bhi NES10-2 MkII

Speaker and programmable DSP unit. Offers dramatic noise reduction.

~~£99.95~~ **£89.95 C**

bhi NEIM-1031

Noise Eliminating In-Line Module.

~~£129.95~~ **£119.95 C**

bhi NEDSP-1061/2-KBD

NEDSP-1061-KBD - Noise Eliminating DSP module fits into FT-817 etc.
NEDSP-1062-KBD - Noise Eliminating DSP module fits into Loudspeaker.

(1061) ~~£89.95~~ £79.95 C
(1062) ~~£99.95~~ £89.95 C

Icom VHF/UHF Mobile/Base

ICOM IC-E208

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 £1085 D
2m / 70cm 100W Base station all - modes with option for 23cm module (**UX-910 £359**)

IC-910X £1229 D
As above but with 23cm module ready fitted and a big saving as well.

IC-2200H £179 D
2m 55W FM mobile with rugged construction and with digital option.

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

Kenwood VHF/UHF Mobile/Base

KENWOOD TM-271E

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

£187 D

TM-G707E £249 D
Dual Band 2m & 70cm with detachable front

Yaesu VHF/UHF Mobile/Base

YAESU FT-7800E

*2m/70cms Dual Band Mobile
*High power 50W 2m /40W 70cms
*Wide receive inc. civil & military air-band *CTCSS & DCS with direct keypad mic.
*Detachable front panel *1000 memories plus five one-touch

£219 D

FT-1802E *NEW!* £125 D
*2m FM Mobile transceiver *5, 10, 25 50W
*DTMF Mic Supplied as standard

FT-8800E £265 D
*2m/70cmDualband FM Mobile transceiver
*50W 2m, 35W 70cm *Wideband receiver

FT-8900R £329 D
*2m, 70cm, 6m & 10m Quadband FM Mobile transceiver *Independent dial for each band

Yaesu ADMS Software

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

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

Customer feedback

Don't take our word for it - read what our customers say!
Just go to www.wsplc.com and click on 'letters'.

Visit our eBay shop for more bargains!

eBay

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

Icom VHF/UHF Handhelds

ICOM IC-E91

The IC-E91 is Icom's new stylish true dual-band handheld transceiver. It covers 2m and 70cm transmit and a wideband receiver that covers 0.495 to 999MHz.

£239.95 C

IC-V82 7W 2m Digital £159 C
IC-U82 70cms Digital £159 C
IC-E90 6/2/70cm £189 C
IC-T3H 2m 5W £129 C
IC-E7 2m/70cm Wide Rx £169 C

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!

£199.95 C

TH-D7E 2m/70cms £249 C
TH-K2E 2m 5W £139 C
TH-K2ET 2m 5W FM £145 C
TH-K4E 79cm 5W FM £139 C

Yaesu VHF/UHF Handhelds

YAESU VX-7R

LIMITED SPECIAL OFFER

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

£209 C

VX-6E 2m/70cm wide rx 5W £169 C
FT-60E 2m/70cm wide rx 5W £129 C
VX-2E 2m/70cms miniature £115 C
VX-150 2m w/ 16-key pad £99 C
VX-120 2m 5W w/ 8-key pad £99 C
VX-170 2m 5W w/ 16-key pad £109 C

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

WATERS & STANTON

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

Software Defined Transceiver

Nothing Else Comes Close!

£6,000 in hardware form - £995 as above! What a choice!

If you have heard my recent talks you will understand how exciting this SDR-1000 software defined transceiver is. Just load the FREE software, connect up the SDR-1000 transceiver to a suitable soundcard and you are ready to go. It will transform your enjoyment. There are regular FREE updates for customers to download. Call our sales desk for a FREE demonstration CD and operate the radio on your PC using a supplied 80m RF sound file. The FlexRadio SDR-1000 would cost you around £6,000 in hardware form! Part Exchange welcome. Peter Waters G3OJV

The Concept:

All modulation and demodulation takes place in your PC. IF filtering and other DSP processes also take place in the PC. Ancillary controls such as AGC, ALC, audio processing, control functions, metering and displays are likewise done within your PC. And everything can be updated FREE as new software versions appear.

SDR-1000 comprises transceiver (100W or 1W) software and PC control cable connector. You need to add a suitable PC professional soundcard like the Delta-44 and 3.5mm stereo connecting leads (soundcard leads and PC speaker adaptor lead kits recommended) plus any Yaesu 8-pin microphone.

Check These Features!

Rx - 12kHz to 65MHz
Tx - 1.8MHz to 52MHz (Ham)
Power - 1W - 100W (500mW 6m)
IMD - 99dB
MDS - 130dBm (14MHz 500Hz)
Modes - SSB CW AM FM
*Realtime Panadapter
*Click on Spectrum Display Tune
*Filter shape factors 1.05:1
*No ring filters down to 25Hz
*AGC after brick wall filter
*Graphic Equaliser & Compander
*Variable bandwidth Tx filter
*Iambic Memory Keyer

Prices

SDR-1000	100 Watts	£995.00	**Delta-44** Soundcard £99.00
SDR-1000	1 Watt	£649.00	**Yaesu MH-31B8 mic.** £39.95
SDR-1000	Receiver	£649.00	**Shuttle VFO Knob** £99.00
Auto ATU		£199.00	**Soundcard leads** £24.95
			PC speaker adaptor lead £4.95

Software Defined Receivers

WiNRADiO

* *Unmatched in value and performance*
* *Choose from either internal PCI module (i) or external module (e)*
* *Software included and requires Windows 98 or later with PC speed 500MHz or above*


PCI version


External version

No hardware design can match them at anywhere near this price! Uses your exising PC soundcard.

Welcome to the exciting world of SDR where the power of your PC outperforms anything a hardware design could achieve!

WR-G303 Features

HF 9kHz-30Mhz Dual Conversion SSB FM AM
Real-time spectrum analyser; Plug and Play installation, 2nd IF totally SDR; Easily updated, Simple USB connection; 3 scan modes; S-meter reading S-points - dBm or uV; Triple AGC speeds or manual; Extensive memory feature; Dual real-time spectrum scopes; Bandwidths of: 0.5, 2.5, 3, 4, 6, and 12kHz; SSB sens. typically: 0.3uV; AM Sens: 0.9uV.

Specification

Mode: AM AMN AMS SSB CW NFM
Tuning steps: 1Hz **Image reject:** 60dB
IP3: +5dBm@20kHz **MDS:** -135dBm
Phase Noise: -148 dBc/Hz @ 100kHz
RSSI Accurate: 5dB **RSSI Sensitivity:** 1uV
Scan Speed: 40chs per sec
IFs: 45MHz; 12kHz **Stability:** 10 ppm 0-60C
Antenna: 50 Ohm. **Supply:** 12VDC Unit or PCI

WR-G313 Features (Upgraded WR-G303)

Additionas and uprated specification are: Test & Measure features; Bandwidths variable 1Hz - 15kHz; 600 Ohms line output; SSB sens. typically: 0.25uV.

Specification (As WR-G303 except the following)

Image reject: >70dB **IP3:** +8.5dBm@20kHz
RSSI Accurate: 2dB **Dynamic Range:** 95dB
Stability: 0.5 ppm 0-60C

WR-G305 Features

HF-UHF 9kHz-1800MHz Dual Conversion SSB FM AM
Real-time spectrum analyser; Plug and Play installation, 2nd IF totally SDR; Easily updated, Simple USB connection; 3 scan modes; S-meter reading S-points - dBm or uV; Dual Loop variable speed AGC; Manual IF gain; Unlimited memory; Audio filter: Dual real-time spectrum scopes; Multifunction squelch; Graphi hit count; Bandwidths of: 0.5, 2.5, 3, 4, 6, 12 and 220kHz; SSB sens. typically: 0.3uV; FM Sens: 0.7uV.

Specification

Mode: AM AMN AMS SSB CW NFM
Tuning steps: 1Hz **Image reject:** 60dB
IP3: 0dBm@20kHz **MDS:** -135dBm
Phase Noise: -148 dBc/Hz @ 100kHz
RSSI Accurate: 5dB **RSSI Sensitivity:** 1uV
Squelch: Level, noise, voice, CTCSS, DCS
Scan Speed: 60chs per sec max
IFs: 109.65 MHz;12kHz **Stability:** 10 ppm 0-60C
Antenna: 50 Ohm. **Supply:** 12VDC Unit or PCI

WR-G315 Features (Upgraded WR-G303)

HF-UHF 9kHz-1800MHz Dual Conversion SSB FM AM
IF Shift & Notch Filter, 2nd IF totally SDR; IF spectrum record, Noise Blanker; Bandwidths of: variable 1Hz - 15kHz; SSB sens. typically: 0.25uV; FM Sens: 0.5uV.

Specification

Dynamic Range: 90dB
Scan Speed: 500chs per sec @1kHz steps
Stability: 0.5 ppm 0-60C

Prices

WR-G303i	HF PCI module	£385.95	**WR-G305e/WFM/PD**	HF-UHF Ext. USB & Pro-Demod	£599.95
WR-G303i/PD	HF PCI module & Pro-Demod	£458.95	**WR-G313i**	HF PCI module	£699.95
WR-G303e	HF External USB	£454.95	**WE-G313i/180**	HF PCI module	£869.95
WR-G303E/PD	HF Ext. USB & Pro-Demod	£528.95	**WR-G313e**	HF External USB	£809.95
WR-G305i/WFM	HF-UHF PCI module	£469.95	**WR-G313e/180**	HF External USB	£999.95
WR-G305i/PD	HF PCI module & Pro-Demod	£458.95	**WR-G315i/WFM**	HF-UHF PCI module	£1499.95
WR-G305e/WFM	HF-UHF External USB	£539.95	**WR-G315e/WFM**	HF-UHF External USB	£1699.95
WR-G305e/PD	HF Ext. USB & Pro-Demod	£528.95	**WR-DNC3300**	3300MHz down converter	£174.95


Previous model for illustration only

Software Defined Receiver £19.95!

NEW *SoftRock-Lite v6.2*

These are single band designs in kit form
They will outperform many current transceivers and receivers
This is the future of Ham Radio - Experience it NOW!

Here is your chance to experience the power and performance of Software Defined Radio at a crazy price. These designs work with the receiver section of the Power SDR software used by the FlexRadio SDR-1000. You get:
*** Digital readout * Full DSP * Variable IF filtering 20kHz - 25Hz * SSB CW AM FM * Comprehensive metering and AGC etc. Uses your regular PC soundcard.**

**Software CD provided*
**Requires PC - with SoundCard*
**PCB size 38.1 x 38.1mm*
**Supply 9-12V*
**Build Time - approx 3 hours*

Prices

SOFTROCK-Lite-160m	160m Kit	£19.95
SOFTROCK-Lite 80m	80m Kit	£19.95
SOFTROCK-Lite-40m	20m Kit	£19.95
SOFTROCK-Lite-30m	30m Kit	£19.95

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

Practical Wirelesscontents

January 2007
On Sale 14 December
Vol. 83 No. 1 Issue 1197
(February 2007 Issue on sale 11 January)

60 Practically Yours
75 Years of Heritage & History
Looking back at some rather special news items, articles and other material covering the period from 2000 to 2006 in *Practical Wireless*.

January Regulars

Published by
PW Publishing Limited
Arrowsmith Court
Station Approach
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

Our 0870 numbers are charged at the BT Standard National Rate

Cover Subject
This month, why not have a go at building a slinky long wire antenna or a VoIP linking interface? Alternatively, sit back and enjoy Practically Yours - 75 years of Heritage & History and a hidden secret at Somerton radio station.

Design: Steve Hunt
Photography: John Curzon G8GTH, Tim Walford G3PCJ and Ken Ginn G8NDL

Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0870 224 7810. Printed in England by Holbrooks Printers Ltd., Portsmouth P03 5HX. Distributed by Seymour, 86 Newman Street, London , W1P 3LD, Tel: 0207-396 8000, Fax: 0207-306 8002, Web: http://www.seymour.co.uk. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £32, EUROPE £40, REST OF WORLD £49, payable to PRACTICAL WIRELESS, Subscription Department. PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0870 224 7830. PRACTICAL WIRELESS is sold subject to the following conditions, namely that it sha l not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. **Practical Wireless** is Published monthly for $50 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, Royal Ma l International, c/o Yellowstone International, 87 Burlews Court, Hackensack, NJ 07601. UK Second Class Postage paid at South Hackensack. Send USA address changes to Royal Ma l International, c/oYellowstone International, 2375 Pratt Boulevard, Elk Grove Village, IL 60007-5937. The USPS (United States Postal Service) number for Practical Wireless is: 007075.

Welcome! Each month Rob introduces topics of interest and comments on current news

Keylines

Rob G3XFD introduces another issue of great radio reading as PW embarks on its 75th year of publication. There's lots of treats planned throughout 2007 so, sit back and enjoy.

This issue of *PW* marks a milestone – the start of our 75th anniversary year and also - I think you'll have noticed it already! - a complete redesign of the magazine itself, complete with a new style of binding. The magazine will no longer be printed, folded and stapled. Instead, the pages are produced, folded into sections and then 'perfect bound' in a special process which provides a stiff spine for the magazine. The whole process is designed to make *PW* more durable, easier-to-hold and read as well as 'looking good'!

Along with a regular 84 pages, I'm sure readers will be very pleased with the new look for an old favourite. Inside this issue, included throughout 2007, you'll find 16 extra pages forming a 'special' section. These will be used to explore the 75 years of heritage and history behind the internationally famous words 'practical wireless'. Inevitably, as production cost and paper costs continue to spiral upwards there's an associated price increase but I'm sure our readers will consider *PW* as being excellent value for money at a reasonable £3.35 from this issue.

The price increase - the first for two years - is something I never look forward to. However, I'm re-assured because other specialist magazines I read (on railways, aircraft and science topics) are often priced from £3.50 to £4.50! Reading a magazine nowadays is one of the cheapest pleasures there is and there's nothing more enjoyable than a good read in a comfortable chair!

Throughout 2007

Throughout 2007 the *PW* team, together with our authors, will be making a huge effort to produce some very special magazines for you and of course, **you have your part to play!** During the year, I'm hoping that readers will write in to us regarding their own memories of a particular issue, a project or anything else connected with *PW*. These letters will be incorporated into the usual letters pages but with a difference! When a 'very special letter' arrives that we can use to towards the 75th anniversary year - that letter could be awarded the 'Star letter' prize. I'm planning to offer some special prizes for the really good letters that are awarded the ' 75th Anniversary Letter' status - make sure your letter is written and sent!

If you are E-mailing the letter to me at *PW* please ensure you place '75th Anniversary Letter entrant' the subject line of the E-mail. If you are planning to send a letter in via the post, please mark the envelope '75th Anniversary letter entry'. Good luck to you all!

Morse On Radio 4

On Friday 3 November, an example of careful research, aided by Radio Amateurs who were keen to see our hobby publicised in an efficient manner, resulted in a rather interesting short piece on the nationwide coverage BBC R4 'Today' programme. The story line - although not strictly Amateur Radio – centred around the first official use of the SOS signal in an emergency one hundred years previously.

The truly remarkable thing about the resultant broadcast was (despite the excellent audio Morse message being too long for the highly pressurised live programme) was the number of people who became involved. **Carlos Eavis G0AKI** appeared on the programme represented the RSGB and produced the (excellent) Morse via a lap-top computer. However, to get enough information, the BBC's researchers first contacted **Richard Brunton G4TUT** who manages the **Southgate Amateur Radio Club's** excellent website. Richard then suggested that *PW* and the RSGB were contacted for background information. I spent many hours on the telephone answering questions on the Wednesday and Thursday evening, all thanks to Richard, who effectively co-ordinated the rather pleasant (but lost and rather frantic) researcher's efforts.

Although the transmitted Morse signal had to be cut short - I'm sure that our hobby was well represented to the radio audience. It's rare that such a team effort of this sort occurs and works well. I'm pleased it did and hope that it will do so again in the future.

Rob Mannion G3XFD/EI5IW

Send in your thoughts and win a voucher!

letters

Send your moans, groans and even praise when it's due to the editorial address or E-mail: pwletters@pwpublishing.ltd.uk

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**

Star Letter

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

Using Veroboard

● **Dear Rob**

I hope that you and the production team are all keeping well at *PW*? We are both breathing in and out at this end! I'm writing to you because in Topical Talk you asked for comments from your readers about using Veroboard. Well, here are my experiences of using it and if you think that it's worth printing then please do so and I'll be pleased to pass on my experiences of using it.

Although I prefer 'ugly construction', I always use Veroboard for the final amplifier of a project. This is probably because I don't like soldering directly to the pins of an integrated circuit, so I use a chip holder before placing it on the board.

I have at least two 7MHz receivers using NE602 and LM380 chips built entirely on Veroboard and working fine. So, whether or not - after reading your comments in 'Topical Ta k' - I have perhaps just been lucky? I don't know and I would be interested to hear other readers' comments!

Even when building a circuit 'ugly style', I always place any integrated circuits in holders on small pieces of Veroboard - leaving a couple of holes either side of the pins to solder to the rest of the circuit.

You also asked could we still get supplies of the material, I get my supply from **Will Outram** at **Bowood Electronics** in Chesterfield, who of course advertise in *PW*. Best wishes to you and the *PW* team.

Jack 'Titch' Nelson G0DNC
Stockport
Cheshire

Nice to hear from you 'Titch! It's a long time since we last chatted face-to-face and everyone on PW looks forward to meeting you at the Leicester show or one of the other events during 2007. Thank you for your feedback regarding Veroboard projects. We are seriously considering using it again for occasional projects because of positive feedback. To help us judge the situation more accurately, we would be most grateful if readers could to make their own preferences known by writing (postcards only please) to the PW offices. Mark your postcard ***'Veroboard Yes'*** *or* ***'Veroboard No'*** *along with your name and address. If preferred, you can also E-mail your comments to me at* ***rob@pwpublishing.ltd.uk*** *and please ensure the subject line contains* ***PW Veroboard Comments*** *to help identify your message and to avoid spam filtering. Thank you.* ***Editor***

The ISWL QSL Bureau

● **Dear Rob**

I read **Michael Goodwin G7NBE's** Trials & Tribulations of QSLing (December 2006 PW) with interest. As a general overview of QSLing it was very good. However, I would like to comment on one or two aspects.

The **Radio Society of Great Britain** (RSGB) is not the only organisation providing an international outgoing QSL bureau service. The International Short Wave League (ISWL) provides an excellent QSL bureau, which is faster than the RSGB as far as sending cards is concerned. The ISWL is affiliated to the RSGB and annual membership is £24 for the complete service.

There's also a monthly magazine, which among other things, contains information on QSL managers and DX and Islands On The Air activities (IOTA). I suggest that anyone interested should contact either G4HYP, G8XTJ or G6OU, all of whom are listed in the late RSGB Yearbook, or by letter to myself. I'm also QTHR in the Yearbook and also on the **QRZ.com website**, and I would be happy to point anyone in the right direction. However, I think it would be wise to ensure that stamped addressed envelopes (s.a.e.s) are lodged with the appropriate RSGB QSL sub-manager.

Incidentally, two important points were not mentioned in Michael's article. First, it's important to ensure that the sub-manager has two or three of your addressed envelopes at all times and they are stamped with suitable 1st or 2nd class values. Second, I think it's wise to stamp the envelopes for the Royal Mail's recently introduced 'Large Letter' rate because of the possible thickness of a bunch of cards.

As Michael stated in his article, cards 'via the bureau' aren't quick. My record for the slowest is over five years with two years being quite usual. The return rate on those sent has never bettered 65% and is often closer to 50%, which is not good!

Direct QSLing is not without its problems either. It's worth noting that International reply Coupons (IRCs) are now stamped with a date of expiry and because of this should only be purchased from the Post Office as needed and used 'sharpish'. I've obtained $1US notes from my local travel shop and I believe they are cheaper than IRCs at present.

The QRZ.com website is great for addresses and I get the info from the Internet via my local library where the first half hour on the computer is free.

Michael's advice regarding avoiding placing the address's callsign on the outgoing envelope is sound advice. Some postal services - especially those in third world countries are suspect.

I keep records of stations I've sent cards 'direct' to and those who have sent a card in return. I have a 'bad boys' list and there are some countries that I have yet to receive a card from, despite four direct cards for different contacts.

Those stations that use a QSL Manager, especially if they are American or European, will increase your chance of a return card. However, even here a 100% success rate is not guaranteed.

Amateur Radio is just like fishing- so keep dipping your rod and line in because you might get the big one!

I'll close by saying that - the final courtesy of a QSO is a QSL.

Best wishes to everyone.

Peter Lewis G4VFG/ISWL G20322
18 Bittaford Wood
Ivybridge
Devon PL21 0ET

No problems with Veroboard!

● **Dear Rob**

I was quite surprised to see the letters and hear of the problems you have with Veroboard. I have never had difficulties using

the boards myself although, as a listener, I have never built transmitter using the method. I have, however, built a number of receivers and all have worked well.

On the occasions I have met with you at the Mayo Rally at Knock, we have talked about just how effective simple receivers can be. Only one receiver caused problems, it was the MK484 replacement for the ZN414 and as we have discussed in the past the r.f. coupling problems can be overcome by careful placing of the high gain chips.

I work in a specialised electronics workshop and we often prototype circuits using Veroboard. Most are digital boards but occasionally we have to make circuits up for r.f., especially to test EMC capabilities. Occasionally, we run into difficulties but it's usually because we are 'experimenting as we go'. The Veroboard system is very flexible and is better for prototyping than other fixed matrix board systems. I find that my hobby radio constructional experience really helps me in my work and actually led me into my present job.

I hope to see you again at the 2006 Knock rally and will come over to the *PW* stand to show you one of my latest receivers built using Veroboard. One day you will come to see me because you know what the name Inchicore stands for. We may even be able to arrange a visit for you! Keep up the good work with *PW* and please try to visit us on this side of the water more often.

Dermot Connelly
Inchicore
Ireland

Dermot has shown me his simple regenerative receivers on a number of occasions and there's no doubt he thoroughly enjoys building and operating them with the skill required to add to his QSL collection. Hopefully, Dermot and other readers will make their opinions known by sending in postcards on the Veroboard debate. Incidentally, the Dublin Inchicore railway works were a centre of engineering excellence. Many famous Irish locomotives were designed and built there - the place is a magnet for amateur railway historians. ***EI5IW/G3XFD****!*

Stefan's Toroid Tables

● **Dear Rob and Team**

I enjoyed reading Stefan Niewiadomski's Toroid Ready Reckoner Tables in the December 2006 issue of *PW*. It was an interesting article on ferrite rings, thank you. Speaking as an avid hoarder of 'anything that might come in handy sometime', I have a tin full of assorted anonymous ferritey ring things!

What chance is there of *PW* producing a comprehensive article on how to identify these things, what they're best used for, how I can measure anything useful about them other than with a ruler (imperial of course!). Or perhaps I should just throw them all away? Regards to you all.

Ant Astley GW0AJA
Montgomeryshire
Mid-Wales

Please don't throw the toroids away Ant! Thanks for your suggestion - it's a very good idea if we can get a wide enough information reference base of samples of the different toroids! I've no doubt that many of us have hoards of ferrite rings we've collected over the years and I certainly have loads of them I cannot identify! I will talk the proposal over with Stefan and we'll try to produce as comprehensive a guide as possible. To help Stefan I'll send him a few samples of what I have and if readers can send in a few (one or two samples only - not bags of them please!) unidentifiable types we can help perhaps get enough information to help Stefan provide another useful article, complete with a selection of photographs to help us identify what they are and what they can be used for. Please regard your sample toroids as being a 'donation for the cause' as it will not be practical to return them. ***Editor***

Trying to buy an old RCA AR88

● **Dear Rob**

I took my father to visit Bletchley Park, where he had been stationed - post Second World War - as an RAF radio communications operator. We met a chap there who was running the old MI6 radio room. My father, David, was delighted to see the old receiver he used to operate - an RCA AR88.

I am now trying to obtain one for him (for Christmas). It doesn't have to work or even have any transformers/valves inside it. The former MI6 chap suggested I contacted *PW* - so please, have you any ideas where I might find such a relic in time for Christmas? Thank you.

Kevin Higgs
Hsquared Limited
Grange Road
Hugglescote
Leeds LE67 2BT
Tel: (01530) 814200
Mobile: (07980) 742055

I'm sure there will be a PW *reader able to help you Kevin - especially as you are able and willing to arrange collection and delivery of this beautiful but monstrously heavy receiver! I'll never forget the John Worthington G3COI cartoon in The Short Wave Magazine - that featured a heavy breakdown crane lorry parked outside a house while the driver knocks at the door and asks, "Are you the chap who has an AR88 for sale?" I hope David gets his AR88 for Christmas.* ***Editor***

rallies

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

2007

January 28
The Horncastle Radio Rally
Contact: Tony G3ZPU
Tel: (01507) 527835
E-mail: rallly@enlandrepeater.org.uk
This is a small informal event, with stalls selling items of interest for the Radio Amateur and computer enthusiast. Horncastle Youth Centre, Cagthorpe, Horncastle, Linconshire LN9 6HW Admission only £1. Doors open at 1030.

February 4
South Essex ARS Mobile Radio Rally
Contact: Ken
Tel: (01842) 861089
E-mail: www.southessex.ars.btinternet.co.uk
The South Essex ARS Mobile Radio Rally will be held at the Paddocks Community Centre, Long Road, Canvey Island, Essex SS8 0JA (southern end of A130). Doors open at 1030 and there is free car parking. Clubs may book tables to sell unused equipment and Amateurs are also welcome to book tables to sell any of their unused equipment.

February 11
Wakefield & District Radio Soceity
Contact: John Carter
Tel: (01924) 251822
Wakefield & District Radio Society are holding their Northern Cross Mobile Rally at Thornes Park Athletics Stadium on the A642 Horbury Road, Wakefield WF2 8TY. The dealers are on the ground floor and there is good disabled access. The Bring & Buy has booking-in from 1015am. Doors open 1030 with disabled access also at 1015. There is ample parking on site and admission is £2.50.

February 18
Swansea ARS Amateur Radio Show
Contact: Roger
Tel: (01792) 404422
The Swansea ARS Amateur Radio Show will be held at the Afan Lido, Aberavon seafront, Port Talbot SA12 6QN (1mile from M4 J41). Doors open at 1030. There will be a Bring & Buy and free car parking.

March 3/4
M0VOG Radio Club Rally
Website: www.firepowerradiorally.zoomshare.com
The M0VOG Radio Club Rally will be a Vintage Radio Display, Demonstration & Radio Junk Sale (no computers) at Firepower, The Royal Artillery Museum, Royal Arsenal, Woolwich South East London SE18 6ST. Doors open at 1030 on both days.

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. Look out for representatives from *Practical Wireless* and *RadioUser* at rallies printed in bold.

news & products

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

Morse Rescues

On the 19 October, just after 1730 hours, Steve Mann a member of the Hayling Island (off the Hampshire coast) Coastguard team witnessed what he thought was a SOS message flashed by torchlight towards the Control Tower at Hayling Island Sailing Club. Steve responded to the SOS message by switching the lights on and off in the Control Tower.

The casualty was identified and it was confirmed that he was using Morse code as he had recently transferred all of his safety equipment from his 8.5m (28ft) fishing vessel onto a newly acquired boat. He was running this vessel from Emsworth to Thorneham Marina, a distance of about 6km, when he ran aground and started to take on water.

Steve Mann alerted Solent Coastguard Marine Rescue Co-ordination Centre who requested the launch of the RNLI inshore and D-class lifeboats from Hayling Island to the casualty who was transferred to Hayling Island Lifeboat Station, where he was checked over by a crewman who is also a paramedic. His vessel was towed back to Sparks Marina by the inshore lifeboat.

After the event Steve said, "I was absolutely amazed to see the flashed SOS message. This man was caught out on the one occasion he went to sea with absolutely no safety equipment. Even without radio communication going to sea without even a portable flare is extremely dangerous and could cost you your life." So, there you go – Morse code is still very much alive and kicking and can be a life-line.

Editorial Note: This news item attracted attention all over the world and was featured by any professional broadcast stations. **Editor.**

British manufacturer big in Japan

Graham Somerville of bhi Ltd., has been working hard this year to break into the Japanese market with his company's noise eliminating products. As the photo here shows they have achieved success. As they have teamed up with Japanese dealer, JACOM who displayed a selection of bhi products at the recent Tokyo Hamfest. Following the Hamfest, Graham is pleased to report that bhi have had a repeat order from JACOM for their NEIM1031 Noise Eliminating In-line Module as a direct result of their products being displayed at the show.

In case your Japanese is not up to scratch, the sign in the photo translates as "No worry of noise any longer. High efficiency DSP born in England is being demonstrated."

If you know of a fellow Radio Amateur abroad who you think could benefit from using bhi's products why not point them at: **http://www.bhinstrumentation.co.uk/html/worldwide_dealers.html** for a full list of their world-wide dealers?

Equipment Guide Available Now!

Essex based Waters & Stanton have recently published their 2007 Equipment Guide priced at £2.95 plus £1.75 P&P. With 368 pages and more than 300 new products included And W & S say "There is something for everyone inside the guide." Products featured include antennas, accessories, cables, books, hand-helds, GPS equipment, kits, scanners and much more.

● **Waters & Stanton PLC, Spa House, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835. Website: www.wsplc.com**

news snippets

Diary Date
On 11 February 2007, the **Harwell Radio and Computing Rally** will be held in the Didcot Leisure Centre, Mereland Road, Didco, Oxon OX11 8A. Car parking will be Free and admission £2 (under 12s free). Doors will be open from 1015 for disabled visitors and 1030 for others.

More details can be obtained from **Ann G8NVI** on **(01235) 816379,** E-mail to **ann.stevens@btinternet.com** or by looking at **www.g3pia.org.uk**

Leiston ARC News
If you live in the Leiston area of Suffolk and are thinking of joining the **Leiston Amateur Radio Club** then please note that the club meet at Leiston High School, Seaward Avenue, Leiston, Suffolk IP16 4BG on the first Tuesday of the month. Visitors and prospective new members will be made very welcome. Why not go along on 2 January and join in the Quiz night?

For more details on the club or getting involved contact: **John Francis G4XVE. Tel: (01728) 648586. E-mail: pintail@globalnet.co.uk**

Amateur Radio on TV!
On Tuesday 7 November ITV1 showed the *Pride of Britain Awards* in which the Teacher of the Year award was given to Head Teacher **Linda Davies** who has made going to school an out-of-this world experience for pupils at Wiltshire's Neston Primary School. The school was the first in Britain to speak to an astronaut in space using Amateur Radio during a ten-minute question and answer session from their moonbase-themed classroom. Linda Davies was given the award for her work in promoting Science at Neston Primary School in which Amateur Radio played a vital role.

The Amateur Radio contact with the *International Space Station* (ISS) helped inspire the young people at the school to take an interest in science. The ARISS organisation and members of AMSAT-UK arranged the contact, with The Radio Society of Great Britain (RSGB) providing the use of GB4FUN, their radio communications van.

The Radio Amateurs who took part in the ISS contact were **Charles Riley G4JQX** (on the microphone), **Howard Long G6LVB** and **Carlos Eavis G0AKI** who manages the RSGB GB4FUN van. If you missed the programme a video can be seen at: **www.g6lvb.com/Neston/NestonPOB.mpg**

news & products

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

World Premier Webcast

A slight twist was added to a recent open evening at Martin Lynch & Sons when Martin enabled hundreds of Amateurs around the world to view the live broadcast of Paul Bigwood from Yaesu UK's demonstration of the FT-2000. The UK's first demonstration of Yaesu's new h.f. and 50MHz transceiver was very well attended .

The whole event was transmitted in real time via a fast Internet connection set up by VOIP and Internet service provider NSE. This meant that anyone who logged onto the webcast could view the demonstration as it happened.

The event was so successful that Martin promises to set-up more webcasts for new product demonstrations in the near future. For further details take a look at **www.hamradio.co.uk/news.shtml?nws=16**

- **ML&S**
  Martin Lynch & Sons Ltd.,
  Outline House,
  73 Guildford Street,
  Chertsey,
  Surrey. KT16 9AS
  Tel: (01932) 567 333
  Website: www.hamradio.co.uk

New Medium Wave CDs

The Medium Wave Circle have recently added two new CDs to their collection for enthusiasts to buy. Titled, *Offshore Radio Collection* and *Reprint*, they are bound to appeal to many radio enthusiasts.

The *Reprint* CD is a collection from the Medium Wave Circle reprint service, which, for years has provided paper copies of articles that have appeared in *Medium Wave News.* Due to rising postage and copying costs it was decided to scan all of the 240 plus titles (1400 pages) in PDF format and make them available on a double CD, allowing enthusiasts to view and print out as much or as little as required. The price of the *Reprint* CD is just £9 including P&P.

The *Offshore Radio Collection* CD features several hours of recordings from Radio Caroline North, recordings from Radio Caroline South, Radio Atlanta, Radio City, Radio England & Radio 227. From 1962, There are a also couple of shows from 1962 from the Scandinavian off-shore station Radio Nord, as well as three hours from the 1997 Radio London RSL broadcasting off the Essex coast and a feature programme about Radio Northsea from BBC Radio Humberside, plus much more! The Offshore Radio Collection CD costs £5 including P&P.

All previous CDs produced by the Medium Wave Circle, including Radio Caroline 1983-1987 and Laser 558 1984-1986, are still available. Full ordering details can be found on the Medium Wave Circle website **www.mwcircle.org/shop.htm** and orders can be places by mail or on-line using a secure on-line payment service using a credit card or via a Paypal account.

Celebrating Moonbounce

The Ocean Monmouth Amateur Radio Club in the USA will put the special event callsign N2MO on the air from 14 to 15th January to commemorate the first successful moonbounce experiment. This was carried out by the US Army Signal Corps on 10 January 1946 in what was known as Project Diana.

The special event station will be activated from the historic Project Diana site at the InfoAge Learning Centre in New Jersey. Ocean Monmouth ARC plans to operate the special event station using ALE, c.w., PKS31, RTTY and s.s.b. on the 3.5, 7, 14, 21 and 28MHz bands.

If you'd like to know more about Project Diana details can be found at **www.omarc.org**

The Project Diana Site 1946 at Marconi Road, Wall, New Jersey from www.infoage.org/diana.html

news snippets

Maldol HF Antenna

The Maldol MFB-300 is the latest in a line of 'All-Band' h.f. verticals available. It covers 1.8-60MHz on both transmit with a power rating of 200W p.e.p and 1-60MHz on receive. It is 7m in length, weighs 4.1kg and is made of fibre-glass with stainless steel and alloy fittings.

The Maldol MFB-300 costs £259.95 including VAT and is available now from **Martin Lynch & Sons Ltd., Tel: 0845 2300 599, Website: www.hamradio.co.uk**

Free Foundation Courses

The **Milton Keynes Amateur Radio Society** (MKARS) offer free courses for the Foundation, Intermediate and Advanced amateur radio licences. All courses are taught by experienced Radio Amateurs, with a very high level of first-time success. Further information can be found on the MKARS website **www.mkars.org.uk** or via E-mail at: **training@mkars.org.uk**

The MKARS meet every Monday night (except public holidays) at 1930 in the club room: (Green Room, B Block annex), Bletchley Park, Wilton Ave, Bletchley, Milton Keynes MK3 6EB. New members are always made very welcome. All membership enquires should be E-mailed to: **information@mkars.org.uk**

Most Wanted DXCC

Liakshadweep Islands, which is part of the Laccadive Islands and is the smallest union territory of India, is the second most-wanted DXCC entity and is about to host two DXpeditions during December.

A team sponsored by the Amateur Radio Society of India intends to activate the island with the callsign **VU7LD** from 1 to 30th December. A second group, under the auspices of the Indian National Institute for Amateur Radio, has announced plans to operate as **VU7RG** from the island, in honour of the late Indian Prime Minister, **Rajiv Gandhi VU2RG**. The group will be active from 1 to 10th December.

More than 60 Indian Amateurs, including a number of well-known Dxers, are expected to participate in the two Dxpeditions. Make sure you listen out for VU7LD and VU7RG!

Air Tattoo Thrills

All the thrills and excitement of the world's largest military airshow have been captured on the official DVD of this summer's Royal International Air Tattoo. Featuring unique footage of the first ever UK display by the breathtaking MiG-29M (OVT) and the US Marine Corps futuristic MV-22B Osprey, the Royal International Air Tattoo 2006 DVD gets closer to all the aerial action than ever.

More than 300 of the world's top aircraft took part in July's spectacular at RAF Fairford in Gloucestershire and many of the stars of the air show are featured including a US Navy F/A-18F Super Hornet, a French Air Force Mirage 2000 and a USAF F-15C Eagle.

Popular Air Tattoo commentator, **Sean Maffett** brings a wealth of informed and entertaining observations, delivered his inimitable style, as many of the world's greatest aircraft soar through the sky at one of the UK's greatest outdoor events.

No Air Tattoo DVD would be complete without lashings of stunning in-cockpit footage. Climb aboard a USAF B-1B, RAF C- Hercules, PC-7 and Tornado GR4 as they're put through their paces and enjoy an unusual view of the Czech Mi-24V 'Hind', courtesy of internally and externally-mounted cameras.

The Royal International Air Tattoo 2006 official DVD, produced in support of the Royal Air Force Charitable Trust, costs £16.95 plus P&P) and is available from **www.airtattoo.com**/ and if you order quickly you could just get it in time for Christmas! The 2007 Air Tattoo takes place on July 14-15th. Details of their special Earlybird tickets will be available on the website from 1 December 2006.

The Irrepressible G3JIX is Busy Again!

Ken Smith G3JIX is well known for his work helping young people into the Amateur radio hobby. In this report Rob Mannion G3XFD brings news of yet another series of courses from Kent's 'Mr. Amateur Radio'.

During the late summer of 2006 a letter arrived at the *PW* offices from **Ken Marchant G3TAJ**, bringing news of another course to be run by **Dr. Ken Smith G3JIX**. Despite becoming a father himself when most of us are enjoying our grandchildren (congratulations again Ken!) Ken's not only busily involving his young family into the hobby but has found time to run some more courses to help others into the hobby.

Ken G3JIX, who is President of the Thanet radio Club, is now running an evening class course entitled 'Radio-Electronics; what is it all about?' In his letter to *PW,* Ken Marchant G3TAJ mentioned that, 'What is of some interest is that among students enrolling there were a number of people who had been attracted to the course by G3JIX's earlier series of articles in *Radio Active* magazine (Now incorporated into *Radio User*).

The course is now running at Canterbury and the course will cover some Amateur Radio, re-acted experiments, radio astronomy, radar and satellite navigation to provide a broad perspective of what goes on in electronics. Full details on the course, for people living in the county of Kent, can be obtained from the Adult Education Prospectus available at libraries. Ken G3JIX will be very pleased to provide further information himself and readers may call him on (**01304**) **813175**.

Ron G3TAJ also mentioned another of Ken's courses that proved very popular; 'The Universe: What's it all about? This was very successful, even more radio astronomy was covered, along with supernova explosions, black holes, plus big bangs and inflation! This course will be offered in the Thanet region of Kent again later. More details from Ken G3JIX.

All I can say, Ken is that now you're a busy Dad you've found even more time to help share science and radio! Thank you for your efforts on behalf of the hobby. If readers living in Kent can attend his courses, I thoroughly recommend them, as G3JIX's enthusiasm and dedication to science is truly infectious.
Rob G3XFD

club news

Keep your club news coming to pwnews@pwpublishing.ltd.uk and please remember to include full details of your club, E-mail and telephone contact details and the postcode of your meeting venue - it helps potential visitors to find you!

BRISTOL

South Bristol ARC
Contact: Len Baker G4RZY
Tel: (01275) 834282
Website: www.sbarc.co.uk
Members of the South Bristol Amateur Radio Club meet at Whitchurch Folkhouse, Bridge Farm House, East Dundry, Whitchurch, Bristol BS14 0LN every Wednesday at 1930. They offer a varied program of events and are always pleased to welcome new members. Why not take some time out over the festive period and go along? Here's what's on offer: **Dec 20**: 'Celebrating another Record Year' by **Fred G7LPP**; **27th**: On the air evening; **Jan 3**: Workshop 'HF Aerials' by **Cyril G3XED** and **10th**: Display of club archives with **Muriel G4YZR**.

HAMPSHIRE

Horndean & District ARC
Contact: Stuart Swain GYFYX
E-mail: gyfyx@msn.com
Website: www.hdarc.co.uk
Meetings of the Horndean & District Amateur Radio Club are held on the 1st and 4th Tuesday of every month at: the Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants PO8 9SF. Doors open at 1930 and visitors are always welcome. Please note there will be **no** meeting on **December 26**!

KENT

Bromley & District ARS
E-mail: bdars-news@hotmail.co.uk
Website: www.bdars.org
The society meet on the third Tuesday of the month in the Victory Social Club, Kechill Gardens, Hayes, Kent BR2 7NG from 1930 for a 2000 hours start. Forthcoming meetings include: **Dec 19**: Christmas Meal and **Jan 16th**: Annual General Meeting. Why not go along and join in? You'll be made very welcome.

SHROPSHIRE

Telford & District ARS
Contact: Mike G3JKX
Tel: (01952) 299677
E-mail: mjstreetg3jkx@blueyonder.co.uk
Website: www.tdars.org
The Telford & District Amateur Radio Society meet at the Community Centre, Bank Road, Dawley Bank, Telford, Shropshire TF7 2AX at 2000 hours every Wednesday. Forthcoming meetings include: **Dec 20**: Games evening; **27th**: HQ closed, Net on 144.6MHz/GB3TF at 2100UTC; **Jan 3**: HQ closed, Net on 144.6MHz/GB3TF at 2100UTC and **10th**: Open evening/h.f. on the air/committee meeting.

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.

BNC Screw type plug (Small entry) **£1.25**
BNC Solder type plug (Small entry) **£1.25**
BNC Solder type plug (Large entry) **£3.00**
N-Type plug (Small entry) **£3.00**
N-Type plug (Large entry) **£3.00**
SO239 Chassis socket (Round) **£1.00**
SO239 Chassis socket (Square) **£1.00**
N-Type Chassis scoket (Round) **£3.00**
N-Type Chassis scoket (Square) **£3.00**
SO239 Double female adapter **£1.00**
PL259 Double male adapter **£1.00**
N-Type Double female **£2.50**
SO239 to BNC adapter **£2.00**
SO239 to N-Type adapter **£3.00**
SO239 to PL259 adapter (Right angle) **£2.50**
SO239 T-Piece adapter (2xPL 1XSO) **£3.00**
N-Type to PL259 adapter (Female to male) **£3.00**
BNC to PL259 adapter (Female to male) **£2.00**
BNC to N-Type adapter (Female to male) **£3.00**
BNC to N-Type adapter (Male to female) **£2.50**
SMA to BNC adapter (Male to female) **£3.95**
SMA to SO239 adapter (Male to SO239) **£3.95**
SO239 to 3/8 adapter (For antennas) **£3.95**
3/8 Whip stud (For 2.5mm whips) **£2.95**

Please add just £2.00 P&P for connector only orders
PLEASE PHONE FOR LARGE CONNECTOR ORDER DISCOUNTS

5ft Poles Heavy Duty (Swaged)

20ft Heavy Duty Swaged Pole Set
These heavy duty aluminium (1.8mm wall) have a lovely push fit finish to give a very strong mast set
1.25" set of four 5ft sections **£29.95**
1.50" set of four 5ft sections **£39.95**
1.75" set of four 5ft sections **£49.95**
2.00" set of four 5ft sections **£59.95**

Mounting Hardware (All galvanised)

Tripod-2 *(free standing with 2-OD for use with 2" joiner or 1.5" pole inside)* **£69.95**
Tripod-3 *(free standing with 3" OD for use with 2.5" pole inside)* **£79.95**
6" Stand Off Bracket *(complete with U Bolts)* **£6.00**
9" Stand off bracket *(complete with U Bolts)* **£9.00**
12" Stand off bracket *(complete with U Bolts)* **£12.00**
12" T & K Bracket *(complete with U Bolts)* **£14.95**
18" T & K Bracket *(complete with U Bolts)* **£17.95**
24" T & K Bracket *(complete with U Bolts)* **£19.95**
36" T & K Bracket *(complete with U Bolts)* **£29.95**
Single chimney lashing kit *(suitable up to 2 mast)* **£14.95**
Double chimney lashing kit *(suitable up to 2 mast)* **£19.95**
3-Way Pole Spider for Guy Rope/ wire **£3.95**
4-Way Pole Spider for Guy Rope/wire **£4.95**
Mast Sleeve/Joiner *(for 1" pole)* **£6.95**
Mast Sleeve/Joiner *(for 1.25" pole)* **£7.95**
Mast Sleeve/Joiner *(for 1.5" pole)* **£11.95**
Mast Sleeve/Joiner *(for 2" pole)* **£13.95**
Earth rod including clamp (copper plated) **£9.95**
Earth rod including clamp (solid copper) **£14.95**
Pole to pole clamp 2"-2" **£4.95**
Di-pole centre *(for wire)* **£4.95**
Di-pole centre *(for aluminium rod)* **£4.95**
Di-pole centre *(for wire but with an SO239 socket)* **£6.95**
Dog bone insulator **£1.00**
Dog bone insulator heavy duty **£1.50**
Dog bone *(ceramic type)* **£1.50**
EGG-S *(small porcelain egg insulator)* **£1.95**
EGG-M *(medium porcelain egg insulator)* **£2.50**
EGG-XL *(extra large porcelain egg insulator)* **£5.95**
CAR PLATE *(drive on plate to suit 1.5 to 2" mast/pole)* **£19.95**

Cable & Coax Cable

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

Baluns

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

Duplexers & Antenna Switches

DX-720D Duplexer *Port 1: HF + 6 + 2m (1.6-150MHz). *Port 2: 70cm (400-460MHz). *Connection: Fixed 2 x PL259 & 1 x SO239 ..... **£19.95**
MX-72 Duplexer *Same spec as DX-720D but with PL259 fly leads **£29.95**
MX2000 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz) **£59.95**
CS201 Two-way di-cast antenna switch. Freq: 0-1000MHz max 2,500 watts SO239 fittings **£14.95**
CS201-N Same spec as CS201 but with N-type fittings **£19.95**
CS401 Same spec as CS201 but4-way **£39.95**
CS401N Same spec as CS401 but with N-type fittings **£59.95**

Antennas Rotators

AR-300XL Light duty UHF\VHF **£49.95**
YS-130 Medium duty VHF **£79.95**
RC5-1 Heavy duty HF **£329.95**
RC5-3 Heavy Duty HF inc pre set control box **£419.95**
AR26 Alignment Bearing for the AR300XL **£18.95**
RC26 Alignment Bearing for RC5-1/3 ..... **£49.95**
RC5A-3 Serious heavey duty HF **£579.95**

Complete Mobile Mounts

All mounts come complete with 4m RG58 coax terminated in PL259 (different fittings available on request).
3.5" Pigmy magnetic 3/8 fitting **£7.95**
3.5" Pigmy magnetic SO239 fitting **£9.95**
5" Limpet magnetic 3/8 fitting **£9.95**
5" Limpet magnetic SO239 fitting **£12.95**
7" Turbo magnetic 3/8 fitting **£12.95**
7" Turbo magnetic SO239 fitting **£14.95**
Tri-Mag magnetic 3 x 5" 3/8 fitting **£29.95**
Tri-Mag magnetic 3 x 5" SO239 fitting **£29.95**
HKITHD-38 Heavy duty adjustable 3/8 hatch back mount **£29.95**
HKITHD-SO Heavy duty adjustable SO hatch back mount **£29.95**
RKIT-38 Aluminium 3/8 rail mount to suit 1" roof bar or pole **£12.95**
RKIT-SO Aluminium SO rail mount to suit 1" roof bar or pole **£14.95**
RKIT-PR Stainless SO239 rail kit to suit 1" roof bar or pole **£24.95**
PBKIT-SO Right angle SO239 pole kit with 10m cable/PL259 *(ideal for mounting mobile antennas to a 1.25" pole)* **£19.95**

Antenna Wire & Ribbon

Enamelled copper wire 16 gauge (50mtrs) **£16.95**
Hard Drawn copper wire 16 gauge (50mtrs) **£19.95**
Equipment wire Multi Stranded (50mtrs) **£14.95**
Flexweave high quality (50mtrs) **£27.95**
PVC Coated Flexweave high quality (50mtrs) **£37.95**
300Ω Ladder Ribbon heavy duty USA imported (20mtrs) **£14.95**
450Ω Ladder Ribbon heavy duty USA imported (20mtrs) **£17.95**
(Other lengths available, please phone for details)

Miscellaneous Items

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

Telescopic Masts (aluminium/fibreglass opt)

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed **£99.95**
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed **£189.95**
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed **£99.95**
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed **£179.95**
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed **£189.95**

HF Yagi

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

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

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

Mini HF Dipoles (Length 11' approx)

MD020 20mt version approx only 11ft **£39.95**
MD040 40mt version approx only 11ft **£44.95**
MD080 80mt version approx only 11ft **£49.95**
(slimline lightweight aluminium construction)

HF Verticals

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

EVX4000 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs GAIN: 3.5dBi HEIGHT: 6.50m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials) **£119.95**
OPTIONAL 10-15-20mtr radial kit **£39.95**
OPTIONAL 40mtr radial kit **£14.95**

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

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

EVX8000 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) GAIN: 3.5dBi HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts **£319.95**
80 MTR RADIAL KIT FOR ABOVE **£89.00**

(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

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

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

ALL PICTURES ARE FOR REFERENCE ONLY

Doing it by Design

Continuing his in-depth look at double sideband techniques from the designer's point of view - Tony Nailer G4CFY describes the circuitry of a 7MHz receiver.

In the previous article of this series I developed a double sideband (d.s.b.) transmitter for 7MHz. A number of readers have told me how interesting they found it but there has been a lack of interest in kits for the project, which may demonstrate the level of interest!

Maybe I should have done the receiver first? Possibly there have been too many designs in the recent past for direct conversion (DC) d.s.b. receivers for 7MHz? Nevertheless, I will proceed to describe the design and development of such a receiver, as much as anything for those interested in my design methods as it helps in the understanding of the design process for single sideband suppressed carrier transmission and reception.

Design Concept

The receiver has a radio frequency (r.f.) amplifier and mixer operating at 7MHz, then an audio amplifier centred around 1kHz. It's unwise to try to exceed 60dB (a factor of 1000) at any single frequency or instability is likely.

The circuit diagram, **Fig. 1**, shows the initial concept. This comprises a tuned input and output r.f. stage with an assumed gain of about 26dB, followed by a mixer with an assumed gain of about 8dB. This followed by an op amp stage with a gain of 26dB to work with the audio frequency (a.f.) amplifier that has a gain of 34dB.

It's important to realise that the input stage is operating at the same frequency as the local oscillator and is likely to be swamped with r.f. pick-up. A single dual-gate m.o.s.f.e.t was chosen as the r.f. amplifier as it's both good at signal handling and very stable in operation.

Fig. 2: As part of the development process, Tony G4CFY used an amplifier built for the earlier DiBD audio amplifier article. He added it to the copper clad breadboard as shown here.

At 7MHz the old style 3N201 or 40673 m.o.s.f.e.t.s really come into their own. I have a reasonable quantity of BFR84, which is the Mullard version of the same type, so I decided to use them for both the r.f. stage and mixer.

At v.h.f. I use the newer BF964 to achieve gains in excess of 26dB. Without even bothering to calculate it I assumed the BFR84/3N201 would achieve much the same at h.f.

Radio Frequency Tuning

The 7MHz (40 metre) band is now 200kHz wide, an increase of 100kHz but it's still used by strong broadcast stations, although they are supposed to be leaving the band eventually! However, for the purposes of this design exercise I'll treat the band as it was – just 100kHz wide - as it's convenient figure wise.

A bandwidth of 100kHz with a centre frequency of 7.05MHz corresponds to a tuned circuit *Q* of 70.5. To select just the Amateur band and strongly reject the adjacent bands could be done fairly easily using band-pass coupled pairs of fixed tuned circuits at input and output of the r.f. stage.

From experience I chose the Toko coil KANK3334R with a minimum inductance of 5.5μH and a *Q* of 85. The capacitance to resonate it is C = 1 / 39.5*f*f*L.

C = 1 / 39.5*7*7*10^{12}*5.5*10^{-6},

C = 1 / 10645.25*10^{6},

C = 0.0000939*10^{-6} = 93.9pF.

As the coil inductance is minimum at 5.5μH and could be up to 50% higher at maximum, I initially chose C to be 82pF.

Then two tuned circuits are band-pass coupled using a top coupling capacitor, it significantly reduces the *Q*. Maybe at critical coupling two coils with unloaded *Q* of 85 might give half that, at 42.5.

The years of experience I've gained, have revealed that critical coupling of parallel tuned circuits occurs when the top coupling capacitor is about 1/15 the value of the tuning capacitor. In this case 82/15 = 5.46pF. (Use 5.6.pF).

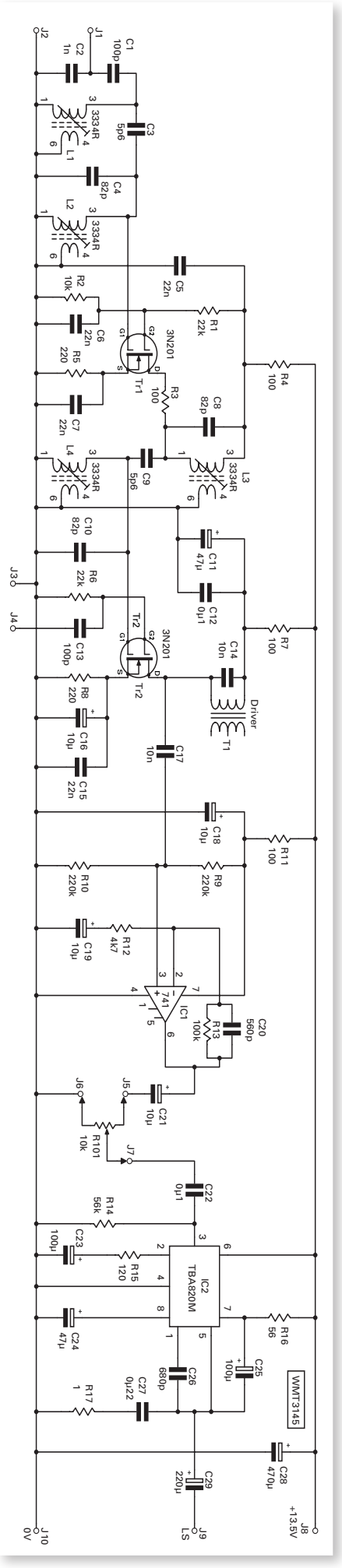


Fig. 1: Circuit diagram of G4CFY's original concept.

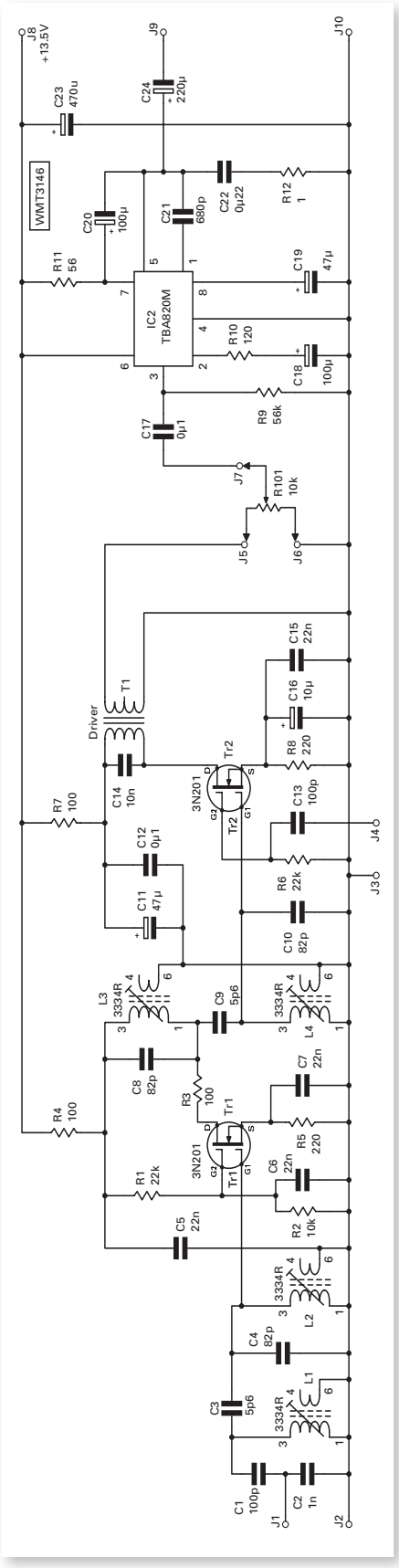


Fig. 3: The original circuit was updated and the final result is shown in this diagram.

The inductive reactance of 5.5µH at 7MHz is X = 2*π*f*L.
X = 2*π*7*10⁶*5.5*10⁻⁶,
X = 241.9Ω.
If the critically loaded *Q* is 42.5, then the dynamic resistance will be 241.9*42.5 = 10280Ω.
To match the 10280 to a 75Ω antenna will require a transformation of 137:1. Now Rd/Rin = $(C2/C1 + 1)^2$. Then SqRt(Rd/Rin) = C2/C2 + 1.
So C2/C1 = SqRt(Rd/Rin) - 1. In this case C2/C1 = SqRt(137) - 1 = 10.7.
If I make C1 100pF then C2 should be 1070pF. (Use 1nF).
The total series combination of C1 and C2 is Cs = C1*C2/(C1+C2)
Cs = 100*1000/(100+1000) = 100000/1100 = 90.9pF. (Close enough).

Direct Current Biasing

Let's now look at d.c. biasing. The old style metal-can m.o.s.f.e.t.s usually require the gate 2 to be about 4V higher than the source at full drain current of 10mA. For many years now I've used 22 and 10kΩ gate bias resistors, which - together with a 13.5V supply - provide the required bias.

Vg2 = R2*13.5/(R1+R2),
Vg2 = 10k*13.5/(10K+22k),
Vg2 = 135k/32k = 4.22V.

With the gate 2 set at 4.22V the drain/source current will drop voltage across the source resistor. I found that a value of 220Ω provided a drop of 0.35V, making the gate 2 to source volts at 3.87, corresponding to a drain current of only 1.6mA (much lower than expected).

In order to prevent parasitic oscillation at v.h.f., a 'drain stopper' resistor of 100Ω was put in series with the drain lead. This actually reduces the effect of internal feedback (via the drain to gate 1 path), which would make this into a tuned-input, tuned-output oscillator.

The Mixer

For the mixer I used the band-pass coupled pair of tuned circuits as the interstage network feeding the mixer device. In this case gate 2 was referenced to ground with a 22kΩ resistor. The value not being critical at all, anything from say 10 to 100kΩ could be used with little or no noticeable difference.

The local oscillator (l.o.) signal would come from a Portland VFO with a volt or so peak-to-peak (p-p) swing, enough to switch the mixer device on and off. This utilises the square law gate-to-drain current relationship at low drain currents for these devices, resulting in good mixer action.

The mixing action will result in alternating currents of the drain/source at 7, 14MHz, and audio frequencies. Due to these frequencies the source resistor needs to be decoupled at both r.f. and a.f.

Assuming that ideal decoupling occurs when the capacitor is 1Ω, then Xc = 1 = 1 / (*π*F*C), and C = 1 / (2*π*F).
C = 1 / (2*π*7*10⁶) = 0.0227uF, use 22nF.

For audio decoupling the capacitor cannot be 1Ω, as its value would be too high. A suitable target would be for its reactance to be lower than 1/10 the source resistor.

The Xc = 22 = 1 / (2*π*1000*C), and C = 1 / (2*π*1000*22) = 7.2µF. (Use 10µF, which will be about 16Ω). It follows that a 47µF capacitor would be 3.4Ω.

Mixer Output

It's onto the mixer output now and this part of the design required much deliberation before I chose to use a low frequency choke or transformer! What was required was a load, which would provide high impedance at audio frequencies but at a low d.c. resistance.

Ideally, the output of the mixer should pass low audio frequencies and rapidly reject higher frequencies. This is because in effect the pass-band of the audio part of the receiver is defining the bandwidth of the receiver.

I tested an Eagle driver transformer using an audio signal generator and an oscilloscope. The tapped secondary was driven from the signal generator and the oscilloscope used to observe the envelope across the main winding.

Then, I discovered that the audio signal amplitude was pretty flat from a few tens of Hertz to well over 20kHz. Very good as a high quality audio transformer - but too wide a bandwidth for our purposes.

A 10nF capacitor was then added across the main winding. The value was just a guess but it was a lucky one! The response was constant from a few tens of Hertz until just above 1kHz before starting to fall and was -3dB at 2.4kHz. It continued to fall and was -20dB at 24kHz.

The driver transformer was incorporated into the design just using the main winding, and the 10nF capacitor as a parallel tuned audio circuit.

Audio Pre-amplifier

An op amp stage was designed as a non-inverting amplifier. Bias was provided by two equal value resistors, R9 and 10, across the supply rails. The gain was set at just over 20 times by the feedback resistor R13 and the input resistor R12.
The capacitor C19 provides a low impedance, about 16Ω at 1kHz, and is a direct current (d.c.) blocker. This allows the negative input to sit at the same d.c. level as the positive input.

I then incorporated further audio filtering by shunting the feedback resistor with capacitor C20. A corner frequency for the R and C combination should be 2.4kHz.

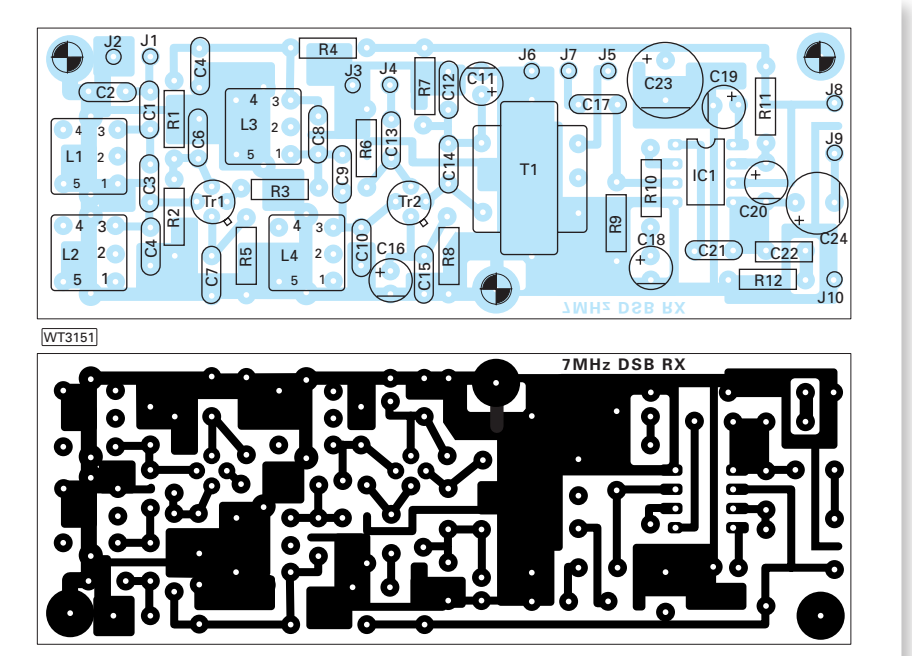


Fig. 4: The track overlay and component placement diagram for the final project.

Then f = 1 / 2*π*R13*C20. So C20 = 1 / 2*π*R13*f,
C = 1 / 2*π*10^5*2.4*10^3, C = 0.066*10^{-8}, or 663pF.

I should have chosen 680pF, but as I had a 560pF to hand, I decided to try that first.

Output from the a.f. pre-amplifier would be via a 10μF capacitor to a 10kΩ log potentiometer. The a.f. amplifier I chose was one dealt with in an earlier DiDB and needs no further explanation here.

Development

The r.f. and mixer stages were built 'dead bug style' using copper laminate board. A Portland VFO was connected to it and also my HP8640 signal generator. My oscilloscope was connected using a 220nF capacitor directly to the drain of the mixer stage.

Tuning the v.f.o. to within 1kHz of the signal generator and an enormous audio signal was observed on the 'scope! The signal generator, which was originally set to 10μVrms, was reduced to around 2μVrms and the recovered audio was about 200mV p-p. (This is a voltage gain of about 90dB).

The circuit was then checked for stability by seeing if it was affected by putting my hand nearby, no change was noticed. I then held the d.c. supply wires and no change in the recovered output was noted. Everything checked out as solid gain, without regeneration. Maybe the two stages could be producing this regularly?

Earlier in the developed stage (and noted in this article) the dynamic resistance of the 3334 critically coupled was determined to be about 100Ω.

The BFR84 has forward transconductance of 15mA/V. This puts the gain as

Av = 10k * 15mA/V, Av = 150. This is 43.5dB. (Well over the level I had assumed).

Similarly, if the driver transformer and 10nF are resonant at say 1kHz, then

X_L = XC = 1 / 2*π*F*C. X_L = 1 / 2*π*1000*10^{-8}. X_L = 10^5 / 2* π = 15915Ω.

The gain of the mixer at 1KHz will then be A = 15mA/V * 15915 = 238.7. This is 47.55dB. How about that then!

Mixed Blessing?

The r.f. and mixer stage gains come out to about 91dB but this could be a mixed blessing. Clearly, I realised that the audio preamplifier stage wasn't needed. I knew that the r.f. sensitivity would be so great that it could easily be saturated by the v.f.o., unless they were kept strategically separated. Too much audio gain would also create l.f. instability.

Not only do we not need the audio preamplifier but I realised we could also use the secondary winding of the transformer to give a reduced audio output from the mixer and at a lower impedance.

An audio amplifier printed circuit board, as built for the earlier DiBD audio amplifier article, was added to the copper clad breadboard. A picture of the assembly is shown in **Fig. 2.**

Kits & Bits

The p.c.b. costs £4.50, P&P 75p.
Transformer £1.50, P&P £1.
Volume control £1.50, P&P £1
The p.c.b. and parts kits complete, including transformer and volume control £18. P&P £1.50.

Cheques payable to **A.J** & **J.R. Nailer**.
Orders to:
Spectrum Communications,
12 Weatherbury Way, Dorchester,
Dorset DT1 2EF.

Tony Nailer G4CFY

To subscribe to my readers' list, send a blank e-mail to: **g4cfy@pwpublishing.ltd.uk** with the word subscribe in the subject box. When you receive confirmation from the server you can then send e-mails to **pw-g4cfy@pwpublishing.ltd.uk** and your comments will be answered by myself or the *PW* team.

Complete Receiver Tested

The complete receiver was then tested using the signal generator, oscilloscope, and with a loudspeaker output. Signals down to below 1μV were clearly detected. (Really quite amazing!).

However, I then noticed that the recovered audio (observed on the 'scope) seemed to undergo a frequency jump at regular intervals. I suspected that the effect was being caused by noise spikes on the d.c. power line, pulse modulating the Portland VFO.

I switched bench power supplies and sure enough the condition changed but the frequency modulation (f.m.) effect also changed, as did the v.f.o. frequency! This indicated that the v.f.o. was supply line sensitive and that the zener stabilisation was not working effectively. Varying the power supply voltage and the voltage measured across the 5.1V zener on the v.f.o. buffer board, I found it varied quite considerably.

As a result of this exercise I've found a problem that needs curing on the v.f.o. Luckily the answer is quite simple and requires fitting a 78L05 three terminal regulated in place of the resistor and 5.1V zener. At the time of writing the article, I have not done this as I am out of stock of the required regulator.

The original circuit of Fig. 1 was edited to bring it into line with the successful prototype and this is shown in **Fig. 3.** I then laid out a p.c.b. for the 7MHz d.s.b. receiver and the track artwork and component layouts are shown in **Fig. 4.**

I hope the design work has been of interest, and that readers will have a go at building the project, either using their own bits, 'dead bug' style, or using my p.c.b. and kits, which are available as usual. The driver transformer is quite common but can be purchased as a separate item if required. ●

Project

Point-to-Point

linking radios over the Internet using VoIP

Echolink has been an interest of mine for a number of years, as much as Packet Radio was some ten or more years ago. I ran a Packet node on 70, 144 and 430MHz and was impressed with the performance from the home location in north-west Kent. I was providing a service into south-west Essex as far as Chelmsford, into London and covering the Darenth Valley. Serving stations in Farningham, Eynsford, Otford, Shoreham and onto Sevenoaks.

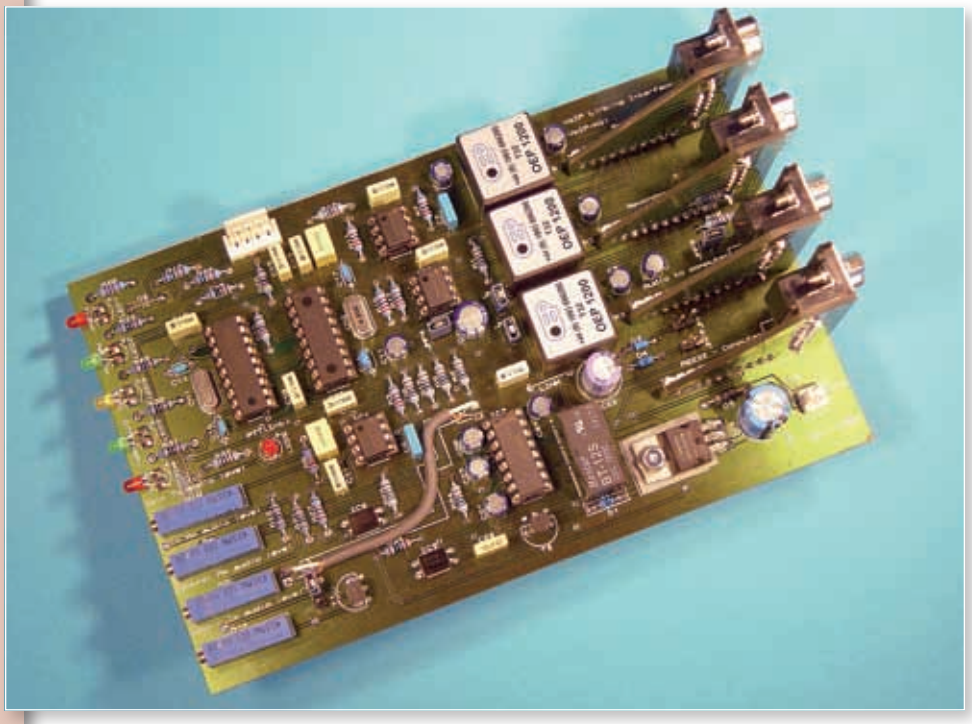
My Packet equipment had been taken out of service, some of which was sold off, while some still remains in the loft. I decided to get some of the equipment re-commissioned and working again. The Echolink node G8NDL-L, node # 263052, is currently working on 430.0625MHz with no CTCSS tone. It works a treat with the prototype linking interface. An outside antenna will be used in due course, the λ/4 antenna in the loft is certainly insufficient for the job.

Voice over Internet Protocol or VoIP is a transitory network protocol designed to connect two or more computers through their IP addresses over a network. The network is commonly the Internet so, speech can be transmitted simplex over a dial-up or broadband Internet connection. For a number of years systems such as *Echolink*, Internet Radio Linking Project (*IRLP*), *eQSO* and the Yaesu system *WIRES,* have been operating, all of which allow radio access from a transceiver to the Internet.

For example, access, via a v.h.f. radio link, can be made in most parts of the world to a local node. In some other parts of the world, there could well be a computer logged on and running on that system. For example; *Echolink*, with a local operator with no radio access. Alternatively, it could be linked to a mobile station running around within the service area of a local linking node or repeater.

Interface

This project describes an interface that can be used with *Echolink* or the *eQSO* software to connect a radio to the Internet. This enables radio access to another location on the globe via the Internet to another user. Whether the second user is sitting at a computer, or remote from the computer on a transceiver within range of that node, isn't that important.



The whole idea revolves around a computer-based system setting up all the peer-to-peer connections operating over the Internet. Access to the system can be gained with a computer directly connected to the Internet. There's also an option where a radio operating on the Amateur bands can gain access via a radio link. Access can be via one or more of the 50-430MHz bands.

The linking interface is essentially a black box that connects the Internet-based computer to the radio that's running the radio access node.

Ken Ginn G8NDL describes an interface for linking your radio, computer and the Internet to widen the scope for hand-held or mobile communications.

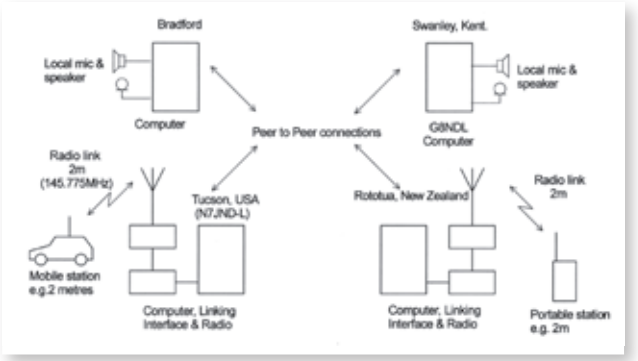


Fig. 1: An Echolink style of radio and computer audio interconnection, allowing any user to talk to any of the other three users. *(Author's original)*

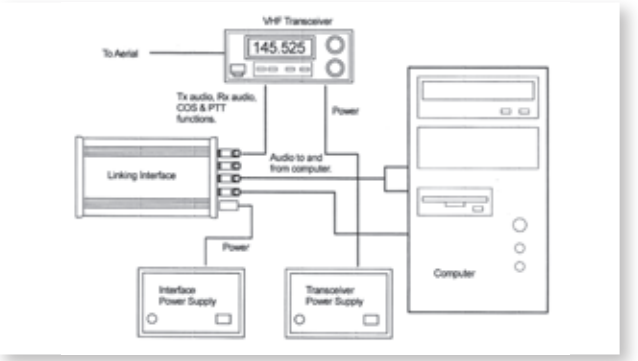


Fig. 2: The basic layout of the equipment at one of the node stations - a link between radio and computer audio lines. *(Author's original)*

This unit sorts out the switching needed for the transceiver and routing of the transmitted and received audio. There are additional functions: including COS (Carrier Operated Squelch), p.t.t. (press-to-talk, i.e. transmit), audio muting and DTMF decoding. The combination therefore becomes a central piece of equipment providing access via links and repeaters covering parts of the world hitherto unheard of via a hand-held or v.h.f./u.h.f. mobile radio.

A similar idea to my project is the IRLP system. But the *IRLP* program only runs on a *Linux* based operating system and it uses a dedicated interface of it own, that's not compatible with this interface. The same comment applies to the Yaesu *WIRES* system, Yaesu supply their own linking interface that works on their *WIRES* system.

Basically Speaking

The very basic outline of a VoIP system example is shown in **Fig. 1**, it uses the Internet as the primary carrier of data. For example, two computer-based installations with amateurs using computers alone (no radios involved here), are located in Bradford and London.

They will exclusively use computer-to-computer communications. But notice also, there are two additional users, one as a mobile station (145.775MHz) in Tucson Arizona USA working through a v.h.f. Echolink node (N7JND-L) and the other is a portable station using a hand-held in Rototua New Zealand, working through another v.h.f. repeater. Any of these four users can communicate with the other three, just as you would do on a local net on S19 or S21. But a mixture of radio and Internet routing is used to establish communication between two people, three or maybe all four users.

With a mobile or a portable station, access is gained through a local radio link to a computer and radio linked node. This could be a suitably equipped repeater without a local microphone and speaker attached to the computer. To connect the radio link, at the node of the Internet connected computer, we need a linking interface, a small box of tricks that comes in to play. There are websites and books describing in detail the VoIP system and you're encouraged to seek more information from these sources.

The Internet is a great source of information on the subject. See the references at the end of the article. But essentially the radio user can 'dial-up' a node, which could be a remote repeater at the other side of the world, just by knowing the repeater or node's number. Linking is achieved by using DTMF commands from the transmitter's DTMF keypad. Access to the remote node is then controlled by the user of the local node and peer-to-peer communication can be established.

The linking interface

The whole interface is constructed on five p.c.b.s and enclosed in an extruded aluminium case measuring approximately 170 x 110 x 60mm in size. Small enough to sit along side any radio equipment. The interface connects the audio and switching functions between the node's radio and the computer running the linking software under a *Windows* operating system. The linking interface is powered by an external stabilised 12V d.c. supply, that's preferably independent from the transceiver's own power supply **Fig. 2**.

Having a separate supply to power the interface

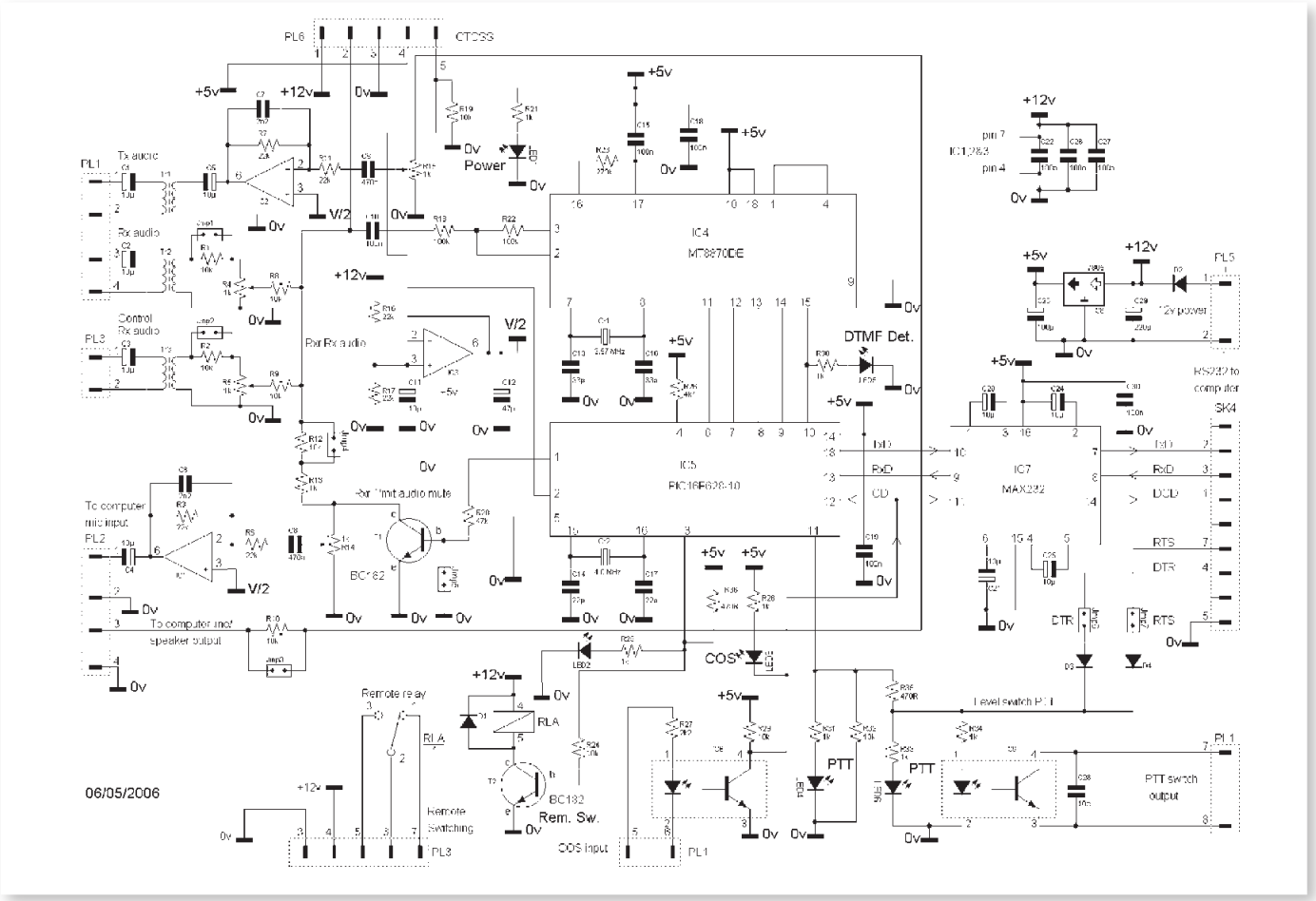


Fig. 3: The circuit of the VoIP interface is relatively simple to look at. The 'hard work' goes on within IC5 combined with inputs from IC4. (Author's original)

will endeavour to isolate the interface electronics to a degree from the transceiver and it tends to lessen any r.f. appearing on the interface circuitry. This power supply only needs to be able to supply a stabilised 12V with a maximum current of only 100mA to the interface. The unit interfaces with no r.f. signalling and purely decodes the serial data from the computer and sets up the transceiver controlling the p.t.t. and COS functions.

The interface circuitry routes audio signals from the node's radio to computer and vice versa. Also if needed, it will mute the audio as in the prototype system, that uses separate transmitter and receiver. The p.t.t. function received from the RS232 serial port can be decoded and used to key the transmitter.

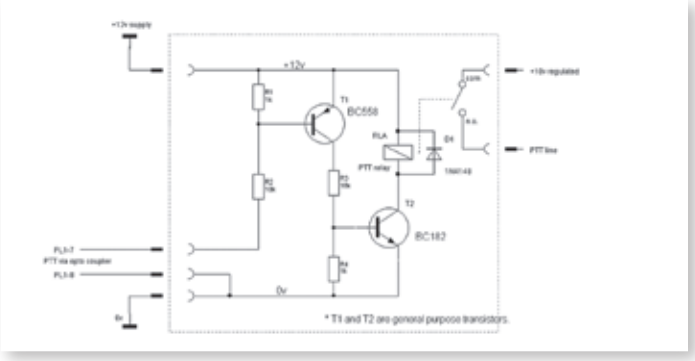


Fig. 4: An additional interface to allow the use of a Pye T412 transmitter. (Author's original)

Additionally, a COS signal can be utilised from the receiver to indicate a received signal and inhibit the transmitter from being keyed whilst the receiver is open and receiving a signal.

The p.t.t. function can be initiated in one of three ways, either as: serial data in ASCII format as received data from the computer (2400Bd, 8N1, RTS signalling from the computer) or DTR signalling from the computer via the RS232 computer connection.

Receive signal indication is initiated in one of two ways: Either as a carrier operated squelch (COS) function from the radio receiver as a logic level, logic 1 indicating the squelch is open. The COS function will work on logic levels of five to twelve volts. This is electrically isolated but polarity conscious. Finally, the voice operated switch (VOX) within the computer/software can be used to indicate received audio.

Audio Paths

Let's now have a look at the audio paths in the project, the circuit of which appears in **Fig. 3**. There are two primary paths. The first is the received audio from the Internet computer (speaker or line level output) that appears on PL2, pins 3 and 4. This is the transmitter's transmitted audio. This passes through R10 and Jmp3 to the preset R15 through IC2, isolating transformer Tr1 and out to PL1 pins 1 and 2. From here the audio passes onto the microphone or line input of the transmitter. The preset, R15, affects the modulation level of the transmitted audio when the transmitter is keyed-up.

The second path is the receiver's received audio passing through the isolating transformer Tr2 via PL1 pins 3 and 4, through Jmp1, the preset R4 that sets the

received audio level. Then onto the DTMF decoder IC4. This path also meets with the summing point coming from a secondary receiver (if needed) via PL3 pins 1 and 2. Isolated input and audio level control as with the main transceiver through connector PL1.

The audio now passes through R12/Jmp4 and through onto the preset R14, which sets the overall audio level to the computer. Transistor T1 is provided as an audio mute and mutes received audio. When this transistor (T1) is turned on and the receiver is receiving a signal, the device shunts the audio to ground. This can be disabled by inserting the link in Jmp5, which will force the transistor to switch off even when instructed to do so by the PIC, IC5.

Within the *Echolink* software, there is a provision to control the node by issuing commands over the Internet or via the radio link. This can shut down the node if problems persist. The use of a secondary receiver integrating with the interface is a useful addition to control the node itself, should the link's frequency suffer from interference (intentional or otherwise). For example interference that's keeping the receiver squelch open.

Remote Shutdown

It would be difficult to shut down the node remotely via r.f. with interference on the link's primary receive frequency holding the squelch open. Therefore the secondary frequency can used to issue commands on this clear frequency, assuming the secondary frequency is clear from interference to and the command to disable the link can be issued remotely.

Biasing for both the two audio buffers, IC1 and IC2 is provided by IC3, which provides a mid-rail voltage of 6 volts derived from the external stabilized 12V supply. Audio frequency tailoring is provided with feedback capacitors in the op-amp buffer circuits in an attempt to restrict the upper audio frequency and to reduce any noise that could be present.

The NE5534 low noise op-amp used was chosen for these buffer amplifiers as they offer a better and guaranteed performance at the lower 12V supply than the standard 741, although the 741 can successfully be used in the circuit.

Data and digital switching

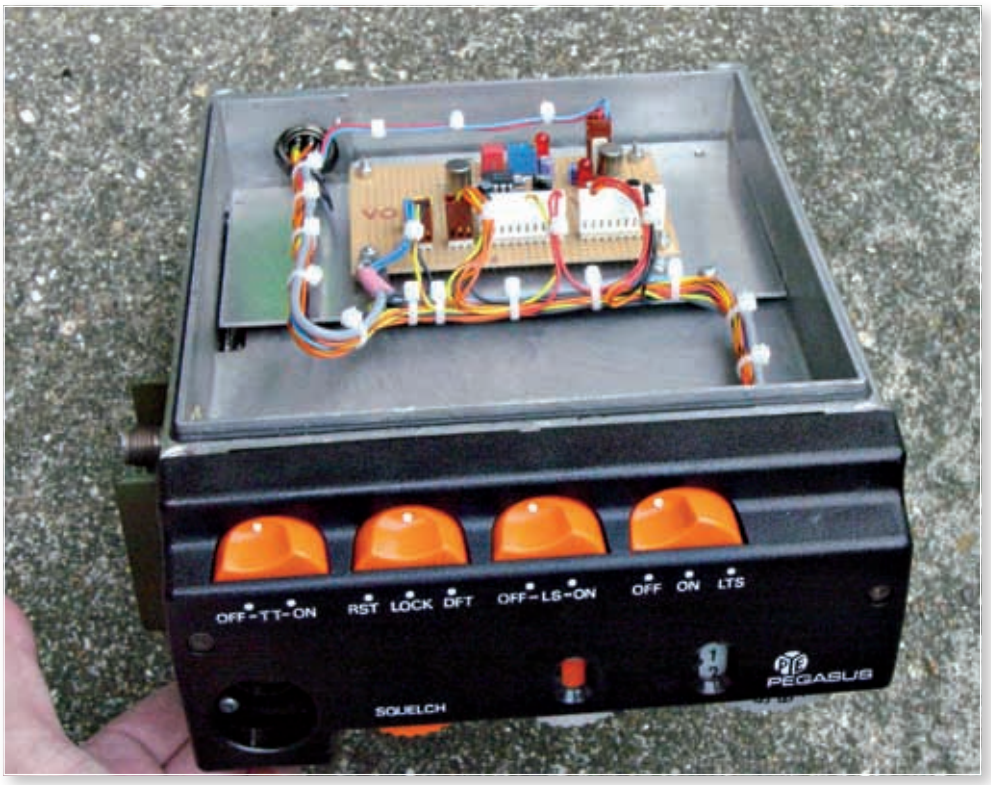
The main data path from the computer is received from the RS232 serial port presented at PL4. The serial data from the computer is in the format of 8N1, which refers to 8 data bits, no parity and 1 stop bit. When you are running the linking software, you have the choice to use DTR, RTS or serial data switching. Although RTS and DTR signalling is easiest to configure, it was thought best to have the data from the computer controlling the linking interface.

The serial data through PL4 is passed through a MAX232 RS232 to TTL converter. This ensures the right voltage levels operate the PIC. For DTR and RTS switching the appropriate link has to be inserted. For ASCII signalling, neither links are used in circuit.

The p.t.t. switching of the transmitter is accomplished by raising the voltage of the port of the PIC, IC5 pin 11. This is under instruction from the computer. This illuminates the p.t.t. l.e.d. on the front panel of the unit, LED4, and the internal p.t.t. l.e.d., LED6. The output port also forward biases the diode of the opto-coupler IC9, sufficient drive current to cause the output transistor in the device into conduction. This can be used to switch a p.t.t. line of a transmitter, or if difficulties are experienced, switch an additional transistor capable of operating a higher current device, **Fig. 4**.

The carrier operated squelch input is provided and this illuminates an l.e.d., LED3, when current is supplied to the opto-coupler IC6. This forces the transistor of the opto-coupler into conduction and pulls this device's output line low. This instructs the PIC that the COS has been activated and also signals the computer via the DCD line.

A feature seen on most linking interfaces is the function to remotely control a set of relay contacts for auxiliary equipment and a DTMF tone A energises the relay. A DTMF tone B de-energises the relay. A set of single pole double throw (s.p.d.t.) relay contacts is provided giving latched operation. Indication of the relay being latched on, is shown by LED2 being illuminated.



The DTMF functions are handled by the decoder chip, IC4 and five of the decoder chip's outputs are fed to five inputs on the PIC IC5. The outputs signal from the DTMF decoder are; Valid Data detect and binary coded decimal (BCD) values of the decoded DTMF tones.

When a DTMF tone is detected, the Data Valid

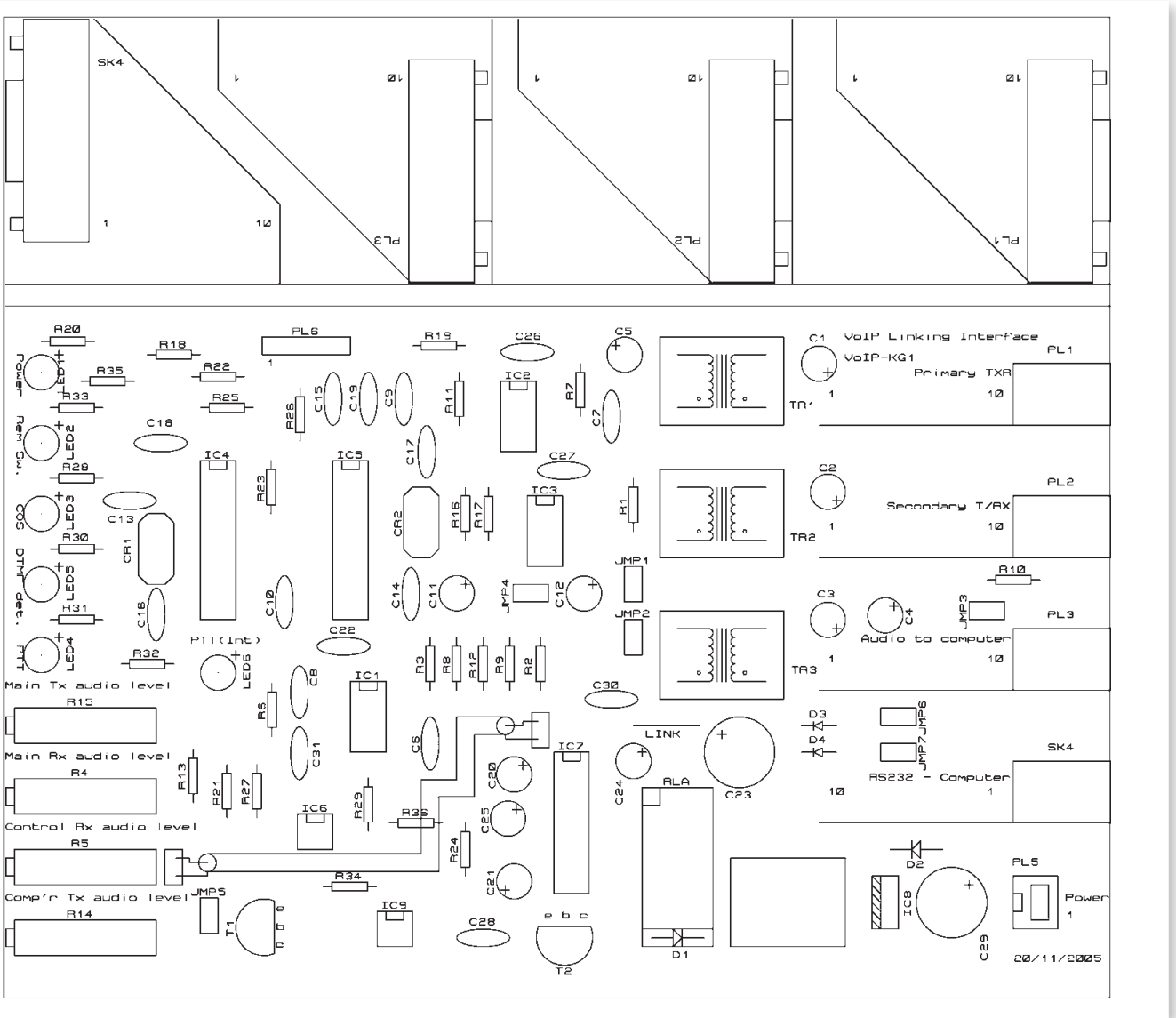


Fig. 5: Ken's original component overlay diagram will allow you to identify items to be seen in the photographs that accompany this article. *(Author's original)*

output immediately goes high (IC4 pin 15) and LED5 illuminates. A delay of 2ms is introduced into the PIC's routine to enable the four BCD outputs of the DTMF decoder to stabilise before the data is read by the PIC. The DTMF tones accepted are 0 to 9, *, # and tones A and B.

The PIC, IC5 (a PIC16F628 device) performs all the necessary decoding and functions required to operate the interface. Writing, programming and de-bugging of the PIC's source code was greatly simplified with the use of the *Proton IDE* compiler from Crownhill Associates. The *Proton IDE* compiler uses a PIC BASIC programming language, the BASIC code some 150 lines in length, translates to 600 lines in Assembler.

The writing, debugging and initial testing of the code took about twenty or so hours of work. Details of the actual code programmed into the PIC are beyond the scope of this article. Needless to say it does all the clever work of decoding, coding and switching of all the functions in the unit.

Normal Operation

The PIC handles the signalling from the computer. During normal operation, the software in the computer sends an ASCII character C to interrogate the interface about twenty times a second. This is to establish if a valid DTMF tone has been detected and successfully decoded. If the interface has decoded a DTMF character, then the reply back to the computer will be the ASCII character, i.e. 0 to 9, *, #, A or tone B.

If no tone is detected, then the equivalent value of a 'space' character, will be sent back indicating that no DTMF signal has been received. Additionally, the computer will initiate a transmit function by sending a T (upper case only) character to the interface, causing the p.t.t. command to be initiated within the unit, keying up the transceiver. An R (again upper case only) will switch the transceiver into the receive mode.

Built into the programming of the PIC interface is an option to use a standard terminal program (such as *Hyperterminal*) to check and monitor the basic functions of the unit. It's also possible to check the version of code programmed into the PIC. This function is initiated by sending the ? character to the interface.

Power supply

A 7805 5V/1A regulator is provided to supply current to the logic circuitry. Although it is advised that the maximum current drawn through this device is no higher than 100mA. Decoupling is provided on both the input and outputs of the regulator, along with a series

diode to protect the circuitry from reverse connection of the power supply.

The onboard connector, PL6,F is provided to attach a CTCSS decoder and interface with the PIC but this is regarded as a further expansion and is currently not used here. It can also currently be considered as a test point giving access to 0V, +5V, +12V and received audio.

Construction

So, that you can identify the main components in the photographs within this article, I've included the main overlay diagram, **Fig. 5**. The whole circuit is fabricated on five double-sided p.c.b.s (contact Ken G8NDL for more details, see panel opposite) although it's supplied as a single large p.c.b. The one major p.c.b. is cut into its five parts by following the top silkscreen printing, Once these boards have been cut to size and shape the rough edges may be cleaned up with a file and cleaned off with wet and dry paper, used wet to keep the dust down. The reason for choosing this particular method of construction was that the circuit needed to be made into a reasonable sized and easily available enclosure.

For easy duplication of the unit, the connectors have to be readily available from suppliers. And the density of connections on the unit, mainly the four D-type connectors, made this method of construction the best option overall.

Ensure all components are soldered in correctly, ensuring the polarity of all diodes, including l.e.d.s, also capacitors and transistors. All i.c.s are socketed with the exception of the two opto-couplers, IC6 and IC9; they are soldered directly into the board.

The four D-type connectors, PL1, PL2, PL3 and SKT4 are all mounted on the smaller five-sided p.c.b.s and soldered as the last components to the assembly at right angles to the main p.c.b. using tinned copper wire formed at ninety degrees, or pre-formed wire assemblies as used in the prototype.

Testing

The unit should be tested initially without connecting the unit to a either a computer or a radio. For reasons of safety (of the i.c.s), it's best to keep the i.c.s out of the board until the operation of the regulator is verified. This should of course be a nice steady 5V. The nominal supply is 12V should be current limited to 100mA and when applied to the unit with the regulator fitted as the only i.c., the current drawn should be no greater than 50mA, when the relay is energised.

The remote switch relay, RLA, will energise, without the PIC inserted, and LED2 will also illuminate. Temporarily shorting pin 3 of the PIC's socket to ground should de-energise the relay and extinguish the l.e.d. Do not do this with the PIC in-situ.

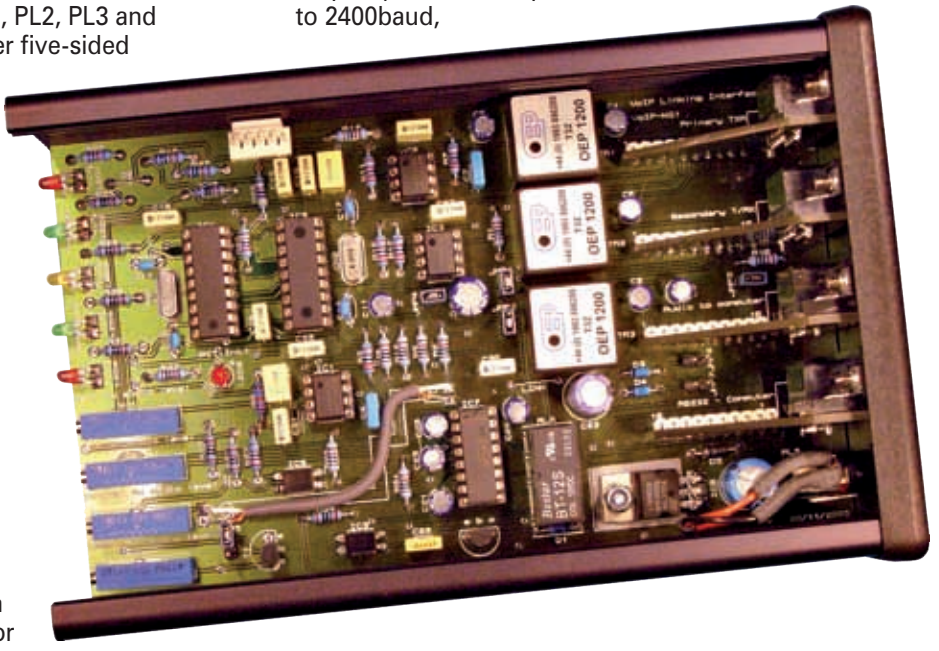
Install the i.c.s into their sockets and, once again, switch on the supply, the power drawn should be no greater than 30mA. The power l.e.d. should illuminate and none other should remain lit. The relay l.e.d. will flash when switched on, this is normal. Decide which links need to be used regarding which type of switching is to be used for p.t.t. or whether a separate transmitter is used, as was used in the prototype. See separate panel.

You should elect which jumpers need to be present for the particular mode of operation. In the prototype, links were present for jumpers 1, 2, 3 and 4. The remaining jumpers were left off. This combination of jumpers, uses ASCII commands to transmit and receive, it uses the Interface's DTMF decoder and it uses software VOX.

If you'd like to build this unit or for more details of the VoIP interface and availability of p.c.b. and circuit details, send your request, marked 'VoIP Interface', to the editorial offices.

To test the operation of the circuit and if you're using ASCII control from the computer, the operation of and the PIC's limited function command set can be accessed in the following way:

Using a suitable 9-pin serial lead, connect a computer to the Interface's RS232 serial port, SK4 and run a terminal programme. A program, such as *HyperTerminal* in *Windows* is suitable for this task. Set up the terminal programme at 8N1, or eight data bits, no parity and one stop bit. The data rate is set to 2400baud,



which corresponds to the data rate set in the PIC's interface software.

Now send the 'T' character (note upper case) from the computer. The unit should go into transmit and the p.t.t. l.e.d. will illuminate. The opto-coupler IC9 will conduct too.

Now sending an R character from the computer should put the unit back into reveive mode and extinguish the p.t.t. l.e.d. The opto-coupler will also stop conducting.

Sending the question mark character(?) via

H*yperterminal* to the interface will interrogate the interface and return the details and description of the code programmed into the PIC itself. You'll see the software date, its revision number and the PIC source code file name.

Presently (as I write this article) for example, the response would be; **G8NDL VoIP linking interface, 07/01/2006 V1.1 VOIP109E**.

Connecting up

Care must be exercised when connecting the unit to the computer, the radio or any other ancillary equipment. This includes all the 9-way D-type connectors on the unit. The ground and 12V output from the unit can on PL3 be mis-connected and the 12V d.c. output could then be shorted to the computer ground.

One way around this problem of mis-connection, could be to not have the 12V supply and 0V made available at PL3. This is achieved by leaving out the links on the mother-board to the daughter board assembly (pins 3 and 4).

In the prototype all the functions were built-in but the links adopted for the prototype were the following; COS changed from a modification for the Pye R414 receiver (12V indicating an open squelch).

Note: For reliable operation of the VoIP interface, software VOX is preferred. This was a complication of using separate transmitter and receiver units. The transmitter is a Pye T412 transceiver unit.

PTT command set to ASCII.

Jumper **Jmp5** off, to mute received audio on transmit.

Jumper **Jmp4** on, to give no reduction in received audio level.

Initially, all the pre-set potentiometers on the p.c.b. were set to fully anti-clockwise, these work in reverse to a normal volume control and will admit the full level of the audio through their respective paths. The actual level can be adjusted with the pre-sets, or the levels can be adjusted in the transmitter, receiver and computer. This depends on the radio(s) used in the actual installation.

To test the linking interface takes a little time as the audio paths through the device from and to the Internet and the radio equipment have to be juggled such that transmitted and received audio through the radio equipment is clean and undistorted. This is best accomplished with a local hand-held transceiver and the interface transceiver running its r.f. connection into a dummy load.

This will ensure minimal problems and embarrassment on the air. The fine-tuning of the computer software used has to be accomplished on the computer and is not described here. Thereby all the functions can be checked for correct operation including DTMF tone decoding.

References and acknowledgements

I would like to thank and acknowledge the following people for their help in this project, **Jonathan Taylor K1RFD**, **Peter Norman G0WMC**, **Phil Wolfe G4EGU** and **Bob Martin G6CKK**.

Websites to look up:

Echolink: **www.echolink.org**

IRLP: **www.ilrp.org**

EQSO: **www.eqso.org**

WIRES: **www.yaesu.com.**

Further reading - TAYLOR J, K1RFD (2004), *VoIP: Internet Linking for Radio Amateurs*, ARRL Publications, Newington CT USA.
ISBN: 0-87259-926-4.

www.ilrp.org

Jumpers Functions

The function of the jumpers are detailed below:

Jmp1-Main radio receiver audio level high/low select.

Jmp2-Auxiliary radio audio level high/low select.

Jmp3-Main computer audio level from line (computer) high/low select.

Jmp4-Main Radio receiver audio level high/low select.

Jmp5-Audio mute on transmit, remove link for separate transmitter and receiver units.

Jmp6-DTR signalling p.t.t. from RS232. Leave out for ASCII control.

Jmp7- RTS signalling p.t.t. from RS232. Leave out for ASCII control.

Outlined below are a summary of the l.e.d. functions:

LED1-Power.

LED2-Remote switch on/off.

LED3-COS (Carrier Operated Squelch).

LED4-PTT (Transmit).

LED5-DTMF valid tone detect.

LED6-PTT Internal (Transmit).

Details of the preset potentiometers functions are given below:

R4-Receiver audio level, - receiver audio output.

R5-Auxiliary (control) receiver audio level.

R14-Audio level to line, computer.

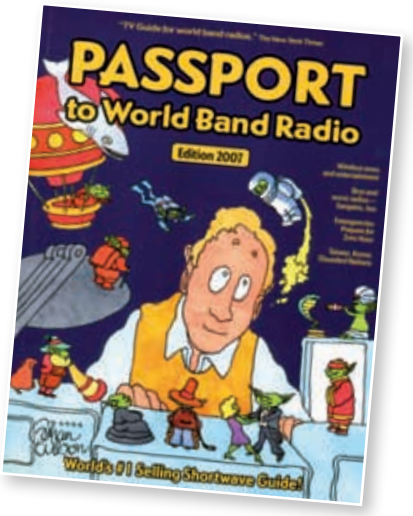
R15-Transmitted audio level, - transmitter modulation.

So, why not try it for yourself? Point-to-point VoIP linking could add another dimension to your hobby.

the pwpublishing RADIO BOOKSTORE

order today NEW

Passport to World Band Radio
2007 Edition
Published by International Broadcasting Services Ltd



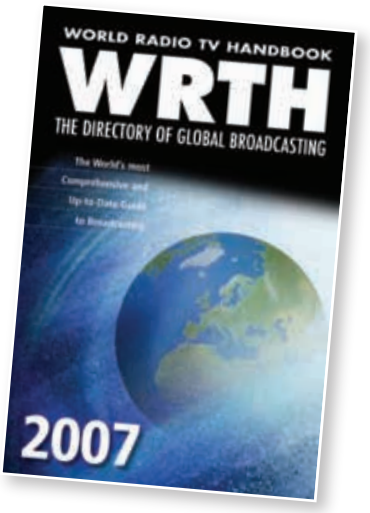
Passport to World Band Radio is said to be the world's number one selling short wave publication and continues to be the popular choice among listeners everywhere. The contents include: what's on world band radio, what to buy, how to get started and is written to make interesting reading. It contains a mix of articles, from an idiot's guide, to a five-minute start and ten easy catches to best times to listen. It also has a channel-by-channel guide to what's on the air. Everything the short wave broadcast listener needs to know.

The world really is at your fingertips when you invest in a copy of Passport for your bookshelf. The 2007 edition has been fully updated to cover the latest band changes.

Buy your copy today!

ISBN: 0-89701-57
592 pages
PW Book Store Price: £17.50

World Radio TV Handbook 2007
Published by WRTH Publications Ltd.



The ***WRTH*** is the most accurate and complete guide to the world of radio on l.w., m.w., s.w. and f.m., available in any form. This long established reference book contains the names, addresses, programmes and frequency details of radio stations all round the world.

Radio stations are listed under the country and all countries are split up into continents, making it much easier to tune to the station you need. Also included are articles on h.f. broadcasting conditions, radio reviews and a section on how to use the book to the best advantage. Sections within this 600+ page book include: National Radio, International Radio, Frequency Lists, Television and Reference.

Every discerning listener should own a copy of the updated 2007 edition.

ISBN: 0-82305-997-9
688 pages
PW Book Store Price: £23.00

P&P FREE UNTIL 18th December *UK ONLY

To order please use the form on page 77 or call 0870 224 7830

SHOWROOM & MAIL ORDER:
Unit 1, Purfleet Industrial Estate,
Off Juliette Way,
Aveley RM15 4YA
NEXT DAY DELIVERY MOST AREAS £10

Haydon Communications

LOCAL TO GLOBAL

TEL: 01708 862524
FAX: 01708 868441

Showroom Open:
Mon-Thurs, 10.00am - 4.00pm.
Mail Order Open:
Mon-Fri, 10.00am - 4.00pm.
West Midlands Showroom:
Tel: 01384 481681

E&OE

MasterCard | Switch | VISA

TO ORDER ON-LINE SEE **www.haydon.info**

PSUs

DIAMOND GZV-4000

Diamond quality power supplies/ switch mode. 40 amp version

Includes built-in speaker **£129.99**

Model	Input voltage	Output voltage	Output current	Dimensions (W x H x D)mm	Weight	Price
GZV4000 (sw tching)	240V	5-15VDC variable	40A continuous	210x110x300	3.5kg	£129.99
GZV2500 (sw tching)	AC 240V	5-15VDC variable	25A continuous	210x110x220	2.5kg	£99.99

NISSEI MS-1228

28A at 13.8V yet under 2kgs. (H 57mm, W 174mm, D 200mm approx). Fully voltage protected. Cigar socket & extra sockets at front/rear. Ultra slim.

NISSEI HAVE BECOME RENOWNED FOR PUTTING QUALITY FIRST, YET MAINTAINING A GOOD PRICING STRUCTURE. A TRULY SUPERB POWER SUPPLY UNIT

'Smallest version to date' now with cigar socket.

£69.95 Del £10.00

2 for £120.00

NISSEI PS-300

TRUE 'LINEAR' PSU

Features: ★ Over voltage protection ★ Short circuit current limited ★ Twin illuminated meters ★ Variable voltage (3-15V) latches 13.8V ★ Additional "push clip" DC power sockets at rear. Dim'ns: 256(W) x 135(H) x 280(D)mm.

A truly professionally made unit built to outlast most PSUs.

30 AMP/12 VOLT PSU

SUPERB VALUE AT **£119.95** Del £10.00

HF TRANCEIVERS

YAESU FT-1000 MkV

200 watts of shear delight from a radio that is without peer when it comes to performance and innovation. Limited stock available. Latest 2005 spec.

Optional extension speaker £119.99

LAST ONE (SEALED BOX) **£1799.99**

New Yaesu FT-2000 in stock..... £Phone

YAESU FT-817 ND

100kHz-440MHz (with gaps). All mode transportable. Includes NIMH battery/ charger. Latest spec.

£345.00

FT-817ND + case + CW filter.....£379.99
FT-817ND pack + MS-1228 .....£429.00

YAESU FT-897D

HF + 6m + 2m + 70cm all mode. An amazing DSP Tcvr for base/mobile or portable use. Very little has been left out!

FT-897D + MS-1228 £629.00

CRAZY PRICE **£575.00**

ATAS-120 remote antenna.....£219.99

KENWOOD TS-570DGE

Last few left. Brand new.

OUR PRICE **£789.00**

ICOM IC-7400

One only. As new, private sale

OUR PRICE **£849.00**

YAESU FT-857D DSP

The ultimate HF excitement in a small package. HF + 6m + 2m + 70cm. Incl's digital signal processor unit. Incl's optional DSP unit

Optional detatch kit £44.99

(Optional DTMF mic £59.95) **£529.99**

FT-857D + MS-1228 PSU.....£575.00

D-308B DELUXE DESK MIC

(with up/down). Many amateurs (over 4000) have been pleased with it's performance. Includes 8-pin round Yaesu mic lead. Icom/ Kenwood & other leads available. Replacemaent foam windshields £3 incl P&P

Truly remarkable audio on both SSB & FM/AM

£49.95 P&P £7.50

HF RCV'RS

REALISTIC DX-394

Send SAE for review

★ Superb performance SW receiver ★ 0.2-30MHz (all mode) ★ Selectable tuning steps (down to 100Hz) ★ 240 or 12V ★ Digital S-meter ★ Attenuator ★ Key pad entry ★ 160 memories ★ Noise blanker.

OUR PRICE **£249.95** P&P £10

SONY SW-100E

★ Miniature portable all mode SW receiver ★ Station presets for 50 frequencies ★ Synchronous detector ★ Tuning in 100Hz + 1kHz steps ★ Includes compact antenna/ stereo earphones/carrying case. Superb SSB performance.

240V Power Supply £24.95

OUR PRICE **£179.95** P&P £10

SANGEAN ATS-909

IDEAL FOR NAVTEX RECEPTION

A superb performance all mode synthesized world receiver with true SSB and 40Hz tunning for ultra clean reception. Other features include RDS facility, 306 memories and WFM. Incl's case/earphones/wind-out antenna. A truly remarkable receiver, especially on SSB – you'll be amazed.

Incls free 240V Power Supply £16.95

£139.95 P&P £10

VHF/UHF TRANS

ALINCO DJ-596

2m + 70cm Handie. Includes: (NIMH) Battery/ Charger. Wide + narrow switchable. High power (4.5W) OP as standard.

Now includes free remote mic

£119.95

Optional case.....£16.99
Cigar lead £19.99
Optional headset (Boom mic) £24.99

FT-7800E

2m/70cm Tx (Rx:-108-1000MHz) Superb 50/35W FM mobile (AM Rx).

FT-7800 + YSK-7800 (in-car kit). **£189.99**

FT-1802

2m/70cm, FM (50W) mobile.

£125.00

YAESU FT-60E

2m/70cm Tx (5W). Rx:- 108-520/700-1000MHz. Includes Nicad battery and charger & antenna.

CRAZY PRICE **£125.00**

Optional Micro antenna (shown) £16.99
Optional case.....£16.99
Cigar lead £21.99
Optional speaker mic £23.99

SUPER-GAINER RH-9090

SMA 40cm flexible whip that is ideal as replacement. Tx:- 2m + 70cm. Rx:- 25MHz-2.9GHz

OUR PRICE **£28.95** P&P £4.00

SUPER-GAINER RH-9000

BNC 40cm flexible whip for the ultimate in gain. Tx:- 2m + 70cm (Rx:- 25MHz-2.9GHz).

OUR PRICE **£24.95** P&P £4.00

YAESU VX-2E

Tx:- 2m/70cm. Rx:- 0.5-999MHz. Includes battery (Li-/on) + charger.

OUR PRICE **£109.99**

Optional speaker microphone. £23.95Optional plastic case £12.99

YAESU BARGAINS

VX-7 2/6/70.....£199.99
VX-120 2m hand-held..... £95.00
FT-8800E..... £259.00
FT-8900..... £319.00

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W) .....£79.95 P&P £6
RS-102 1.8-150MHz (200W) .....£49.95 P&P £6
RS-402 125-525MHz (200W) .....£49.95 P&P £6
RS-3000 1.8-60MHz (3kW) Incls mod meter.....£59.95 P&P £5
RS-40 144/430MHz Pocket PWR/SWR.....£29.95 P&P £4
DL-30 diamond dummy load (100W max) .....£26.99 P&P £4

ACCS

SGC BARGAINS

SGC MAC-200 New auto tuner 1.8-54MHz (200W) wire, vertical, dipole. You name it. (5 selectable outputs).

OUR PRICE **£239.99**

SGC-239 Mini tower ATU (1.8-30MHz) £169.99
SGC-230 (HF-200W) ATU.....£319.99
SGC-237 HF+6m Tuner.....£269.99
SGC-231 HF+6m (Deluxe).....£319.99

MFJ-949E

NOW **£110.00**

- 1.8-30MHz 300W ATU
- Large cross needle meter
- 30/300W PEP power meter
- VSWR
- 3-way antenna selector
- Internal balun

MFJ-969

300W **£169.99**

HF + 6m rollercoaster ATU

MFJ-259B

UK VERSION

HF digital SWR analyser + 1.8-170MHz.

NOW **£169.99** P&P £7

Optional case.....£22.99
MFJ-901B Superb versitile ATU.....£69.99
MFJ-902 Compact ATU.....£59.99
MFJ-16010 Random wire ATU £39.99
MFJ-260C 300W dummy load £39.99
MFJ-264 1.5kW dumm load £69.99

D-308B DELUXE DESK

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

Spare foam windshield £3.00

£49.95 P&P £6.00

Yaesu 8 pin round to modular adapter (8 pin)..... £19.99
Yaesu 8 pin round to 6 pin modular adapter..... £19.99
A-08 8 pin "Alinco" round..... £9.95
K-08 8 pin "Kenwood" round..... £9.95
I-08 8 pin "Icom" round..... £9.95
IM-08 Modular phone "Icom"..... £9.95
KM-08 Kenwood modular lead..... £9.95

YAESU G-450C

Heavy duty rotator for HF beams, etc. Supplied with circular display control box and 25m of rotator cable.

OUR PRICE **£299.99**

G-650C..... our price £339.99
G-1000DXC..... our price £429.99
G-5500 (azimuth/elevation) rotator..... our price £499.99
GC-065 thrust bearing..... £48.00
GC-038 lower mast clamps..... £25.00
8 core heavy duty rotator cable..... £1.00/mtr

New station log books (A4) **£4.99** P&P £2.00
5 log books **£20.00** P&P £6.50

AR788

Quality rotator for VHF/UHF. Superb for most VHF-UHF yagis, 3 core cable required. 3 core cable 50p per mtr.

OUR PRICE **£44.99**

AE-201 thrust bearing..... £17.99

CAROLINA WINDOM

CW-160S	(160-10m) 40m long.....	£121.95 P&P £8.50
CW-160	(160-10m) 80m long.....	£119.95 P&P £8.50
CW-80	(80-10m) 40m long.....	£95.00 P&P £8.50
CW-80S	(80-10m) 20m long.....	£105.00 P&P £8.50
CW-40	(40-10m) 20m long.....	£84.95 P&P £8.50

CUSHCRAFT BARGAINS

Delivery £12.00

MA5B	Mini beam 10, 12, 15, 17, 20m.....	SPECIAL OFFER	£339.95
A4S	4 ele beam (10 - 20m).....		£499.99
A3S	3 ele beam (10-20m).....		£429.00
R-8E	Vertical (40 - 6m) "special".....	SPECIAL £499.95	£425.00

FIBRE GLASS POLES

Del £10.00

1m	1¾" £10.50	2" £12.50	Longer lengths
2m	1¾" £20.00	2" £24.00	available – phone

COPPER ANTENNA WIRE ETC

Enamelled (50m roll)..... £16.95 P&P £5
Hard drawn (50m roll)..... £16.95 P&P £5
Multi-Stranded (Grey PVC) (50m roll)..... £13.95 P&P £5
Flexweave (H/duty 50 mtrs)..... £30.00 P&P £5
Flexweave H/duty (18 mtrs)..... £15.95 P&P £5
Flexweave (PVC coated 18 mtrs)..... £18.95 P&P £5
Flexweave (PVC coated 50 mtrs)..... £40.00 P&P £6
Special 200mtr roll PVC coated flexweave..... £99.00 P&P £10
Copper plated earth rod (4ft)..... £13.00 P&P £6
Copper plated earth rod (4ft) + earth wire..... £18.99 P&P £6
New RF grounding wire (10m pack) PVC coated..... £12.50 P&P £5
8 core rotator cable (heavy duty)..... £1.00 /mtr

CAR BOOT MAST SET

Once they've gone, they've gone! 5 section (15') 4.5m 1⅛" slot together mast set. Collapsed length 0.92m (3') makes this ideal for travelling.

£24.99 Del £10.00

2 for £39.99 del £15.00 3 for £45.99 del £12.50

MFJ-125

12" Dxer's quartz wall clock. give:- 24hr time + 3 smaller dials give 12 hour time/day of week/date.

£37.99 P&P £6.00

MFJ-115

24 hour quartz clock. Major cities shown on rim. World map on face. "Know what time it is around the world".

£29.99 P&P £6.00

Q-TEK COLINEARS (VHF/UHF)

P&P £10.00

X-30 GF 144/70, 3/6dB (1.1m)..... £39.95
X-50 GF 144/70, 4.5/7.2dB (1.7m)..... £54.95
X-300 GF 144/70,6.5/9dB (3m)..... £69.95
X-510H GF 144/70, 8.5/11dB (5.4m)..... £120.00
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m)..... £79.95

BALUNS & TRAPS

Baluns 1:1 or 4:1 or 6:1..... £29.99 each P&P £4
Traps 80m or 40m or 20m..... £29.99 pair P&P £4

DIAMOND CP-6

A superb (diamond quality) 6 band trap verticle antenna with trap radials – "rotary" trap system allows "flat wall" mounting. 80m/40m/20m/15m/10m/6m 200W SSB, HT 4.6m

SEND SAE FOR DATA SHEET

OUR PRICE **£219.99**

Q-TEK PENETRATOR

"We've sold 100s all over Europe"

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

ONLY **£179.95** Del £10.00

SEND SAE FOR LEAFLET

Standard G5RV

Full size - 102ft (now includes heavy duty 300Ω ribbon)..... £28.95
Half size 51ft (now includes heavy duty 300Ω ribbon)..... £24.95

DELUXE G5RV

P&P on either full/half size £6.50

Double size - 200ft (160-10m)..... £84.95
Full size - 102ft (80-10m)..... £42.95
Half size 51ft. (40-10m)..... £36.95

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end).....£25.00 P&P £4.00 (a pair)

In-line "RF" choke balun (for G5RV's).....£32.99

COAX BARGAINS

RG-213 Military spec x 100m.
£69.99 or 2 for £125.00

RG-58 Military spec x 100m.
£35 or 2 for £50.00

Coax stripping tool (for RG-58)..... £2.50

NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/ Mains/PC/Phone etc.

Simply close shut over cables and notice the difference! Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.

2 for £10.00 or 6 for £25.00 (P&P £3.50)

DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/ OD35mm. 6 for £12.00
12 for £20.00 P&P £3.50
50 for £40.00 P&P 7.00

LOW LOSS PATCH LEADS

£3.50 P&P

Connectors	Length	Price
PL-259 - PL-259	0.6m	£5.99
PL-259 - PL-259	1m	£6.99
PL-259 - PL-259	4m	£9.99
BNC - BNC	1m	£6.99

REPLACEMENT POWER LEADS

DC-1 Standard 6-pin/20A fits most HF..... £20.00
DC-2 Standard 2-pin/15A fits most VHF/UHF..... £10.00

YAESU REPLACEMENT MICS

MH-IC8 8 pin Yaesu mic (8-pin round)..... £24.99
MH-4 4 pin fits older HF, etc. (4-pin round)..... £19.95

COAX SWITCHES (P&P £4.50)

2 way CX-201 (0-1GHz) SO239.....£19.95
2 way CX-201 'N' (0-1GHz) 'N'.....£24.95
4 way CX-401 (0-500MHz) SO239.....£69.95
4 way CX-401 'N' (0-500MHz) 'N'.....£79.95

QS-200

Superb quick fit dash mount for hand-helds.

£4.99 P&P £2.50

3 for **£10.00** P&P £4.50

QS-300

A fully adjustable desk top stand for use with all hand-helds. Fitted coaxial lead with BNC + SO239 connections.

£12.50 P&P £4 3 for **£30.00** P&P £7.50

HHC-2 Police style holster

A unique "stretch case" designed to fit atatched to your belt or fixed to your body via the 3-point body harness (supplied). (Ideal for hand-held/mobile phones).

£10.00 P&P £2.50 2 for £15.00

MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to awvoid tangling. (Fits up to 2" mast)..... **£8.99** + P&P £4.50

30m pack (4.4mm) nylon guy rope £12.50
132m roll 4.4m nylon guy (480Kg b/f) ..... £40.00 Del £7.50

NEW EASY FIT WALL PULLEY

Pulley will hang freely and take most rope up to 6mm. (Wall bracket not supplied).

£8.99 + P&P £4.50

Wall bracket, screws not supplied. Simply screw to outside wall and hang pulley on WALL BRACKET £2.99 P&P £1.00

30m pack (4.4mm) nylon guy (480kg)..... £12.50
132 (4.4mm) nylon guy (480Kg)..... £40.00

BARGAIN WINCH

500kg brake winch. BARGAIN PRICE **£59.95** Del £8.50

Winch wall bracket..... £19.99

TELESCOPIC MASTS

6 section telescopic masts. Starting at 2½" in diameter and finishing with a top section of ¼" diameter we offer a 8 metre and a 12 metre version. Each mast is supplied with guy rings and steel pins for locking the sections when erected. The closed height of the 8 metre mast is just 5 feet and the 12 metre version at 8 feet. All sections are extruded aluminium tube with a 16 gauge wall thickness.

8 mtrs **£139.99** 12 mtrs **£169.99** Carriage £12.00.

NEW 20' SLEEVED MAST SET

A heavy duty-sleeved, mast set that will tightly slot together. 4 x 5' (2" dia) 16 guage heavy duty aluminium tubes. (Dimensions approx).

£49.99 Del £10.00.

TWO FOR £90.00 DEL £12.50

HEAVY DUTY SWAGED MAST SET

New extra heavy duty 2" mast set. 4 sections x 5½ foot slot together.

£54.99 each.

TWO FOR £95.00 DEL £15.00

ALUMINIUM POLE CLEARANCE

We have sets of 4 (2") poles (3 of which are swaged) that slot together to make a (approx) 20' pole. Each section is approx 5' long – some have small dents in – some have been swaged slightly off centre – hence the price.

3 SETS FOR £40.00 DEL £15.00

SET PRICE **£23.99** Del £10.00

ALUMINIUM POLES

20 foot (collection only) 2"..... £44.99
10 foot (collection only) 2"..... £29.99
2.4m (2") Ally pole..... 24.99
5 foot (2") Ally pole..... £9.99

SPEAKER MICS

M-U120
Fits most handies. Alinco, Kenwood, Yaesu.

£14.99 P&P £3.00

Ms-107K
Fits Kenwood handies.

£14.99 P&P £3.00

TH-887 HEADSET

ADAPTERS FOR MOBILE TCVRS AVAILABLE – PHONE

Superb headset for most handies. 887K (fits Kenwood) £24.95. 887 fits most twin sockets. Alinco, Icom, Yaesu, etc. **£24.95** P&P £3

LIGHTNING ARRESTOR

SP-350V
DC-1000MHz (400W through power). SO-239 fitting.

Replacement fuses £5.00

£22.95 P&P £3.00

MFJ-1118 metered

High current distribution unit..... £64.95

MFJ-1117

DC High current distribution unit..... £39.99

UNIDEN UBC-780XLT

25-512/760-1300MHz. AM, FM, WFM. Ideal seperate monitor.

CRAZY PRICE **£179.99**

Down the tubes
at Somerton radio station!

After researching and writing the article on the history of Somerton radio station (Feb 2003 *PW*), I was encouraged by Geoff G4ZYX to go hunting for some equipment. I was asked to hunt for something he thought might have been overlooked by the removal gang - the underground 100kHz reference oscillators, which had kept all the receivers on frequency.

My British Telecom (BT) acquaintance, who was removing all the antenna gear, didn't know about the reference oscillators! Geoff had said "look by the back door!" He was spot on - there were three suspicious drain type inspection covers close together.

Each of the inspection covers had a 152mm (6in) vertical tube with a severed section of multi-cored cable protruding from a gland plate! We had to use an angle grinder to undo the gland plates and then found a red canister dangling on the end of about 10m (30ft) of cable - undoubtedly the 100kHz reference oscillators!

Each canister, **Fig. 1**, had six sprung loaded guide wheels to keep it steady in the centre of the vertical steel tubes. Removing the small amount of grime that had gathered over the years, revealed a grease nipple and ring of studs. This only gained access to a small terminal chamber for the multi-cored cable, with the signals passing by feed-through insulators into the main hermetically sealed brass canister.

There was no provision for servicing! Neither were there any clues about the role of the several signal wires except for the output on the one shielded cable.

Fig. 1: The canisters, hanging on cable, were kept 'steady' within the tubes with the help of spring loaded wheels.

Breaking Into History?

I was uneasy about breaking into these historic items but, having three, I felt justified in opening one to determine the technology, connection data and so on. I expected to find a valved oscillator from the 1950s. The only way in was with the angle grinder again!

Gingerly cutting off the bottom, revealed an aluminium locating plate attached by three studs and there was no further sensible access. Nothing else would do - I had to also grind off the top shoulder to release the main casing.

Success! The angle grinder revealed a magnificent assembly, **Fig. 2**, comprising three sections - the crystal housing, the main circuitry and a stepper motor driving the brightly plated variable capacitor. Excellent workmanship but, surprisingly, the crystal assembly is vibration prone! (And we do occasionally get earth quakes in Somerset!).

Thermal Insulating Cylinder

The crystal is in a small thermal insulating cylinder suspended by three springs at each end, **Fig. 3**. Clearly, the main objective was exceptional frequency stability from a constant temperature, hence the lagging and 'burial' 10m down.

There were no valves, instead the equipment used four 2N930 germanium transistors in an oscillator/bias supply pair, followed by an amplifier and output buffer. It was all constructed

Tim Walford G3PCJ lives just down the road from the former historic Somerton radio station in Somerset. Although it's now completely demolished, Tim discovered that the station's engineers kept some of the calibration equipment in a most unusual place!

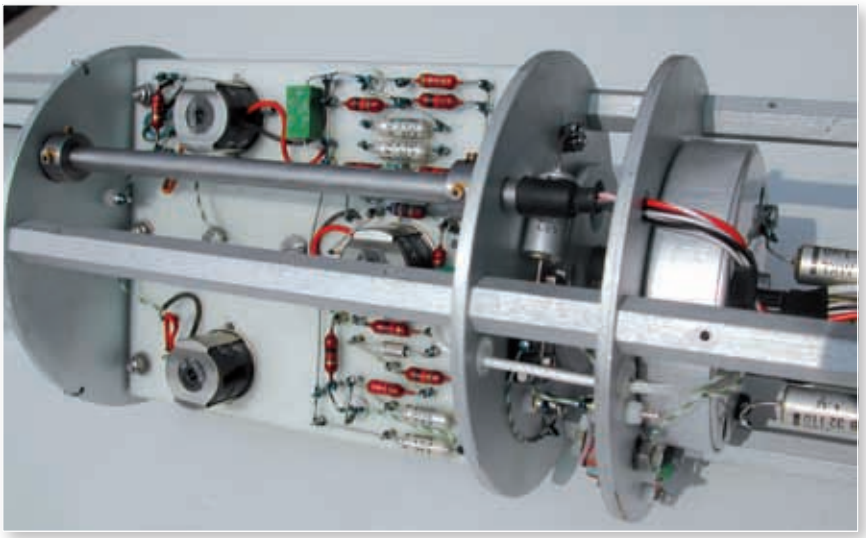


Fig. 2: Tim G3PCJ's efforts were rewarded when a magnificent assembly was found - with the help of an angle grinder!

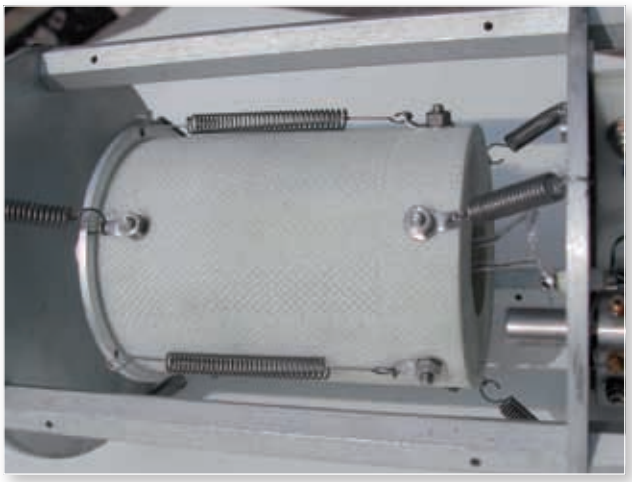


Fig. 3: The equipment had been literally been 'buried' to help maintain crystal oscillator stability. The crystal itself is within a small thermal insulating cylinder.

on a hand wired pinned board. Mid-to-late 1960s technology, I think.

I just had to see if it would work! Gingerly, I increased the volts but without any output, then suddenly at 5.5V the supply current rose rapidly - I eased back and was pondering the significance when the signal appeared - it runs quite happily over a range of 3.5 to 5V

Dollis Hill Research Station

Through my friend **Eric G3GC**, I was put in touch with **Dennis G3MNO** who had worked at the Post Office Research Station at Dollis Hill in London. Dennis kindly produced a 1955 article by **J. S. McClements** describing the benefits of installing a crystal reference deep underground.

The article showed that 'burial' at 10m reduced annual temperature variations to below 0.4°C without any daily effects. This lead to an initial ageing of below two parts in 10^8 over the first four months. After adjustment with the stepper/capacitor, it should remain within 0.002Hz at 100kHz!

After effective 'multiplication' to (let's say 40MHz - for the local oscillator of a 30MHz superhet with 10MHz i.f.), the error would be below 1Hz!

Derivatives of McClements' trial units were clearly installed at Somerton and elsewhere. I understand that normally all three oscillators were working, with the control system comparing their actual frequencies - one being rejected if it disagreed badly with the other two.

Fundamentally Different

Dennis also pointed out the fundamentally different approach of the Post Office when they took over from the original owners. Marconi had used huge antennas for the simple receivers but the safety aspects of riggers hanging between 91m (300ft) towers horrified the new owners! The GPO soon changed to more sensitive receivers, which could use the smaller but safer rhombic antennas.

Finally, I have given one intact reference oscillator, with data, to the **Cable & Wireless Museum** at Porthcurno in Cornwall. At least they can now fire it up if they wish!

Falklands War 1982 Historical reminder: For many of us it will seem that the 25 years since the Falklands War in 1982 have rushed by! We might think that things have changed a great deal but since that time the world of communications has undergone a revolution!

When I first visited the Falkland Islands in 1960 with the Royal Navy, it seemed it was another world away as it was so far from home. Yet, all around us were people speaking with a marked Bristolian accent. Their accent had remained virtually unchanged for a hundred years or so, reflecting the Islanders' contact with Bristol via the ships that provided a regular service from the port.

In those days, and indeed right up until the time of the invasion of the Falklands by the Argentinians, radio communications to Britain hung by a thread. The British end of that thread lay at Somerton in Somerset where the high frequency (h.f.) radio teleprinter transmissions from Port Stanley were received. In fact, I can remember that it took two days before a telegram I'd sent to my parents back home in Hampshire was received in England. The radio station staff at Port Stanley told us that h.f. conditions varied a great deal on the almost 12872km (8000 miles) pathway to the UK and delays could occur often.

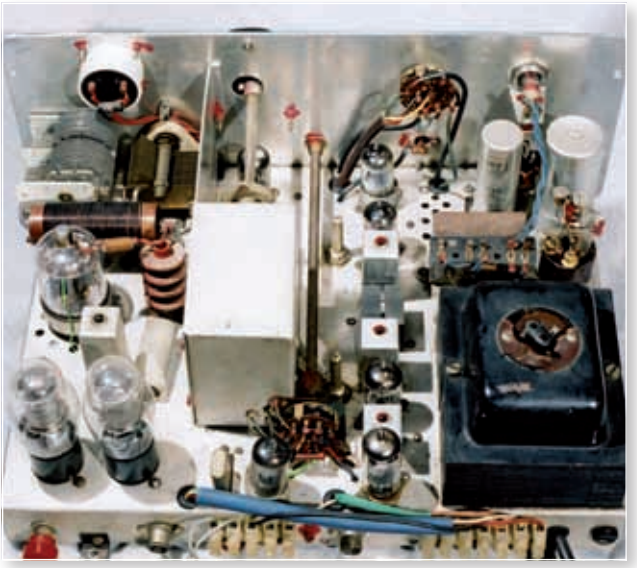
After the Argentinian invasion things changed dramatically – almost overnight - and the famous "I counted them all out and I counted them all back" (regarding aircraft on mission from their aircraft carriers) quote was broadcast via television and communications satellites services provided in double quick time! A far cry from the long serving but rather creaky h.f. RTTY service.

However, if the Somerton station had not been there 'doing its bit' things could have been very difficult. We must never forget the part that Somerton radio station played in providing the emergency link for the Falkland Islanders. It may have gone but it must not be forgotten. **Editor**

The riddle of the 'Sphinx'

Back in the mists of time, there was an industry in Britain that catered for the needs of its Amateur Radio fraternity. Out of that industry came many a strange beast, hand-built receivers and transmitters, kits of parts that the home constructor and experimenter (that's what we were all supposed to be doing in those days by the way) could put together in their garden shed and then use them to talk to the world. Sadly, or maybe not, those days are long gone.

A recent addition to the radio shelves here at the 'Kidderminster Kollection' saw one of those home grown sets reappear. Made in Derby by a company called SSB Products, the set in question is the 'Sphinx' transmitter. It's a three band set, covering 1.8MHz (160 metres), 3.5MHz (80m) and 14MHz (20m). The transmitter is capable of around 25W of c.w., amplitude modulation (a.m.), or s.s.b., it's controlled by a variable frequency oscillator (v.f.o.) and is mains powered.



The British made Sphinx s.s.b. transmitter. Made in the City of Derby, in the English central midlands, this rig works extremely well but in G4BXD's opinion appears to be 'hand made' and 'knocked up in someone's shed'.

Simple Sphinx

The Sphinx is of a very simple design, as shown in **Figs. 1**, **2**, **3** and **4**. It uses a free running oscillator, which is mixed with a crystal generated sideband signal to give 1.8 and 3.5MHz output, or further mixed with another crystal oscillator to give a 14MHz output.

The valved (6146) power amplifier (p.a.) design is straightforward with a π-tank output. A built-in power supply provides over 400V for the p.a. along with a stabilised 230V supply for the rest of the set's requirements. Inserting an amount of carrier into the sideband generator allows operation using the c.w. and a.m. modes.

Along with the transmitter there came a 1965 copy of *The Short Wave Magazine*, volume XXIII September issue. This not only carried an advert from the company detailing the Sphinx and other items they produced but also some notes on using the transmitter written by **Mr. R Butterworth G8BI**, from which I quote.

"Being unable to get much information on the Sphinx, the writer went to Derby, liked what he saw and bought it. This review is one man's opinion, completely unsolicited and in no way biased. It gives s.s.b. on three bands, 160, 80 and 20 metres.

"It can also be

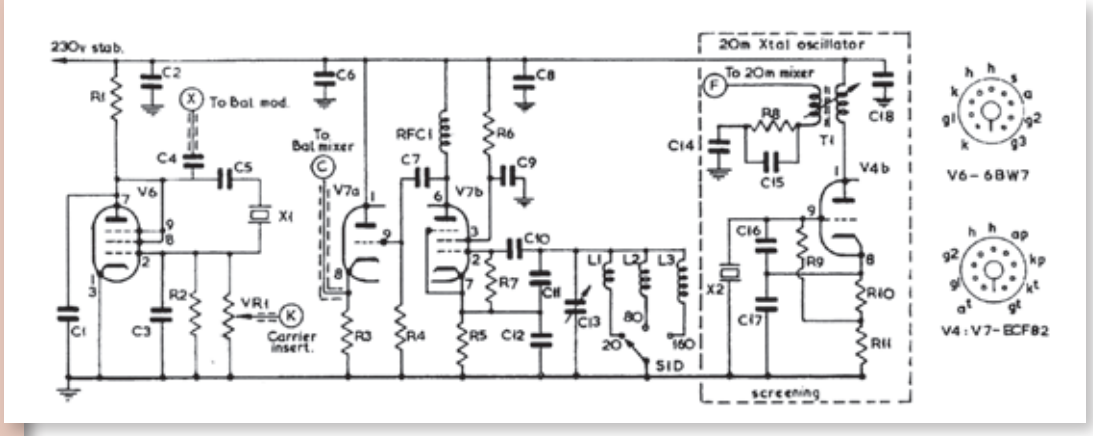


Fig. 1: Circuit arrangement for the originating stages in the Sphinx Sideband transmitter, showing the carrier oscillator V6 (a 6BW7), the VFO and cathode follower V7 (ECF82), and the crystal oscillator for 20 metres, the triode section of an ECF82 (Original caption from the September 1965 issue SWM).

Ben Nock G4BXD looks back over 40 years to examine the mysteries behind the then well known British made 'Sphinx' s.s.b. transmitter.

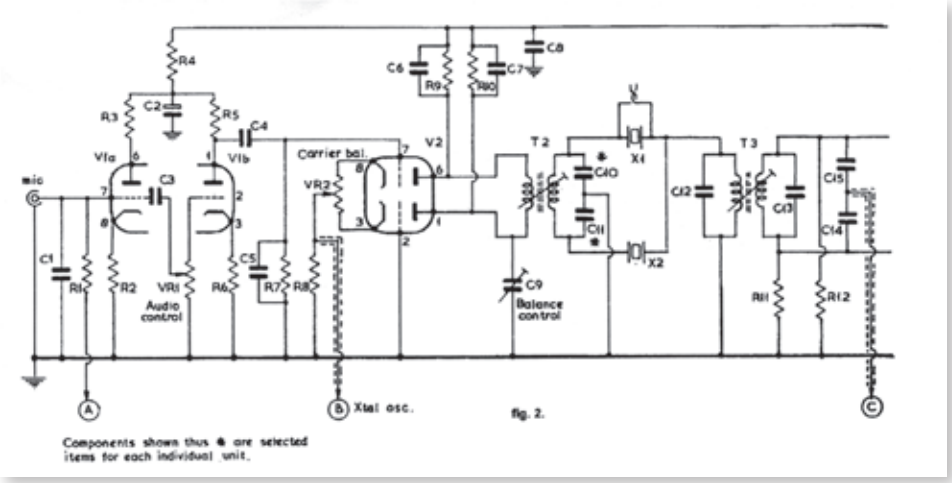
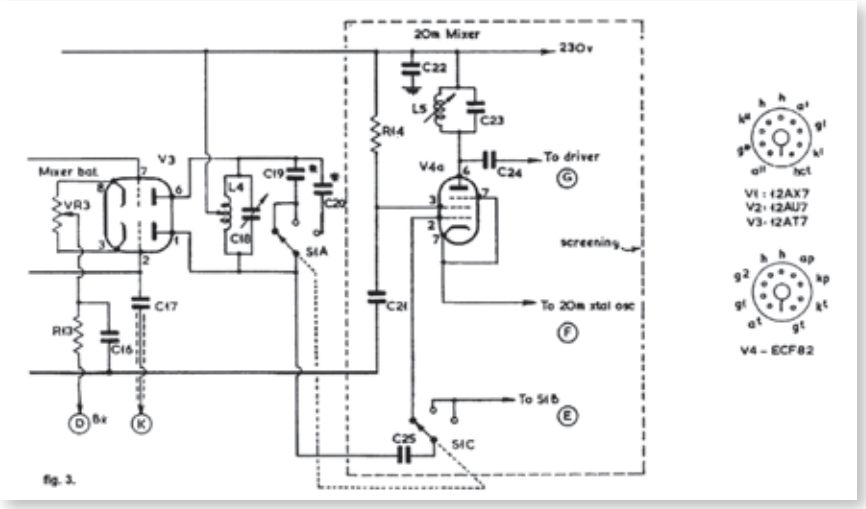


Fig. 2: Audio and balanced modulator, and sideband generator with crystal filter on the Sphinx.

Fig. 3: Part of mixer stage, showing the band switching.

used on a.m. and c.w. on these bands, while 40 metres can be included in these modes by using the p.a. as a doubler stage. No exaggerated claims are made for this equipment but the maker does maintain that the speech quality is better than quite a lot of rigs, home-brewed and otherwise. The suppression claimed is: Carrier 65dB; sideband 35dB, lower sideband on 160 and 80m, and upper on 20m. Optional extras are Delta Control Unit and 'Silplug' silicon rectifiers instead of the conventional valve. Both these were used in the writer's version".

I think that was a most interesting look back at an opinion from 40 years ago!



Wrap Around Case

The case is the familiar wrap-round type so popular in the 1960s, with vented lid and removable bottom cover. The back is integral with the case, a slot giving access to the antenna socket, terminal strip and p.a. bias control.

Louvres in the base and sides, together with the vented lid, give excellent air circulation. The case and front panel could be obtained in a variety of colours, to give two-tone if required to match other equipment. All controls are on the front panel with the exception of p.a. bias, carrier and variable frequency oscillator (v.f.o.) balance.

Also on the front are the microphone and key jack sockets, together with a mains indicator lamp. All controls have clearly marked scales with good sized, easily manageable knobs.

The v.f.o. control, marked 0 - 100 with vernier scale, is smooth and positive with no backlash to speak of. It's the predominant feature of the front panel. The chassis is of 16 gauge aluminium and the front panel 12 gauge, providing a substantial base on which to mount all other components. Two cross-members stiffen the chassis and divide it into p.s.u., exciter/mixer and p.a. units.

Under Chassis

On the underside of the chassis the components are good quality with generous tolerances. The wiring is substantial, stiff and very direct, which provides excellent stability. All this was borne out by two tests I made on the rig.

First, the lid was slammed, the complete transmitter dropped approximately 50mm (2in) onto a solid table and finally the v.f.o. box was thumped hard. This was done while I was in contact with other stations and none of them reported any detectable frequency shift.

The rig was then set up on a.m. with an input of 20W into to a dummy load, and left for 24 hours. The result was no 'toasted' or 'drippy' components. The only casualty was an EF85 with low emission.

I carried out further tests to check the specification claimed by the maker and found to be substantially correct. Tests on the air were with a 40m (130ft) long-wire and a 20m dipole. Reports confirmed the static tests the most consistent report being, "Excellent speech quality and very easy resolution of the signal". The microphone used was a popular Japanese type and a Grampian DP4 was also tried, with its matching transformer.

Reports were of marginal differences on a.m. where the speech was again reported as excellent. On c.w. the note was reported as T9.

It would have been nice to report that some choice DX was worked but conditions were not on my side! However, I worked all round Europe and the Mediterranean with the minimum report being S6 on14MHz. I also worked the UK on 3.5MHz (80m).

Tight Fit!

No equipment is perfect and the Sphinx has its faults. The chassis fits too tightly into the case for easy withdrawal. Some of the brackets appear to have been made up from scrap material and had vice marks.

The p.a. anode and antenna loading controls would be better if they were stiffer. The meter is a little too well damped to get tuning right on the 'nose'.

If you manage to buy a Sphinx complete with paperwork, don't expect a fully illustrated instruction book on glossy paper and lots of diagrams! All you will get is a briefly worded copy of the tuning procedure for 1.8MHz, which is slightly expanded for other bands, a simple calibration chart and a connection diagram for the terminal strip at the back. In spite of these minor criticisms, I'm satisfied that the value is in the set. As shown here, there is no trick circuitry, it's simple, and this approach results in reliability.

The transmitter has been used and abused for a couple of months now and I can recommended the rig - if you find one. It's a rig for those who haven't the time to 'roll their own' but want to get their feet wet easily on s.s.b. and at a very reasonable cost.

I mentioned earlier that the Delta Control unit and silicon rectifiers were used throughout these tests. These give, (or rather gave in G8BI's opinion), three advantages, i.e., "almost VOX-like operation, less heat dissipated and appreciably more power".

Delta Control Unit

The Delta Control Unit referred to by G8BI, is simply a mains powered change over unit allowing push button control of the transmitter and any receiver. The 'Silplug' is nothing more than four silicon diodes mounted on a valve base to replace the original valved rectifier in the power supply.

Having played with the transmitter myself now for a short while I find that, although 40 years on, I have to agree with many of G8BI's comments. The v.f.o. is indeed very stable, both electrically and mechanically. Back in the 1960s it must have seemed very good compared to what else was around at the time. The set is quite robust, although this example arrived with a 'caved-in' voltage selector on the mains transformer. This was more likely the result of previous owners rather than poor construction.

Small Tank Coil

A real surprise is in the size of the π-tank coil, which is very small considering the space available in the case (as can be seen from the photographs). There was also a tendency for the p.a. stage to 'take off' (self-oscillate) requiring detuning of the grid capacitor to calm things down.

There was mention of neutralisation in the circuit diagram shown in the *SWM* article but nothing of such a circuit was evident in the rig I acquired. I tried adding a loose capacity coupling from the anode to the grid of the p.a. stage, which seemed to help but further experimentation was needed.

Though the set does have some good points, it really has to be said that it's obvious why the Japanese imports took the market by storm. They were all neat, small, compact, well-built, well laid out and good looking.

The Sphinx and other UK made sets of the time, even including KW, in my opinion, look hand-made, with poor wiring, layout and looks. The Sphinx does not even have a calibrated dial!

Many of the UK made sets of the 1960s period really looked like they were 'knocked up' in people's sheds and then sold to the hobby as an after thought. The price of this set though seems astronomical at a massive £78.

Finally, I feel it's most important that we remember what we used to have to put up with. We will then appreciate the wonderful technological marvels we can now buy. Despite the fact, that these new sets have no character or soul whatsoever. Unlike the Sphinx, which is a right little character.

Fig. 5: Original advert published in 1965 issues of The Short Wave Magazine.

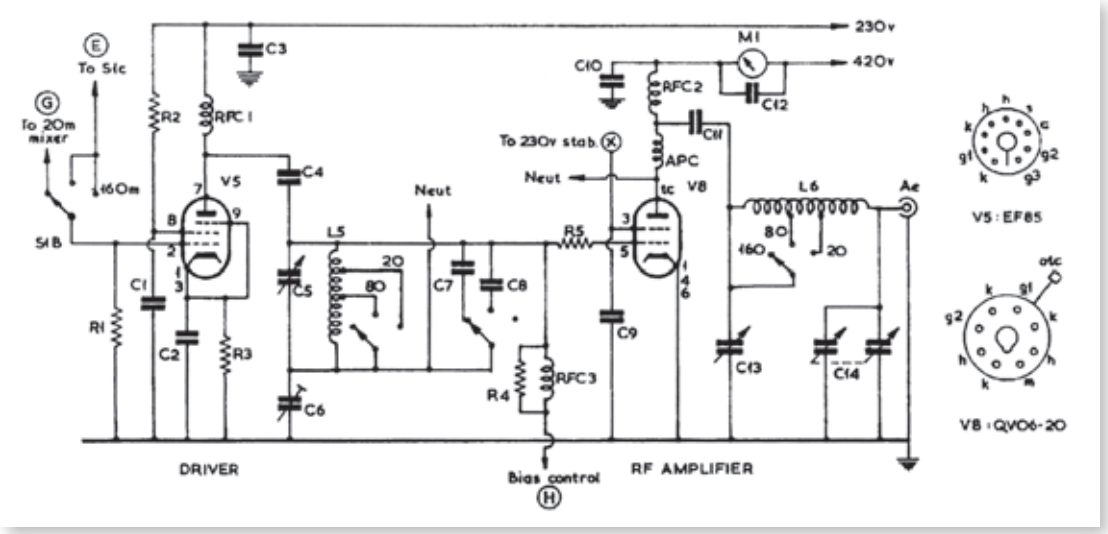


Fig. 4: In the Sphinx Sideband transmitter for 20 - 80 - 160 metres, the driver (V5) is an EF85, and the PA a QV06-20 with neutralisation, the screen voltage being stabilised. A great deal of design work has gone into the achieving of a stable unit capable of developing its full RF power output of about70W p.e.p. (Original caption from September issue of SWM).

KENWOOD
Listen to the Future

Unique concept, brilliant execution. Kenwood's compact TS-480HX/480SAT is tailor-made for DX'ing. But its smartly designed standalone LCD control panel — featuring backlit keys to enhance operating ease — is equally at home on your desk, with the main unit up to 4 metres away. And wherever it is, this HF transceiver delivers an astonishing punch: 200W. Performance is equally impressive. For example, a quad-mixer provides RX dynamic range in the TS-950 class, while AF DSP processing offers many powerful features, including noise reduction, a speech processor, and AF filters. And of course you can enjoy all of the convenience of PC-based control. The TS-480HX/480SAT lets you enjoy the best of both worlds.

● Built-in automatic antenna tuner (100W model) ● Terminals for external antenna tuner, linear amp, PC ● Electronic memory keyer ● AF DSP features: ● AF DSP filters ● Beat-cancel, noise reduction ● TX/RX equalizer ● CW auto-tune ● Speech processor ● Optional 500Hz/270Hz band CW narrow IF filters, 1.8kHz band SSB narrow IF filter ● PSK31 compatible ● 5W minimum RF output, QRP compatible ● Electronic keyer ● Plug-in voice recording/synthesis unit available ● Packet cluster tune with TM-D700E ● Supplied with mobile panel bracket, tabletop panel bracket and carrying brackets

HF/50MHz ALL-MODE TRANSCEIVER

TS-480HX

200W Model

- **200W output (50MHz: 100W) DC 13.8V operation**
- **100W model available with built-in antenna tuner**
- **TX/RX AF DSP**
- **Compact construction for easy carrying**
- **Separate LCD control panel with speaker**
- **Continuous RX: 500kHz (VFO: 30kHz) to 60MHz**
- **TX: covers all Amateur bands 1.8MHz to 50MHz**

TS-480SAT

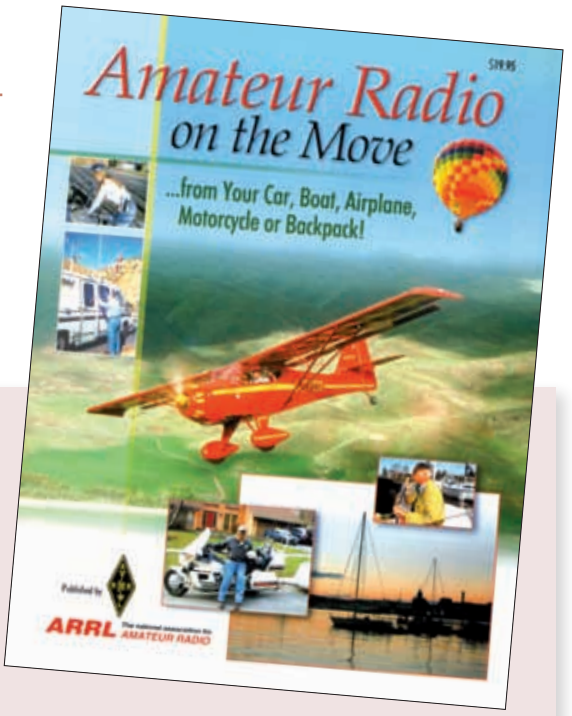
100W Model with Built-in Antenna Tuner

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

book reviews

We've added some new titles to the PW Book Store this month so, Rob Mannion G3XFD looks at what they have to offer the avid radio enthusiast.



Amateur Radio on the Move. 1st Edition

Published by the ARRL

Rob Mannion G3XFD looks at a book that aims to encourage those who would like to enjoy our hobby from the car, boat, aeroplanes, motorbikes and backpacks.

Enjoying Amateur Radio outside and in the country is one of the pleasures I enjoy very much indeed and many other Amateurs in Europe enjoy it just as much. However, I've always regarded our American friends to be the keenest of 'out door Amateurs' and this book clearly demonstrates just how active they are in this field (forgive the obvious pun!) as the full title is *Amateur Radio on the move ...from your Car, boat, Airplane. Motorcycle or Backpack!*

Although this 172-page book is full of many projects and ideas we can share on this side of the Atlantic, there's one aspect it covers that we cannot (at the moment) enjoy here in the UK, namely aeronautical mobile operating (there's an excellent QSL card photograph of the balloon aeronautical mobile station EI2AIR on page 3.19). Despite this, I'm sure that in the near future we'll be able to work airborne 'balloon DXpeditions, activities, etc., and further extend our 'out and about' activities.

The book contains a foreword, a section about the ARRL, a section (**1.1**) on 'Mobile in your automobile', 'On the go with Maritime Mobile' (**2.1**), Aeronautical Mobile (**2.2**), Motorcycle Mobile (**4.1**), 'HF Unplugged' (**5.1**), 'Recreational Vehicle Mobile' (**6.1**) an appendix and index. **Note**: Recreational Vehicle is the commonly used term for motor caravans in the USA. They are usually the size of mobile home rather than the smaller vehicles we know. They're huge!

Section 1.1 on mobile operating from a car is very interesting. You may think you know what to do when visiting the USA on holiday but you'd be wise to have the information provided here to hand! Mobile history and the modern technical approach are well covered. Also included is a helpful section on suppressing interference on motor vehicles, together with a very helpful chart with full explanation of all the available bands from 1.8MHz to 23cm (1240 to 1300MHz in the USA).

Section 2.1, maritime mobile provides a little history along with some practical /MM tips. Also included are details of the various /MM nets and the frequencies where they can be found and the times, etc. I can imagine this subject could be a DX target for some listeners!

Even though I've never ridden a motorcycle and they don't appeal to me at all, the section, 4.1, on operating mobile with motorbikes is truly fascinating. In the USA you can often see motorbike mobile operators towing a trailer, which often contains a separate engine-driven generator to provide power up to 1kW! I've met many motorbike mobile operators in the USA - especially at the Dayton Hamvention. The section provides an excellent overview of what can be achieved - even on the smaller bikes made for the European market. This aspect of the Amateur Radio hobby is neglected in the UK and I'm sure that any reader who is keen on two wheels will find the book very helpful.

The 'HF Unplugged'' section (5.1) deals with backpacking and operating portable away from a mains supply (hence 'unplugged). The section contains some very useful projects- including a slingshot (catapult) system for utilising trees as antenna supports.

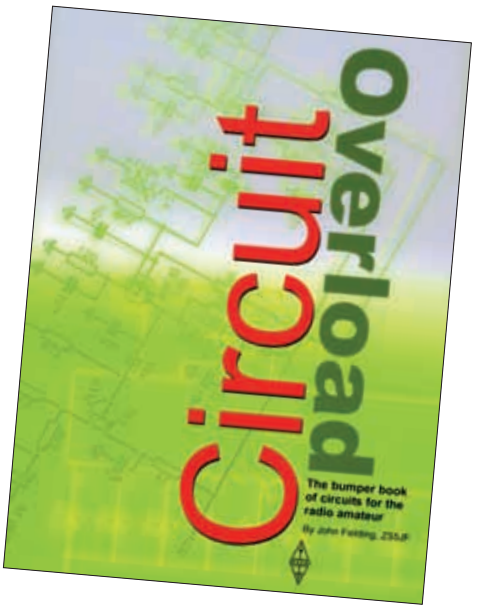
Also included (in the appendix) are some useful, practical antenna projects for both h.f. and v.h.f. This book is one of the most useful publications to come from the ARRL recently and it comes highly recommended from G3XFD. However, as keen as I am on aircraft and possibly operating 'aeronautical mobile' - you won't find me on a motorbike calling "CQ". However, I would be very pleased if this book encourages more motorcycling Amateurs to get on the air.

Price: £14.99.

Circuit Overload

By John Fielding ZS5JF

Published by the RSGB



This newly published slightly less than A4-sized book's title doesn't truly reflect just how useful it would be in the Amateur Radio workshop. To be fair, I'm always looking for 'Zappy' titles for articles and although 'Circuit overload' is `zappy- it cannot do full justice to what is a useful 204-paged handbook for anyone who enjoys building and constructing radio and electronics. In fact, the sub-titling conveys a better impression - stating that it's 'The bumper book of circuits for the radio amateur'!

Regular *PW* readers will know that I personally use and recommend the 'building block' approach for constructional projects and *Circuit Overload* will be a most useful companion in my workshop. It's an ideal size to leave on the bench while I'm working and also provide enough explanation of the various circuits to enable me to modify/incorporate them into my own projects. Several of the photographs within the book are rather dark (a problem with the printing process perhaps) but all the many circuits are presented clearly and in a graphic form I find pleasing to the eye. Additionally, I'm sure that it will help many constructors to go one step further to help them design their own equipment - utilising the building blocks the book provides so well.

Chapters include bread boarding, audio circuits, metering display and control circuits, power supply circuits and test circuits. There's a section with 'miscellaneous circuits' - including a simple intercom and a wind speed indicator (is it safe to go up the mast or work on antennas today?).

Other chapters include antenna circuits, radio frequency circuits, and the design of low-pass filters, high-pass filters and of band-pass filters.

Of interest to valved equipment constructors are sections covering 'designing with valves' and circuits using valves. A helpful appendix provides pin-out details of various active devices and the book is full indexed.

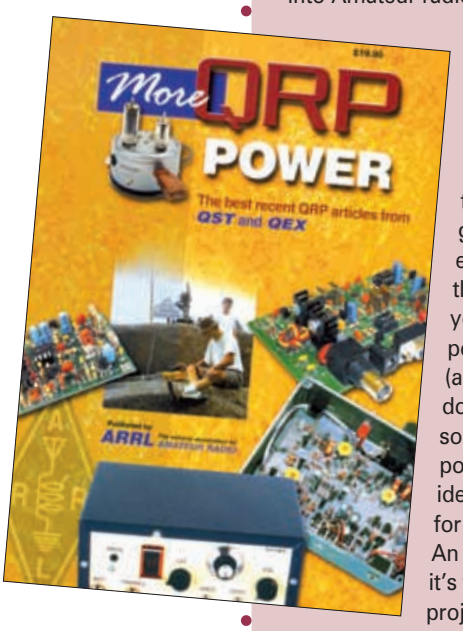
Interestingly, the author **John Fielding** - despite the South African callsign - is originally from the UK and was licensed as **G8FPH** and is therefore very familiar with Amateur Radio here in these Islands.

This is a book I can thoroughly recommend to *PW* readers - it's eminently practical. Additionally, if you're not that experienced in building equipment the author's first chapter- entitled 'the breadboard' is an excellent introduction to building techniques. Unfortunately, this is the section (in the review sample) where the photographs are rather dark. However, despite this I would not hesitate to suggest to readers that they buy a copy. John ZS5JF has done very well and I hope we will see many more (perhaps a series?) on the same subject. **Price: £18.99.**

More QRP Power

Compiled by Mark Wilson K1RO

Published by the ARRL



I'm sure that *PW* readers will love this book! Despite the conundrum set by the name (*More QRP Power* seems at odds with the aim of QRP operation!) this A4-sized 206 paged gem is superb. The contents provide coverage on construction practices, transceivers, transmitters, recovers, accessories and the all-important antenna. Utilising republished articles from *QST* and *QEX*, the book is not indexed.

Of particular interest to *PW* readers will be the sections with the titles 'Surface mount technology - 'You can work with it'! There's also an excellent article dealing with the construction of cabinets and enclosures using printed circuit board material (a favourite technique of mine) and a very helpful article on making a small instrument to help wind toroidal cores.

How about 'Panel Layout' with Microsoft PowerPoint then? Yes, Mr. Bill Gates has even found his way into Amateur radio and after you made a surface mount device workstation you can get busy building!

Altogether, this book will give much encouragement to the reader and if you enjoyable low power operation (and even if you don't) there are some easy-to-make portable antenna ideas thrown in for good measure. An excellent read, it's full of ideas and projects and is highly recommended. **Price: £16.99.**

For a good selection of Amateur Radio reading turn to pages 76 & 77 of this issue for a full listing of the titles currently available from the Book Store. If you place your order before 18 December you can qualify for free P&P!

What are you waiting for? Place your order today! To order please use the form on page 77 or call 0870 224 79830.

You don't need coaxial cable for your antenna...

Here's an idea for new Foundation Licence holders and anyone who has joined the hobby via any of the new entry level Amateur Radio Licence schemes around the world. In this article I'm aiming to help you get the best results without coaxial cables.

Some of the more 'senior' Amateurs may remember seeing in older hobby magazines the use of a figure-of-eight (in cross section) configuration twin flexible, 240V mains cable to feed and form part of an antenna system. Once upon a time it was a simple and popular feeder/antenna technique

One of the things that fascinated me was the fancy knot used at the point where the twin flex was split from the feeder to form the dipole antenna. In American Amateur Radio publications, it was said to be an 'Electrician's' knot. However, it may have another name with the knot fraternity!

Satisfying Curiosity

A short time ago, I acquired a part reel of the figure-of-eight flex. To satisfy my curiosity on its suitability for antennas I decided to give it a try!

I was fortunate enough to have enough flex to make a 7MHz dipole and feeder. With the aid of a tape measure and the end of the flex tied to the gate, I measured off a quarter wavelength at 7MHz.

Next, I split the flex in two - you can actually pull it apart and either side of the '8' shape pulls away from the other - down to the measured point. I then had a half-wave dipole for 7MHz. At this point I tied the knot shown. It did the job - it wouldn't split anymore – as it was locked up tight at the knot.

I proceeded to make up an experimental antenna tuning unit (a.t.u.) for balanced feeders, quickly winding a coil and using a couple of old broadcast tuning capacitors. I couldn't use my normal a.t.u. as it's for 50Ω unbalanced coaxial cable feeder and a spare ferrite toroid to make-up a 4:1 balun wasn't available.

Fig. 1: The special 'Electrician's' knot used to fix the dipole feed-point when using figure-of-eight cross section flexible cable.

On The Air

To try the system out on-air I took my Icom IC-706, powered by a gel-cell battery, portable field day mast and Tenna Tourer base to the local park at the end of my street. With it all connected I peaked up signals on 7.07MHz. I adjusted the a.t.u. for minimum v.s.w.r., with the meter needle pointer just lifting

Then I went back down to 7.7MHz*. Awaiting a pause in an interstate QSO I announced my callsign. I was acknowledged and was invited to join the QSO some minutes later. Both stations were 5 and 9 (as I was to them.)

When I mentioned I was using an experimental antenna the other stations wanted to know all about it. Describing the figure-of-eight flex antenna and feeder, one of my QSO partners remembered seeing the fancy knot but had never tried it. We chatted for a while about antennas and that this aspect of the hobby was one we could all experiment and play around with at minimum cost.

***Note:** The Australian 7MHz band extends from 7 to 7.7MHz (the Amateur service is Primary between 7 and 7.1 and Secondary between 7.1 to 7.7MHz).* ***Editor**.*

Pleased With Efforts

Pleased with my efforts I packed the system up and went home. I have since extended the ends of the dipole to enable it to work on 3.5MHz (80m) and it worked well using the home-brewed 'rats nest' a.t.u. The system also worked on 14 and 21MHz satisfactorily.

American Amateur Radio magazines seem to generally agree that the flex dipole system is too 'lossy' above about 10MHz. According to another article I've read the flex has an Impedance of about 100Ω!

How the antenna and feeder would go with a balanced-to-unbalanced transformer on an ordinary a.t.u. I don't know as I've not tried it. It should go well with a 'Z Match' to get a newly-licensed Amateur on the air!

Thinking back, I believe the figure-of-eight twin flex was used as a feeder on the h.f. dipoles on the old Trager RFDS transceivers 50 years ago. (See my article in *PW* August 2000 Wireless at Woomera for more details). I guess the flex was easily obtainable and the valve finals were not that fussy as to the load and besides, they usually worked with a.m. and only ran 10 to 20W. ●

... says Steve Mahoney VK5AIM! In his article Steve passes on some of his practical experience - all achieved without expensive coaxial cable.

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 accoun s and see how many issues they have left t n.

update your details

If mov or han e y ur per onal details, you can now update hem on ine wi hout having to write in to let us kn w.

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 by ourselves or Webscribe.

Subscription Rates

(Please tick appropriate box)

***Practical Wireless* SAVE £££s**

1 YEAR	UK	£33	❑
	Europe Airmail	£41	❑
	ROW Airmail	£50	❑
3 YEARS	UK	£89	❑
	Europ ail	£111	❑
	ROW ma	43	❑

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	❑

Subs Prices Held!

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

Antenna Workshop

David Butler G4ASR describes how to build a seven-element Yagi antenna for use on the 70MHz Band.

The 70MHz 7-element Yagi antenna that's featured this time, above a 50MHz 6-element Yagi.

As a keen v.h.f. operator I've always taken a special interest in the DX capabilities of the 70MHz band and if you take a look at my VHF DXER column this month you'll see what I mean. To achieve consistent results, I wanted an excellent antenna with a very clean pattern, a good amount of forward gain and something that's easily reproduced.

The antenna I've chosen, comprises of seven elements mounted on a boom that's a little over 6.5m long. So, if you're planning to build a 70MHz moonbounce array, this is the antenna for you! I realise that the antenna shown in the photograph is great but that not everyone has the space for such a monster! However, the techniques and constructional methods are transferable!

Design

The seven elements are: a reflector, driven element and five directors as shown in the diagram, **Fig. 1**. Note: part of this design is that some of the directors don't get progressively shorter as with other Yagi models. All parasitic elements are positively fixed to the surface of the boom via metal fixing plates and stainless steel fixings so, possessing a slight advantage in terms of noise and discharge of static build-up.

The driven element assembly, comprises of a split feed with a hairpin match. This is superior to gamma matching as it eliminates tedious adjustments and is far more reliable. The antenna terminates in a 50Ω female N-connector fed via a coaxial choke balun. The design has been modelled in *EZNEC* and the predictions confirmed with practical examples. At 70.200MHz, it possesses a peak gain of 10.8dBd, a 3dB beamwidth of 42° and a 30dB front-back ratio. The v.s.w.r. is essentially flat (<1.1:1) across the band although it has been designed for use at the lower end of the 70MHz allocation.

If the antenna is to last a long time, the grade of aluminium used is paramount. The boom on my antenna was made from aerospace quality HE30 grade alloy, as this has excellent corrosion resistance. All the elements were made from 12mm aircraft grade 6061-T6 aluminium tubing and are attached to the boom clamps by sliding into a length of 15mm diameter 0.028in wall thickness 6061-T6 tubing. This creates a double wall at the centre of the elements without excessive clearance between the inner and outer tubes. Some designs use thinner tubing that's cheaper and easier to obtain but isn't a good fit within the tube used for the element outer sections.

The 6061-T6 grade aluminium has excellent characteristics for antenna construction though it's not readily available in the UK. The boom-to-element clamps are made from thick alloy plates securely fixed to the boom to ensure that the elements cannot become misaligned in high winds. Finally, M4 stainless steel bolts, nuts and shake-proof washers are used for all fixings to give a trouble-free performance.

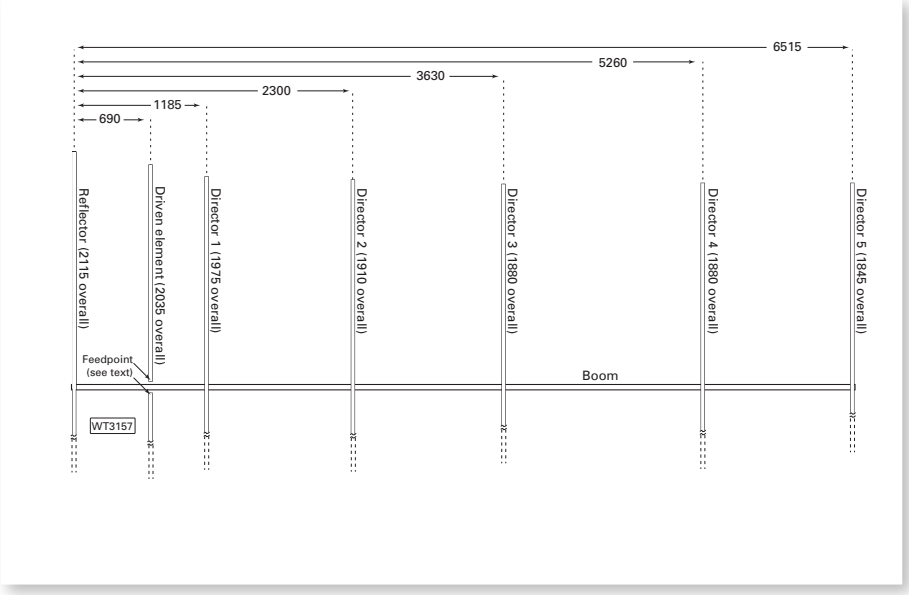


Fig. 1: A diagram of the antenna that doesn't follow the 'normal' Yagi Layout.

Construction

Start the construction of the boom by cutting the 31mm (1.25in) aluminium square box section into four equal 1650mm lengths. To join the boom sections together cut the 28mm (1.125in) aluminium tubing into three equal 300mm lengths. These are slid into three of the boom sections as shown in the photograph, **Fig. 2**, and riveted into place.

Then mark out the 75mm (3in) square alloy plates and drill four M4 holes as shown in the photograph **Fig. 3**. These plates are used to mount the elements on to the boom.

The materials I used are shown in **Table 1**. You could opt to use cheaper and more readily available materials as long as the dimensions are adhered to.

Now you need to measure, mark out and drill holes in the boom to suit the element retainers that are to be attached as shown in Table 1. Note that you must align the centre line of the plate exactly where the element should be placed. Measure all spacing dimensions from the reflector position rather than marking out between each element. By referencing all dimensions to one starting position you reduce inaccuracies that might accumulate along the length of the boom.

Cut eight 150mm lengths of 15mm (0.625in) diameter tubing and attach six

of them centrally to the element retainers as shown in Fig. 3. The driven element is constructed differently as shown in the photograph **Fig. 4.** The dipole elements are insulated from the retainer plate by the use of plastic central heating fixings. A 50mm length of fibre-glass insulating rod is placed between the centres of the split dipole to create a 12mm gap.

Now, the elements are cut to length and attached to the main boom with the associated clamps. The dipole elements are made in a similar manner but consist of two separate pieces. As a purist I used conductive grease on all aluminium-to-aluminium joints.

This Yagi uses a hairpin match (sometimes known as a Beta match) to raise the 28Ω feed-point impedance to 50Ω. It's made from a 440mm length of 5mm diameter solid aluminium rod. The hairpin is 205mm long by 30mm wide with flattened ends that attach to the driven elements and balun assembly as shown in the photograph **Fig. 5**.

A 125mm long off-cut of the 31mm square boom material is conveniently used to house a 1:1 coaxial choke balun. Conventionally, this is a length of coaxial cable slightly shorter than a λ/4 wavelength long coiled up as close as possible to the driven element feed-point and then taped to the boom. This 70MHz Yagi uses 800mm of RG58 cable tightly coiled up and slid into the balun housing. One end of the cable is attached to a female N-connector and the other end connected to two short 'pig-tails' terminated in M4 solder tags to connect to the dipole feed-point.

To complete the construction plastic caps are fitted to the ends of the boom and antenna elements. The Yagi is attached at the balance point with a suitable mast clamp but it will require a support to prevent drooping of the main boom. An effective method is to support the boom approximately 175mm from each end with Draylon cord fixed to a small clamp above the main boom.

Results

I constructed two of these antennas that had effectively identical responses (they were eventually stacked 5.6m apart to give approximately 14dBd gain). Neither antenna required any matching adjustment, both possessing a very low standing wave ratio, even during periods of heavy rain. It's difficult to quantify the absolute gain of this antenna but it has subjectively more gain than a 6-element NBS Yagi that I've previously used. The antenna pattern appears to be very clean with a good drop-off in signal strength as the antenna was rotated away from the received station.

If you build this superb 7-element antenna you will discover a great improvement in your 70MHz station capabilities. If you don't have the time to procure all the materials and build one it is possible to buy a similar 7-element Yagi from **Vine Antenna Products (01691 831111).** ●

Table 1:

Materials
7m of 31mm (1 1/4") HE30 grade aluminium square box (boom)
1m of 28mm (1 1/8") 6061-T6 grade aluminium tubing (boom joiners)
14m of 12mm (1/2") diameter 6061-T6 grade aluminium tubing (elements)
1.5m of 15mm (5/8") diameter, 0.028" wall thickness, 6061-T6 grade aluminium tubing (element centres)
450mm of 5mm (3/16") diameter 6061-T6 grade aluminium rod (hairpin match)
7 off 75mm (3") square x 3mm (1/8") thick aluminium alloy plate (element/boom clamp)
Various M4 Stainless Steel fixings and plastic end caps for boom and elements

Fig. 2: The Boom Joiner.

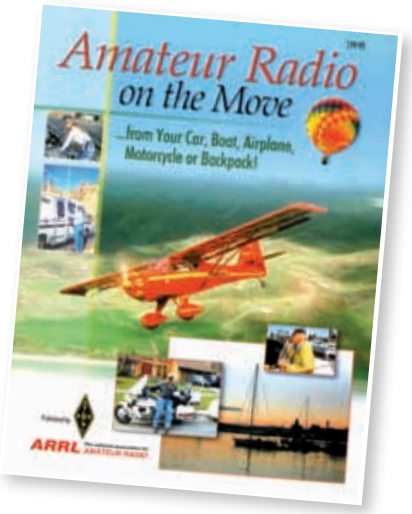
Fig. 3: The Element Plate.

Fig. 4: The Dipole Plate.

Fig. 5: The Hairpin Match & Balun Assembly.

Three new titles for 2007

the pwpublishing RADIO BOOKSTORE

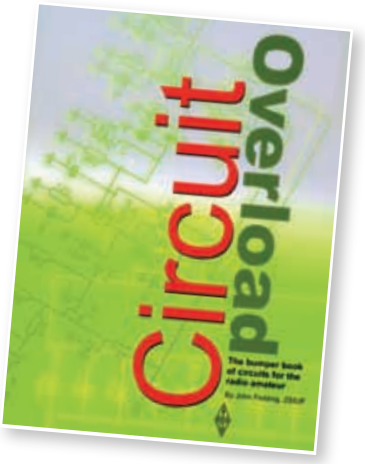


Amateur Radio on the Move
1st Edition
Published by the ARRL

Rob G3XFD says: "Enjoying Amateur Radio outside and in the country is one of the pleasures I enjoy very much indeed and many other Amateurs in Europe enjoy it just as much. However, I've always regarded our American friends to be the keenest of 'out door Amateurs' and this book clearly demonstrates just how active they are in this field (forgive the obvious pun!) as the full title is *Amateur Radio on the move ... from your Car, boat, Airplane. Motorcycle or Backpack!"*

"Altogether, this book will give much encouragement to the reader and if you enjoy low power operation (and even if you don't) there are some easy-to-make portable antenna ideas thrown in for good measure. An excellent read, it's full of ideas and projects and is highly recommended."

ISBN: 0-87259-945-0
PW Book Store Price: £14.99



Circuit Overload
By John Fielding ZS5JF
Published by the RSGB

Chapters in this 204-page handbook include bread boarding, audio circuits, metering display and control circuits, power supply circuits and test circuits. There's a section with 'miscellaneous circuits' - including a simple intercom and a wind speed indicator (is it safe to go up the mast or work on antennas today?).

This is a book that is described by Rob Mannion G3XFD as being "eminently practical, with an excellent first chapter entitled 'the breadboard' providing a useful introduction to building techniques". Rob says he would not "hesitate to suggest to readers that they buy a copy".

ISBN: 190508620-2
PW Book Store Price: £18.99

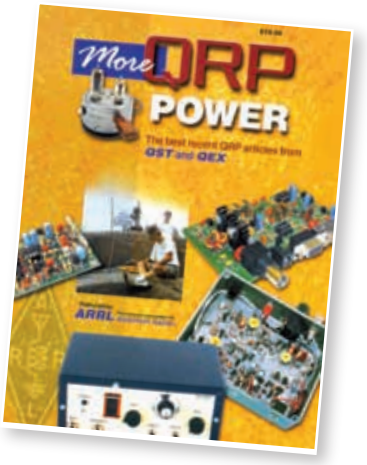
in stock NOW

More QRP Power
Compiled by Mark Wilson K1RO
Published by the ARRL

The contents of this A4-sized 206 page book provides coverage on construction practices, transceivers, transmitters, receivers, accessories and the all-important antenna. Of particular interest is the section covering surface mount technology as well those on the construction of cabinets and enclosures. There's even an article on making a small instrument to help wind toroidal cores as well as some easy-to-make antenna ideas.

If QRP operating is your favourite area of Amateur Radio operating or you're thinking about giving it a try this book will encourage you to have a go. Rob G3XFD said after reviewing book "An excellent read, it's full of ideas and projects and is highly recommended".

ISBN:0-87259-965-5
PW Book Store Price: £16.99



P&P FREE UNTIL 18th December *UK ONLY

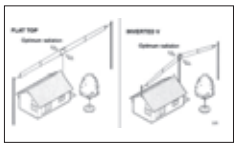
Read the full reviews of these new books on pages 34 & 35 of this issue.

For a good selection of Amateur Radio reading turn to pages 76 & 77 of this issue for a full listing of the titles currently available from the Book Store. If you place your order before 18 December you can qualify for free P&P (UK only)!

What are you waiting for? Place your order today!

To order please use the form on page 77 or call 0870 224 7830

New! Yaesu YA-30 Broadband Antenna



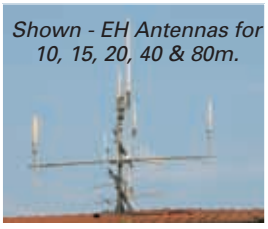
The Yaesu YA-30 pre-assembled multi-band, commercial-grade folded dipole is designed to get HF operators owners on the air fast. No ATU required. Covering all amateur bands from 1.9 to 30 MHz [VSWR < 2:1 1.9-18 MHz, VSWR <2.5:1 18-30 MHz]. It is 80.3 feet (24m) long and can handle up to 150 watts. The YA-30 can be installed as a Flat Top or an Inverted-V. This antenna is identical to the Icom IC-AH710. **£199.95** (RRP: £319)

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.

NEW LOW PRICE: **£29.95**



Small Garden? No Garden?

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.

Cobra 10,12,15,17,20. All 90cm long, all 500W RTTY/AM..... All £119.95 each
Cobra 30 & 40 Both 1kW, 93cm long, both 500W RTTY/AM ..... Both £119.95 each
Venus 80, 155 (1.913 - 1.930) **& 160** (1.830 - 1.850). All 2kW, all 248cm long (500W RTTY/AM) ..... All £189.95 each
Delivery and Insurance: Cobra Series £10, Venus Series £25. (England & Wales, phone for other destinations)

Miracle Antennas UK Main Distributor

Mirade Whip Others try & copy it but never quite get there..... **£99.95**
Mirade Ducker Like the Miracle Whip but has BNC socket in lieu of whip to connect random wire..... **£99.95**
Mirade Ducker IL Latest model! Identical to Ducker but has BNC plug for mounting instead of PL-259..... **£99.95**

Professional grade and easy-to-read backlit meters.

Daiwa Meters

CrossNeedleSWRMeters

CN101L PL259 1.8-150Mhz 5/150/1.5kW..... **£59.95**
CN103LN (N type) 140-525MHz 20/200W..... **£65.95**
CS201A 2-way co-ax switch PL259..... **£19.95**

CN801 Series

LOW PRICES

CN-801H 1.8-200Mhz 0/200/2000W..... **£89.95**
CN-801HP 1.8-200Mhz 20/200/2000W PEP..... **£99.95**
CN-801VM 140-525MHz 20/200W..... **£99.95**
CN-801S 0.9-2.5Ghz 2/20 /0.5W..... **£119.95**
CN-801S11 0.9-2.5Ghz 200mW/2W /20W..... **£169.95**

Tigertronics Sound Card - Radio Interface

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

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**

Miniature Palm Keys

NEW! PPK. The smallest retractable straight key! **£49.95**
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 with 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 13.8 Volts at up to 60 Amps.

MyDEL MP-250A Only £89.99

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

MyDEL MP-8230 NEW MODEL! £69.95

The latest version of our popular MP-4128. 13.8V DC, 25Amps, rear posts for neat installation of cables & Cigar outlet.

MyDEL MP-925 £99.95

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

MyDEL MP-9600 £179.94

The UK's best selling 60 AMP switch mode PSU. Massive rear facing binding posts with additional low current front facing sockets. Digital Volts & Amps reading in big clear numbers. Housed in a strong metal case, huge near-silent speed sensitive fan to enable cooling. Over Volts protected. Minimal RF & fan noise generation.

MyDEL MP-6A NEW MODEL!

Another model to the MyDEL PSU range, 13.8V DC, 6 Amps with Cigar socket & front facing binding posts. Ideal for FT-817, handies etc.

Yaesu FP-1030A £179.00

A power supply for Life? Probably. 25-30 Amp. Twin Meter, fixed 13.8V Crowbar protected with low current terminals & Cigar socket.

MFJ PRODUCTS AT LOWER PRICES

MFJ-945E Mobile ATU 160M-6M with meters. **£89.95**

MFJ-834 RF Current Meter 160-10M 3Amps **£69.95**

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. **£54.95**

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. **£189.95**

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.
FREE End Fed Wire Kit **£199.95**

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

MFJ-259B/L Special With FREE Loop Antenna 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-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.

Tel: 0845 2300 599 local call number
Web: www.hamradio.co.uk
E-mail: sales@hamradio.co.uk

Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS
Open 6 days a week. Mon - Fri 9.30am - 5.30pm Sat 9.00am - 5.00pm

ML&S martin lynch & sons
Suppliers of Communications Equipment

Icom

PC Controlled Receivers from ICOM

See web for full details, PDF's etc.

All Windows XP Controlled via USB

Four models to choose

IC-PCR1500	IC-R2500	IC-R1500	IC-PCR1500
10kHz-3300MHz All Mode	Twin Receiver version of PCR-1500	As above but with remote head	10kHz-3300MHz All Mode
£369.95	£474.95	£419.95	£369.95

Icom IC-7000

If you see it cheaper then call!

Only £949.95

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

Icom IC-7400

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

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

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-E91

VHF/UHF DUAL-BAND FM TRANSCEIVER

Only £249.95

REVIEWED IN PW AUG ISSUE!

A truly versatile multi-featured radio that further advances Icom's lead in digital amateur communications!

New IC-E90
Triple Band Handie
Only £199.95!
Or available with 4m and extra antenna for
Only £239.95

Icom IC-703
IDEAL FOR M3 USERS
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: £215

NEW Icom IC-E7E
The latest micro Twin Band Handie from Icom! 2m/70cms.
ONLY £169 or add a LC-161 for only £16.99. in stock now!

Icom IC-718
Basic ready to go 100W HF Transceiver supplied with Microphone & DC Lead.

CALL FOR BEST PRICE

kenwood

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

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

TS-2000E Bundles

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

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

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 TH-F7E
2/70 Handie with Gen Cov RX. If you must have SSB RX on your dual-bander then buy one!
RRP £289.95 ML&S LOW PRICE £199.95

NEW!

Shure Microphones

Shure 550L Desk Microphone
The "Classic" Dynamic Base Station low impedance microphones designed to withstand rigorous operating conditions and constant use.

Only £89.95

Shure 522 Desk Microphone
A Dual Impedance version of the 522 but suppresses unwanted background noise such as linear fans. Ideal for noisy contest environments.

Only £119.95

Shure 527B Fist Microphone
The ultimate fist microphone with extremely clear, crisp and natural voice response. Beautifully engineered to last for years!

Only £69.95

Please Note: All Shure microphones are supplied with "bare ends", requiring the user to fit the relevant plug before use. ML&S are able to supply any of the Shure range with a plug wired to you radio for an additional £10.

Icom

Icom IC-756Pro mkIII

RRP £2495
ML&S £1999
Buy now, pay later*
Package deal
IC-756ProIII,
SM20 Microphone, SP-23 New Base Speaker with filters.
RRP £2768 ML&S £2199

Icom IC-7800mkII

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

yaesu

The Rig of the Year has arrived!

Now available with either 5 year warranty or Yaesu SP-8 Desk Speaker - you choose!

- Two Versions, MP & D Specification
- FT-2000MP 100 Watts, 160-6m, Internal PSU
- FT-2000D 200 Watts, 160-6m, External PSU
- Variable RF Tuning & Roofing Filters as standard
- Orders being taken today, trade-ins welcome

Yaesu FT-2000MP: £1,989.95.
Yaesu FT-2000D: Price to be confirmed (approx £2400)

FT-857D + ATAS-120 Auto Antenna Bundle
Still only £759 for both (Rig only £559)
The Ultimate HF Mobile Installation!

FREE YSK-857! (whilst stocks

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.	Bundle 2.
FT-897D 'Vanilla' Basic FT-897 HF-70cm Transportable.	FT-897D + LDG AT-897 & MP-8230 22Amp PSU.
£Call!	Only £849

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

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

Yaesu FT-817ND Bundles

CALL - LOW PRICES ON THESE BUNDLES

Bundle 1	FT-817ND 'Vanilla' - Basic FT-817
Bundle 2	FT-817ND + YF-122C 500Hz CW Filter
Bundle 3	FT-817ND + YF-122S COLLINS SSB Filter
Bundle 4	FT-817ND + SLA-817 100W Amplifier

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?

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
NEW LOW PRICE: £169

Yaesu FT-8800 Similar to the FT-7800 but can receive on 2 & 70 simultaneously ..... **ML&S: £269**

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**

FREE MyDEL HANDS FREE OR YSK-8900 YOU CHOOSE OFFER SUBJECT TO AVAILABILITY

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 FT-60 Latest twin band handie complete and ready to go. **£129.95**

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)**

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

yaesu

FT-1000MP 200W

Due to the considerable success of the FT-2000, ML&S are able to offer a limited supply of refurbished pre-owned Yaesu FT-1000MP mkV's. Look at any of the big HF IOTA stations around the world and you'll see they use the Yaesu FT-1000MkV.

Fully checked, cleaned and offered with 12 months warranty, handbook, microphone, matching AC PSU and connecting leads, this 200 Watt HF Flagship from Yaesu cost £2899 retail only a few years ago.

ML&S
£1299

maldol

NEW Product
Maldol MFB-300
1.8-60MHz Vertical. **Only £259.95**

● Continuous Coverage TX/RX 160m - 6m ● RX 1MHz-60MHz ● Typically better than 1:5:1 VSWR on most bands No ATU Required! ● 7m tall ● Can be used without guys (supplied) at 5.3m or improved range full 7m ● 4.1kg weight

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**



Apply now for your very own ML&S Store Card

Conditions Apply

palstar

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 Available from stock. Cool 1kW, small foot print. **£1699.95**

DX-2SP Available from stock. 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**

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"

ten tec

Ten Tec Orion 2

Visit our showroom and compare the Orion 2, IC-7800 & FTdx9000D side by side!

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**

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

mydel

NEW MYDEL CG-3000. Only £199.95

High power version. With 200W and 200 memory channels.

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

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

LDG

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**

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**

LDG AT-7000

£139.94

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

Take Away Now and Pay NOTHING for Six Months!

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. If you do not settle the original amount differed within the six month period you will then pay £13.54 for 36 months at an APR of 29.8% TAP £487.44. Please note that in erest is calculated from the date of the original agreement. 29 8% APR. E&OE

Tel: 0845 2300 599 local call number

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

Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS
Open 6 days a week. Mon - Fri 9.30am - 5.30pm Sat 9.00am - 5.00pm

ML&S martin lynch & sons
Suppliers of Communications Equipment

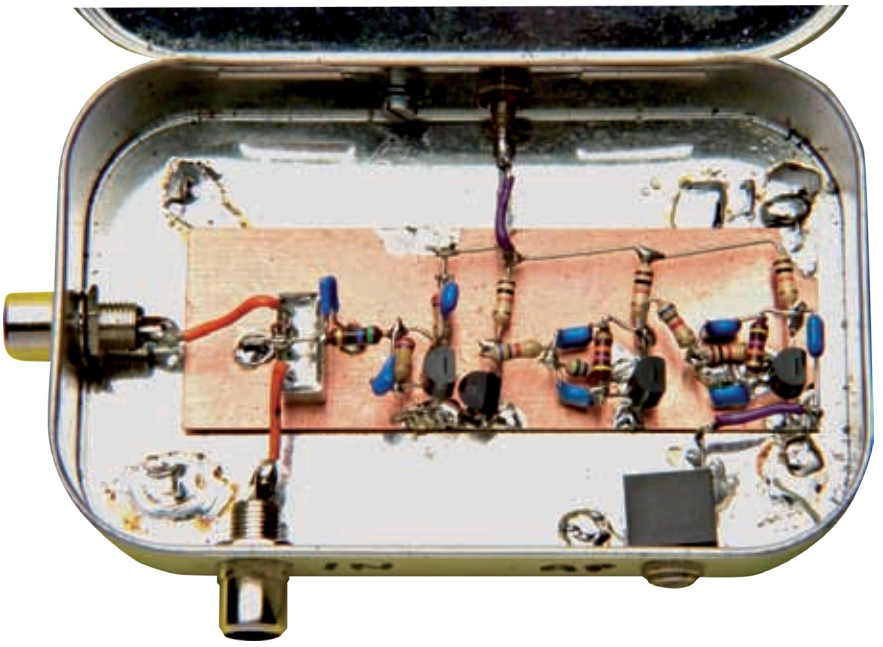
J, Miracle Antenna, Hustler, Tokyo-Hypower, Tom Tom, Diamond, Yaesu, Palstar & Comet and many more

A general purpose receive-box

Carrying on the Practical Way

For his first column of 2007, the Rev. George Dobbs G3RJV looks at the 'Receive-Box' and what he describes as "variations on a theme".

Rev. George Dobbs G3RJV
C/O Practical Wireless
Arrowsmith Court
Station Approach
Broadstone
Dorset BH18 8PW
E-mail: pracway@pwpublishing.ltd.uk



"Incline thine ear unto me: in the day when I call answer me speedily."
Psalm 102. V.2.

I'm indebted to Richard Brett-Knowles G3AAT, for the Radio Amateur's plea in Psalm 102. Should faithful readers of this column have any similar quotations, please let me know! This leads nicely into a project, which offers several receiver options.

Recently, my old friend **Dick Pascoe G0BPS**, visited Russia to attend an Amateur Radio camp in the Ugra region, 400km (250 miles) south west of Moscow. Dick's host was **Oleg Borodin RM3GM**. Oleg is well known to western QRP enthusiasts for his 'Micro-80' design, which became Americanised as the 'Pixie' transceiver - a design that has featured more than once in this column.

The Pixie Files

Versions of the Pixie became so legion that the G QRP Club produced the 'Pixie Files', a collection of articles based on Oleg's original design. This suggests to me that half of the QRP constructing world have produced their own versions of the Pixie!

One version that gained my attention was the 'RixPix' by **Rick Anderson KE3IJ**. Rick decided against the LM386 chip amplifier used in most other versions and used discrete audio stages all based on the 2N3904 transistor. In fact he used to audio stages as a preamplifier and audio tailoring stages to feed an external audio amplifier.

I was interested in Rick's audio stages and built them 'ugly style' some time ago. They worked well but I laid the board aside for further use in a project. But as **Robert Frost** once said, *"Yet knowing how way leads on to way, I doubted if I should ever come back."*

However, a couple of weeks ago I found the board in a drawer and decided to make use of it. Constructing a general purpose 'receive-box' had been a vague idea for some time and I thought that the KE3IJ audio stages could be useful in such a project.

Band	L1	C2	C3/C4	C5	T1	C
3.5MHz *	100µ	100p	220p	100p	10.3µ	200p
7MHz	47µ	60p	100p	47p	5.2µ	100p
10MHz	33µ	60p	68p	39p	5.2µ	48p
14MHz	16µ	60p	47p	33p	5.2µ	25p

For C1 values see text.
* T1 is 45t on a T50-2 toidal core, link winding 12t.
Otherwise T1 is 36t on a T50-6 toriodal core. Link winding

Table 1: Universal VXO band components.

The Receive Box

The diagram, **Fig. 1**, shows the circuit of the receive-box. It's the basis of a direct conversion (DC) receiver for any band and contains only a mixer and some audio stages. The audio stages are built entirely from the easily available 2N3904 transistors and Tr1 is an audio preamplifier stage directly coupled to Tr2.

The 22nF capacitor connected across the collector load resistor tailors the audio signal and helps removed vestiges of r.f. signal from the mixer. This load resistor has a high value, 270kΩ, because it also provides the base bias for Tr2.

The transistors Tr3 and 4 are a transistor version of a common op-amp circuit; forming a multiple feedback bandpass filter. It is based on a centre frequency of some 750 to 800Hz and produce pleasant filtering of c.w. signals without the ringing effect often noted with audio filters. It's also acceptable for single sideband (s.s.b.) signals.

The Mixer

The mixer is a passive double balanced diode mixer type (d.b.m.), chosen because I had several commercial versions available. Although rather lossy, they are very effective high signal handling mixers.

There are several choices and most are made by the American company **Micrometals Inc**. The common SBL-1 would be ideal for this application. In fact I used the smaller TUF-1 mixer (the TFM-2 is equivalent) for my board. They are quite expensive but the TUF-1 has the great advantage of having four pins spaced at 0.1 inches. This means a TUF-1 (or TFM-2) can be plugged into a socket.

It's possible to buy strips of 0.1 inch sockets to make custom i.c. holders and four of these could be snipped off to make a holder. Failing that, an 8-pin dual-in-line (DIL). socket could be cut in half to make a suitable holder. The connections for the SBL-1 and the TUF-1 (TFM-2) are shown in the drawing.

Passive double balanced mixers do require quite a lot of local oscillator drive to work efficiently. The usual quoted figure is +7dBm; that's 1.414V peak-to-peak. **Important note:** But remember being overdriven can also damage them! The usual quoted maximum figure is +20dBm; that's 6.3V peak-to-peak. The usual cause of damage is the burning out of the very thin wires used for the balance transformers.

Local Oscillator Insertion

The diagram, Fig. 1, shows where we can insert the local oscillator signal and the

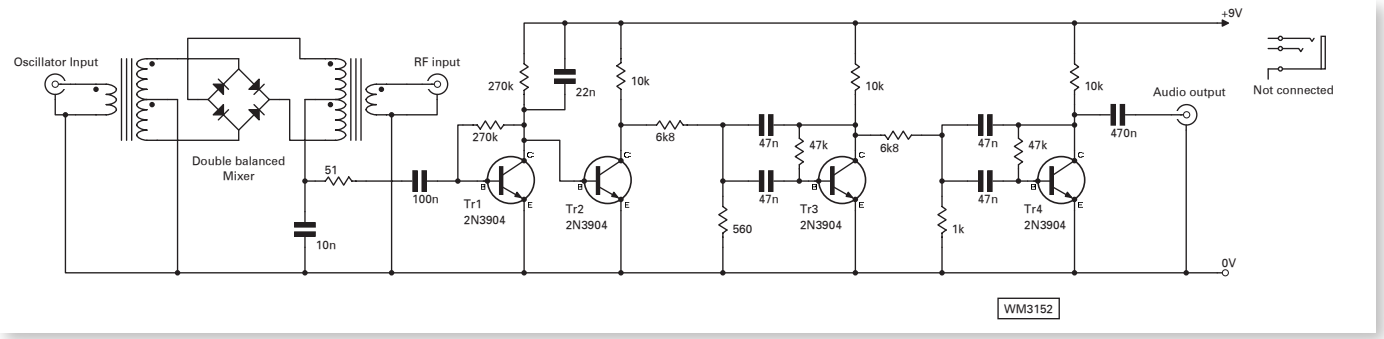


Fig. 1: The circuit for this month's project involves 'variations on a theme' with the 'Receive-Box' concept.

input signal from the antenna. These can be from a variety of sources. The local oscillator can be any r.f. signal source of suitable frequency and signal level, perhaps even the workshop signal generator.

The local oscillator can be any available signal source for the required band and frequencies. The input filtering can be built to suit the chosen frequencies and any suitable audio amplifier may be used to bring the signals up to a comfortable listening level. The box contains a double balanced diode mixer and the KE3IJ audio stages. The input from the antenna is best fed via a suitable bandpass filter for the required frequency. Both inputs are at 50Ω impedance.

The diagram, **Fig. 2**, shows one possibility for the local oscillator. This is the universal variable crystal oscillator (VXO) described in this column for March 1999. The circuit for the VXO is a bipolar transistor oscillator followed by a bipolar tuned buffer stage.

My prototype used 2N2222A transistors but many similar types would work and I used 2N3904 devices in an earlier version. The oscillator has a stabilised supply derived from a zener diode. Other constructors might like to use a three-pin voltage regulator chip of similar voltage.

The oscillator is based on the popular Colpitts circuit and capacitive feedback is provided via the capacitive divider provided by C3 and C4. These values vary according to band (see the band table in **Table 1**).

The capacitor, C1, is used to minimise the effects of the parallel capacitors, C2 and C3. Without C1, the upper frequency range of the oscillator would be restricted.

By using an inductor, L1, and a variable capacitor, C2, the crystal should pull slightly above its nominal frequency. The value of C1 will depend upon individual crystals. I found that around 100pF served very well for 40m. Try 100pF as a starter value on other bands and experiment.

Antenna Input

Although the antenna could be fed directly into the input port, a DC receiver does usually require good input filtering. There

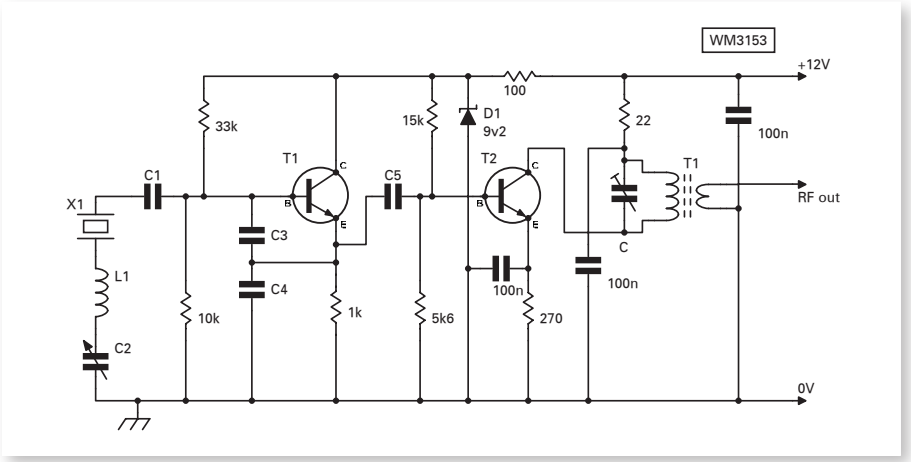


Fig. 2: The Universal variable crystal oscillator project (from COTPW in March 1999) comes into play with this month's project.

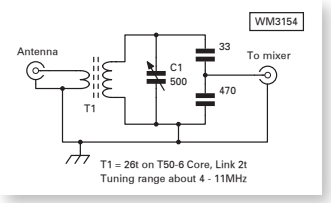


Fig. 3: The preselector was developed many years ago by DJ1ZB. It's surprisingly effective for such a simple a circuit.

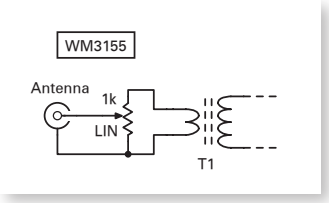


Fig. 4: A suitable attenuator, if one is required.

are a variety of circuits around for receiver input bandpass filters and to test the unit I used a very easy to build, single tuned circuit, shown in **Fig. 3**.

The values derive from a receiver pre-selector circuit produced many years ago by **DJ1ZB**. It's surprisingly effective for so simple a circuit.

The parallel capacitors (33pF and 470pF) give the low impedance required by the mixer input. This set of values tunes roughly from 4 to 11MHz and covers the 7MHz (40m) and 10MHz (30m) Amateur bands. More sophisticated readers might like to build double (or triple) tuned bandpass filters designed for the frequencies they intend to use.

Input Attenuator Advantage

There's some advantage in adding an input attenuator between the bandpass filter and the antenna. This is especially so on the 40 metre band with its adjacent strong broadcast signals. The attenuation can help reduce cross modulation.

The simplest way to attenuate incoming signals is shown in **Fig. 4**. In this circuit a 1kΩ linear carbon track potentiometer is placed across the input to the filter. I fed the audio output into a little bench audio amplifier but a pair of amplifier speakers of the type used with computers would do the job. To wire a stereo socket to suit such amplifiers use only the tip and ring connections, isolating the earth side connection.

In my prototype the audio stages already existed, built 'ugly' style on a small piece of printed circuit board (p.c.b.) material. I merely wired in the mixer. **A word of warning!** It's essential to place the circuitry in a screened metal box and use screened wire for inputs and outputs. Strong local broadcast signals love to break through into direct conversion receivers!

I put mine in a small tin but it wasn't an Altoids peppermint (so beloved of QRP constructors!). Instead, I used a tin that once held 'Energit' sweets from the Czech Republic. It must be at least 10 years since I was in Prague - so it proves what my wife says, "that I am a hoarder!"

●

Slinky
long-wire top-band antenna

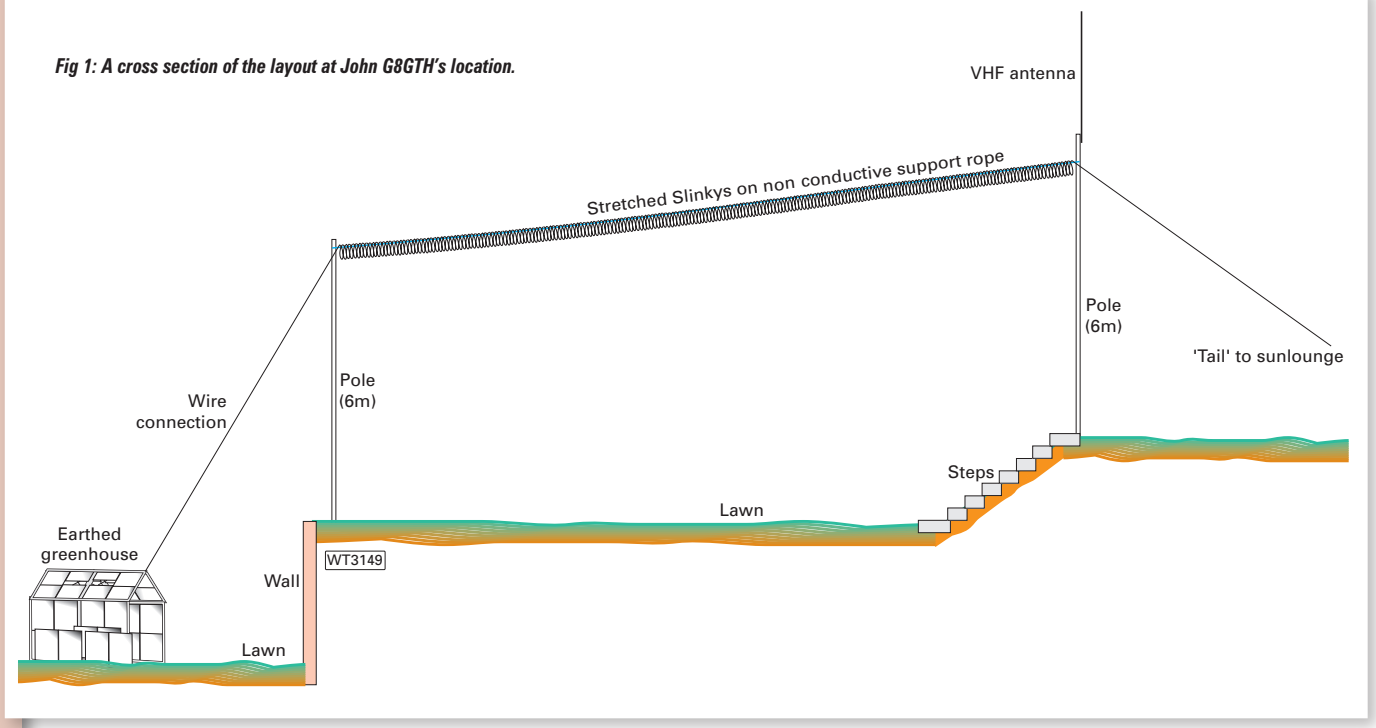
The Slinky antenna running down the garden at John's QTH.

My QTH is about 150m above sea level and being on the South Downs has only a few millimetres of soil above the bedrock chalk. This can prove a problem when constructing a good radio earth system. The real earth is probably many metres below the soil line, which can be helpful, in that I can get away with lower slung antennas than someone on a good conductive soil.

I have used multiple earth rods, plus an earth mat and radials on my vertical h.f. 3.5-28MHz antenna. This antenna lies lower down the garden and is fed from to the output of a linear amplifier. It's an antenna that has proved fine for the majority of DX working on the h.f. bands but the 1.8MHz band presents a problem all of its own.

Most Amateurs, myself included, don't have the space for an efficient antenna for 1.8MHz. I have a maximum horizontal run of about 27.5m from the house to the end of my main back lawn. There is a small lawn at the end of the main one that's about six metres long and 2.7m lower. The layout is shown in **Fig. 1** although not to scale.

Fig 1: A cross section of the layout at John G8GTH's location.



John Curzon G8GTH couples his Slinky antenna to the greenhouse at the bottom of his garden to get going on 'Top-Band'.

Fig. 2: One of the silver-soldered junctions between two Slinkys.

I have been using an auto-tuned (Icom AH4) long wire with a total length of about 50m, including a 'tail' of about 9m, running at 90° to it. This part runs sloping down to the lower lawn and is terminated about one and a half metres above ground, on a wooden post.

The long wire antenna has proved fairly successful, if a little noisy at times, on Top Band. The arrangement only worked with my Icom IC-746 located in my sun lounge, located on the upper floor of our chalet bungalow. In winter I use an alternative location, downstairs, with a Kenwood TS-2000. There's a connecting coaxial cable between the two shacks and a separate Carolina Windom antenna for 3.5-28MHz coming into this alternative shack.

Having read about antennas using Slinkys in *PW* previously and talked to **John Heys G3BDQ** (the Slinky expert) about them, I thought I would try using four of these toys soldered together to give an extra *artificial* length, in the space available (about 27.5m horizontally). I believe the Slinky adds about 70% of extra length, to a normal wire.

Unsuccessful

I was unsuccessful in obtaining the Slinky in local toy shops, so after a search on the Internet. I found that they were available through Amazon, priced at £2.80 each including VAT. I ordered five, just in case I needed an extra one. When buying, make sure you only buy the regular metal ones, as some are completely made of plastic material.

I joined four of the Slinkys together by binding the ends in two places; on opposite sides of the end 'ring' (they have a small clip to terminate the end loop) with a couple of inches of tinned thin copper wire and silver soldered the joints. One of the joints is shown in **Fig. 2**.

Silver soldering is a method of soldering used more in engineering, where steel is joined to brass or bronze. The temperature needed is higher and the 'solder' consists of a stick of silver-bronze rod using a powdered borax flux.

The solder rod is heated for a couple of seconds with a gas blow-torch and dipped in the flux very briefly; this gathers enough flux for the joint to be soldered. The work is then heated with the blow-torch until it glows just red and the solder rod applied. The solder should flow readily onto the joint.

I would imagine that ordinary electrical soft solder can be used but, as the Slinky is made of a composite steel mixture, I thought a hard solder joint would be more reliable. Also a solder tag was attached to each end of the antenna. One was for the feed to the shack, this is about 3m long, consisting of horizontal stranded covered wire. The solder tag at the 'far' end of the Slinky is for possible lengthening at a future date.

The antenna is supported by running a length of 6mm nylon rope through the centre of it and then fixing the Slinkys onto an insulator, along with the end of the nylon rope. I used a black cable tie at the feed end to attach the Slinkys to an insulator, plus a short length of nylon rope to the pole.

Fig. 3: The greenhouse on the lower lawn is used as a connection point for the 'far' end of the Slinky antenna.

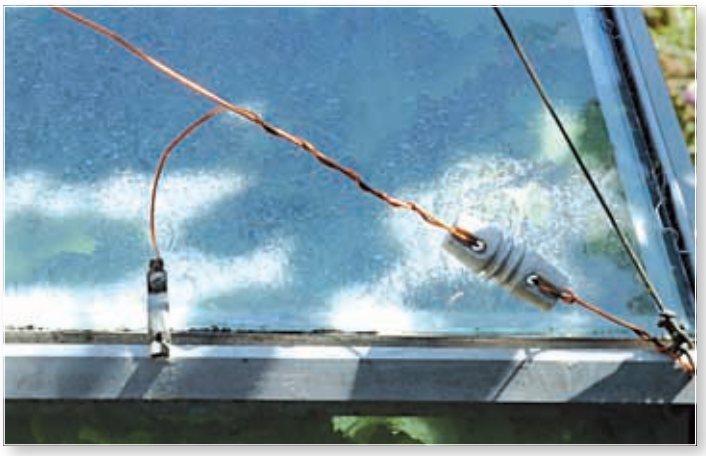


Fig. 4: Connecting the crocodile clip at the greenhouse end.

The not inconsiderable weight of the Slinkys is taken by the nylon rope. The far end of which then fixes to my six-metre aluminium pole by a draw cord of Kevlar material. This end can be lowered on a pulley, for working on the antenna.

The antenna is on average only six metres above the lawn, so it's relatively low in comparison with the advised effective height of 40m (quarter-wave). Using a manual antenna-tuning unit, that has a long wire output terminal and internal balun, I tuned up the antenna.

On test the antenna proved less successful than I had expected, with two S-points less gain than my original long wire and received reports down in comparison with it. My friend and our local top band net controller, John Heys G3BDQ, suggested earthing the end of the antenna, as he also has an earthed long wire.

Earthing of the far end on the antenna was achieved by running a 1.5mm enamelled wire, about 9m long, down at 45° (missing the pole), to my greenhouse on the lower lawn. The greenhouse is aluminium framed, **Fig. 3** and was already

Fig. 4: Looking up towards the sun lounge from the greenhouse end.

At the house end just above the sun lounge.

earthed into my radial earth system used for the Butternut vertical.

Rainwater Channel

By drilling a small hole in the aluminium rainwater channel of the greenhouse, I was able to make a suitable connection point. I then used an insulator with a short length of wire as a termination. The antenna wire was then looped back and fitted with a large crocodile clip, **Fig. 4**. So that the earth would not have to be permanent (more about that later). Finally, I gave the crocodile clip a spray of Waxoil (obtainable from Halfords) to help keep it rust-free.

This time when tested, I noticed a much quieter background noise level and reports from our net on Sunday morning suggested that although signal levels were down by about one S-point on both transmit and receive, compared to my normal long wire. But the speech quality had improved dramatically and my received signal to noise level had improved considerably. Neither John G3BDQ, nor myself can explain the improvement to the modulation quality - this was a surprising but welcome finding.

For my winter set-up, I shall leave the a.t.u. in the sun lounge, already tuned to our 1.990MHz net frequency and connect it to the coaxial cable going to the downstairs shack.

Of course this antenna is not restricted to 160m and will also work on both 3.5 and 7MHz while earthed at the far end, but tests have proved that the earth needs removing for working on the higher h.f. bands, hence the large clip at the greenhouse end.

So, there you have it my Slinky antenna now works on all h.f. bands, from Top-Band upwards. ●

Radioworld communications

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

kenwood

1 YEAR WARRANTY

TS-480SAT - HF&6m 100W..£669.00.
TS-480HX - HF & 6m 200W..£799.00.
TS-2000 - HF/6/2/70cm's...£1275.00.
TS-2000X-HF/6/2/70/23cm..£1789.00
TM-G707-Dual Band Mobile £265.00.
TM-V7E - 2m/70cm's.....£359.00.
TH-F7E - 2mtrs/70cm's.....£189.95.
THG-7IE-Dual Band Handy £169.00.

ICOM IC-7800MK2 *IN STOCK*

ICOM

2 YEAR WARRANTY

IC-7800 - HF/50MHz 200W.....£6399.95.
IC-756PRO3 - HF/50MHz .....£1999.00.
IC-7400 - HF 6m/2m 100W.....£1199.00.
IC-7000 - HF/6m/2m/70cm's.....£949.00.
IC-718 - HF 100W.....£439.00.
IC-910H - 2M 100W/70cm 75W £1085.00.
IC-208 - 2m/70cm's Mobile.....£215.00.
IC-E7 - Mini Dual-Band Handy....£165.00.
IC-E91 - Top Flight Handheld.....£229.00.

YAESU

2 YEAR WARRANTY

FT-897D - HF/6m/2m/70cm...£579.00.
FT-817ND - 1.8-430MHz 5W..£349.00.
FT-857D - HF/6m/2m/70cm's £555.00.
FT-7800E - 2m/70cm mobile. £169.00.
FT-8800E - 2m/70cm mobile..£265.00.
FT-8900 - 10m/6m/2m/70cm..£339.00.
FT-1802E - 2m 50W mobile...£129.00.
FT-2800M - 2m 65W mobile...£159.00.
VX-7R - 6m/2m/70cm handy..£209.00.
VX-6E - 2m/70cm handheld...£185.00.
VX-2E - 2m/70cm handheld...£115.00.
VX-150 - 2m handheld 5W.....£89.95.
VX-120 - 2m handheld 5W.....£98.00.
VX-170 - 2m handheld 5W.....£105.00.
FT-60E - DB *limited Stock*..£129.00.

NEW YAESU FT-2000
ONLY £1995.00.

www.radioworld.co.uk

MFJ TUNERS.

MFJ-989C 3Kw HF.....£319.95.
MFJ-986C 3Kw HF.....£299.95.
MFJ-993B Auto Intellituner....£229.95.
MFJ-971 Portable QRP .....£89.95.
MFJ-969 300w Rollercoaster £179.95.
MFJ-962D 1.5Kw Inductor.....£249.95.
MFJ-949E 300w W/D-Load....£159.95.
MFJ-948 300w HF.....£129.95.
MFJ-945E Mobile .....£109.95.
MFJ-941E 300w .....£119.95.
MFJ-934 ATU+AG .....£179.95.
MFJ-921 2m .....£79.95.
MFJ-924 70cms .....£79.95.
MFJ-914 Extender .....£69.95.
MFJ-901B 200w .....£89.95.

MFJ-259Z, Batteries, Loop & charger.
£239.95.

Analysers

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

MFJ-249B 1.8-170 Dig.....£219.95.
MFJ-259B 1.8-170 .....£219.95.
MFJ-269 HF/VHF/UHF .....£289.95.
MFJ-201 grid dip meter.....£119.95.

Dummy Loads

MFJ-250 1kw Oil filled .....£69.95.
MFJ-250X 1KW without oil .....£49.95.
MFJ-260C 300w PL259 .....£39.95.
MFJ-260CN 300w N-Type .....£49.95.
MFJ-264 1.5kw PL259 .....£69.95.
MFJ-264N 1.5kw N-Type .....£74.95.
MFJ-267Load/VSWR .....£149.95.

MFJ-418 £89.95

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.

New lower prices on..

HEIL SOUND

PR-780-PTT deluxe base mic...£179.95.
Pro-Set-Plus Headset .....£129.95.
Pro-Set-Plus-IC Headset .....£139.95.
Pro-Set-HC-4/5 Headset .....£79.95.
Pro-Set-HC-IC Headset .....£89.95.
Goldline GM-4 Stick mic .....£89.95.
Goldline GM-5 Stick mic .....£89.95.
Goldline Vintage Stick mic .....£99.95.
HM-10-4 HC4 Reg stick mic .....£59.95.
HM-10-5 HC5 Reg stick mic .....£59.95.
HM-Dual HC4+5 Stick mic .....£89.95.
ICM H-Mic W/Icom 8Pin cable...£65.95.
HM-IC Icom Hand Mic .....£59.95.
Traveller-817 Yaesu headset.
Traveller-706 Icom headset.
(traveller headsets require leads)

bhi DSP

Noise Cancelling Solutions for Amateur Radio & SWL

NES10-2MKII Speaker W/ dsp £89.95.
NES1031 Inline dsp module..£129.95.
NESP 1061 817 dsp mod .....£89.95.
NES1062 dsp module .....£89.95.
NES1042 Switch Box ..... £19.95.
ANEM .....£119.95.
NCH noise cancelling spk.....£24.95.

Watson Power Supplies

POWER-MITE * NEW * Watson 20A, £49.95

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.

Watson Antennas

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

Hustler 4-BTV 4 Band Vert ... £169.95
Hustler 6-BTV 6 Band Vert ... £229.95

Palstar Tuners

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.

Avair Power Meters

AV-201 HF/VHF .....£49.95.
AV-400 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.

CALL, 01922 414796

ORDER HOTLINE

Email: sales@radioworld.co.uk

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

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

Merry Christmas and a Happy New Year to all of our customers.

Tonna Antennas.

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 20835 23cm 35el	£64.95
Tonna 20655 23cm 55el	£89.95
Tonna 20745 13cm 25el	£69.95

West Mountain Radio.

RIGblaster Pro	£199.95
RIGblaster Plus Serial	£109.95
RIGblaster Plus USB	£134.95
Nomic 8P	£59.95
Nomic RJ	£59.95
M4-CBL RG45/4Pin lead	£12.95
RIGRunner 10way 12v distribution board	£99.95

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	£69.95
CP6 Base 6m-80m	£239.95
X50 Base 2/70	£54.95
X200N Base 2/70	£84.95
X300 Base 2/70	£89.95
X510N Base 2/70	£124.95
X700H Base 2/70	£249.95

TGM Antennas. Mini Beams.

MQ-1 6-10-15-20m 2EL	£329.95
MQ-24SR 6-10-15-20m 2EL	£379.95
MQ-34SR 6-10-15-20m 3EL	£489.95
MQ-26 6-10-12-15-17-20m 2EL	£409.95
MQ-26SR 6-10-12-15-17-20m 2EL	£439.95
MQ-36SR 6-10-12-15-17-20m 3EL	£579.95
MQ-26-1AFS-BLUE Replacement Driven Coil	£79.95
MQ-26-1AFS-RED Replacement Reflector Coil	£79.95

Radioworks Wire Ants

CW-160 160-10m (252ft)	£129.95
CWS-160 160-10m (133ft)	£124.95
CW-80 80-10m (133ft)	£99.95
CWS-80 80-10m (66ft)	£109.95
CW-40 40-10m (66ft)	£89.95
CW-40+ 40-10m (66ft)	£99.95
CW-20 20-10m (34ft)	£89.95
G5RV+ 80-10m	£59.95
Radioworld G5RV Fullsize	£29.95
Radioworld G5RV Halfsize	£27.95

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
YAMOTOR YS130 50Kg	£79.95
AR3000XL Light Duty	£49.95

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

LDG AUTO-TUNERS

Z-100 1.8-54MHz	£115.00
TW-1 0-2000W PEP	£109.00
RBA1:1 & 4:1 200W	£29.95
AT-100PRO 1.8-54MHz	£169.95
AT-897 1.8-54MHz	£174.95
NEW AT-7000	£139.95

Cushcraft Antennas

X-7 - 20/15/10 7EL Yagi	£699.95
A3S - 20/15/10 3EL Yagi	£499.95
A4S - 20/15/10 Yagi	£599.95
A3WS - 12/17 3EL Yagi	£399.95
ASL-2010 13-32MHz Log	£799.95
MA5B - Mini Beam	£399.95
D-3 - 20/15/10 Dipole	£269.95
R-6000 - 6Band Vertical	£329.95
R-8 - 40-6m Verical	£499.95
MA5V - 10/20m Vertical	£249.95

The UK's no.1 Used Equipment Trader

Second Hand List.

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

Pay by PayPal

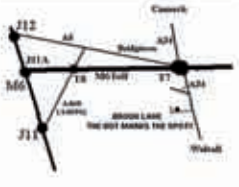
Happy New Year!

Kenwood R-5000 Communications Receiver HF £450.00
Kenwood VFO-230 external digital VFO £175.00
AEA PK-232MBX £120.00
Alinco DJ-V5 Handheld £99.00
Alinco DR-112 2m Mobile Transceiver £99.00
Alinco DR-150 2m Trx £120.00
Alinco DR-605 2 / 70cm £175.00
Alinco DX-70TH HF & 6m transceiver £375.00
Alinco DX-77E HF Transceiver £389.00
Alinco EDX-2 Auto ATU £219.00
AOR 5000 Rx £899.00
AOR AR-1500 Wideband Receiver £89.00
AOR AR-2002 Receiver £199.00
AOR AR-3000A Wide Band Receiver £425.00
AOR AR-7030 £550.00
AOR AR-7030+ HF Receiver £699.00
AOR AR-8200 Mk II £199.00
AOR AR-8200Mk3 Scanner £275.00
AOR AR-8600MkII £439.00
AOR AR8000 £139.00
AOR ARD9000 Digital Voice Interface. £129.00
AR-5000A+3 AOR Wide band all mode Receiver £1399.00
Ascom SE550 £99.00
AV-400 AVAIR VSWR POWER Meter £35.00
Bearcat UBC-120XLT Scanner £69.00
Bearcat UBC-278 XLT Scanner £99.00
Bearcat UBC-780XLT Scanner £199.00
Bearcat UBC-9000 Scanner £179.00
Bnos 20AMP PSU £89.00
Comet CD-270D Meter £49.00
Daiwa CNA-1001 £149.00
Datong FL-2 filter £60.00
Datong FL-2 Multimode Filter £69.00
Datong FL-3 Multi-Mode Filter £69.00
Diamond SX-100 Meter £65.00
Diamond SX-200 Meter £69.00
Drake R8E HF Receiver £425.00
DRU-2 Digital recording unit. £80.00
EDC-16B adapter £9.99
FL-100 9MHz Filter CW/RTTY narrow 500Hz for IC-R75 £40.00
FL-223 9MHz Filter SSB narrow 1.9kHz £40.00
FRA-7700 Active Antenna £80.00
FT-2800M 2m Mobile £115.00
FT-290R 2m Multi mode £150.00
FT-60E Yaesu 2m / 70cm FM 5W £139.00
Fujion F-2000A Finder £99.00
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
IC-7400 HF, 6m & 2m transceiver £799.00
IC-7800 Icom HF + 6m Trx £5400.00
IC-E208 2m / 70cm FM Mobile £189.00
IC-R20 Icom Scanner Wideband £239.95
IC-R71E HF Receiver £349.00
IC-V82 2m FM 7w Digital Handheld £129.95
Icom AT-180 AUTO ATU £225.00
Icom IC-229H 144-146 MHz £119.00
Icom IC-2350H VHF/UHF dual bander £175.00
Icom IC-24ET Dual Band Handy £139.00
Icom IC-2725E £199.00
Icom IC-2800H Dual Band Mobile £289.00
Icom IC-7000 1.8 - 70cms Mobile Transceiver - IC7000 £789.00
Icom IC-706mk1 £399.00
Icom IC-706MkII Mobile Transceiver £425.00
Icom IC-706MKIIG £525.00
Icom IC-706MkIIG DSP £649.00
Icom IC-718 HF Transceiver £379.00
Icom IC-736 HF 6 £699.00
Icom IC-740 HF Transceiver £389.00
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-751A HF Transceiver £450.00
Icom IC-756ProII HF / 6m Transceiver £1499.00
Icom IC-775DSP HF Base Transceiver £1499.00
Icom IC-781 Amateur HF transceiver £1995.00
Icom IC-R10 Hand held Scanner £179.00
Icom IC-R2 Wideband Receiver(Scanner) £89.00
Icom IC-R2 Wideband Receiver(Scanner) £89.00
Icom IC-R3 Hand held Scanner £250.00
Icom IC-R7000 £449.00
Icom IC-R7000 Mint Condition £550.00
ICOM IC-R7100 25-2000 MHz £450.00
Icom IC-R72 Receiver £350.00
Icom IC-R8500 Receiver £899.00
Icom IC-T7E Dual Band Handy £139.00
Icom IC-W31E Dual Bander £160.00
Icom SP-21 loudspeaker £54.00
Icom ut-102 Voice Synthesizer Unit £25.00
Japan Radio Company NRD-535 Receiver £499.00
Jil SWR Meter £15.00
JPS NiR-10 Noise Unit £99.00
JRC NRD-525 HF Receiver £399.00
Kamtronics KAM Multimode TNC £140.00
Kantronics KPC-3+ TNC £129.00
Kent Straight Key £45.00
Kenwood AT-230 ATU £149.00
Kenwood AT-50 ATU £175.00
Kenwood BO-9 Base Unit £39.00
Kenwood DSP-100 digital signal processor £275.00
Kenwood MB-201 £20.00
Kenwood MC-80 Base Mic £50.00
Kenwood PS-30 PSU £89.00
Kenwood PS-31 Power Supply £129.00
Kenwood PS-52 DC Power Supply £159.00
Kenwood SO-2 Hi-Stab Oscillator £69.00
Kenwood SP-230 Loudspeaker £49.00
Kenwood SP-31 Loudspeaker £59.00
Kenwood SP-430 Speaker £45.00
Kenwood TH-47E 430-440 MHz £79.00
Kenwood TH-D7E Dual Band Handheld £220.00
Kenwood TH-F7E Dualband Handheld Transceiver £169.00
Kenwood TH-G71E £139.00
Kenwood TH-G71E Dualband Handie £129.00
Kenwood TH-K2E 2m Handie £99.00
Kenwood TM-702E VHF/UHF transceiver £175.00

Kenwood TM-V7E 2m/70cm FM Mobile Transceiver £250.00
Kenwood TR-251E 144-146 MHz £120.00
Kenwood TR-751E 2m Multi-mode transceiver £299.00
Kenwood TR-9500 70cms Multi-Mode Transceiver £220.00
Kenwood TS-2000 All Mode Multibander Transceiver £1099.00
Kenwood TS-2000X HF/6m/2m/70cm & 23cm Transceiver £1499.00
Kenwood TS-271E £165.00
Kenwood TS-440SAT HF Transceiver £399.00
Kenwood TS-50 £425.00
Kenwood TS-570D HF Transceiver £525.00
Kenwood TS-570DG/E £675.00
Kenwood TS-570DG/E £675.00
Kenwood TS-790E Dual-Band Base / Mobile Transceiver £799.00
Kenwood TS-830S HF Trx Base £349.00
Kenwood TS-850S /AT £699.00
Kenwood TS-870S HF Transceiver £899.00
Kenwood TS-950SD HF Transceiver £1099.00
Kenwood TS-950SDX HF Transceiver £1499.00
Kenwood VS-1 Voice Synthesiser £39.00
Kenwood VS-2 Voice Synthesizer £30.00
KP-100 Keypad £29.95
LDG AT-897 Autotuner £149.00
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
Magnum 257 £139.00
Manson EP-925 Power Supply £75.00
MCL1100 EasyReader £59.00
MFJ-1272B TNC / Mic Switch £20.00
MFJ-1701 6 Way Antenna Switch £40.00
MFJ-382 Deluxe Amplified ClearTone Speaker £30.00
MFJ-418 Pocket Morse Tutor £49.00
MFJ-432 Voice Keyer, £99.00
MFJ-442 Elec + Memory keyer £89.00
MFJ-781 DSP filter £89.00
MFJ-784 DSP Filter £149.00
MFJ-9015 15m cw Trx £84.26
MFJ-921 VHF 200 Watt ATU £50.00
MFJ-962D Versa Tuner £149.00
MFJ-969 ATU £130.00
Microset PC2S 30 Power Supply £99.00
Microset PT 135 PSU £120.00
Microset R50 2m Amp £79.00
Microset SR-200 2m 200w £220.00
Mirage B-108 2m Linear Amplifier £129.00
MML432-30L £89.00
MML432-50 70cm's Linear Amplifier £79.00
MVT-7100 Scanner £139.00
NEUMANN U 87 Ai condenser microphone £1100.00
OptoElectronics X Sweeper £1199.00
Palstar PS-30N PSU £75.00
PT-50A Microset 50A 13.5V PSU £149.00
R-9914 Roberts Multiband Digital Preset World Radio £75.00
Realistic DX394 HF Receiver £119.00
Realistic Pro-2006 Scanner £129.00
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
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 AX-700E VHF-UHF communications receiver £299.00

Target HF3 HF3 RX £99.00
The Japan Radio Company JST-100 +PSU £399.00
Timewave DSP-59+ Filter £129.00
Timewave PK-12 Packet £99.00
TOKYO HL 62V 2 meter amp. £89.00
Tokyo Hy-Power HT-106 6m Transceiver £199.00
Tono Theta 777 TNC £49.00
Trio (Kenwood) SM-220 Monitor £249.00
Trio R2000 HF Receiver £220.00
TS-480S / AT £549.00
UNIDEN UBC-3000 Hand Scanner £129.00
UT-86 (Spare) CTCSS Board £20.00
Vibroplex Vibro Keyer Deluxe £119.00
Watson W-25AM Power Supply £75.00
Watson W-25SM 22A Power Supply £59.00
WELZ DL-600 Dummy Load £49.00
Wimo R-150 HF Linear Amplifier £89.00
Yacht-Boy 1100 £79.00
Yaesu FC-20 Antenna Tuning Unit £169.00
YAESU FC-301 ATU £110.00
Yaesu FC-700 ATU £99.00
Yaesu FC-707 Antenna Tuner £89.00
Yaesu FC-757AT Auto ATU £169.00
Yaesu FC-901 Antenna Tuner £140.00
Yaesu FEX-736-50 6M Module for FT-736R £199.00
Yaesu FL-2025 25W Linear Amplifier £99.00
Yaesu FP-30 power supply for the FT-897 £159.00

Yaesu FP-707 PSU £110.00
Yaesu FP-757GX 757 PSU £99.00
Yaesu FP-757HD Power Supply £139.00
Yaesu FR-101 HF RX £399.00
Yaesu FRG-100 HF Receiver £299.00
Yaesu FRG-8800 RX £199.00
Yaesu FT-1000 "CLASSIC" HF Transceiver £1399.00
Yaesu FT-1000MK V 200w £1499.00
Yaesu FT-1000MP / AC HF Transceiver £999.00
Yaesu FT-1000MP Mark -V Field £1299.00
Yaesu FT-290MkII 2m Multi-mode transceiver £250.00
Yaesu FT-41R Handheld Transceiver £120.00
Yaesu FT-470R Dual Band Handheld £129.00
Yaesu FT-50R Handy £99.00
Yaesu FT-690R II 6m transceiver £275.00
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-757GXII HF Transceiver £329.00
Yaesu FT-767GX HF, 6m & 2m transceiver £599.00
Yaesu FT-76R 70 cms Handheld Transceiver £99.00
Yaesu FT-77 HF transceiver £250.00
Yaesu FT-817 Portable Transceiver £299.00
Yaesu FT-840 HF Transceiver £299.00
Yaesu FT-847 Multi-Band Transceiver £849.00
Yaesu FT-857D Multi-band Mobile £479.00
Yaesu FT-897 Multiband Portable Transceiver £539.00
Yaesu FT-897D Multiband Portable Transceiver £529.00
Yaesu FT-900/AT HF Transceiver £475.00
Yaesu FT-920AF HF / 6M Base £749.00
Yaesu FT-990 /AC £899.00
Yaesu FTV-1000 200 W Transverter £475.00
Yaesu FTV-901R 2m / 6m Transvertor £275.00
YAESU FV-707DM DIGITAL VFO £99.00
Yaesu MMB-31 Mobile Mounting Bracket £15.00
Yaesu MW-1 Remote Control Mic £60.00
Yaesu NC70 Battery Charger £60.00
Yaesu SP-767 £69.00
Yaesu SP-8 Loudspeaker £89.00
Yaesu SP-980 Speaker £80.00
Yaesu VR-5000 £399.00
Yaesu VR-5000 Scanning Receiver £389.00
Yaesu VX-110 2m Handy £69.00
Yaesu VX-1R Dual Band Handy £89.00
Yaesu VX-2r Dual Band Handy £99.00
Yaesu VX-5R Yaesu 6m / 2m / 70cm £149.00
Yaesu VX-7R £199.00
Yaesu VX-7R black Tri-Band Handy £189.00
YF-112C 2nd IF CW 500Hz Crystal Filter for FT840 £25.00
Yupiteru MVT-3300EU Scanner £99.00
Yupiteru MVT-7100 Scanner £149.00
Yupiteru MVT-7300 Scanner £179.00
Yupiteru MVT-9000 MK2 Scanner £249.00
Yupiteru MVT-9000 Scanner £199.00
Yupiteru VT-125 Air Band Scanner £99.00



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

CALL 01922 414796

Feature

The Rother

1.8MHz amplitude modulated transmitter

Nowadays, amplitude modulation (a.m.), often derided by some as 'ancient modulation', is a mode used by an increasing number of UK Amateurs on the lower frequency (l.f.) bands. In fact, there are now regular a.m. nets on 1.8 (160m and 3.5MHz (80m).

The Rother (the name of the District Council that serves my area) is a crystal controlled single valve a.m. rig, which I built to discover just how far its 250m - 500mW output could travel. To my surprise (and delight) its voice transmissions were easily copied up to 32km (20m) from my QTH near Hastings.

The photograph on page 54 shows just how small the Rother is with its chassis measuring just 100 x 65 x 50mm. The so-called 'ugly' arrangement of the below chassis components is a reminder of what the undersides of our radios looked like throughout the valve era!

There's no reason why the transmitter components should not be arranged on a sheet of printed circuit board (p.c.b.) material. If you're happier with that arrangement, the transmitter should be just as effective as in this original model. The circuit, **Fig. 1**, reveals the simplicity of the design, which employs just five fixed and one variable capacitor together with two resistors.

The Circuit

The heart of the Rother transmitter is a single twin-triode valve, a 12AT7. **Note:** There are equivalent types including the ECC81, CV4024 and the 'ruggedised' 6060. I've tried all these types and they work equally well in this circuit.

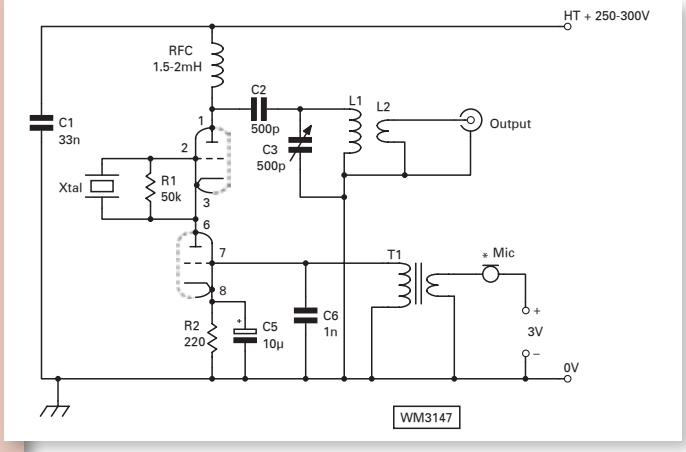


Fig. 1: The circuit of the single-valve a.m. transmitter. The valve heater's are shown wired for 6V. When using a 12V supply the centre tap (pin 9) is not used.

The 12AT7 has a centre tapped heater, which means its heater voltage can be either 12V at 150m.a. or 6.3V at 300m.a. The anode voltage for each section is approximately half of the high tension (h.t.) supply voltage of from 250 to 300V.

In the Rother one triode (Va) is arranged to be a crystal controlled oscillator and the other triode, (Vb) is the modulator. To simplify things series modulation is used, a system which needs no modulation transformer or low frequency choke (a smoothing choke).

By using an ex-GPO telephone carbon microphone insert, the microphone gain via the high ratios step-up transformer T is enough to fully drive Vb. The current changes at audio frequencies through Vb also change the current through Va (the oscillator) and so modulate the radio frequency output.

The tuned circuit, L1/C3, can tune to the crystal frequency. The inductor L1 also has a two turn coupling coil at its 'earthy' end and this connects to the r.f. power output socket.

The crystal I used is a very large and ancient survivor of the Second World War. I originally picked it up second-hand because it was on the frequency of my local Top Band Net. But a more modern (smaller and no doubt more active) crystal can be used for any frequency in the 'phone section of the band.

Triodes In Series

The triode sections of the 12AT7 are in series, which means that each section has a cathode to anode voltage of between 125 and 150V. Should the h.t. supply be raised to 500V the transmitter output would be enhanced, but there would then be the risk of a breakdown in the valve's heater-to-cathode insulation. A suitable h.t. supply is shown in **Fig. 2**.

To get a bigger signal into my 1.8MHz antenna, a small solid state or valve linear amplifier could be used, but I personally feel that this would destroy the Rother's simplicity. Incidentally, 12AT7 valves can be purchased new from several UK valve suppliers and they are quite reasonably priced.

New To Valves?

If you're new to valve projects, I'd like to suggest that anyone inexperienced in this kind of constructional work should use a larger chassis for the project. A suitable 'chassis' could be made up from sections of p.c.b. material, which would allow earthing connections to be soldered with ease.

I'm fortunate in having a die-cutting tool, which can

John Heys G3BDQ takes a break from Antenna Workshop to describe a small one-valved amplitude modulated transmitter for 1.8MHz. John's enjoyed using his rig and encourages you to try one yourself!

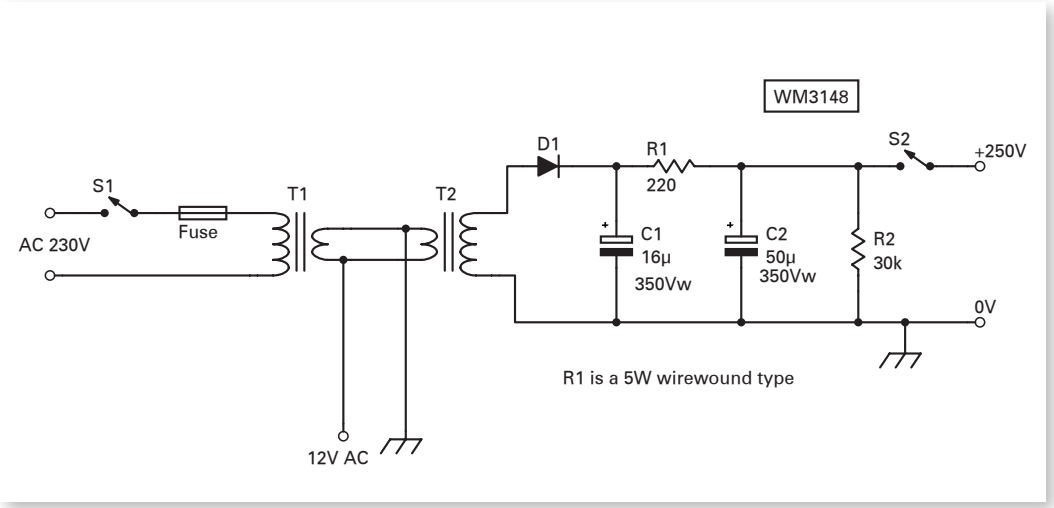


Fig. 2: Circuit of a power supply which uses a pair of 12V transformers back-to-back to obtain a high output voltage. This unit should be housed in a suitable case so that none of the high voltage connections can be touched.

easily cut out the hole size required for the B9a valve holder. However, a fretsaw or piercing saw may also be used for this operation.

Inductors & Capacitors

The 34µH anode coil, L1, is close wound with 24s.w.g. enamelled copper wire and has 42 turns on a 35mm plastic film container and it also has two turns of plastic covered wire at the lower 'earthy' end of L1. This winding makes the output link L2.

The inductor, L1, is tuned by C3 a solid dielectric variable capacitor, which has a maximum capacitance of 500pF. This capacitor C3 can be seen in the underside photograph (**Fig. 4.**). Six of these capacitors were obtained at a rally many years ago*****. A variable capacitor with a maximum capacitance of 250pF can be used and it will still tune L1 to the crystal frequency.

The r.f. choke (r.f.c.) is clearly shown in the photograph, as are the two brown coloured mica capacitors C2 and 4. These must have a working voltage of at least 250V and were components found yet again in the junk box.

The microphone transformer, T1, is quite small and it has a 1:100 turns ratio. A larger transformer that may be used. As an alternative would be the output transformer of an old valved broadcast bands set. These transformers matched the high impedance of the output valve to a very low impedance speaker. It's also possible to use transformer with a mains primary with a 6 to 9V step down winding, using the 6-9V winding as the microphone input side.

Note**: This form of variable capacitor is still available from rallies and a number of PW advertisers. Constructors should be aware that the dielectric used means that they are only suitable for low power transmitting applications. I have used them for powers outputs of up to 1.5W with no problems whatsoever.* ***Editor

Carbon Insert Microphone

The carbon microphone insert* (as used in old telephone handsets) is energised by 3V from two AA cells that are held in a holder at the rear of the chassis. The input jack for the microphone connection isolates the batteries when the microphone is disconnected - this prevents battery exhaustion when the transmitter is not in use.

The external rear chassis also has a plastic strip connector for earth-negative, 250V positive and the heater supply. The photograph of the underside, Fig. 4, also shows how I tried to arrange the components either parallel with or at right angles to the chassis walls. This is not always possible but it does lead to a neat arrangement avoiding a 'rat's nest' of wiring and components.

Many of us will have at least one or two of these in our junk boxes. You can identify them by placing the insert close to your ear - if you hear the carbon granules moving - it's the right type. When tested with a multimeter on the ohms range - a noticeable drop in resistance should be indicated when you tap the insert. John Birkett (see PW advert) has suitable complete carbon insert microphones for £4 plus postage.* ***Editor*

High Voltages

At this point I must stress the inherent danger when working with high voltages. The home constructor who is safe when working on solid state equipment with only low voltages involved - rarely exceeding 24V - must be always aware of the danger when handling gear whenever high a.c. or d.c. voltages are present.

Never make internal adjustments or probe into any equipment that has high voltages present! Always switch off at the mains before delving into a circuit or rig. The traditional 'one hand in the pocket' advice (less chance of you accidentally providing a 'circuit') still holds good when testing or setting up valved equipment.

Power Supplies

Small mains transformers having low voltage windings for valve heaters and a high voltage winding for h.t. now seem to be almost unobtainable. One way to solve this problem is to resort to 'back-to-back' transformers as shown in Fig. 2.

The circuit provides 12V for the 12AT7 heater and also a 250V h.t. supply. Small 12V output transformers are often seen with a 1A output winding at rallies and junk sales. Two of these are shown as T1 and T2 in Fig. 2.

The output of T2 is rectified by a silicon power diode D1, which can be a 1N4006 or 4007. The smoothing capacitors C1 and 2 are connected via R1, a 220Ω wire wound 5W resistor. The 30kΩ 10W resistor, R2, helps to stabilise the output voltage and (more importantly) acts as a 'bleed' resistor to discharge the electrolytic capacitors after switch off.

Instead of capacitors of 16µ and 50µF (as shown) 8µF and 32µF components will be satisfactory. The fuse must be rated at 1A and the switches must be for use with voltages of 250V or more. The power unit should be totally enclosed with plenty of ventilation as R2 gets quite hot.

Checking & Testing

Once you've built your version of the rig, the next stage is checking and testing. First, you must check that the oscillator is working (Don't connect an antenna at this stage) by

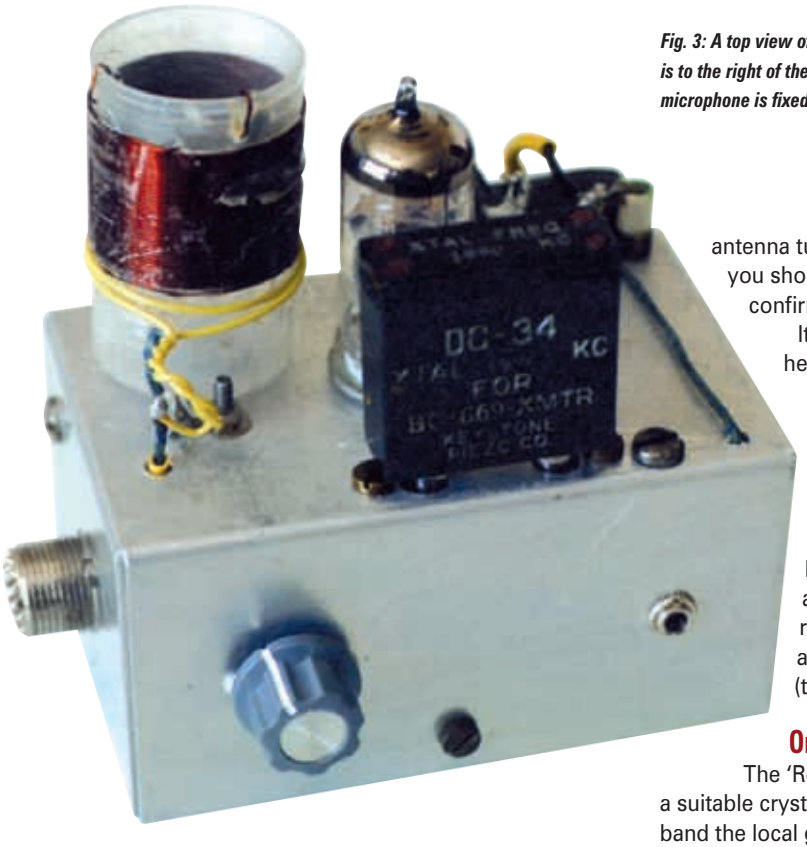


Fig. 3: A top view of the 'Rother' transmitter. The microphone socket is to the right of the C3 tuning knob. the battery pack for the carbon microphone is fixed to the outer side of the chassis.

connecting a multimeter on the current range with a full scale read out of 20-30mA selected, in series with the 250V d.c. supply.

Adjustment of C3, to tune L1 to the crystal frequency, will result in a sharp drop in the current reading, reducing to approximately 10mA (a receiver tuned to the crystal frequency will pick up the oscillator signal).

Next make up a single turn loop of stiff insulated wire, which can then be slipped over L1 and down to L2. Connect the ends of this loop to a low current torch bulb.

The loop - when in position - will illuminate the bulb when the oscillator is working and provide a relative indication of the power output. By carefully adjusting C3 a setting can be found where there's a reasonable output (not the maximum) and where the oscillator always starts again after switch off.

Plug the microphone into circuit (leaving the bulb and loop in place) while listening to the carrier on a receiver tuned to the crystal frequency - using headphones - and check that there's modulation when you speak.

I discovered that when speaking quite close to the microphone the speech peaks made the bulb significantly increase in its brightness. Series modulation is very efficient and the modulation percentage can be more then 80%. When the modulation is near 100% the added power will increase the output power on peaks by 22%.

On Air Testing

When the initial testing is completed, the antenna - via an antenna tuning unit (a.t.u.) may be connected. If possible, you should ask for co-operation from a local station to confirm that all is well on the air.

It's surprising how far the 'phone signals will be heard considering the very low power available. I received an S6-7 report from a station 14km (9 miles) away, solid reception in Cranbrook (well north of my QTH) and with another net member east of Beachy Head and not far from Seaford (near Newhaven) in East Sussex.

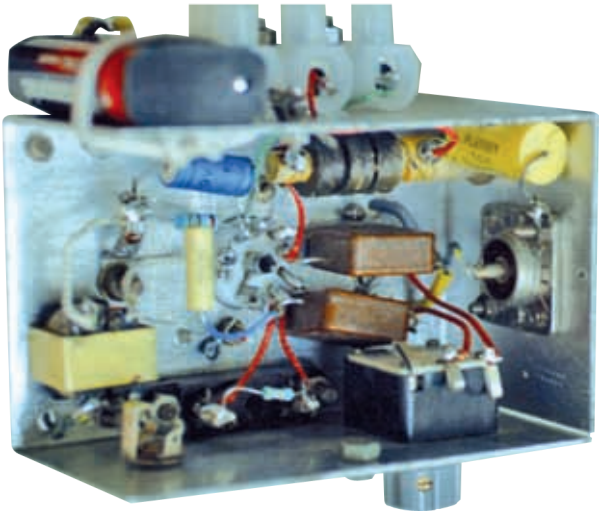
The building of different versions of the Rother might be an interesting club project and, of course, a.m. transmissions are ideal for reception on older 'all bands' broadcast receivers and simple home-brew tuned radio frequency (t.r.f.) receivers.

On 3.5MHz

The 'Rother' can be made to work on 3.5MHz by using a suitable crystal and by having fewer turns on L1. On that band the local ground-wave will not be so good but under good conditions there can be quite long range inter-G contacts using sky wave propagation.

This project owes much to the Hastings Sunday Top Band Net for their reports and help, with **John Curzon G8GTH** taking the photographs. Thank you everyone!

Fig 4: The underside of the transmitter where most of its components are visible. The tiny microphone transformer is in the lower left corner.



This project owes much to the Hastings Sunday Top Band Net for their reports and help, with John Curzon G8GTH taking the photographs. Thank you everyone!

Share your news, views and reports with fellow readers. Reports to David by the last Saturday of each month please.

VHF DXer

This month, David G4ASR takes a look at the 70MHz band and reports that it's 50 years old!

Following the demise of the 5-Metre (60MHz) band in 1949, a number of enthusiasts lobbied the Radio Society of Great Britain (RSGB) to negotiate with the authorities for access to a frequency slot somewhere in the lower v.h.f. spectrum. Finally, in November 1956 the Post Office announced that UK Amateurs could operate between 70.2-70.4Mc/s. So, it's happy 50th Birthday to the 4-Metre Band!

In 1964 the band was increased by 400kHz extending it from 70.1 to 70.7MHz and at a later date the lower edge was moved down to 70.025MHz but the h.f. edge lopped by 200kHz down to 70.5MHz. More changes were made in June 1987 with the bottom of the band being extended to 70.0MHz giving a full 500kHz and more importantly the band was made available to Class B licensees thereby increasing UK activity.

At the end of the 1950s a number of other countries were active on 4-Metre wavelengths including stations in Algeria (7X, previously FA), Austria (OE), France (F), Germany (DL), Ireland (EI), Kenya (5Z), Morocco (CN), Netherlands (PA) and Norway (LA). Unfortunately, pressure by commercial broadcasters meant that by 1962 virtually no country in Europe or Africa remained with a 4-Metre Amateur allocation.

During the 1990s, in my voluntary role as the RSGB v.h.f. Manager, I submitted papers at international conferences urging national v.h.f. managers to approach their authorities to seek access to the 70MHz band. I also provided information regarding the Detailed Spectrum Investigation (DSI) that was carried out a few years ago. It was conducted by the European Radiocommunications Office (ERO) on behalf of the European Radiocommunications Committee (ERC).

In its review of the 29.7-960MHz part of the spectrum the ERC concluded, "It would therefore seem possible to agree a limited amateur transmitting facility of at least 100kHz centred on 70.200MHz. It is also hoped that the existing beacon network between 70.000 and 70.150MHz can be maintained and extended." Prompted by this, a number of administrations within IARU Region 1 have now granted Radio Amateurs access to the band.

At the end of 2006 there was 25 DXCC countries with authorisation to use the 70MHz band. These are Azores (CU), Crete (SV9), Croatia (9A), Cyprus (5B), Denmark (OZ), Dodecanese (SV5), Faroe Islands (OY), Gibraltar (ZB), Greece (SV), Greenland (OX), Ireland (EI), Luxembourg (LX), Madeira Is (CT3), Monaco (3A), Portugal (CT), Slovenia (S5), South Africa (ZS), UK Sovereign Base areas on Cyprus (ZC4) and of course England (G), Isle of Man (GD), Northern Ireland (GI), Jersey (GJ), Scotland (GM), Guernsey (GU) and Wales (GW). As the ERC has suggested its recommendations be implemented by 2008 there could well be further countries gaining access to the 70MHz band on a limited basis in 2007.

Ivan Stauning OZ7IS (EDR v.h.f. manager) passes on the news that at the end of November 2006 Danish Amateurs gained access to an extra 25kHz of the band centred on 70.200MHz +/- 12.5kHz. This is in addition to their existing sub-band allocations of 70.0125-70.0625MHz, 70.0875-70.1125MHz, 70.3125-70.3875 and 70.4125-70.4875 MHz. Beacons are allowed in the band 70.0125-70.0500MHz and OZ7IGY has been operating on 70.021MHz since November 2003.

Tony CT1FFU mentions that the Portuguese authorities (Anacom) have recently allowed existing 70MHz permit holders access to the band for another eight month period, until April 30 2007. Anacom has observed that no interference has been experienced to local p.m.r. communications so they consider that Amateur Radio traffic will again be permitted. Currently, the only authorised frequencies in Portugal are two 12.5kHz wide channels centred on 70.6125 and 70.6250MHz. However, Anacom are studying a permanent and wider allocation within the IARU band that might be available during the 2007 Sp-E season.

To keep up-to-date with recent developments take a look at **www.70mhz.org** This website was created by **Stewart GM4AFF** and **Allan GM4ZUK** and is maintained by **Ross G6GVI**. It has up-to-date details of international allocations, band plans, beacons, contests, equipment and station reports.

Similarly, you can register at **http://groups.yahoo.com/group/fourmetres/** to participate in a 70MHz E-mail reflector. There is also a group for Northern Ireland operators at **http://groups.yahoo.com/group/northern-ireland-4metres/**

75 Years Celebration

Every month during 2007, I'm celebrating the 75 years of *Practical Wireless* by taking a trip down memory lane and looking at notable developments that have occurred on the v.h.f. bands. I'll be mentioning techniques, equipment, achievements, experiments and so on.

My schedule is as follows: February (1990s), March (1980s), April (1970s), May (1960s), June (1950s), July (1940s) and August (1930s). The September issue will specifically look at v.h.f. events during 1932 - the year that Practical Wireless was born! In the October, November and December issues I'll be going even further back and writing about pre-1930s pioneering v.h.f. work. This is where I need your help. I particularly want to hear from readers who can provide me with information about their v.h.f. station or techniques used in any of the decades since *PW* started publication.

So, take a look at your old log books and let me know how you started on the v.h.f. bands. Please send any information to the address given on this page, before the last Saturday of each month.

Four Metre DX Contacts

Soon after the release in November 1956 of the 4-Metre band to UK stations it was established that DX contacts could be made on this interesting v.h.f. band. In June 1958, **Major Ken Ellis G5KW** worked the station of FA9VN (Algeria) to set up a new record distance and this was exceeded two years later in May 1960 when the station of G5MR contacted CN8MG (Morocco). This record stood for over 20 years until June 1981 when I was operating as **GW4ASR/P** (IO82) and established the existing UK record by contacting the c.w. station of 5B4AZ (Cyprus) over a distance of 3475km. The current IARU Region 1 record is held by the stations of EI3IO (IO63) and 5B/G1JJE (KM64) for an s.s.b. contact made in July 2001 over a path of 3640km. It's interesting to note that all these two-way contacts were made in the period May-July via Sporadic-E propagation.

However, even greater distances can

be worked on the 70MHz band via F2-layer propagation at the peak of the Sun Spot cycle. The evidence of DX possibilities on the Four Metre band came in January 1957 when the station of W2ZKE (USA) claimed to have heard G3EHY and later in the same year in November 1957 the station of W2IDZ heard UK Amateur signals around mid-afternoon but was unable to confirm any callsigns. It was two 11-year Solar Cycles later at 1627UTC on November 17 1980 when the first authenticated trans-Atlantic crossband contact took place between **Gordon Pheasant G4BPY** on the 70MHz band and **Andy McLellan VE1ASJ** on the 50MHz band over a distance of 4591km. Almost one year to the day on November 4 1981 the trans-Atlantic path was broken again with the Canadian station of VE1ASJ making crossband contacts from the 28MHz band with the UK 70MHz stations of G4JCC at 1356UTC and GW4HXO, for the first GW, at 1422UTC.

More crossband contacts were made on December 8 1981 with VE1ASJ, this time on the 50MHz band, completing QSOs with EI6AS, EI6DT, G2AOK, G3APY and GW3MHW. All these crossband F2-layer contacts were made in the period November-January at the peak of the Sun Spot cycle.

There's one mode that hasn't been exploited on the 70MHz band yet and that is trans-equatorial propagation (t.e.p.). Since the 1940s, it has been observed that it's possible to communicate from north to south and vice versa across the Equator over intercontinental distances using frequencies in the v.h.f. bands. At times of high Sun Spot number the F2-layer may support normal modes up to 50MHz but frequencies considerably higher than this were found useable on trans-equatorial circuits. This mode will definitely provide DX contacts with 70MHz stations in South Africa (ZS) around the equinoxes (February and October) at Solar Maximum. We don't necessarily need to wait for the absolute peak, as we can expect an increasing number of disturbances that are usually quite severe on the upside of the Solar Cycle. Solar Maximum is only four to five years away (as seen in the diagram **Fig.1**) and I urge all stations (especially those with crossband capabilities) to prepare for very exciting times ahead.

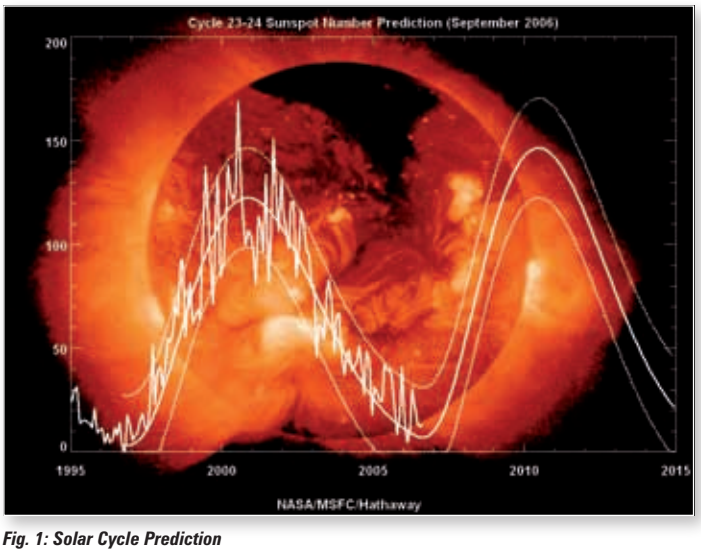


Fig. 1: Solar Cycle Prediction

70MHz Summer Sporadic-E

Propagation on the 70MHz band during this summer Sp-E season has been exceptional with numerous openings being reported. The first opening occurred on May 16 between 1130-1150UTC and enabled stations in Scotland to make DX contacts into Slovenia. A further 12 days of openings were reported between May 17-26 and May 30-31 to stations in Croatia, Denmark, Greece, Portugal and Slovenia.

Conditions were even better during June with only five days during the period when there was no reported Sp-E propagation. Many of the new DXCC countries were worked from the UK and a number of 'firsts' were reported. UK operators reported making two-way contacts with stations in Azores (CU), Croatia, Denmark, Dodecanese (SV5), Greece and Portugal.

Your reports show that propagation during July was even better with only four days during the month when Sp-E wasn't reported. Contacts were made into all the countries already mentioned plus a new one in the form of LX1JX, operating from Luxembourg. Sp-E propagation slowed up during the following month with only nine days of openings being reported on August 1-2, 6, 8, 13-14 and 16-17. The last opening of the summer season occurred on August 21 between 0730-0800UTC with stations in southern England making contacts into Croatia.

All-in-all it was quite a spectacular Sp-E season for stations operational on the 70MHz band with 72-days of openings between May 16 to August 21. Some of the DX contacts made from the UK included the stations of CT1HZE, CT3HF, CU8AO, LX1JX, OZ2LD, SV1OE, SV5BYR, S51DI and 9A2SB. Numerically the most contacts were made with stations in Portugal, Slovenia, Croatia and Greece.

Relatively few contacts have been made with stations in Denmark primarily because the skip distance for this country is quite short for Sp-E propagation. Luxembourg, Azores and Madeira Islands come bottom of the list, as there is currently only one 70MHz operator in each of these DXCC countries. The longest distance Sp-E contact of the season was established on July 7 when the expedition station of GM4SIV (St Kilda IO57) contacted SV1DH on s.s.b. over a 3200km path. The CU8DUB beacon (Azores HM49) was also copied in the UK on many occasions. Built by OZ1DJJ and installed by CU8AO it runs 25W to a dipole on 70.612MHz and has been heard by SV2DCD over a path in excess of 4300km!

After the summer Sp-E season had been thought to be over there was a very unusual series of openings reported during October. Stations mentioned that the 70MHz band was open again via Sp-E on October 2, 16, 21, 23, 24, 25, 29 and November 3 to operators in Denmark, Portugal and Slovenia. The 50MHz band was also open on many occasions throughout October with DX contacts being made with stations such as CN8IG (Morocco), CT1BXT (Portugal), CU3EQ (Azores), DH2UAK (Germany), EA6/M0DLL (Balearic Islands), EA7EHA (Spain), EA9IB (Ceuta), ES7FQ (Estonia), F5MMF (France), HA8CE (Hungary), HB9QQ (Switzerland), I8MPO (Italy), IS0GRB (Sardinia), IT9KSS (Sicily), LZ1WX (Bulgaria), OE3XLB (Austria), OH0A (Aland Islands), OH2TP (Finland), OK2POI (Czech Republic), OM3BC (Slovakia), PA2M (Netherlands), SM7GVF (Sweden), SP2FHM (Poland), S57RR (Slovenia), T99C (Bosnia-Hercegovina), UZ5DU (Ukraine), YL2GB (Latvia), YO5BWD (Romania), YU6DZ (Montenegro), YU7AZ (Serbia), Z38C (Macedonia), 5B4FL (Cyprus) and 9A2IB (Croatia).

There was even a glimmer of trans-equatorial propagation on the Six Metre band with television signals from Equatorial Guinea (3C) and Sierra Leone (9L) being detected and the beacon stations of TR0A (Gabon 50.049MHz) and ZD7VC (St Helena 50.006MHz) being heard by operators in southern England and Wales. On October 17 between 1815-1900UTC the station of ZD7VC made some two-way c.w. and s.s.b. contacts with UK stations in IO80, IO81 and IO90 locator squares.

73, David G4ASR

David Butler G4ASR
Yew Tree Cottage
Lower Maescoed
Herefordshire HR2 0HP
Tel: (01873) 860679
E-mail: g4asr@btinternet.com

Share your news, views and reports with fellow readers. Reports to Carl by the 15th of each month please.

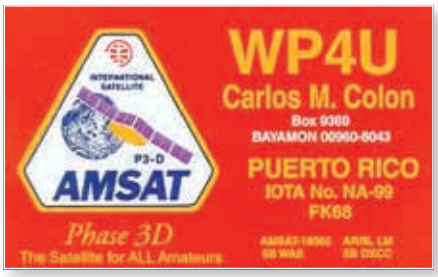
HF Highlights

Carl GW0VSW looks back at the history of the SOS call, has DXpedition news and rounds up your band reports

Carl Mason GW0VSW
12 Llwyn-y-Bryn
Crymlyn Parc
Skewen
West Glamorgan SA10 6DZ
Tel: (01792) 817321
E-mail: carl@gw0vsw.freeserve.co.uk

It's hard to believe that the International Distress call, SOS, is now 100 years old! Before the development of radio communication in the early 1890s, seagoing vessels had begun to use a variety of visual and audio signals to indicate they were in trouble or 'distress' using semaphore flags, signal flares, bells or foghorns. When Wireless Telegraphy and Morse Code was introduced to sea going vessels and ship-bourne radio installations became more common there was a need for standardised communication. However, this was limited by national differences and rivalries between competing radio companies.

The first International Radiotelegraphic Conference was held in Berlin, Germany in 1903 and at this time **Captain Quintino Bonomo**, an Italian representative, talked of the need for some common operating procedures and included the suggestion



QSL for Carlos WP4U worked by Panos Dadis SV1GRN.

A QSL card for the special event SY05AIA operating from Athens International Airport. When the station was operating Panos SV1GRNcould hear their signal transmitted through a logarithmic antenna by ground-wave. They were so close to his home QTH!

that a ship or vessel in distress should send the signal **SSS DDD** at regular intervals. This was beyond the conference at the time, although a statement had been made earlier saying "Wireless telegraph stations should, wherever possible, give priority to calls for help received from ships at sea".

Without regulations being imposed, individual organisations were left to develop their own procedures. It's thought that the first radio distress call to be adopted was CQD, which was published in Circular 57 of the Marconi International Marine Communication Company on 7 January 1904 and this became effective for all Marconi installations on 1 February that year.

In 1906 a manual used by Naval Electricians in the US Navy said that the standard visual flag signals, known as the International Code of Signals, would most probably be adopted for radio use and therefore flag signal **NC**, which stood for "In distress; want immediate assistance", would become their radio distress call. On 3 November 1906 the International Wireless Telegraph Convention came to an agreement, signed by 27 countries, that established **500kHz** as a maritime radio frequency and subsequently it became the International Distress and Calling frequency. It still remains today.

After a short time, in 1908, **SOS** (to be repeated at intervals) became the adopted signal for distress world-wide. Even in 1912 when the *Titanic* was sinking, its operator put out a CQD first and only added SOS after being reminded about the distress signal. It's commonly believed that SOS stands for 'Save Our Souls' or 'Save Our Ship'. However, they are actually a meaningless group of letters chosen because they were easily recognisable and could be sent rapidly on a Morse key. Anyone with a key can try tapping out SOS (dit-dit-dit-dah-dah-dah-dit-dit-dit) and the older CQD (dah-dit-dah-dit dah-dah-dit-dah dah-dit-dit) to see what I mean. It's obvious how much simpler the new code was and it would not now be mistaken for the similar **CQ** call or radio code for 'calling anyone' and the one we are familiar with today as Radio Amateurs. There are many Internet sites on the subject, try **http://en.wikipedia.org/wiki/SOS** or **www.answers.com/topic/international-distress-frequency** for further information.

DX News

On to this month's DX news now and to Malawi in Southern Africa where **Harry Berry G0JMU** will be active as **7Q7HB** between now and mid-January. Activity is expected to be on 3.5 and 7MHz using an inverted 'V' antenna and 14, 21 and 28MHz using a dipole. Operation will be both c.w. and voice and your QSL should go via **G0IAS**.

In Tonga, OC-049, which lies on an archipelago in the South Pacific Ocean, about two-thirds of the way from Hawaii to New Zealand, **Mark Roberts VK2GND**, will be active on s.s.b. as **A35GN** from Christmas day until the 3 January. Suggested frequencies to try will be: 7.050, 14.195 and 14.273MHz with all QSL's going via Mark's home call direct to **POB 1609, Hornsby, NSW 2077, Australia** or via the bureau.

South African special event station, **ZS90DW**, will be on air from 1400UTC most afternoons around 14.225 or 21.919MHz or the nearest open frequency depending on QRM around 1400UTC. The station will be operational until the end of 2006, Monday to Thursday some Fridays/Saturdays and will operate until 1700 or occasionally 1800UTC each day. The station, ZS90DW is operating to remember the South Africa forces that helped the English and Allied forces during the first World War at the battle of Delvillewood.

Closer to home Belgium Amateurs are allowed to replace their ordinary radio call prefix with **ON60** (Oscar November Six Zero) until 10 February 2008. This is to celebrate the 60th anniversary of the **Union Belge des Amateurs-emetteurs** the IARU society for Belgian Amateur Radio club stations.

Five Star DXpedition

The Five Star DXers Association or **FSDXA** has announced its next DXpedition to St. Brandon **3B7**, which is to take place in September next year. The FSDXA, closely linked to Chiltern DX Club, the UK DX Foundation and is the group, which brought you the 1998 **9M0C** Spratly Islands DXpedition and the subsequent record-breaking 2001 **D68C** DXpedition to the Comoros. Their most recent activity was as **3B9C** the Rodrigues DXpedition in 2004. Once again, Yaesu have agreed to be the principal sponsor and will be providing 12 FT-2000 transceivers along with six Quadra VL-1000 linears for the group's use.

Amateur radio retailers, Martyn Lynch & Sons and Nevada are also sponsoring the operation. It is hoped that the callsign **3B7C** will be allocated with the letter 'C' in the callsign representing the 'CDXC', the club from which the Five Star DXers Association was formed. As with previous FSDXA expeditions, this will be a major event

that will have a target of making more than 100,000 QSOs. With up to 12 stations on the air at anyone time, 24 hours a day, over a three week period and many of these using amplifiers and monoband beams, it should provide a great opportunity to work the Island on all h.f. bands during the autumn equinox when DX propagation is typically at its best. I will keep you posted as more information becomes available.

Your Reports

Once again, **Leighton Smart GW0LBI** starts us off this month with a Top Band report from Trelewis, Mid-Glamorgan where LX/PA6Z (Luxembourg) 2045, UA3BS (European Russia) 2100 and John Doyle K1GUN (U.S.A) in Woolwich Maine at 2215UTC all made his log using his Yaesu FT-100 with 100W c.w. to a 67m (220ft) long wire antenna tuned against earth. One QRP contact made the log at 5W and that was with OH0JWH (Aland Island) EU-002 at 2140UTC while a change to 3.5MHz allowed an s.s.b. QSO with Rolf Seichter KE1Y (USA) in Tewksbury, Massachusetts at 2300UTC.

In Nuneaton, **Chris Colclough G1VDP** also enjoyed his time on 3.5MHz working the s.s.b. station 4O3ES (Montenegro) at 2016 before switching to RTTY and working ES1A (Estonia) 2025, 4N1A (Serbia) 2026, DM3HZN (Germany) 2027, LB8IB (Norway) 2035, UA3BD (European Russia) 2039, S52OP (Slovenia) 2207, OH0Z (Aland Island) 2210 and OS1Q (Belgium) at 2212UTC using a Yaesu FT-1000 Mark V Field and 400W via a UK Ranger amplifier to a Moonraker 3-band Trap dipole.

The 7 & 10MHz Bands

On 7MHz, Chris found Mark Bailey KD4D (USA) in Huntingtown, Maryland at 0655, GN3XRQ/P (Northern Ireland) on EU-122 at 1411, OJ0LA (Market Reef) EU-053 at 2058, EA9EU (Ceuta & Melilla) 2140, C31JS (Andorra) 2159, ZW5B (Brazil) 2242, VE3AT (Canada) 2249UTC. His RTTY list included UA9CLB (Asiatic Russia) 1817, TF4M (Iceland) EU-021 at 2021, Z37M (Macedonia) 2039, YZ9A (Venezuela) 2158, WP3C (Puerto Rico) NA-099 at 2228 and TX5NK (Mayotte) AF-027 at 2223UTC.

The log of all c.w. man, **Ted Trowell G2HKU** on the Isle of Sheppy, Kent, included YI9KT (Iraq) and CT3/PA0RRS (Madeira Island) AF-014 at 2000UTC using his usual station, a Ten Tec Omni 5 at 70W to a G5RV.

In Newmarket, Suffolk Steve Norman M3MVB ran his Yaesu FT-857D at 10W into a full- size G5RV tuned via a LDG Z11 auto tuner and lists UR5WBB (Ukraine), I5HLK (Italy), EC2AFI (Spain), OE3FPA (Austria), DG7XO (Germany), LZ2NP (Bulgaria), UY5UV (Ukraine) and HZ1IK (Saudi Arabia) between 1030 and 1554UTC. Moving to 10MHz, Ted G2HKU found YI9KT (Iraq), 8P6CF (Barbados), ZG2FX (Gibraltar), CO2NB (Cuba) NA-015, FP/G2TXF (St. Pierre & Miquelon) NA-032, CN2BC (Morocco) and VE7IG/1 (Canada) between 2200 and 2259UTC.

The 14MHz Band

On to 14MHz and **David Bambrook 2E0DAB/M3DAB** in Little Milton near Oxford who continues to do well with his Yaesu FT-747GX and a dipole installed in his loft. Voice contacts on the band included: RZ6AST (European Russia), SV2HRV (Greece), US5IFA (Ukraine), TC125ATA (Turkey) celebrating the 125th birthday of Mustafa Kemal Ataturk. All QSLs should be via **Mehmet Cevik TA1CM, POB 26, Tekirdag 59100, Turkey**, 4X4FR (Israel), LY2PX (Lithuania) and EB7AEU (Spain) between 1820 and 2007UTC.

In East Finchley, North London **Martin Addison 2E0MCA** worked RX9TL (Asiatic Russia) 0619, SY8GE (Greece) Kythera Island EU-113 at 0707, EM750W (Ukraine) 0757, EA5/ON4LO/P (Spain) 1033, IK2VFR (Italy) OM5DP (Slovak Republic) 1551, 9K2GS (Kuwait) 1612, YU3AD (Monenegro) 1626, YO/IK2WZM Romania) from Count Dracula's castle at 1732 and 4L4CR (Georgia) 1732UTC using a Yaesu FT-840 and 10W s.s.b. to a folded half-size G5RV antenna.

Gary McKelvie G7USC in Guildon, Surrey has been using his TGM MQ26 beam for all his 14MHz activity. His vast log includes, PSK31 contacts LY2FN (Lithuania) 1038, HB9CTH (Switzerland) 1419, DD1UN (Germany) 1546, RW6BN (European Russia) 1626, SPHK (Poland) 1814, SV1GGA (Greece) 1840, 9K2YM (Kuwait) 1935, OM3TBG (Slovak Republic) 2120, UT0MG (Ukraine) 2125 and EA1EWC (Spain) at 2150. Changing to MFSK16, 9Z4FZ (Trinidad & Tabago) SA-011 was worked at 1423 followed by RU3AKS (European Russia) at 1540UTC using a Yaesu FT-857D at 40W.

The 18 & 21MHz Bands

Moving on to 18MHz and the large log of **Geoffrey Powell M1EDF** in Seckington, Staffordshire who used his Yaesu FT-840 and 100W into a dipole to find c.w. stations UA9CN (Asiatic Russia) 0800, YO4WR (Romania) 0910, JF2IWW (Japan) 0915, UA3GM (European Russia) 0954, YL2DQ (Latvia) 1139, HA5AI (Hungary) 1230, EM8N (Ukraine) 1450, LZ1IKY (Bulgaria) 1500, LA6CF (Norway) 1519, ZS1EL (South Africa) 1852, F5VLT (France) 1859, YV5KG (Venezuela) 2050 and LU9HGW (Argentina) at 2130UTC. Also active on the band was **Panos Dadis SV1GRN** in Athens who uses a variety of antennas in his backyard, though a trap dipole was used this time as his main antenna had suffered some damage earlier in the month. Contacts here on s.s.b. included 2W0DAA/M at 1127 followed by an interesting contact with Thomas Robinson G0SBW/M in Clacton-on-Sea, Essex who operates 'pedestrian' mobile, walking with his h.f. equipment in a back pack at 1717UTC.

The RZ3AFK QSL worked by Martin 2E0MCA.

The 4O3T QSL worked by Martin 2E0MCA.

Moving to 21MHz, Panos lists contacts with YI9KT (Iraq) 1128, CN8YZ (Morocco) 1608, JY4NE (Jordan) 1610, ZP8VAO (Paraguay) 1634, TR8CA (Gabon) 1647, and Carlos Colon WP4U (Puerto Rico) NA-099 at 1833UTC.

Another reporter operating here was Chris G1VDP who found RTTY stations UX0FY (Ukraine) 0946, CT3EN (Madeira) at 1046, EA8AH (Canary Islands) on Grand Canaria, AF-004 at 1053, PT7BL (Brazil) 1741 and CX0TTY (Uruguay) at 1743 and several voice contacts that included UP0L (Kazakhstan) 0809, VU2DSI (India) at 1424, VP2E (Anguilla) NA-022 at 2041 and finally YY1LCR (Venezuela) at 2113UTC.

Signing Off

Well that's about it for another month and indeed, another year! The bands are showing a slight improvement now and I hope that this trend will continue throughout the coming months. As usual my thanks go to all our reporters again for their logs and to **Tedd Mirgliotta KB8NW** editor of the *OPDX Bulletin* for the DX information. I wish you all good DX filled month and a very Happy Christmas.

73, Carl GW0VSW

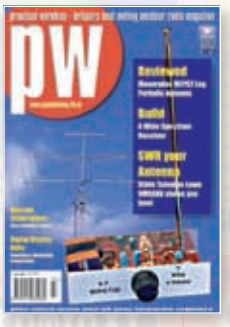
75 Years Celebration

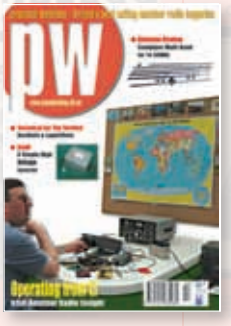
Every month during 2007, I'm celebrating the 75 years of *Practical Wireless* by taking a trip down memory lane and looking at notable developments that have occurred on the h.f. bands. I'll be mentioning techniques, equipment, achievements, experiments and so on.

The schedule is shown in David's column on page 56. I particularly want to hear from readers who can provide me with information about their v.h.f. station or techniques used in any of the decades since *PW* started publication.

Practically Yours

75 years of Heritage & History





Looking back at some rather special news items, articles and other material covering the period from 2000 to 2006.

Introduction

Practically Yours
75 years of Heritage & History

As *Practical Wireless* first appeared on the bookshelves in 1932, and has been continuously published from that time, there's obviously an enormous amount of relevant history and heritage to be found within our archives. Another factor adds to the volume of history – the magazine was weekly from its inception right up until the severe paper shortages in mid-1940! this means that those of us who look after *PW* on your behalf have an extremely difficult series of choices to make on your behalf and include within this 16-page extra section of the magazine each month during 2007!

After much discussion we've agreed that it's best to look back in decades – starting in this issue we'll look back at some rather special news items, articles and other material covering the period from 2000 – 2006. One of the articles republished this time feature the ground-breaking introduction of satellite navigation (who would have thought that ten years ago this feature would be offered in new 'budget' priced cars!) and an article on hospital broadcasting, a service where many Radio Amateurs serve the community.

Although I've never smoked, cigarette cards have provided much historical interest in the last 100 years (they've become a special interest of mine - my wife carol has added to a collection she started for me). Literally everything you can think of - from railways to radio - can be found on cigarette cards and in good quality colour too! Bearing in mind how much cigarette advertising radio hobby magazines carried (right up until the 1960s) it seems fitting to acknowledge an addiction, which has now become unacceptable to many of us. I just wonder how much people had to smoke to collect the attractive little cards!

Continuing the theme, the February issue will cover the 1990s, March will look at the 1980s, April will feature the 1970s and May will look at the 1960s. The June issue will provide an overview of the 1950s and July will concentrate on the 1940s – including the war years. August will cover the 1930s in general and September will be devoted to the September 1932 launch issue of *PW*.

The October issue will take a look at pre-*PW* days when George Newnes & Co. (who originally published *PW*) were active in radio hobby publishing during the mid-1920s. November will concentrate on the early 1920s publishing scene and December will look at the very beginnings of hobby radio via publications in our archives. Everyone here at *PW* is working very hard to archive the best for our devoted readers and we'll be delighted to hear from you regarding your own memories covering the period 1932 to the present day.

Rob Mannion G3XFD

2000-2006

On Track With Satellite Navigation
March 2000
Ian Brothwell G4EAN has already found his Garmin GPSII Plus to be useful when travelling on the UK's franchised railways operated by contractors and the preserved steam lines run by enthusiasts. Read on to find out why!

Bedside Broadcasting
May 2001
Many Radio Amateurs use their radio skills in their everyday lives and this is certainly true of **Dick Pascoe GOBPS**. Dick explains how he and many Amateurs like him are involved in hospital radio broadcasting.

Looking Back
2000-2006
Snippets from the *Practical Wireless* archives

What Do You Get When You Cross ... Cigarette Cards & Wireless?
March 2000
Neville Denson says that back in the late 19th and early 20th Century, cigarette companies were issuing cigarette cards that would have been of great interest to Radio Amateurs.

Advertising Memories
A trip down memory lane.

On Track with Satellite Navigation


Do Satellites & Steam Go Together?
On Track With Satellite Navigation
Put An End to The Hunt For That Bookcase!

It was a 'preserved' steam railway that gave me the excuse to buy a Garmin GPSII+. That excuse came on an annual day trip to Matlock in the Derbyshire Peak District, my friends and I would have a ride on the 'Peak Railway'. The line's westerly terminus was at a new station named Rowsley South.

The question arose: "Did we have time for a walk to the nearby village of Rowsley before the train returned to the other end of the line"? We couldn't tell, Rowsley South station was too new to be on a map so we couldn't determine the distance (and thus the time) to walk to Rowsley. This was a situation I had an answer to!

For our next trip on the steam railway, I had a GPS, into which I had entered the co-ordinates for Rowsley village. The train arrived at Rowsley South station, I pressed a button on the GPS and the distance to Rowsley village was displayed on the screen of my GPS unit and we saw that our walk would be feasible. Better still, once we got into a comfortable walking pace the GPS could reasonably accurately give us an Estimated Time of Arrival (ETA) for Rowsley.

Gozo Beacon

The next time I got to use of my GPS combined my interests in radio and in aviation in trying to find the Gozo aviation beacon while I was on holiday in Malta GC. Using my GPS in conjunction with a set of 1:25,000 maps of Malta and Gozo, and with the co-ordinates of the beacon entered into the GPS, I reached the beacon without any navigation errors whatsoever.

I confirmed the Gozo beacon's identity by copying its c.w. identification on my wide-band hand-held transceiver. My finding was further confirmed by seeing an aircraft making a turn almost directly overhead!

The ETA feature of my GPS was a great aid when walking back to the port for the ferry to Malta. Once I had reached a steady walking pace the ETA feature showed me that I'd reach the port ten minutes before the ferry departed.

So, armed with the information from the GPS unit ... there was no need to break my pace to read a map or estimate the remaining distance to walk, I could simply relax and enjoy the lovely scenery of Gozo (I'd recommend 'Malta's Garden Island' to everyone!).

Fig. 1: The Garmin GPSII Plus unit. (An add-on optional antenna unit is available for 'in car' use). Photograph courtesy of Waters & Stanton PLC.

Wheres That Train?

It's back to the train for my next use of the GPS. Let's just imagine I'm on the train home from London. It has been a busy day, I'm a little tired and engrossed in a magazine. It's dark outside and the train comes to a halt in the middle of nowhere. Where are we and how long before we reach Nottingham?

My GPS is running and I see from its simple line map that we (the train and I!) are near Kettering. I now know where we are and, once the train is up to speed again, the GPS's ETA is usually quite accurate ... I'll probably know when we're due to arrive before an announcement is made!

On another train trip in the dark, just before Christmas 1999, we went past a tower crane decorated with a Santa and sleigh. I saw it too late to get out my camera ... but my GPS was running and I needed only to press a couple of buttons for it to record our position. On the return journey the GPS was set to display the distance to go to this tower crane and I got my picture!

Nearer to home, looking for a short cut through a new housing estate was made easier by using the GPS to plot a simple map of my walk around the estate. Useful eh?

Garmin GPSII Plus

My GPS unit is the Garmin GPSII Plus. As I had originally planned to use it for walking and cycling I didn't want a GPS that included maps as these are usually not detailed enough for walking (and I also greatly enjoy reading and using printed maps).

The GPS unit I've got has a display which can be used in either portrait or landscape. In use, its standard antenna can be unplugged and replaced with a remote antenna on a length of coaxial cable, which is the way I use it on a train.

I have used my GPS in a car and, placed on the dashboard it works well using its standard antenna. However, you can get a special antenna for in-car use. (The GPS-150 Active Magnetic Mount Antenna is available, prices are from £39.95).

Before leaving home on a journey on a dark night, I loaded the co-ordinates of several turning points on my route into the GPS. Shortly before I reached each turning point the

Many readers may be tempted to buy a 'Satellite' navigation (GPS) unit and Nottingham-based Ian Brothwell G4EAN has already found his Garmin GPSII Plus to be useful when travelling on the UK's franchised railways operated by contractors.

GPS' display would light up and I could confidently make the turn without needing to stop and confirm that I was at the correct point. This made the journey both quicker and more relaxing.

Finally, if like me you want to use a GPS on a train, then I recommend getting a GPS which will accept a remote antenna. You should also check that the GPS is receiving the satellites before boarding the train.

The GPS initially needs at least 30 seconds free of QRM to establish reception of the satellites and that may not be easy to get on a train. Once it has established reception then QRM causes little problems.

After the train has passed through a tunnel my GPS takes only a few seconds to re-establish reception and once again tell me where we are. And if we stop 'in the middle of nowhere' ... I know where we are!

There are very many uses for GPS units, whether it be for /P Amateur Radio operating or hill-walking. It's one of those systems that we'll always find new jobs for. I wouldn't be without mine!

"After the train has passed through the tunnel, my GPS takes only a few seconds to re-establish reception and once again tells me where we are. And if we stop in the middle of nowhere...I still know where we are"!

Remember the great kits supplied by Dave Howes? Dave sold his business to Chris Rees G3TUX of the QRP Component Company in 2000.

Hospital Radio Bedside Broadcasting


BEDSIDE BROADCASTING

While listening to a local radio station, 'Neptune Radio', I heard a request for volunteers to help out at the nearby hospital's broadcast station - 'Radio Victoria'. A phone number was given and much to my amazement I ended up talking to another Amateur that I knew, **Matt M1CMN,** who turned out to be the station manager and invited me down to the hospital to have a look and a chat.

Perhaps unwisely, I expected to spend some time helping behind the scenes cataloging records and even making the tea. I did **not** expect to be shown the studio and allocated a broadcast time just two weeks away. I was then put under the wing of **Stan G6ZNW** who taught me the basics of a studio and how it all worked.

A sharp learning curve started and I joined the team of Radio Victoria. Although our broadcasts can only be heard by patients in the hospital where the studio is based, they have a choice of three stations that they can tune into.

The other stations available are a national station including BBC Radio Kent. Surprisingly we are quite popular, it must be the type of music we play.

Radio Victoria is based at the Royal Victoria Hospital, Folkestone. The hospital caters for stroke victims and the elderly so our music choice is very wide.

Requests vary from Vera Lynn to Queen, keeping us on our toes as we try to make the music flow from one type to another. We are based in rather a small hospital so are allocated a small room for our record collection and the studio. We have several thousands of LPs and our CD collection is growing too.

Radio Victoria has been on the air since 1972 when a few volunteers offered to provide the service. Moving several times around the hospital in the 1970s and 1980s it now has a permanent home on the top floor right next to the maternity unit. I am not sure if there is a message in that!

Dick Pascoe G0BPS live on air as Richard Anthony.

Equipment Used

The equipment used for the station is similar to that used by a DJ at a disco but without all the lights. A mixer deck (hopefully) ensures that the correct audio line is fed to the listeners. We have a choice of two CD players, two mini-disk players, two tape decks and two microphones.

We also have a link to a telephone for live interviews and if needed a link to another hospital radio station, a couple of jingle machines and an outside broadcast facility. We currently use a total of 13 controls on the control deck. These controls are used to ease in and out (fade) the music and audio tracks we play. The mixer equipment we are using is over 20 years old and showing its age hence the live broadcast station to try to generate funds to rebuild the studio.

The choice of music apart from any requests is our own and after the initial training we are left to make up our own shows. Often I will be alone in the studio right through my two hour show.

Hospital radio is all about helping to make the stay of the patients a little easier. It provides a direct link between us, the presenter and them, the often bedridden patient.

It always saddens us to see an empty bed where we usually collect a request. One of our listeners, **Ken Ellis G5KW**, now a Silent key, was well known in the Amateur field and loved to listen to Gilbert and Sullivan's operettas.

Silver 2000

I was away on holiday when an application for a Restricted Service Licence (RSL) was made to put our station on air live to the people of Shepway in the South East of England. This would be for a period of five days in a bid to raise money to revamp Radio Victoria's studio. So I returned to be told that we were 'going live' on air as Silver 2000 on 1 January 2000.

The announcement came as a total shock to my system as I knew nothing about it. Remember, I had only been with the

Many Radio Amateurs use their radio skills in their everyday lives and this is certainly true of Dick Pascoe G0BPS. Dick explains how he and many Amateurs like him are involved in hospital radio broadcasting.

Royal Victoria's hospital broadcasting studio.

Situated in the home shack of GOBPS. The final transmitter in the alloy box, the p.a. is shown above with the temperature sensor.

Running repairs - 20 minutes into the show and Stan and Dan have to repair the link transmitter.

The Silver team - Pictured l-r (back row) Andy, Rob, Gerry, Stuart, Dick, Nick & Stan, (front row) Dan, Eamonn and Matt.

hospital broadcasters for three months at this time and been away for 7 weeks of that!

The rush of chasing advertisers and sponsors just before Christmas became a nightmare, all everyone else was thinking about was the Christmas holiday and the New Year Millennium celebrations. However, we did get sponsors who were apparently delighted with what they received from us.

After much haggling we were allocated the 95.1MHz Band II v.h.f. as our transmitted frequency for the f.m. service. As I live right on top of the hills surrounding Folkestone and with the hospital being down in the centre of Folkestone a link was arranged between the studio and my house with the broadcast antenna at the top of my tower.

The link was just above 50MHz on 52.925MHz with two peaked 3-element beams using just 1W from the transmitter. The final transmitter on 95.1MHz. peaking 15W at best.

With the frequency allocated it was time to sort out the programme scheduling. I was eventually allocated the afternoon show from 1-4pm and as I had never done anything like this before and immediately decided to use an alias. The alias was so that when I blew it big time no one would know it was me! So; 'Richard Anthony in the afternoon' was born.

We started at 7am with Andy doing the Breakfast Show until 9am. Stan then took over for the Mystery Year getting listeners to 'phone in and guess the year.

Eamonn our resident Irish presenter covered the 10 until 1 spot when I took over. We eventually agreed that a three-hour slot was far too much for us novices. The remainder of the day saw a Jazz hour with Rob and a country hour with Tony. Matt did the 8-10 section with the final two hours covered by Gerry B (The Groove Rider!). The overnight coverage was automated from the computer.

As the final minutes of 1999 ticked away and Big Ben struck midnight the transmitter switched on and Silver 2000 was on the air with the computer based music and jingles. The voice of **Stan G6ZNW** provided the links between tracks, yes, it **was** all recorded earlier!

The five days passed very quickly with two of us clocking up a total of 16 hours each on the air. The remainder only managing a total of 10 hours each.

What the others failed to tell me until after the whole event was that I went 'off air' for about 20 minutes in the middle of my first show! The link transmitter failed so Stan assisted Dan to complete a rapid repair whilst I carried on oblivious to it all.

Helping Out

If your local hospital doesn't have a broadcast station then why not set one up? Alternatively you can send your unwanted records and CDs or donations to Dick Pascoe for Radio Victoria. Please make cheques payable to Radio Victoria and send to **Dick Pascoe, Radio Victoria, Royal Victoria Hospital, Folkestone, Kent.**

Objective Achieved

We achieved our objective of raising money for the new studio, but not as much as we would have liked but for something done at very short notice it worked very well, if nothing else it helped us learn a great deal and improve our own skills.

A quick check later found showed that six of the ten helpers were Radio Amateurs, without doubt this helped those that presented a show as most of these had used a microphone 'for real' before. Mind you, the technical background of our engineer **Danny G7SUH** helped enormously. One of the presenters, **Andy Cadier**, was (at the time) a columnist on our sister publication *Short Wave Magazine, (*now re-launched as *Radiouser Editor.*

Doing a live show increases the perception of what is good and not so good. I have become very aware of the errors that creep in on even major stations.

As I mentioned previously the learning curve was steep and staying on the way up is a challenge. Keeping the good bits going when you are alone is difficult.

Many presenters are told that you play two tracks and talk for two minutes Not us, we keep the music playing and talk over it. Except for interviews of course.

Digital technology in the form of mini disks have been a boon. I picked up a small Walkman sized player in the USA last year and found a full sized one at a local auction at silly money. For those who are not familiar with this technology the audio is stored digitally and you can name each track, read it and then select the track you wish to play. Much, much better than the old tape technology.

Most hospitals now have a broadcast station and are often short of helpers. People are often needed to go around the wards collecting requests from patients and then sorting them out with the relevant track ready for the presenter to play. Often there are piles of records waiting to be catalogued and filed away.

Presenters are always needed too but it should be remembered that the music played should be that requested by the patients. There is no point playing heavy metal music to a geriatric ward!

Even if this type of volunteer work doesn't appeal to you, there is still plenty you can do to help. Why not donate all those LPs and singles that you haven't played for years?

Even better have a sort out of your CDs. Do you still play them all? Even those old CD singles still have a use with hospital radio.

So, if this article has whetted your appetite for using your Amateur Radio skills in a different way why not pop down to your local hospital and ask to see the volunteer co-ordinator today?

KENWOOD
Listen to the Future

Kenwood Electronics UK Limited would like to congratulate Practical Wireless on their 75th anniversary

Unique concept, brilliant execution. Kenwood's compact TS-480HX/480SAT is tailor-made for DX'ing. But its smartly designed standalone LCD control panel — featuring backlit keys to enhance operating ease — is equally at home on your desk, with the main unit up to 4 metres away. And wherever it is, this HF transceiver delivers an astonishing punch: 200W. Performance is equally impressive. For example, a quad-mixer provides RX dynamic range in the TS-950 class, while AF DSP processing offers many powerful features, including noise reduction, a speech processor, and AF filters. And of course you can enjoy all of the convenience of PC-based control. The TS-480HX/480SAT lets you enjoy the best of both worlds.

● Built-in automatic antenna tuner (100W model) ● Terminals for external antenna tuner, linear amp, PC ● Electronic memory keyer ● AF DSP features: ● AF DSP filters ● Beat-cancel, noise reduction ● TX/RX equalizer ● CW auto-tune ● Speech processor ● Optional 500Hz/270Hz band CW narrow IF filters, 1.8kHz band SSB narrow IF filter ● PSK31 compatible ● 5W minimum RF output, QRP compatible ● Electronic keyer ● Plug-in voice recording/synthesis unit available ● Packet cluster tune with TM-D700E ● Supplied with mobile panel bracket, tabletop panel bracket and carrying brackets

HF/50MHz ALL-MODE TRANSCEIVER

TS-480HX

200W Model

- 200W output (50MHz: 100W) DC 13.8V operation
- 100W model available with built-in antenna tuner
- TX/RX AF DSP
- Compact construction for easy carrying
- Separate LCD control panel with speaker
- Continuous RX: 500kHz (VFO: 30kHz) to 60MHz
- TX: covers all Amateur bands 1.8MHz to 50MHz

TS-480SAT

100W Model with Built-in Antenna Tuner

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

News, Views and Memories from 2000-2006

June 2000

The QRP Component Co. Buys Out Howes Kits

Chris Rees G3TUX has told *PW* that he is delighted to announce his purchase of the "well-known kit business from C. M. Howes Communications". He goes on to say that his first priority is the relocation of the business to his Haslemere base, which involves moving "substantial amounts of stock, machinery and documentation as well as the preparation of a new workshop and stores facilities".

Chris G3TUX states that once continuity of supply for the current kit range is assured, he will be looking to expand the number of products offered and also to "broaden their appeal to a wider section of the hobby electronics industry". Transfer of the business took place on Monday 17 April.

April 2000

Amateur Retail Division Closed At SMC

Barry Gardner G8MNN of South Midlands Communications (SMC) has been in touch with *Practical Wireless* to announce the closure of their retail division. In the E-mail announcing this closure, Barry states that SMC has now become "one of the world's leading manufacturers and suppliers of antennas, masts and radio systems, supplying major names, such as Marconi, Racal, Cable & Wireless, Thomson, Harris and Datron, in addition to aid agencies, defence, national guard and police forces world-wide".

It is as a result of the growth of their "in-house manufacturing", that SMC have decided to concentrate upon these growing markets and hence close down their retail division. Barry says that there will be closing down sales at both shops in Southampton and Axminster and all remaining stocks will be sold at near, or below cost price.

Barry states that they will "continue to support and guarantee the equipment we have supplied and shall continue to manufacture the Fairhaven and Lowe range which will be available from local dealers". In closing, Barry states that they will "deeply miss our many friends and loyal customers, whom we have served since 1958. SMC has appreciated your friendship and custom and trust that we have in turn served the amateur fraternity to the best of our abilities".

South Midlands Communications have also told *PW* about a recently completed radio communications coverage survey, which they did on behalf of the Saudi Saline Water Conversion Company (SWCC). To ensure uninterrupted supply of water, SMC state in their E-mail, it is essential to quickly identify problems along the supply pipeline which is located in a remote area.

The plan, SMC state, is to provide communication links between maintenance teams along the supply pipeline and control centres in Madinha and Yanbu. South Midlands Communications tell us that they are working alongside in-country installation and support teams to maximise local involvement.

Nevada's New Location

Mike Devereux G3SED, Managing Director at Nevada Ltd., sent in an interesting press release regarding their new premises in Farlington, Portsmouth. He says that "after 30 years in their Portsmouth premises" in North End, they have moved to a huge new 11 500 square foot showroom and distribution centre.

The new premises are located on the outskirts of Portsmouth just two minutes from the Farlington exit of the M27/A27 and Mike says that "With so many negative views of the Amateur Radio business just now, we feel quite the opposite. We have made this positive move to provide our customers [with] better facilities, out of town, with spacious showrooms and easy car parking".

Mike Devereux states that Nevada, will be stocking many new products for the short wave, scanning and Amateur Radio enthusiasts "previously unseen in the UK". So, why not pop along to the new showroom at **Unit 1 Fitzherbert Spur, Farlington, Portsmouth PO6 1TT**. Further details on Nevada and what they stock can be obtained from their offices direct on **Tel: 0239-231 3095, FAX: 0239-231 3091**. Alternatively, you can **E-mail them on: info@nevada.co.uk** or visit their **Web site: www.nevada.co.uk**

Editorial comment: I've already visited the new facility ... it's excellent and so convenient. So close to the A27 and the whole of the South Coast! Rob G3XFD

May 2000

A selection of what has happened since 2000 in the Amateur Radio hobby – how much do you remember?

Morse Assesment Success

G1TEX becomes M3NGS!

Practical Wireless **is pleased to announce that Tex Swann G1TEX now also holds the callsign M3NGS!**

Tex Swann G1TEX is now the proud owner of the callsign **M3NGS** following his succesful completion of the Morse Assement on Sunday 3 February 2002. Tex, accompanied by two fellow members of the Poole Radio Society, took the assesment under the watchful eye of assessor **Phil Mayer G0KKL.**

The assessment took a little over one and a half hours to complete for all three, which included coffee and biscuits to calm the nerves! The *PW* team would like to congratulate all three participants and would especially like to say 'Well Done' to Tex for becoming the magazine's first M3!

In case you're wondering, the letters of the callsign are actually Tex's initials of his real name. He really wanted M3TEX but upon applying for it he was told it had already been issued! We suggest the holder of M3TEX keeps a low profile as Mr Swann was not a happy M3 at hearing this news!.

Party on!

30 Years in Business

On a hot, sultry Saturday evening in July, Waters & Stanton threw a party to celebrate 30 years in business.

Peter Waters & Jeff Stanton have been trading for 30 years and to mark this occasion they decided to throw a party for fellow traders, friends, customers and colleagues who have helped shape their 30 years in the radio business. To help things along there was an Hawaiian theme to the evening and many partygoers dressed appropriately for the occasion.

Visitors came from far and wide, the furthest visitor was **Roy Charlesworth G4UNL** who is now a resident of the Phillipines but was home on 'leave' and so was able to join in the fun along with his wife, **Marie**. Congratulations W & S - here's to the next 30 years!

Top left: Taking a breathe of fresh air, David Wilkins G5HF of Kenwood, on the left with Chris Ridley G8GKC from Icom, then Mike Wheaton G4ZPE Waters & Stanton Service Manager, with John Turner G0KFO also from Icom (UK) Ltd.

Above: Mark Francis G0GBY on the left, Peter Waters G3OJV, centre and Jeff Stanton M3JJS after presentations had been made.

Centre: Joining in the festivities, PW Editor Rob Mannion G3XFD, took a glass of non-alcoholic beverage (which looked very much like Guinness!) having made the 300 mile round trip to Essex.

Licence News

Foundation & Intermediate Integration

A year has passed since the launch of the Foundation Licence, so what's next on the agenda?

Interim arrangements for the Intermediate Licence examinations have been announced. As from January 2003, the Foundation and Intermediate licences will become integrated. This means that newcomers to the hobby will have to achieve the Foundation Level Licence before going on to gain their Intermediate Licence.

Over the past year the Radio Society of Great Britain (RSGB) and the Radiocommunications Agency (RA) have been working together to update and integrate the Intermediate Licence syllabus to dovetail with the Foundation Licence. With the City and Guilds decision to withdraw from providing the Intermediate examination from the end of 2002, the RSGB was concerned that the RA had not identified a new provider. Following talks with the RA, the RSGB is pleased to be able to announce the following interim arrangements for the provision of the Intermediate licence examinations from the 1 January 2003. These arrangements will ensure continuity of the examination process until a new examination provider is appointed by the RA.

Twelve centres have been identified to participate in the first controlled Intermediate 'Pilot' scheme. All pilot courses in the first scheme will be completed by the 31 January.

A second Intermediate pilot scheme is planned for March 2003, and 20 locations will be identified nationwide to conduct Intermediate Licence Examinations. The venues will be selected from the pool of RSGB-registered Satellite Examination Centres.

After March and until such time as a new provider is appointed, the RSGB has agreed to administer the Intermediate Licence. From April 2003, monthly Intermediate examinations will be provided by RSGB-registered Satellite Examination Centres on the last Monday of each month, commencing at 1830 hours.

The radio... YAESU
Choice of the World's top DX'ers℠

The Evolution of the FT DX 9000 Series
The Powerful New FT-2000

- Strong receiver front end includes VRF (Variable RF Tuning) preselector and optional external High-Q Tuning for the 1.8 - 14 MHz bands
- First IF Roofing Filters of 3 kHz, 6 kHz and 15 kHz included (Main VFO-A)
- Strong receiver design provides wide dynamic range and high 3rd order intercept point
- Wide array of IF-DSP interference-rejection filters (Main VFO-A)
- External display port for viewing a wide range of information including RF and Audio Scopes (Optional DMU-2000 Data Management Unit and monitor are required)

"Congratulations to Practical Wireless for an incredible 75 years of promoting amateur radio"

HF/50 MHz Transceiver

FT-2000

- FT-2000D 200 W with External Power Supply
- FT-2000 100 W with Internal Power Supply

Shown with after-market keyer paddle, keyboard, and monitor (not supplied). Optional Data Management Unit (DMU-2000) and monitor are required for viewing of Audio Scope and other display features.

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

FT-2000 Available in Europe - NOW
www.yaesu.co.uk

Vertex Standard
Commercial Radio
www.vertexstandard.co.uk

YAESU
Amateur Radio
www.yaesu.co.uk

STANDARD HORIZON
Marine Electronics
www.standardhorizon.co.uk

Neville Denson brings you an interesting article about cigarette cards and wireless.

What Do You Get When You Cross ...Cigarette Cards & Wireless?


What Do You Get When You Cross ...
Cigarette Cards & Wireless?

In these days of open and almost constant hostility towards smokers and the tobacco companies, it's pleasing to be able to reflect on cigarette cards as one good thing tobacco brought. They were issued in cigarette packets from the 1880s until the outbreak of the Second World War and wireless wasn't ignored by the tobacco companies.

As thousands of smokers across the nation opened their packets, up would pop a picture having a connection with what was then a new, exciting and revolutionary subject. The heyday of the cigarette card coincided with the advent and development of wireless and it's not difficult to imagine the excitement of the smoker, opening his packet, perhaps hoping to learn more about his new-found interest.

Few Magazines

Remember that, in those far-off days, there were few magazines - they didn't become common until the 1920s and even *Practical Wireless* didn't appear until 1932. Before then, most knowledge on any subject usually had to be sought from huge, scholarly books. This would be a daunting prospect to most people and on a subject as new as wireless, there was probably little literature available to the man in the street, therefore, interest in finding what you could from your cigarette packet became all the more intense.

As a hobby, wireless could also have determined what brand you smoked because different tobacco companies would become known as issuing cards on certain subjects - be it sport, military, wild life, transport or whatever. Some cards on wireless were to be found in sets that didn't immediately suggest a connection.

Fig. 1: A Wills' cigarette card entitled 'Military Motor', sub-titled 'Wireless Motor - British'.

Fig. 7: Another Odgen's cigarette card entitled 'Marconi Steel-Tape Machine'. No. 46 in the 'Broadcasting' series.

Examples of this include 'Military Motors' - issued by Wills' as far back as 1916 which carried cards of 'Wireless Motors'. One such card, describing the British vehicle, told of the "latest methods and inventions of modern science" being "utilised on the battlefields of the Great War. (See **Fig. 1**)".

The card went on to say that "field communications are much simplified and rendered more efficient by the aid of Wireless Telegraphy" and explained that the car carried a complete wireless outfit with the mast in sections on the side of the vehicle "ready for fixing together and making into the tall antenna, which is necessary for transmitting and receiving the electrical oscillations or waves".

A similar card of an Italian vehicle, showing the antenna being erected, noted that wireless had "revolutionised the methods of field telegraphy". That "to the Italian forces fighting in the mountainous districts of North Italy, wireless telegraphy is of inestimable service". (See **Fig. 2**).

Many Sets

There were many sets of cards which must have improved the general knowledge of a multitude of people. Sets with titles like 'The Reason Why', issued by Gallaher in 1924. The final card in this set of 100 was on 'The Reason Why Valves And Crystals Are Used In Wireless'. (See **Fig. 3**).

These cards said that when wireless waves were received on an antenna, "the current of electricity had to be made to flow one way only" and that "crystals or valves will allow electric current to flow through them in one direction only and therefore act as a kind of filter to the received vibrations". The card went on to state that "a valve can also be made to perform the function of amplifying or magnifying the sounds".

Be Prepared

We all know that Boy Scouts should 'Be Prepared' and Gallaher Ltd published another series of 100 cards in 1922 called 'Boy Scout Series' with the aim of helping Scouts. (See **Fig. 4**). What isn't clear is whether the aim was to get the boys to smoke or their fathers to give them the cards from their packets! (What is clear is that they didn't intend to let the Scouts get lost).

Showing a telegraph pole, this particular card (No.56, 'Telegraph Pole Signs') advised that "If when coming unexpectedly upon a main road you are in doubt as to which direction to turn for London, or when in Ireland for Dublin, the telegraph poles will always solve your difficulty, as the cross-

Bet you never thought that smoking could be good for you? Well, Neville Denson says that back in the late 19th and early 20th Century, cigarette companies were issuing cigarette cards that would have been of great interest to Radio Amateurs.

bars at the top are always affixed to that side of the pole which is looking towards London or Dublin". That information must have saved countless wasted miles for the multitudes of Boy Scouts who daily set out to walk to London or Dublin seeking their fortune and their navigator's badge, no doubt!

Practical Information

A 1936 set of Wills' 'Household Hints' provided what was probably more practical information on a card that told how to make a wireless 'earth'. (See **Fig. 5**). The method was to "Run an insulated copper wire from the earth terminal of the set to the knife-switch connecting it with the down-lead … and from there lead it into the open, where it should be 'earthed' in the shortest possible distance".

This particular set of cards claimed that a good earth was made "by soldering the end of the wire to the side of an old galvanised bucket in which a few holes have been punched". The bucket should then be "tightly filled with damp earth and buried". Better results could be obtained, said the card, if two buckets were used.

It also told us that to be efficient an "earth ... must be kept damp; an inverted flower pot buried above the buckets and level with the earth enables a funnel to be inserted for watering". It's interesting to note that the word "earth", when used in an electrical sense, merited inverted commas on the card. This is presumably because it was, at that time, still a new and not fully-accepted word - probably seen as jargon or slang.

Fig. 2: Another Wills' cigarette card of the 'Military Motor' series this time dealing with the Italian vehicle.

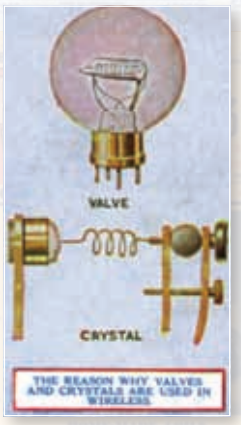


Fig. 3: This card, No. 100 in the series called 'The Reason Why' and issued by Gallaher Ltd., looked at why valves and crystals were used in wireless.

Fig. 4: A cigarette card, which gave you directions? No. 56 in Gallaher Ltd's 'Boy Scout Series' claimed to know a clever trick using telegraph poles.

Fig. 5: A Wills' card, this time giving some practical advice on how to make a wireless "earth".

Fig. 6: This Ogden's cigarette card reported on the launching of Orion by H.R.H. The Duke Of Gloucester by wireless in Brisbane.

Fig. 8: "Senator Guglielmo Marconi" was himself immortalised in a set from Player's Cigarettes entitled 'Straight Line Caricatures'.

Fig. 9: Godfrey Phillips Cigarettes brought out their own set of cigarette cards entitled 'How To Make Your Own Wireless Set". This card, No.13, looks at 'Mounting Variable Condenser'.

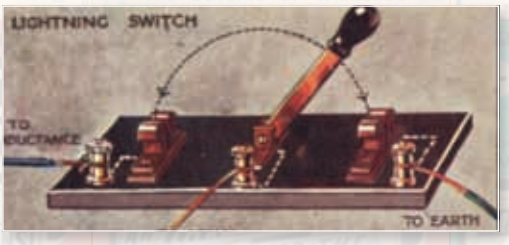


Fig. 10: The No.21 card in the Godfrey Phillips Cigarettes series entitled 'The Lightening Switch'.

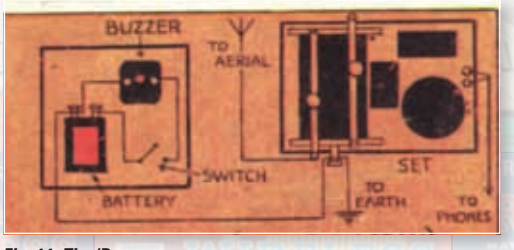


Fig. 11: The 'Buzzer Test' cigarette card from Godfrey Phillips is No.22 in the 'How To Make Your Own Wireless Set' series.

Excitement & Wonder

The era in question was (arguably) the time when, more than any other, the world shrank and it's difficult in today's world of supersonic flight and the Internet to recapture the excitement and wonder that people must have experienced as wireless progressed. Imagine, for example, the thrill of knowing that HRH the Duke of Gloucester was launching the *Orion* at Barrow-in-Furness by wireless impulse from Australia on 7th December 1934.

A card from Ogden's in a 1935 series called 'Broadcasting' (see **Fig. 6**) described the launching of *Orion* as "one of the many wonders of Empire wireless". It went on to say that "At the same time a description of the scene at Barrow-in-Furness was broadcast throughout the Empire by means of the BBC's special Empire service, which is maintained for the benefit of the Dominions and Colonies".

The same series had a card with a Marconi steel-tape machine which, with 3mm wide tape would "run for about half-an-hour" and could be "wiped" for re-use. (See **Fig. 7**). The widest application of this method was in the Empire programmes 'many of which have to be repeated four or five times during the 24 hours in order to reach different countries at a suitable time'.

It's hardly surprising that Marconi himself was immortalised on the cards. He was to be found in a number of series and Player's included him in a 1926 set of famous people called 'Straight Line Caricatures'. (See **Fig. 8**).

He's shown as "Senator Guglielmo Marconi" and described as "a Citizen of the world" who, at the age of 22, had mastered the problem of wireless telegraphy and as early as 1896 had invented an apparatus which would transmit messages several miles.

How To?

The firm of Godfrey Phillips seemed to have a special interest in wireless. They issued three sets in the 1920s - the forerunners of today's *How To?* books Called 'How To Build a Two Valve Set', 'How To Make a Valve Amplifier' and 'How To Make Your Own Wireless Set'. These sets each had 25 cards and must have been the initial

Fig. 12: One of the R & J Hill Ltd cigarette cards issued with Sunripe Cigarettes entitled 'Wireless Telephony'. This one is No.74 and show a 'Low Tension Accumulator'.

Fig. 13: The No.4 in the 'Wireless Telephony' series showing an 'Inductance Coil'.

Fig. 14: Another 'Inductance Coil' from the same Sunripe Cigarette series - this card is No.31.

attraction and spur to many people who later became practical wireless enthusiasts.

The 'How To Make Your Own Wireless' set was the first of these to be issued. It appeared in 1923 and we can but wonder at the frustrations as well as the excitement of the man who needed but one more card to enable him to complete his set - in both card and wireless senses.

One card, on a variable condenser (see **Fig. 9**), says that its capacity, when made up, "will be .0001mfd". It explains how it is assembled, concluding "A section of cardboard tubing is cut so that the side of the condenser is enclosed to keep out particles of dust which cause interference".

Another card in the same series (**Fig. 10**) tells us that the antenna acts as a most efficient lightning conductor. So "it is advisable to connect in the circuit a switch so that in the event of atmospheric electrical disturbance the energy may be transmitted to earth and so dispersed. If set is not so fitted, damage to the set may occur", we are warned.

The person who prepared the information for this card seemed to have a thought for the punter's pocket, saying that "An ordinary tumbler switch is quite excellent, while the single-throw switch is probably cheaper and just as efficient".

The 'Buzzer Test' (**Fig. 11**) is the title given to a third card and states that this test is used for determining the sensitive point of the crystal before reception is required. "The Buzzer, together with a key and dry pocket lamp battery, is mounted on a base" the card goes on. After which on the "Method of Procedure", it advises the user to "Depress switch with left hand. With right hand search the face of the crystal for the most sensitive point which, when found, will produce a slight buzz in the headphones".

'Wireless Telephony'

Another cigarette company, R & J Hill, were also well to the fore in the production of cards on this amazing invention. In 1923, they issued two sets with a total of 104 cards.

One set had 84 cards, called 'Wireless Telephony' and was issued with Sunripe Cigarettes. It explained the purpose of things such as a: 'Low Tension Accumulator' (**Fig. 12**); an intervalve transformer; an 'Inductance Coil' (**Fig. 13 & 14**); 'Filament Rheostat' (**Fig. 15**); 'Marconiphone Range Block' (**Fig. 16**) and 'Tuning Spade' (**Fig. 17**) and showed, for example, the best way to fix an antenna spreader with insulator attached.

But these cards reminded us of the human face of wireless too, with cards about Marconi House and the man it was named after and Mr A. R. Burrows (Uncle Arthur) whose voice was "so well-known to listeners-in".

There's a strange irony in that, indirectly, smoking cigarettes must have brought a breath of fresh air to many a working man and woman, living in squalid industrial areas with little leisure time. Imagine the thrill of the man who'd built his own set, following the advice on the cards, when he got his first sound from it and was carried far away from what was probably a very humdrum existence.

Cigarette Card Facts

Finally, to round this article off, here are a few facts, which I imagine you never knew about cigarette cards:

1. Originally, blank cards were put in packets to protect the cigarettes.
2. Soon these were to contain pictures - quite something in an age when there was no radio, TV, cinema or colourful magazines.
3. Over the years there were to be series ranging from alpine flowers to aviation, from Gilbert & Sullivan to game birds and from boxers to butterflies.
4. Most of the many millions of cards issued will have been thrown away but many survive, some even in mint condition.
5. A set of 50 can still be bought for well under £10 but rarer cards fetch much more.
6. In 1987, £15 500 was paid for 20 'Clowns & Circus Artistes'. That price looks an absolute bargain and 'chickenfeed' alongside the $US451 000 paid in New York in 1991 for a single card of a baseball player. Mind you, it was in mint condition! (The player was one Honus Wagner - a non-smoker!).

We've all heard about the waste of being a slave to the 'weed' - of money "going up in smoke". But I don't suppose many people ever thought that throwing away cards that popped-up from cigarette packets could, in time, prove just as wasteful.

Fig. 15: A 'Filament Rheostat' shown on card No.13 in the 'Wireless Telephony' series.

Fig. 16: Card No.58 of the Sunripe Cigarette series shows a 'Marconiphone Range Block'.

Fig. 17: A 'Tuning Spade' is found on No.71 of the 'Wireless Telephony' series issued by R & J Hill with Sunripe Cigarettes.

A selection of advertisements that have appeared in *PW* since 2000

Advertising Memories

Even though its only six years ago or less since these appeared, how many readers are saying 'It seems like only yesterday'? We hope you enjoy this nostalgia trip and the team would love to hear from readers with suggestions for adverts they'd like to see featured during *PW*'s 75th year.

Martin Lynch & Sons – February 2000

In the February 2000 issue of *PW* Martin Lynch's Ad looked like this...

Look how things have changed!

Waters & Stanton PLC – September 2002

In September 2002, *PW* was celebrating its 70th Birthday as radio dealers, manufacturers and enthusiasts prepared for the annual Donington Radio Show. Waters & Stanton were pleased to announce that **Bob Heil K9EID** would be joining them on their stand to promote his products, something that's still a feature of more recent shows.

February 2001

Sadly, some of the advertisers from this issue are either no longer in business or no longer advertise in *PW*, however, they've all helped shape the Amateur Radio trade over the years. As we delve deeper into the archives in future issues, you'll be reminded of some favourite companies and people that will bring back so many memories.

Icom (UK)Ltd. - April 2002

The IC-7400 was being promoted by Icom UK Ltd. as a radio in a new category, which incorporated the DSP technology previously introduced in the IC-756PROII.

Coming Next Month in

Practically Yours

75 years of Heritage & History

Join the PW team as we take a trip back to the 1990s

- **Poky Toky OVER**
  Peter Barville G3XJS tries out a single channel low power v.h.f. transceiver
- **Looking Back**
  More memories from years gone by
- **Radio Personality**
  A special message from HRH King Hussein JY1
- **Desk-Top Microphone**
  Allan Lester-Rands describes an easy-to-build microphone

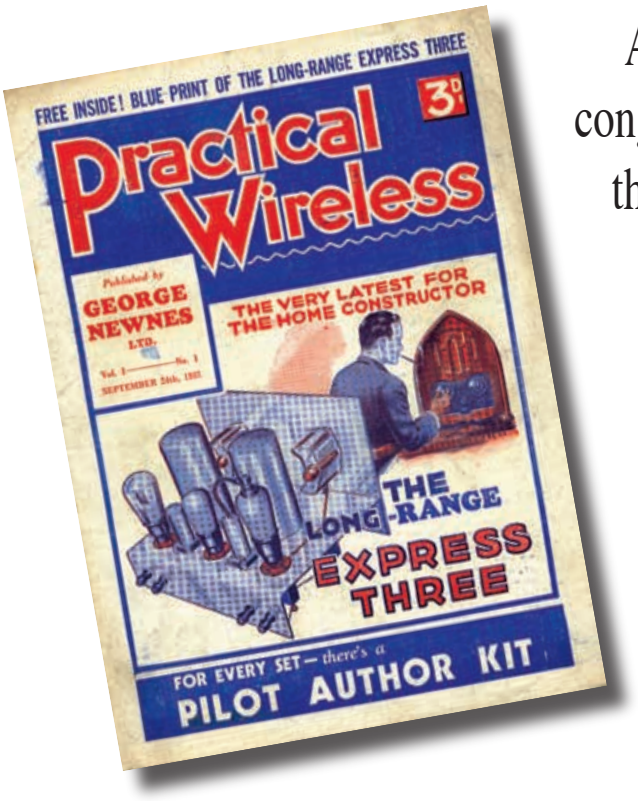
All this and more in Britain's Best Selling Amateur Radio Magazine. We've got plenty of Heritage & History, that's why we're the best!

The February 2007 issue is on sale on the 11 January 2007.

Don't Miss It!

ML&S

Congratulations



All the staff at ML&S would like to congratulate Practical Wireless for serving the Ham Radio Hobby for seventy five years.

Other Ham Radio publications have come and gone but Practical Wireless continues to support both the trade and its readers.

Martin Lynch has been supplying radio equipment to Radio Hams since 1978 and has continued to advertise in Practical Wireless and Shortwave/RadioUser.

Here's to the next 75 years!

mail order...huge range in stock...fast delivery...

the pwpublishing RADIO BOOKSTORE

Please try to order from an up-to-date magazine to ensure correct prices and availability.

LOOK OUT FOR NEW TITLES ADDED THIS MONTH!

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	£12.99
● ***INTERNATIONAL AIRBAND RADIO HANDBOOK***. David Smith (Sutton)	192	£9.99
● ***AIR TRAFFIC CONTROL***. 9th Edition (abc)	112	£8.99
● ***AIRWAVES 2006***. (Photavia)	144	£10.95
● ***AIRWAVES SELCAL - CIVIL & MILITARY DIRECTORY***. (Photavia)	176	£11.95
● ***CALLSIGN 2006***. (Photavia)	111	£10.95
● ***CIVIL AIRCRAFT MARKINGS 2006***. Wright & Peel. (abc)	368	£9.99
● ***FLIGHT ROUTINGS 2006***. T.T. Williams & S.J. Williams	200	£10.00
● ***MILITARY AIRCRAFT MARKINGS 2006***. March & Curtis. (abc)	208	£9.99
● ***BRITISH ISLES ATLANTIC TRANSITION CHART*** (AERAD)	1020x520mm	£11.00
● ***BRITISH ISLES LOW ALTITUDE CHART*** (AERAD)	1020x520mm	£11.00
● ***NORTH ATLANTIC ROUTE CHART*** (AERAD)	1020x520mm	£11.00

Scanning & Shortwave Frequency Guides

● ***IN NOW AT LAST. SCANNERS 5***. B. Robertson & P. Rouse	245	£9.95
● ***IN NOW BUYING A USED SHORT WAVE RECEIVER***. 4th Edition. F. Osterman	78	£6.95
● ***SOLD OUT - SORRY FERRELLS CONFIDENTIAL FREQUENCY LIST***. 13th Edition.	540	£21.50
● ***NEW KLINGENFUSS GUIDE TO UTILITY STATIONS 2007***	604	£33.00
● ***NEW KLINGENFUSS SHORTWAVE FREQUENCY GUIDE 2007***	478	£27.00
● ***NEW KLINGENFUSS SHORTWAVE FREQUENCIES CD 2007***	-	£20.00
● ***KLINGENFUSS RADIO DATA CODE MANUAL***. 17th Edition	600	£30.00
● ***NEW PASSPORT TO WORLD BAND RADIO 2007***. (IBS)	592	£17.50
● ***NEW RADIO LISTENERS GUIDE 2007***	160	£5.45
● ***OUT OF STOCK - NEW EDITION COMING SOON***		
THE ESSENTIAL GUIDE TO SCANNING. Martin Peters	108	£6.00
● ***UK SCANNING DIRECTORY - 9th Edition***	544	£19.75
● ***NEW WORLD RADIO TV HANDBOOK 2007***. (WRTH)	688	£23.00

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 COMPENDIUM***. Vol 7. (ARRL)	285	£18.99
● ***ANTENNA FILE***. (RSGB)	285	£18.99
● ***ANTENNA TOOLKIT 2*** (inc. CDROM). Joseph J. Carr	256	£28.99
● ***ANTENNA TOPICS*** (RSGB)	380	£18.99
● ***ANTENNA COMPENDIUM***. Vol 7. (ARRL)	285	£18.99
● ***NEW IN ARRL ANTENNA BOOK***. 20th Edition, inc CD (ARRL)	944	£32.99
● ***EXPERIMENTAL ANTENNA TOPICS***. H.C. Wright	72	£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	£12.95
● ***INTERNATIONAL ANTENNA COLLECTION 2***. G. Brown M5ACN. (RSGB)	200	£12.95
● ***PRACTICAL ANTENNAS FOR NOVICES***. John Heys	58	£7.99
● ***PRACTICAL WIRE ANTENNAS 2***. Ian Poole G3YWX	172	£11.99
● ***RADIO PROPAGATION PRINCIPLES & PRACTICE***. Ian Poole G3YWX	102	£14.95
● ***SOLD OUT, SORRY RECEIVING ANTENNA HANDBOOK***. Joe Carr	189	£8.75
● ***SIMPLE AND FUN ANTENNAS FOR HAMS***. (ARRL)	200	£16.99
● ***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
● ***IN NOW DISCOVER DXING***. 3rd Edition. J. Zondlo	96	£6.95
● ***FOUNDATION LICENCE NOW!*** Alan Betts G0HIQ. (RSGB)	32	£4.99
● ***HF AMATEUR RADIO***. Ian Poole G3YWX. (RSGB)	128	£15.99
● ***INTERMEDIATE LICENCE - BUILDING ON THE FOUNDATION***. Steve Hartley G0FUW. (RSGB)	76	£6.99
● ***NOVICE RADIO AMATEURS EXAMINATION HANDBOOK***. I.D. Poole. (Babani)	150	£4.95
● ***PRACTICAL RECEIVERS FOR BEGINNERS***. John Case GW4HWR (RSGB)	165	£14.99
● ***SECRET OF LEARNING MORSE CODE***. Mark Francis. (Spa)	84	£6.95

Design & Construction

● ***COIL DESIGN & CONSTRUCTION MANUAL***. (Babani)	208	£14.99
● ***IN STOCK NOW CIRCUIT OVERLOAD***. (RSGB)	504	£18.99
● ***PRACTICAL PROJECTS***. G. Brown M5ACN. (RSGB)	208	£13.95
● ***PROJECTS FOR RADIO AMATEURS & SWL***. R.A. Penfold. (Babani)	92	£3.95
● ***RF COMPONENTS & CIRCUITS***. Joe Carr. (RSGB-Newnes)	416	£25.99
● ***THE ART OF SOLDERING***. R. Brewster. (Babani)	84	£3.99
● ***THE SUPERHET RADIO HANDBOOK***. I.D. Poole. (Babani)	104	£4.95

Shack Essentials

● ***AMATEUR RADIO ESSENTIALS***. G. Brown. (RSGB)	288	£25.99
● ***AMATEUR RADIO ASTRONOMY***. J. Fielding. (RSGB)	330	£16.99
● ***AMATEUR RADIO MOBILE HANDBOOK***. P. Dodd. (RSGB)	114	£14.99
● ***AMATEUR RADIO (VALUE) LOGBOOK***. (RSGB)	80	£4.95
● ***IN STOCK NOW AMATEUR RADIO ON THE MOVE***. (ARRL)		£14.99
● ***NEW ARRL HANDBOOK 2007*** inc CD	1152	£30.99
● ***OUT OF STOCK ARRL OPERATING MANUAL***. 8th Edition. (WSL)	420	£19.99
● ***DIGITAL MODES FOR ALL OCCASIONS***. Murray Greenman (RSGB)	208	£16.95
● ***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*** (A4)	43	£12.00
● ***RSGB AMATEUR RADIO OPERATING MANUAL***. (RSGB)	224	£19.95
● ***RSGB PREFIX GUIDE***. 7th Edition. (RSGB)	34	£8.95
● ***IN STOCK NOW RSGB YEARBOOK. 2007*** Edition. (RSGB)	504	£18.99
● ***RSGB RADIO COMMUNICATIONS HANDBOOK***. 8th Edition. (RSGB)		£29.99
● ***NEW CALLSEEKER PLUS - CALLSIGN LISTING CD & More 2007***		£14.99
● ***RECEIVING (VALUE) STATION LOGBOOK***. (RSGB)	80	£4.95

QRP

● ***LOW POWER COMMUNICATIONS***. 2nd Edition. (ARRL)	240	£14.99
● ***LOW POWER SCRAPBOOK***. (RSGB)	320	£12.99
● ***NEW LOWER PRICE QRP BASICS***. George Dobbs G3RJV. (RSGB)	204	£9.99
● ***NEW MORE QRP POWER***. (ARRL)	176	£16.99

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	£9.99
● ***NEW LOWER PRICE VHF/UHF HANDBOOK***. Dick Bidduph G8DPS. (RSGB)	180	£19.99

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

	Pages	Price
● ***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

●	***1940s AMATEUR RADIO BOX SET.*** *(RSGB) 6 book set*	450	£15.99
●	***AMATEUR RADIO - A BEGINNERS GUIDE.*** *(1940 REPRINT) (Lindsay Publications). Douglas Fortune W9UVC*	156	£7.70
●	***NEW THE BIRTH OF BRITISH RADAR.*** *C. Latham & A. Stobbs*	110	£9.99
●	***COMMUNICATIONS RECEIVERS - THE VACUUM TUBE ERA.*** *R.S. Moore*	141	£17.95
●	***MARCONI'S ATLANTIC LEAP*** *(H/B). Gordon Bussey. (Marconi)*	96	£6.99
●	***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

●	***HOW TO MAKE A NEUTRODYNE RECEIVER.*** *Webb*	63	£5.95

Electronics

●	***ELECTRONIC PROJECT BUILDING FOR BEGINNERS.*** *(Babani)*	110	£4.99
●	***GETTING THE MOST FROM YOUR MULTIMETER.*** *(Babani)*	102	£4.99
●	***HOW TO USE OSCILLOSCOPES & OTHER TEST EQUIPMENT.*** *(Babani)*	110	£4.99
●	***NEW LOWER PRICE UNDERSTANDING BASIC ELECTRONICS.*** *(ARRL)*	316	£9.99

Binders

PRACTICAL WIRELESS & RADIOUSER MAGAZINE (Available NOW)		£10.00

how to order

Telephone: 0870 224 7830

Call the Book Store, Monday to Friday 9am to 4pm.

We'll usually post your book the next day!

Outside these hours your order will be recorded on an answerphone.

Post: Write to the Book Store, remembering to include your name, address, daytime telephone number and payment details (Sterling please - cash not accepted), at: **Book Store, PW Publishing Ltd., Broadstone, Dorset BH18 8PW.**

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**

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 - we have a Review List going back years!

	Current Issue	Back Issues
Practical Wireless	£3.00 (inc P&P)	£4.75 (inc P&P)
RadioUser	£3.25 (inc P&P)	£5.00 (inc P&P)
Radio Active	-	£4.60 (inc P&P)
Short Wave Magazine	-	£5.00 (inc P&P)

Photocopies / Reprints (per article):

UK: £3.00 (inc P&P). **Overseas**: £4.00 overseas (inc P&P) E&OE

order form

Photocopies are acceptable 01/07

Please try to order from an up-to-date magazine to ensure correct prices and availability.

Please send me the following books:

.....Price (£) .....

.....Price (£) .....

.....Price (£) .....

.....Price (£) .....

.....Price (£) .....

.....Price (£) .....

.....Price (£) .....

.....Price (£) .....

FREE POST & PACKING* UNTIL 18th December
*UK ONLY

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, £3.00 for two or more

Overseas Europe:
£3.00 P&P for one, £5.00 for two, £2 extra per item for three or more

Overseas Rest of World:
£5.00 P&P for one, £10.00 for two, £2 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 publishers of *Practical Wireless* wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

Valves

VALVES:- OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAE for FREE list to: Wilson Valves, (Jim Fish G4MH), 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ. Tel: 01484 654650/649380/650725. Mobile:- 07733 283084. 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.
Unit 4, Daux Road, Billingshurst, W. Sussex RH14 9SJ
TEL: 01403 785600. FAX: 01403 785656.

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.

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.

Classified Advertisment Dept.
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW

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

Wanted

OLD HALF INCH FERRITE RODS Must be half inch in diameter and be six inches long or more. Tel: Peter Tankard 0114 2316321.

QSL Cards

FULL COLOUR QSL CARDS for all your QSL needs. Shirts and caps with callsigns and also ham cartoons by GW3COI. For free samples contact Chris M0DOL. E-mail: qslers@aol.com P.O. Box 184 Northampton NN3 9JH.

ORDER FORM FOR CLASSIFIED ADS

PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0870 224 7820, Fax: 0870 224 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 advertiseing dept. could not read/interpret the wording.

Please avoid FAXing your advert - it could delay publication.

Advertisements from traders or for equipment that it is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. **No responsibility will be taken for errors and no correspondence will be entered into on any decision taken by the Editor on any of these conditions.**

You should state clearly in your advert whether equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

FOR SALE

AOR AR7030 high dynamic range receiver with remote, manuals, power supplies boxed as new + MFJ-959B antenna tuner & preamplifier £500. Yupiteru MVT-7100 Multiband Receiver manuals boxed as new £150. Tel: 07970 368428 (Walsall). E-mail: johshphrd@aol.com

AOR AR7030 high dynamic range receiver with remote, manuals, power supplies. Boxed as new plus MFJ-959B antenna tuner and preamplifier, £500. Also for sale Yupiteru MVT-7100 Multiband Receiver manuals boxed as new, £150. Tel: 07970368428 (Westmids-Walsall area) E-mail: johshphrd@aol.com

ASKD 4001 four metre transceiver. Boxed, as new with manual. Cost £200. Will sell for £80 (plus postage). Tel: Adrian G7HSA 01584 872618 (Shropshire).

COMPLETE SET OF 84 1923 Wireless Telephony cigarette cards. Excellent condition, issued by Sunripe Crystal series and Marconi series, £100. Tel: Venis 020 8248 5358 (Pinner).

DRAKE R-8B HF receiver, £800. Icom IC-8500 scanner receiver, £750. Both boxed with manuals and in perfect order. Tel: 077623 73426 (Co. Armagh).

EDDYSTONE 640 Rx Veritone Dx mates. Rx CR-150 Rx type B28 W283SD. Offers invited. Buyer collects. Tel: 01482 899750 (Hedon).

ELECTRONIC MORSE KEYER KIT as published in Practical Wireless. 4-35wpm practice or transmit, with auto switch-off. Excellent keyer yet simplicity itself to make. Full details provided, only £16. E-mail: chick@chickene.freeserve.co.uk

HEADPHONES SG Brown low impedance type, stamped CLR 1940. Original cloth covered. Leads and jack working order. Have used on one valver OK, £40 including post. Tel: 01241 878182. (Angus).

IC-706Mk1 £275. Alinco 22E, 2m FM 25 Watts, £50. R-535 Sigcorp airband VHF/UHF Rx, £60. Sota 2m 100W linear, £60. Trio speaker SP-430, £15. Carriage extra. Prefer buyer collects, all o.n.o. Tel: Ken QTHR 01892 547643.

ICOM PRO-II in excellent condition. Hardly used, £1250 o.n.o. Tel: Ron 01453 822017 (Gloucestershire).

MFJ 1278B multi-mode data controller with software and manuals, £50. Tel: 01745 570538 (Flintshire).

PHILIPS 70MHz AM transceiver with mi. and LS. Good condition. 70MHz vertical antenna. Also, mobile antenna. 70MHz ATU with SWR and PWR. 8M, new low-loss co-axial cable. Cash offers for lot. Tel: Bill 01432 279641 (Hereford).

REALISTIC DESK SCANNER 200 channel programmable. Phone, marine, airband, almost anything. Mains, battery, memories, fast, slow scan, only £90. Includes postage. Tel: 01608 663745 (Warwickshire).

ROBERTS RADIO RG-828 BFO, AM, Wide, narrow, FM, short AM RF gain. Alarm, light, dual time, cassette rec. FM mono, standby, SW 0-30MHz. Plus AM, FM radio, headphone, extension speaker sockets, £80. Tel: 01608 663745 (Warwickshire).

SHACK CLEARANCE Communications receiver AOR AR88. Good working order. Oscilloscope, advance signal generators, valves, four new Brimar EL-34, plus others. Some used components. Too many to list. Technical books, £75 the lot. Tel: 01453 890126.

SILENT KEY SALE Large collection of vintage communication receivers, test equipment, components, valves, books, literature, etc. Too much to list. Please phone for more details. Tel: 01842 812895 (Norfolk).

TRIO TH-26E (VHF) and TH-46E (UHF) matched pair hand-helds. Complete, boxed. Both for £95 plus carriage. Home wanted for Civil Protection magazines. Suitable for museums, historians or Raynet members. Tel: John G8BXO 01769 573382 (North Devon).

VIBRO KEYER DELUXE KEY £85. Heil Proset quiet phones PSQP-5 8-pin for Kenwood, £80. Good new condition plus postage. Tel: Mel 01274 817178 (Clayton Heights). E-mail: melslateruk@yahoo.co.uk

WATSON W-220 VSWR power meter, £25. MFJ-9018 antenna tuner, £40. Both less than 12 months old boxed with manuals as new condition. Tel: G4AQZ QTHR 01255 429117 (Clacton-on-Sea).

YAESU FT-901 and FT-902DM PC panels and spares. FM unit, IF Unit, AM unit, pre-selector ganged variable inductors and others. Genuine W2DU dipole Balun. Correct heater 6146B valve. Tel: 01904 794680 (York).

YAESU FT-847 in mint condition. FC-20 ATU, MD-100 desk mic. Watson 20 Amp PSU, AV-200 SWR meter, £900 the lot. Tel: Brian 0114 2746223 (Sheffield).

YAESU FT-101ZD FM board fitted. Boxed, £180 o.n.o. Yaesu FT-221R plus YC-221 digital display, boxed, £110. Tel: 01473 730899 (Suffolk).

YAESU VR-5000 SCANNER mint condition with PSU, £320 o.n.o. Tel: Jim 0151 355 4797 (Wirral).

YAESU VX-7R (Black) plus soft case and charger, battery, FBA-23 plus CD-15A. Excellent condition, £170. Tel: M0WTD mobile 07753 409154 (London).

YUPITERU MVT-7100 multiband receiver complete with chargers, extra aerial, instructions, original box and leather case. Excellent condition, £100 plus postage or collect. Tel: 01536 420050 (Kettering, Northants).

WANTED

HEATHKIT 101 or KW Vespar. Must be in good working order, plus PSU. Will reply to all letters. I am a M3 and I like old radios. Alan Stacey, 311 Hyde End Road, Spencers Wood, Reading, Berks RG7 1DD.

MEDIUM AND SMALL SIZE Japanese slow motion dial drives. Quantity and cost essential in good order and working condition. Tel: Geoff M0CJC 01202 698142 (Dorset).

MORSE KEYS WANTED by private collector. Straight and bug keys, sounders, relays, morse inking machines, heliographs and all telegraph related items. Tel: Gerald for a friendly chat 0118 9834 307 (Reading).

MORSE TUTOR MFT-417 or MFJ-418. Must be clean and tidy, working and with full instructions. Tel: 01228 577046.

OLD HALF INCH FERRITE RODS must be half inch in diameter and be six inches long or more. Will pay very good money for the rods. Tel: Peter Tankard 0114 2316321 between 9am and 10pm (Sheffield).

ORIGINAL ROTARY PSU for wireless set number 19 type. Mv F.W. Hall, 38 Elmbank Way, Hanwell, London W7 3DG.

POWER UNIT for German receiver EF-52B. Handbook for Hitachi V-252 dual channel 20MHz oscilloscope. Tel: 0287131 2729 (Derry).

WANTED FOR STUDENT Datong D-70 morse tutor, please. Price and postage as cannot collect. Tel: John GW3DDY 02920 753914 (Cardiff).

bargain basement order form

Please insert this advertisement in the next available issue of *Practical Wireless*.

❑ **For Sale** ❑ **Wanted** ❑ **Exchange**

PLEASE NOTE: as a security measure, you must include your house number and postcode.

Name.....

Address.....

.....

..... Post code .....

Telephone Number .....

CARD NUMBER

Signature..... Security number
last three digits on the back of the card

Switch issue number (if on card) .....

Start date of card ..... Expiry date of card.....

My Subs Number is.....(or mailer label) .....

please write in block capitals

	(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. Jan '07

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.

SHORTWAVE SHOP LTD

01202 490099

TRANSCEIVERS

YAESU FT847 HF/6/2/70 TRANSCEIVER £695
YAESU FT847 HF/6/2/70 TRANSCEIVER £745
ICOM T8E 2/6/70cm HANDHELD TCVR £90
NAVICO AMR1000 145Mhz TRANSCEIVER £50
KENWOOD TS140S HF TRANSCEIVER £225
KENWOOD TS530SP HF TRANSCEIVER £295
KENWOOD TR751E VHF MULTIMODE £235
KENWOOD TS 50 HF TRANSCEIVER £295
KENWOOD TMD 700E V/UHF TCVR £295
YEASU FT290R1 VHF PORTABLE TCVR £125
YEASU FT690R1 50Mhz PORTABLE TCVR £125
YEASU FT790R1 70cm PARTABLE TCVR £125
YAESU VX5R 6/2/70cm TRANSCEIVER £125
ALINCO DJ-580 ..... £POA
ALINCO DJ G5E ..... £POA
FDK MULTI 750E + FDK EXPANDER ..... £POA

RECEIVERS

BEARCAT 9000XLT BASE SCANNER £165
NEVADA MS1000 MOBILE SCANNER RX £85
KENWOOD R5000 HF RECEIVER £375
SONY SW77 PORTABLE RECEIVER £149
YUPITERU MVT7100 SCANNER RCVR £125
SANGEAN AT818 PORTABLE HF RCVR £85
ROBERTS 9914 PORTABLE HF RECEIVER £55
LOWE HF150 HF RECEIVER £149
AESU FRG 8800 + FRT 7700 + VHF CONV ..... £POA
YAESU FRG 9600 ..... £POA
ROBERTS R861 ..... £100
SONY SW11 PORTABLE RECEIVER £25
TEN TEC RX350 HF RX WITH SPEAKER £550
AOR AR7030+ HF RECEIVER £495
OR 5000 ..... £825
GRUNDIG SATALIT INTERNATIONAL 650 ..... £295
GRUNDIG YACHT BOY £25
SONY SW100 HF RECEIVER £65
NRD/JRC 545 / 18962 HF RECEIVER £945
NRD/JRC 545 + SPEAKER £825
AOR8200 WIDE BAND RECEIVER £225
HITACH WORLD SPACE RX £50

ACCESSORIES

ICOM SM20 BASE MICROPHONE £80
ICOM SM 6 BASE MICROPHONE £49
ERA MULTIREADER £45
DIAWA CNA1001 HF AUTO ATU £125
GLOBAL AT2000 SWL ANTENNA TUNER £49
RN ELECTRONICS 50/144Mhz TVTR £55
KENWOOD R2000 REMOTE CONTROL £145
DRAE 24A PSU ..... £POA
YAESU FT726 50Mhz MODULE £85
MFJ722 OPTIMIZER UNIT £25
KPC-2 PACKET TNC £85
TINY-2 PACKET TNC £85
AOR LA 350 LOOPS 3-9Mhz and 9-30Mhz £30
AOR SA7000 WIDE BAND ANTENNA. New. £75
FDK KP 100 IAMBIC KEY ..... £POA

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
Kenwood TM732e 2m/70cms FM Mobile Transceiver £199
Rexon RL102 2m Handheld Transceiver £55
Yaesu FT736R 2/6/70cms Base Transceiver £599
Yaesu VX7R 5W Submersible Tri-Band Handheld Transceiver c/w accessories £179.95
Alinco DJX10 Wideband Handheld Scanning Receiver £149
Bearcat 220XLT 200 Channel Handheld Scanning Receiver £79
Bearcat UBC120XLT 100m Handheld Scanning Receiver £79
Bearcat UBC3300XLT Handheld Scanner with Trunk Tracking £129.95
Bearcat UBC860XLT Scanner £99
Icom R10 All Mode Scanning Receiver £179
Realistic PRO28 30 Channel Handheld Scanning Receiver £40
Uniden UBC180XLT Handheld Scanning Receiver £109
Yaesu VR500 Handheld Scanning Receiver £145
Yupiteri MVT8000 Base Scanner £115
Yupiteru MVT3300 Wideband Scanning Receiver £99
AOR 7030+ Receiver c/w NB, Filter Board & Remote Control £699
Eton E1 Portable Shortwave Receiver £325
Grundig Satellit 800 HF & Airband Portable Radio £299
Grundig YB500 Receiver £89
Icom PCR1000 Computer Receiver. 1-1300Mhz All Mode £250
Icom PCR1000 Computer Receiver. 1-1300Mhz All Mode £249
Roberts R861 RDS MultiBand Stereo Radio £145
Icom 7000 HF/VHF/UHF Mobile with DSP / new display £825
Icom 7400 100w HF/2/6m Base Transceiver with DSP/ATU £999
Icom 7400 HF/6 & 2m Transceiver £899
Kenwood TS850S 100w HF Base Transceiver £699
Kenwood TS870 HF Transceiver £899
Yaesu FRG100 HF Receiver £299
Yaesu FT1000MkV 200W HF Base Transceiver inc. PSU & Filters £1695
Yaesu FT920 100w HF & 6M Transceiver including filters £795
Commtel Base 40 Channel Base CB Transceiver £89
Zetagi M27 Antenna Matcher £20
Bencher Keyer Bencher Paddle Keyer £59.95
Adonis AM-601 Desk Microphone (Wired 8 pin Yaesu) £47
Amdat ADC60 Frequency Standard Clock £99
Decca Antenna Switch Antenna change over switch £15
Dewsbury S/TUNER Super Tuner £25
Elmic CONTROLS Noise Limitor £10
Gcomm PSU 12Amp Power Supply £25
Headphones Communications Headphone Set £15
Icom AT160 Coaxial Auto ATU £179
Icom AT180 Auto Tuner to suit Icom 706/7000 ..... £225
Icom HM36 Icom Hand Microphone standard 8 pin £23.95
Kent Paddle Twin Keyer £59.99
Kenwood PS30m 20amp Power Supply £110
Kenwood SM230 Monitor £499
LDG ATU Antenna Tuning Unit £139
MFJ 784 DSP Filter £129
MFJ 784B Digital Noise Filter £149.95
MFJ 9406 6m SSB Transceiver c/w microphone & manual £139
MMT144/28 10watt Transverter £89
Morse Key Morse Key £15
Pakratt 232 Data Terminal & Leads £99.95
Palstar AA30 Active HF Antenna £49
Palstar PS04 2-4 Amp Power Supply £14
PM-2000 2kW Power Meter £69.95
Ten Tec ATU 2KW High Power Antenna Tuner Coaster £169
TenTec229 2Kw Antenna Tuner £199.95
Timewave 59+ Digital Noise Filter £159.95
Tokyo HL160V 100w Amplifier £159
TW232DX Ham International Base Mic £25
Unioss Charger and Batteries £12
Yaesu FC30 Automatic Tuner to suit FT897 ..... £199
Yaesu FRV7700 Band Converter £30
Yaesu MH35A2B Speaker/Mic for older models £19
Zetagi 700 Meter £59.95
Zetagi DL61 Dummy Load £39.95
Zetagi HP201 SWR/Power Meter £14.95

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-821H 2m,70cm All Mode Base Transceiver 45/40W 12V £649
Kantronics KAM plus Multimode Dual Port Data Controller + Pactor £149
GRE PSR-282 66-512MHz (with gaps) AM, FM Hand Held Receiver 200ch £69
Ainco DJ-190T 2m FM H/held Transceiver + CTCSS £99
MFJ MFJ-852 Power Line Noise Meter £65
ADI AT-400 70cm FM H/Held with Battery box 420-465MHz RX £89
Kantronics KAM plus Multimode Dual Port Data Controller + Pactor £149
GRE PSR-282 66-512MHz (with gaps) AM, FM Hand Held Receiver 200ch £69
Sony ICF-760 L Portable Analogue Receiver with FM, MW, SW & LW Bands £69
Ainco DJ-C1 2m FM Micro Hand Held + CTCSS & Wide RX £69
Ainco DJ-191 2m FM H/Held with DTMF keypad £119
Icom IC-R3 0 5-2450MHz AM, FM, WFM Receiver 450Ch. + 2" TFT colour TV £249
Kantronics KAM Multimode Data TNC £99
Ainco DJ-480E 70cm FM H/Held Transceiver + Nicad & Charger £89
JPS NIR-12 Noise & Interference Reduction Unit £199
AKD 2001 2m FM Mobile Transceiver Channe ised 25W £89
Optoelectronics model 40 "Scout" 10MHz-1.4GHz frequency counter + reactive tune & 400ch. £199
CDX SWR-7RM 7MHz HF PWR/SW R meter 60W with Antenna Matcher £39
Yaesu FC-700 3.5-30MHz 150W ATU with Dummy load ..... £ 09
Palstar KH-6 6m FM H/Held with CTCSS, NiCd, Charger, D Clead £75
Sharman PS-205 13.8V 20A Regulated PSU 25A Surge No Meters £59
Sony ICF-SW07 Mini Receiver + FM stereo, SSB & "One Touch" tuning ..... £ 69
Icom PS-85 13.8V 20A (max) Matching PSU £179
Yupiteru MVT-7300 521kHz-1320MHz All Mode Hand Held Receiver + 8.33kHz step £149
SignalLink SL-1-RJ 45 Sound Card Interface with RJ-45 Lead £45
SEC 1212 13.8V Switch Mode Regulated 12A (max) PSU £45
Icom IC-737A HF Base Transceiver with Gen. Cov. RX, Auto ATU 100W 12V £649
Ainco DJ-496E 70cm FM H/Held Transceiver with CTCSS, DTMF keypad, NiMH & charger £99
Ainco DJ-496E 70cm FM H/Held Transceiver with CTCSS, DTMF keypad, NiMH & charger £99
Mirage RC-1 Linear Remote Control Unit for Power, Mode & Preamp with 25' of cable £29
MFJ MFJ-906 6m 200W (100W FM) ATU with PWR/SWR meter £49
Kantronics KAM-98 Mul imode Dig tal Data Controller with Pactor, GTOR, AMT EXT & NMEA-0183 GPS £279
Garmin Etrex-Legend Handheld 12Ch. 500 Waypoints, European Map Database & 8Mb memory £99
Icom IC-821H 2m, 70cm All Mode Base Transceiver 45/40W 12V £649
JPS NTR-1 Digital (DSP) Audio Noise Reducer £79
AOR AR-3000 100kHz-2036MHz All Mode Receiver 400Ch. 12V £399
Kenwood TH-K4E 70cm FM 5W Hand Held Transceiver £99
Uniden UBC-278CLT 25-174, 406-512, 806-956MHz AM, FM, WFM + MW Desk/Mob le Receiver 100Ch. 0V + psu £99
Icom IC-T3H 2m FM transceiver with CTCSS and DTMF keypad £89
Sony ICF-SW07 Mini Receiver + FM stereo, SSB & "One Touch" tuning ..... £ 69
Icom IC-2 00H 2m FM Mobile Transceiver 55W 113ch. + CTCSS £149
Uniden UBC-3300XLT 25-1300MHz (with gaps) AM, FM, WFM 1000Ch. Alpha-tag + Trunk Tracker III, CTCSS £129
BNOS LP50- 0-50 6m Linear Amp 0W in, 50W out with Preamp £99
SGC Porta Pak Portable QRP Transceiver SSB, CW 25W 10xD ce Isor 12V £599
MFJ MFJ-461 Pager size Morse Code Reader + LCD Display £59
Ainco DJ-X7 100kHz-1300MHz AM, FM, WFM Hand Held Receiver 1000Ch + 8.33kHz step £79
Ainco DJ-491T 70cm FM H/Held Transceiver 40ch. + DTMF keypad & CTCSS £115
Maycom AR-108 108-180MHz AM, FM 99Ch Mini Receiver 2x AA or 3VDC £49
Uniden UBC-68XLT 66-512MHz (with gaps) FM Receiver 80Ch 4 x AA or 12VDC £59
Uniden UBC-105XLT 25-960MHz (with gaps) AM, FM receiver + 833Mhz step 100Ch 4 x AA or 9VDC £69
MFJ MFJ-484C Grandmaster CW Memory Keyer + 4 Random Access Memories £89
Yaesu VX-150 2m FM M I. Spec. 5W Hand Held Transceiver + Fu l CTCSS & DTMF keypad £79
Yaesu FT-790R 70cms all-mode portable £149
Icom IC-R2 0.495-1309MHz AM, FM & WFM Hand Held Receiver 450Ch £79
MFJ MFJ- 020C 0-30MHz Indoor Active SWL Antenna £69
MFJ MFJ-931 Artificial Ground £59
Garmin GPS-II Plus 12Ch. GPS system + 500 waypoints, track back & European map database £119
ADI Sender 145 2m FM H/Held with Battery box £69
Yaesu FT-41R 70cm FM Handy transceiver with Wide RX £79
MFJ MFJ-906 6m 200W (100W FM) ATU with PWR/SWR meter £49
SSE PSU- 01 Desk Stand with 2x 12V D Coutputs 240VAC £29
Kenwood TH-215E 2m FM H/Held Transceiver + keypad £49
Trio R-2000 150kHz-30MHz All Mode Communications Receiver mains £189
Yaesu VX-2E 2m/70cm FM U tra Compact Hand Held Transceiver + Fu l CTCSS & Wide RX £89
Icom IC-PCR1000 500kHz-1300MHz All Mode PC Controlled Receiver 12V + psu £199
Yaesu FT-690R 6m Al Mode Portable Transceiver 25W 8xCce lsor 12V £199
Icom IC-R71E 100kHz-30MHz Communications Receiver Mains + FM option £299
AOR AR-8200III 530kHz-3GHz All Mode Hand Held Receiver 1000Ch. Alphanumeric £259
Fairhaven RD-500 10kHz-1750MHz A l Mode Receiver with PC Control, CDROM, 13000 + Ch. 12V + PSU £549
Icom IC-R70 00kHz-30MHz AM, SSB, CW Communications Receiver Mains £199
HI-Mound HK-709 Deluxe Straight Morse Keyon Black Base £39
ERA Microreader Mk I Morse decoder with built-in tutor £69
Kenwood MC-50 Dynamic Desk Mic £49
Radio Shack Pro-6030-512 760-999MHz AM, FM, WFM Hand Held Receiver 200Ch £79
Yaesu VX-150 2m FM M I. Spec. 5W Hand Held Transceiver + Fu l CTCSS & DTMF keypad £79
Icom AT-180 HF+6m Automatic ATU, 50ohm £249
Yaesu FRG-100 0.5-30MHz AM, SSB, CW + FM option Communications Receiver 12V with psu £299
Icom SM-8 Desk Mic 13k/600ohm + 2 inputs, Gain & Tone Control £69
Yaesu SP-767 Matching 3W 8ohm Filtered Extension Speaker + 2 inputs £79
Yaesu FT-816 70cm FM Hand Held Transceiver with Back-it DTMF keypad & CTCSS option £59
Yaesu FRG-100 0.5-30MHz AM, SSB, CW Communications Receiver 12V with psu £279
Icom IC-R2 0.495-1309MHz AM, FM & WFM Hand Held Receiver 450Ch £79
Icom IC-706IIG HF, 6m, 2m, 70cm All Mode Transceiver + Gen. Cov. RX, DSP filters 12VDC £499

Rob's chance to air his views!

Welcome! Each month Rob introduces topics of interest and comments on current news

Topical Talk

Feedback on two varied topics. First, BBC long wave transmitters and then possible support funding, suggested last month, to help protect Amateur Radio and to assist hobbyists who may need legal support to say on the air.

The *PW* editorial staff are always pleased when feedback from constructional projects come our way. This pleasing effect came into play immediately the Droitwich 198kHz frequency standard project - produced by Stefan Niewiadomski - appeared in the magazine (November 2006 issue).

Reader feedback was quick in coming! The first E-mail came from subscribers who get their magazine a day or so after we receive them from the printers. Quick on their heels came the plaudits from those who buy *PW* from the newsagents.

Everyone seemed to approve of the relatively straightforward design from Stef's busy designer's desk. Several readers have asked for more ideas from our Oxfordshire-based author. Both Stef' and *PW* are pleased to oblige and he'll be presenting many more projects in the next year or so.

Several readers asked if the editorial staff and the author himself realise that the famous transmitter - actually at Wychbold Farm on the outskirts of Droitwich, very close to the M5 motorway, in Worcestershire (in the southernmost part of the English Midlands) has very small changes of frequency and a specialised form of modulation employed for commercially-orientated radio operated switching purposes. The answer (in short) is yes, we did know!

Many radio enthusiasts will be aware that the 198kHz transmitter broadcasts r.f. command signals for night storage heaters and the like. However, the transmitter at Droitwich also transmits command signals for other equipment. But, at the time of writing, I cannot confirm whether the other two (lower power) transmitters radiating the BBC Radio 4 programmes (BBC World service from 0100 to R4 start up at 0530 on the Droitwich transmitter) at Westerglen and Burghead in Scotland also radiate the radio data services. I also have yet to confirm whether or not both the Scottish transmitter are are used during the night for the World Service transmissions.

Note: When I lived in the North West Scottish Highlands, just south of Ullapool in Ross-Shire, the Burghead (near Inverness on the Moray Firth) and Westerglen (near Falkirk) transmitters seemed to be out of service at night, much effecting our R4 reception because of Russian stations operating on the same frequency.

At the time of writing I have no reason to believe that the radio data services (and the special modulation used) make the 198kHz frequency standard non-viable for our purposes. However, I will make enquiries on behalf of readers and have no doubt the information will make an interesting article in *PW*.

The only problem I have at the moment, is that I have also to confirm who operates the transmitters for the BBC as there have been some more changes recently! I will contact the BBC Engineering department but I would appreciate if any of our readers - who work for the company who now own and operate the transmitter infrastructure for the BBC - can advise me on who to contact! In fact, I met several licenced Amateurs at the 2006 Leicester Show who service the transmitters and I'm sure we will be able to publish the most accurate information possible. I look forward to hearing from anyone who can help!

Possible Legal Fund

I have been rather surprised (and pleased) at the positive response to the suggestion regarding a possible legal fund to help Amateur Radio and to also assist individual Amateurs who need (otherwise expensive) legal support to be able to remain active in the hobby.

Several readers have contacted me directly and others have discussed the idea on the air. Members of the **Radio Amateurs Old Timers Association** (RAOTA) have been actively discussing the idea! The more we talk about such ideas the higher the possibility of a result! Keep talking everyone!

Finally on this topic, a reader wrote a personal response to me saying, "I think it's a good idea and would be pleased to donate the £15 my licence cost me to help fund the legal service". A good start and an excellent idea! I would be pleased to donate my own £15 to get the scheme rolling. Let's hope there's something to roll very soon!

Rob Mannion G3XFD/EI5IW

YOUR SPECIALIST & LOCAL DEALERS

CORNWALL

WORSLEY COMMUNICATIONS
Robin C Worsley G0 MYR
'Onaru', Pennance Road,
Lanner, Redruth,
Cornwall TR16 5TQ
www.hamradiosales.co.uk
Tel: 01209 820118

ESSEX

WATERS & STANTON PLC
Spa House, 22 Main Road, Hockley
Essex SS5 4QS
Tel: (01702) 206835/204965
Fax: (01702) 205843
Web: http//www.waters-and-stanton co.uk
E-mail: sales@wsplc demon co.uk
Open 9am to 5.30pm Monday to Saturday inclusive
MAIN AGENTS – ALL BRANDS
PHONE/FAX FOR FREE PRICE LIST

EAST YORKSHIRE

LINEAR AMP UK LTD
Field Head, Leconfield Road, Leconfield,
Beverley, East Yorks HU17 7LU
Tel/Fax: 01964 550921
E-mail: sales@linamp.co.uk www.linamp.co.uk
Manufacturers and suppliers of top quality HF and VHF valve amplifiers and antenna tuning units
Repairs of most make of amplifier undertaken

IRELAND

CELLCOM IRELAND
DEERPARK, ORANMORE,
CO. GALWAY, IRELAND
www.cellcom.ie
Approved dealers for: ICOM, TENNA-DYNE & LINEAR AMP UK
Several other brands also available
We can supply and install your experimental radio station!
info@cellcom.ie
Tel: +353 (0)91 790222/4 Fax: ++ 790223

MID GLAMORGAN

SANDPIPER AERIAL TECHNOLOGY
Unit 5 Enterprise House Cwmbach
Industrial Estate Aberdare
Mid Glamorgan CF44 0AE
Tel: (01685) 870425 Fax:(01685) 876104
A full range of transmitting & receiving antennas available for the amateur commercial market.
www.sandpiperaerials.co.uk
e-mail: sales@sandpiperaerials.co.uk

SCOTLAND

JAYCEE ELECTRONICS LTD
20 Woodside Way, Glenrothes, Fife KY7 5DF
Tel: (01592) 756962 (Day or Night)
Fax No. (01592) 610451
New opening hours: Tuesday-Friday 9am to 5pm. Saturday 9am to 4pm. Closed Sunday & Monday.
KENWOOD, YAESU & ICOM APPROVED DEALERS
A good stock of new and secondhand equipment always in stock

SCOTLAND

TENNAMAST SCOTLAND LTD
Masts from 25ft - 40ft
Adapt-A-Mast
(01505) 503824
81 Mains Road, Beith, Ayrshire KA15 2HT
E-mail: nbrown@tennamast.com
Web site: www.tennamast.com

SOUTHWEST & WALES

QSL COMMUNICATIONS
- For all amateur radio and listener needs.
- New and secondhand equipment.
- Part exchange welcome.

Unit 6, Worle Industrial Centre, Coker Road,
Worle, Weston-Super-Mare BS22 6BX
Tel/Fax: (01934) 512757

SOUTH YORKSHIRE

LAM Communications
71 Hoyland Road, Hoyland Common
Barnsley, South Yorks S74 0LT
www.lamcommunications.net
E-mail: lamcommunications.net
Tel: 01226 361 700
Specialists in amateur radio equipment, new and second hand. Scanners, receivers, C.B. radio, and taxi. We buy, sell and broker equipment and will part exchange.
Opening times: Monday 12.00noon to 17.00hrs
Tuesday - Friday 10.00hrs to 17.00hrs. Saturday 10.00hrs to 15.00hrs
SPECIAL VIEWING TIMES CAN BE ARRANGED WITH US We also accept Switch Visa/Cash/Cheques

WEST SUSSEX

Adur Communications
PO Box 2047,
Steyning BN44 3XJ.
Tel: (01903) 879526
E-mail: service@adurcomms.com
Repairs and alignment to all amateur and commercial radio equipment.

YORKSHIRE

LEEDS AMATEUR RADIO LTD
SUPERSLAB CB CENTRE
The home of GB3YW operating on 145.7875MHz. CTCSS 82.5Hz
★ The complete radio suppliers ★
CONTACT STEVE POUNDER
BRADFORD ROAD, EAST ARDSLEY,
NR. WAKEFIELD WF3 2DN
Tel: 0113-252 4586 Fax: 0113-253 6621

PW Publishing Ltd
have a wonderful selection of radio based books and magazines.
We can also supply a copy of most individual reviews that you may have read in past editions of Radio Active, Short Wave Magazine and Practical Wireless magazine
Tel: 0870 224 7830

Telephone
0207 731 6222
to advertise in
Practical Wireless

Don't Miss Out!

WIRELESS Direct

Did you know that you can buy the current issue of *Practical Wireless* direct from the publishers?

Some readers may be experiencing difficulties in finding copies of *PW* in their local WH Smith stores or independent newsagent. So, as we don't want you to miss out on your favourite radio read, we'd like to remind you that you can buy current issues at cover price direct from us.

Simply send a cheque (payable to **PW Publishing Ltd.**), Postal Order or Credit Card details for the cover price (**£3.00** inclusive of P&P, UK only, overseas customers please add £1.00) with your name and address to the **Book Store** and your copy will sent out to you (**cash not accepted**).

Book Store, PW Publishing Ltd. Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.
Tel: 0870 224 7830 Fax: 0870 224 7850
E-mail: bookstore@pwpublishing.ltd.uk
Please check with bookstore for price and availability of back issues.

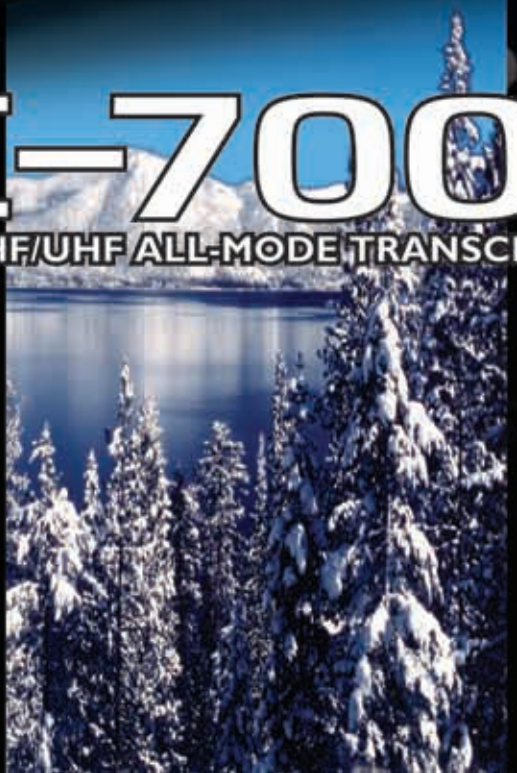
INDEX TO ADVERTISERS

ICOM

A RIG FOR ALL SEASONS FOR ALL THE RIGHT REASONS

IC-7000

HF/VHF/UHF ALL-MODE TRANSCEIVER



Seasonal Best wishes from...

Icom UK Ltd.
Unit 9, Sea Street,
Herne Bay, Kent CT6 8LD.
Telephone: 01227 741741.
Fax: 01227 741742.
e-mail: sales@icomuk.co.uk
website: www.icomuk.co.uk

ICOM-UK

IN CAR ENTERTAINMENT...

FT-8900R

29/50/144/430 MHz 50W FM Quad Band
Full Duplex Mobile Transceiver

FT-8800E

144/430 MHz 50W FM Dual Band
Full Duplex Mobile Transceiver

FT-7800E

144/430 MHz 50W FM Dual Band
Mobile Transceiver

FT-1802E

144 MHz 50W FM Mono Band
Mobile Transceiver

... for when
you are on the move

YAESU
Choice of the World's top DX'ers

Yaesu UK Ltd Unit 12 Sun Valley Business Park Winnall Close Winchester Hampshire SO23 0LB UK
www.yaesu.co.uk